THIAMETHOXAM (245)

The first draft was prepared by Mr. Denis Hamilton Primary Industries and Fisheries Australia

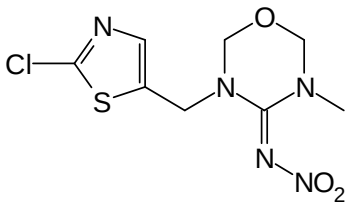
EXPLANATION

Thiamethoxam is a nicotinoid compound with broad-spectrum insecticidal properties. It is registered for use on numerous crops in many countries against sucking and chewing insects in vegetables, ornamentals, field crops, deciduous fruits, citrus, cotton and rice. It possesses contact and stomach activity. Its systemic properties has resulted in its use against foliar feeding insects via seed treatment, soil application, through irrigation systems, or applied to the trunks of trees. It is also registered for direct foliar application.

The compound was evaluated as a new compound by the 2010 JMPR for both residues and toxicology. The Meeting received information on physical and chemical properties, animal and plant metabolism, environmental fate, analytical methods, storage stability, use patterns, processing, farm animal feedingand supervised residue trials.

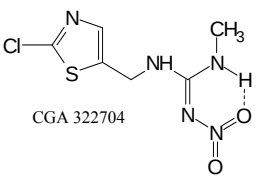
IDENTITY

Thiamethoxam is a nicotinoid compound with broad-spectrum insecticidal properties.

ISO common name	thiamethoxam
Chemical name	
IUPAC	(EZ)-3-(2-chloro-1,3-thiazol-5-ylmethyl)-5-methyl-1,3,5-oxadiazinan-4-ylidene(nitro)amine
CAS	3-[(2-chloro-5-thiazolyl)methyl]tetrahydro-5-methyl-N-nitro-4*H*-1,3,5-oxadiazin-4-imine
CAS Number	153719-23-4
CIPAC Number	637
Synonyms for active substance:	CGA 293343
Molecular formula	$C_8H_{10}ClN_5O_3S$
Molecular mass	291.71
Structural formula	

Thiamethoxam isomers

Thiamethoxam is described as an EZ mixture. It is generally believed that the activation energy for the E↔Z interconversion for the C = N bond is low and that an equilibrium mixture is rapidly established at ambient temperature.



CGA 322704

The situation is similar for metabolite CGA 322704. In this case the E form is likely to be favoured in the equilibrium mixture because of possible formation of a hydrogen bond from the secondary amine to the nitro group. The E form of CGA 322704 is equivalent to the compound clothianidin.

PHYSICAL AND CHEMICAL PROPERTIES

Pure active ingredient: Thiamethoxam

Property	Result	Ref
Description (purity 99.7%)	Slightly cream, fine crystalline powder, odourless	35446
Melting point, melting range (purity 99.7%)	139.1 ˚C	35441
Vapour pressure (purity 99.7%), OECD 104	2.7×10^{-9} Pa at 20 ˚C 6.6×10^{-9} Pa at 25 ˚C. Measurements at 90.5 to 121 ˚C	35445
Water solubility (purity 99.7%) at 25 °C, OECD 105	4.1 g/L (pure water, no buffer, measured pH of aqueous phase 7.3)	35444
Octanol/water partition coefficient (purity 99.7%) at 25 ˚C, OECD 107	log P_{ow} = –0.13 (pure water, no buffer, measured pH of aqueous phase 6.9)	36610
Hydrolysis rate (purity 99.0%) [^{14}C-oxadiazin label]	pH 9, 25 ˚C: 30 days test; $T_{0.5}$ = 8.8 days	ABR-97013
Hydrolysis rate (purity 99.3%) [^{14}C-thiazol label]	pH 1, 60 ˚C: 96% remained after 5 days test pH 5, 60 ˚C: 99% remained after 5 days test pH 7, 60 ˚C: 5 days test; $T_{0.5}$ = 8 days	ABR-96106
Photolysis rate, xenon arc at 410 w/m^2 for 12 hours/day, 25 ˚C, 10 mg/L in pH 5 buffer (purity > 99.9%) [^{14}C-thiazol label]	$T_{0.5}$ = 3.1 days	ABR-98091
Dissociation constant in water (purity 99.7%), OECD 112	no dissociation within pH range 2 to 12	38123

The hydrolysis of CGA 322704, an important metabolite and hydrolysis product of thiamethoxam was investigated by Ulbrich (1999, 98UL03).

CGA 322704 Hydrolysis rate (radiochemical purity 98.3%) [^{14}C-thiazol label]. Starting concentration: 5 mg/L.	pH 4.2, sterile, dark, 20 ˚C: no decline after 31 days test pH 5.1, sterile, dark, 20 ˚C: no decline after 31 days test pH 7.1, sterile, dark, 20 ˚C: no decline after 31 days test pH 8.9, sterile, dark, 20 ˚C: no decline after 31 days test.	98UL03

Technical material: Thiamethoxam

Property	Result	Ref
Description (purity 98.2%)	Off-white, fine powder, odourless	58210
Solubility in organic solvents (purity 98.2%) at 25 ˚C	Acetone 48 g/L; dichloromethane 110 g/L; ethyl acetate 7.0 g/L; hexane < 1 mg/L; methanol 13 g/L; octanol 620 mg/L; toluene 680 mg/L	58212
Hydrolysis rate (purity 98.0%) [^{14}C-oxadiazin label]	pH 1, 60 ˚C: 96% remained after 5 days test pH 5, 60 ˚C: 101% remained after 5 days test pH 7, 25 ˚C: 96% remained after 30 days test pH 9, 40 ˚C: 96 hours test, T0.5 = 28 hours	ABR-97013
Hydrolysis rate (purity 95.4%) [^{14}C-oxadiazin label]	pH 7, 40 ˚C: 87% remained after 30 days test pH 7, 60 ˚C: 20 days test; T0.5 = 17 days	ABR-97013
Hydrolysis rate (purity 97.5%) [^{14}C-thiazol label]	pH 5, 25 ˚C: 100% remained after 30 days test pH 9, 25 ˚C: 30 days test; T0.5 = 100 hours	ABR-96106
Hydrolysis rate (purity 97.7%) [^{14}C-thiazol label]	pH 7, 60 ˚C: 30 days test; T0.5 = 12 days pH 9, 40 ˚C: 30 days test; T0.5 = 26 hours pH 9, 60 ˚C: 17 days test; T0.5 = 3.2 hours	ABR-96106
Hydrolysis rate (purity 98.4%) [^{14}C-thiazol label]	pH 7, 25 ˚C: 98% remained after 30 days test pH 7, 40 ˚C: 30 days test; T0.5 = 70 days	ABR-96106

Property	Result	Ref
Photolysis rate, xenon arc at 410 w/m^2 for 12 hours/day, 25 ˚C, 10 mg/L in pH 5 buffer (purity 97.1%) [^{14}C-oxadiazin label]	T0.5 = 2.3 days	ABR-97023

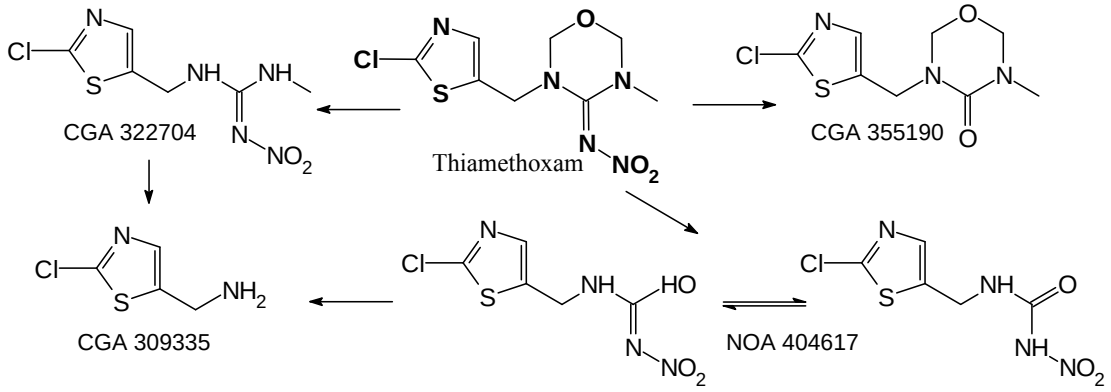


Figure 1 Products of thiamethoxam hydrolysis were identified by Lowery (1997, ABR-97013) and Clark (1998, ABR-96106). CGA 309335, CGA 355190 and NOA 404617 were the major products of hydrolysis. CGA 322704 was a minor product.

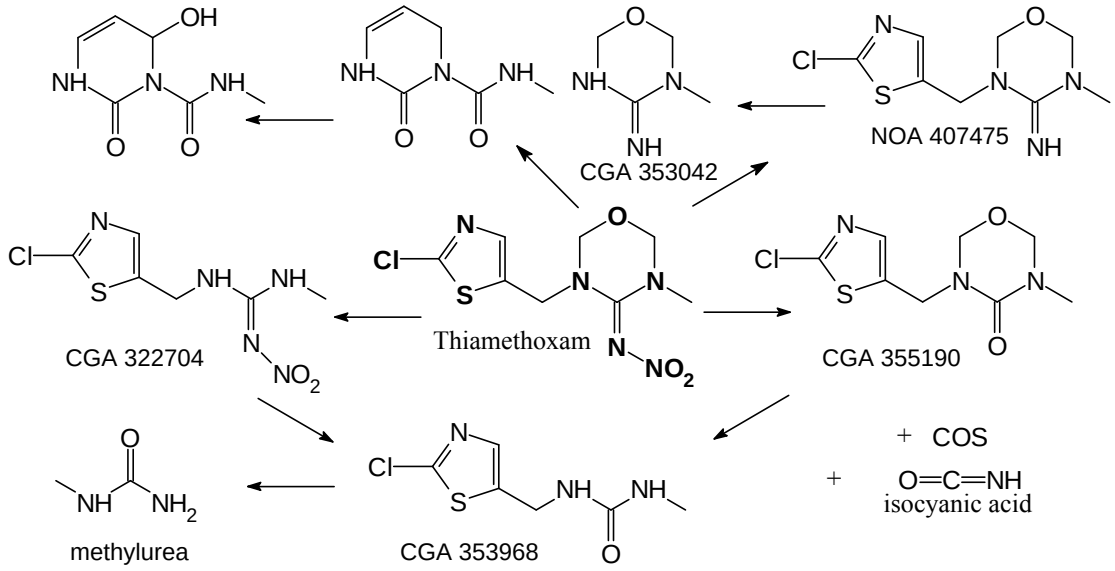


Figure 2 Products of thiamethoxam photolysis were identified by Sparrow (1997, ABR-97023) and Schwartz (1998, ABR-98091).

FORMULATIONS

The main formulation types are:

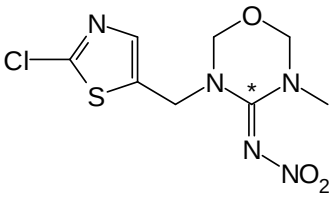
Code	Description	Examples
FS	flowable concentrate for seed treatment	350 g/L, 600 g/L
FS	flowable concentrate for seed treatment (includes mefenoxam and fludioxonil)	258 g/L, 336 g/L

Code	Description	Examples
GR	granule (includes pyroquilon)	80 g/kg
SC	suspension concentrate	240 g/L
SC	suspension concentrate (includes azoxystrobin)	65 g/L
SG	water soluble granule	750 g/kg
SL	soluble concentrate	240 g/L
WG	water dispersible granule	100 g/kg, 250 g/kg, 300 g/kg, 400 g/kg
ZC	a mixed formulation of CS and SC (includes lambda-cyhalothrin)	141 g/L

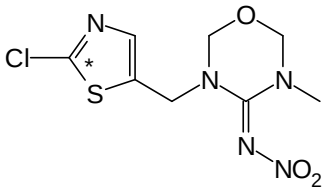
A number of products are registered that contain thiamethoxam and another active ingredient, *viz.*, azoxystrobin, fludioxonil, pyroquilon, lambda-cyhalothrin, lufenuron and cyproconazole.

METABOLISM AND ENVIRONMENTAL FATE

Metabolism and environmental fate studies used thiamethoxam ^{14}C labelled in the guanidine position or in position-2 the thiazole ring.



[^{14}C-oxadiazin-4]thiamethoxam
= [^{14}C-guanidine]thiamethoxam

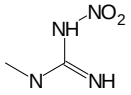
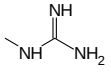


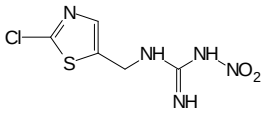
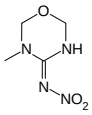
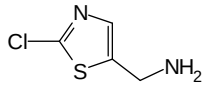
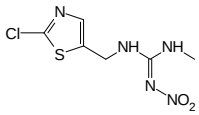
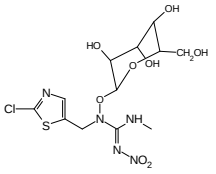
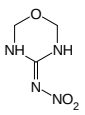
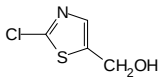
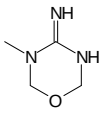
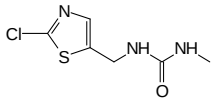
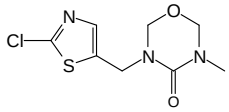
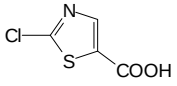
[^{14}C-thiazol]thiamethoxam

Structures, names and codes for metabolites are summarised below. Five possibilities for describing each metabolite are:

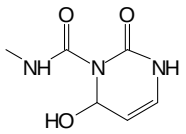
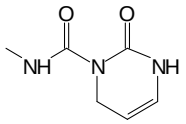
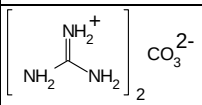
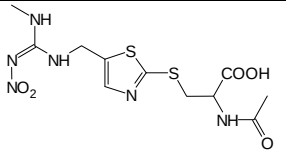
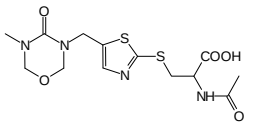
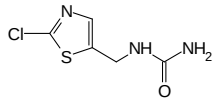
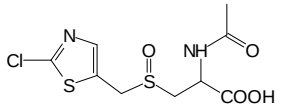
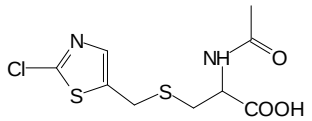
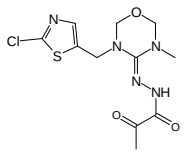
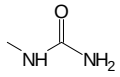
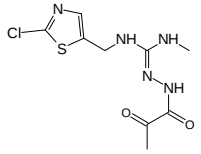
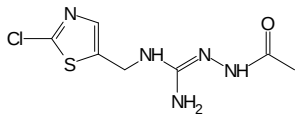
- a simple name, which could be a common name, a simplified systematic name, an abbreviation or a pseudo-common name (e.g. hydroxy-cypermethrin)
- the systematic chemical name—it may be too cumbersome for use in discussion and tables
- the CAS number—CAS numbers are not available for many metabolites
- the company code number, e.g. CGA 322704
- serial numbers, e.g., metab 1, metab 2, etc.

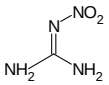
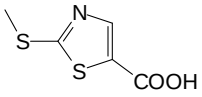
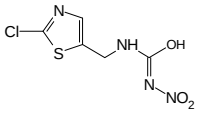
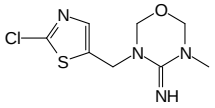
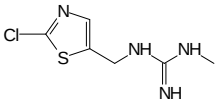
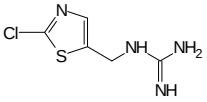
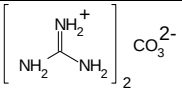
In this evaluation, metabolites are described by the company code number where available or a metabolite serial number used in the metabolite studies. It should be noted that metabolite serial numbers are not necessarily consistent between studies, e.g. metabolites 4U, 8U and 13U are the same compound.

1-methyl-3-nitroguanidine Systematic: N-nitro-N'-methylguanidine CAS number: 4245-76-5 Code: NOA 405217 Code: MNG (clothianidin evaluation)	
1-methylguanidine Systematic: N-methylguanidine Code: CGA 382191 Code: MG (clothianidin evaluation)	

CGA 265307 Systematic: N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine CAS number: 135018-15-4 Code: CGA 265307 Code: TZNG (clothianidin evaluation)	
CGA 282149 Systematic: 3,6-dihydro-3-methyl-*N*-nitro-2H-1,3,5-oxadiazin-4-amine CAS number: 153719-38-1 Code: CGA 282149	
CGA 309335: Systematic: (2-chlorothiazol-5-yl)-methylamine CAS number: 120740-08-1 Code: CGA 309335	
CGA 322704 Systematic: *N*-(2-chlorothiazol-5-ylmethyl)-*N*'-methyl-*N*''-nitroguanidine CAS number: 131748-59-9 Code: CGA 322704 Note[17]	
CGA 322704-NO-glucoside Hydroxylamine glucoside of CGA 322704	
CGA 340575 Systematic: 3,6-dihydro-N-nitro-2H-1,3,5-oxadiazin-4-amine CAS number: 123019-22-7 Code: CGA 340575	
CGA 349208 Systematic: 2-chloro-5-thiazolemethanol CAS number: 145015-15-2 Code: CGA 349208	
CGA 353042 Systematic: 3,6-dihydro-3-methyl-2H-1,3,5-oxadiazin-4-amine Code: CGA 353042	
CGA 353968 Systematic: 1-(2-chlorothiazol-5-ylmethyl)-3-methylurea Code: CGA 353968 Code: TZMU (clothianidin evaluation)	
CGA 355190 Systematic: 3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-one Code: CGA 355190	
CGA 359683 Systematic: 2-chlorothiazole-5-carboxylic acid CAS number: 101012-12-8 Code: CGA 359683 Code: CTCA (clothianidin evaluation)	

[17] Note that clothianidin is the E isomer of CGA 322704 ([C(E)]-N-[(2-chloro-5-thiazolyl)methyl]-N'-methyl-N''-nitroguanidine), CAS number 210880-92-5 (formerly 205510-53-8) (Wood, 2010).

Component D	
Component K	
guanidine carbonate Code: NOA 436955	
Metab 16 Systematic: 2-acetylamino-3-[5-(*N*'-methyl-*N*"-nitroguanidinomethyl)-thiazol-2-ylsulfanyl]-propionic acid	
Metab 17U Systematic: 2-acetylamino-3-[5-(5-methyl-4-oxo-[1,3,5]oxadiazinan-3-ylmethyl)-thiazol-2-ylsulfanyl]-propionic acid	
Metab 4U, 8U, 13U Systematic: (2-chlorothiazol-5-ylmethyl)-urea Code: TZU (clothianidin evaluation)	
Metab 5U Systematic: 2-acetylamino-3-(2-chlorothiazol-5-ylmethanesulfinyl)-propionic acid	
Metab 6U Systematic: 2-acetylamino-3-(2-chlorothiazol-5-ylmethanesulfanyl)-propionic acid	
Metab L14 Systematic: 2-oxopropionic acid [3-(2-chloro-thiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidene]-hydrazide	
Methylurea	
MU12 Systematic: 2-oxopropionic acid ([(2-chlorothiazol-5-ylmethyl)-amino]-methylamino-methylene)-hydrazide Code: ATMG-Pyr or PTMG (clothianidin evaluation)	
MU3 Systematic: amino-([(2-chlorothiazol-5-ylmethyl)-amino]-methylene)-hydrazide Code: ATG-Ac (clothianidin evaluation)	

N-nitroguanidine Systematic: *N*-nitroguanidine Code: NOA 424255 Code: NTG or NG (clothianidin evaluation)	
NOA 402988 Systematic: 2-methylsulfanylthiazole-5-carboxylic acid Code: NOA 402988 Code: MTCA (clothianidin evaluation)	
NOA 404617 Systematic: 1-(2-chloro-thiazol-5-ylmethyl)-3-nitrourea Code: NOA-404617 Code: CTNU (clothianidin evaluation)	
NOA 407475 Systematic: 3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine Code: NOA 407475	
NOA 421275: Systematic: *N*-(2-chlorothiazol-5-ylmethyl)-*N*′-methyl-guanidine Code: NOA 421275 Code: TMG (clothianidin evaluation)	
NOA 421276 Systematic: N-(2-chlorothiazol-5-ylmethyl)-guanidine Code: NOA 421276 Code: TZG (clothianidin evaluation)	
NOA 436944 Carbonic acid, compound with guanidine CAS number: 593-85-1	

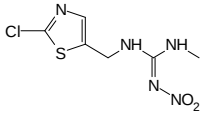
Animal metabolism

The Meeting received animal metabolism studies with thiamethoxam in laboratory animals, lactating goats and laying hens.

Laboratory animals

When rats were orally dosed with [^{14}C-thiazol]thiamethoxam and [^{14}C-oxadiazin]thiamethoxam at 100 mg/kg bw (single high dose) or 0.5 mg/kg bw (single low dose), most of the dose was excreted in the urine (94%) and faeces (4%) within 24 hours (Müller and Stampf, 1996, 027AM01).

The components of the excreted ^{14}C label were identified by Thanei (1998, 027AM02). Approximately 70–80% of the dose was eliminated in the urine as unchanged thiamethoxam. Metabolites CGA 322704 and CGA 265307 accounted for approximately 10% and 1% of the dose respectively, with all other metabolites below 1% of the dose. Identified metabolites are shown in Figure 3.



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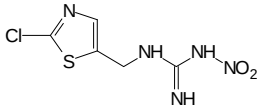
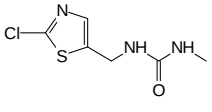


CGA 265307



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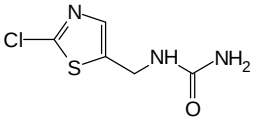


Metab4U

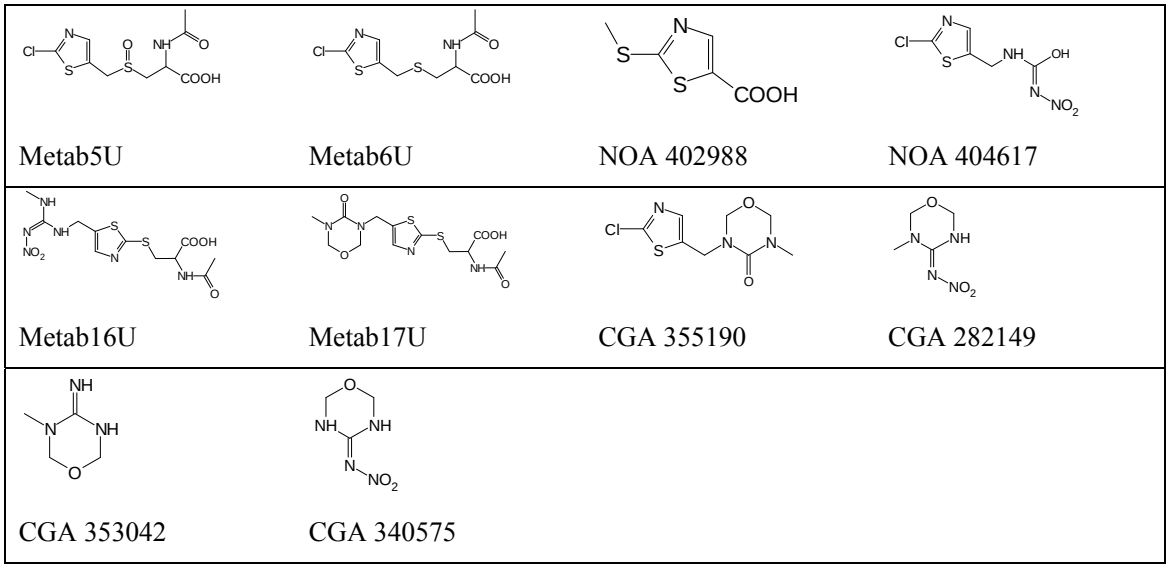


Figure 3 Identified thiamethoxam metabolites from orally dosed rats (Müller and Stampf, 1996, 027AM01 and Thanei, 1998, 027AM02).

Lactating goats

In a lactating goat metabolism study, two goats were dosed with [^{14}C-thiazol]thiamethoxam via gelatin capsules for 4 consecutive days at 4.0 and 3.6 mg/kg bw/day, the equivalent of 101 ppm thiamethoxam in the feed (Rümbeli, 1998, 027AM03). Milk was collected twice daily. Animals were slaughtered 6 hours after the final dose for tissue collection. Body weights were 42 and 48 kg and daily feed consumption was 1.7 kg (600 g concentrate + 1 kg maize cubes + 200 g hay).

Accountability of the administered ^{14}C was 80% and 87% for the two goats, with most (55% and 67%) of the ^{14}C excreted in the urine and faeces. Milk accounted for approximately 1% of the ^{14}C and tissues approximately 3.4%. ^{14}C residue levels in milk reached a plateau within 1–1.5 days.

In a second lactating goat metabolism study, two goats were dosed with [^{14}C-oxadiazin]thiamethoxam via gelatin capsule for 4 consecutive days at 3.9 and 4.5 mg/kg bw/day, the equivalent of 112 ppm thiamethoxam in the feed (Lutringer, 1998, 027AM05). Milk was collected twice daily. Animals were slaughtered 6 hours after the final dose for tissue collection. Body weights were 42 and 48 kg and daily feed consumption was 1.7 kg (500 g concentrate + 1 kg maize cubes + 200 g hay).

Accountability of the administered ^{14}C was 90% and 83% for the two goats, with most (50% and 54%) of the ^{14}C excreted in the urine and faeces. Milk accounted for approximately 1% of the ^{14}C and tissues approximately 3.7%. ^{14}C residue levels in milk reached a plateau within 1–2 days.

The distribution and identity of the residues in tissues and milk of goats from the two studies are summarised in Table 1. Parent thiamethoxam was the major component of the residue in muscle, fat and kidney. CGA 322704 was the major component in milk. In the liver, NOA 421276 was the major component for the thiazol label and L14 for the oxadiazin label.

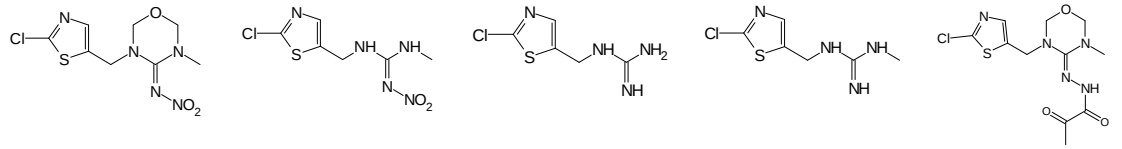
Table 1 Distribution and identity of the residues in tissues and milk of lactating goats dosed with [^{14}C-thiazol]thiamethoxam and [^{14}C-oxadiazin]thiamethoxam via gelatin capsule for 4 consecutive days

	Residues expressed as thiamethoxam, as mg/kg or % TRR						
	Muscle	Fat	Liver	Liver [a]	Kidney	Kidney [a]	Milk
[^{14}C-thiazol]thiamethoxam							
TRR	2.08 mg/kg	0.39 mg/kg	11.1 mg/kg	11.1 mg/kg	6.6 mg/kg	6.6 mg/kg	1.17 mg/kg
Non-extracted	5.3%	6.6%	15%	1.3%	8.8%	0.2%	1.9%

	Residues expressed as thiamethoxam, as mg/kg or % TRR						
	Muscle	Fat	Liver	Liver [a]	Kidney	Kidney [a]	Milk
Thiamethoxam	1.07 mg/kg	0.14 mg/kg	0.11 mg/kg	0.11 mg/kg	1.31 mg/kg	1.4 mg/kg	0.36 mg/kg
Thiamethoxam	51% [b]	36% [b]	1.0%	1.0%	20%	21% [b]	31%
CGA 322704	9.4%	12%	0.6%	7.2%	2.0%	2.0%	44% [b]
NOA 421276	15%	23%	20%	22% [b]	11%	13%	
NOA 421275	5.6%	11%	10%	13%	18%	20%	
8U	2.9%	2.7%	1.4%	1.4%	1.4%	1.4%	2.8%
CGA 265307	3.3%	3.1%	2.2%	3.8%	0.2%	0.9%	18%
CGA 309335			2.7%	2.7%			
CGA 353968			1.3%	1.3%	1.9%	1.9%	
CGA 355190			2.6%	2.6%	2.0%	2.0%	
CGA 359683			0.6%	0.6%	1.5%	1.5%	
L14			13%	13%	9.8%	9.8%	
MU12	6.6%	4.6%	5.9%	5.9%	9.3%	9.2%	
NOA 404617			0.2%	0.2%	4.1%	4.1%	
NOA 407475	0.5%		11%	11%	2.4%	2.4%	
[^{14}C-oxadiazin]thiamethoxam							
TRR	2.27 mg/kg	0.54 mg/kg	11.0 mg/kg	11.0 mg/kg	7.5 mg/kg	7.5 mg/kg	1.48 mg/kg
Non-extracted	6.0%	8.1%	31%	13%	8.9%	2.9%	0.9%
Thiamethoxam	1.22 mg/kg	0.28 mg/kg		0.12 mg/kg	1.68 mg/kg	1.68 mg/kg	0.54 mg/kg
Thiamethoxam	54% [b]	52% [b]		1.1%	22%	22% [b]	37%
CGA 322704	4.5%	7.6%		6.4%			45% [b]
L14	5.6%		23%	25% [b]	8.5%	8.9%	
8U	1.2%	1.0%	0.7%	0.7%	1.0%	1.0%	1.7%
CGA 265307	2.1%	1.6%	0.6%	2.2%			10%
CGA 355190			1.3%	1.3%	2.5%	2.5%	
MU12	11%		5.3%	5.3%	7.5%	7.8%	
N5			3.6%	3.6%	12%	12%	
NOA 404617		0.2%					
1-methyl-3-nitroguanidine	1.4%	1.7%	0.5%	0.5%	1.6%	1.6%	2.8%
NOA 407475	1.5%		9.2%	9.2%	5.3%	5.3%	
NOA 421275	4.6%	13%	9.7%	11%	16%	16%	
NOA 421276	5.0%	13%	4.9%	8.1%	4.8%	6.3%	

[a] microwave assisted extraction.

[b] major component of the residue



thiamethoxam CGA 322704 NOA 421276 NOA 421275 L14

Laying hens

In a laying hen metabolism study, five Leghorn hens were dosed with [^{14}C-thiazol]thiamethoxam via gelatin capsules for 4 consecutive days at 7.9 mg/kg bw/day, the equivalent of 112 ppm thiamethoxam in the feed (Rümbeli, 1998, 027AM04). Eggs were collected twice daily. Birds were slaughtered 6 hours after the final doses for tissue collection. Body weights were 1.5–1.75 kg and daily feed consumption ranged from 94 to 131 g. The nature of the feed and percentage of dry matter were not reported.

Accountability of the administered ^{14}C was acceptable at 79–89% for the five hens, with most (77–88%) of the ^{14}C excreted in the droppings. Eggs accounted for an average of 0.096% of the ^{14}C and tissues accounted for approximately 1.3%. ^{14}C residue levels were highest in liver and lowest in

fat tissues (Table 2). ^{14}C residue levels in yolks and whites of eggs were reasonably close, with a plateau reached after approximately 2–4 days.

In a second laying hen metabolism study, five White Leghorn hens were dosed with [^{14}C-oxadiazin]thiamethoxam via gelatin capsules for 4 consecutive days at 7.7 mg/kg bw/day, the equivalent of 98 ppm thiamethoxam in the feed (Lutringer, 1998, 027AM06). Eggs were collected twice daily. Birds were slaughtered 6 hours after the final doses for tissue collection. Body weights were 1.4–1.7 kg and daily feed consumption ranged from 96 to 135 g (90% dry matter).

Accountability of the administered ^{14}C was acceptable at 76–87% for the five hens, with most (72–82.6%) of the ^{14}C excreted in the droppings. Eggs accounted for an average of 0.11% of the ^{14}C and tissues approximately 1.5%. ^{14}C residue levels were highest in liver and lean meat and lowest in fat tissues (Table 2). ^{14}C residue levels in whites and yolks of eggs were similar, with a plateau reached after approximately 2–3 days.

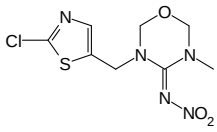
Parent thiamethoxam was not the major residue component in any of the tissues or eggs. Metabolite CGA 265307 was the major residue component in fat + skin and the eggs. Metabolite MU3 was the major residue component of lean meat while CGA 322704 was the major component in the liver.

Table 2 Distribution and identity of the residues in tissues and eggs of laying hens dosed with [^{14}C-thiazol]thiamethoxam and [^{14}C-oxadiazin]thiamethoxam via gelatin capsule for 4 consecutive days

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Lean meat	Fat + skin	Liver	Liver [a]	Egg white	Egg yolk
[^{14}C-thiazol]thiamethoxam dosing equiv to 112 ppm in feed						
TRR	0.68 mg/kg	0.29 mg/kg	8.0 mg/kg	8.0 mg/kg	0.27 mg/kg	0.29 mg/kg
Non-extracted	11%	3.0%	50%	1.0%	1.8%	1.9%
Thiamethoxam	21%	15%			5.0%	11%
CGA 265307	7.0%	54% [b]	15%	20%	45% [b]	69% [b]
MU3	39% [b]	8.3%	22%	22%		
CGA 322704	3.2%	9.2%	3.2%	34% [b]	25%	23%
8U	4.8%	3.0%	1.2%	1.2%	2.4%	
L9			1.9%	1.9%		
NOA 402988			1.3%	1.3%		
NOA 404617		1.8%			8.6%	
NOA 421275	11%	3.4%	3.3%	13%		
[^{14}C-oxadiazin]thiamethoxam dosing equiv to 98 ppm in feed						
TRR	0.93 mg/kg	0.42 mg/kg	9.2 mg/kg	9.2 mg/kg	0.30 mg/kg	0.30 mg/kg
Non-extracted	8.7%	6.8%	49%	5.2%	1.4%	5.2%
Thiamethoxam	21%	5.0%	0.2%	0.2%	1.9%	11%
CGA 265307	8.4%	57% [b]	12%	16%	47% [b]	54% [b]
MU3	28% [b]	3.6%	12%	12%		
CGA 322704	1.5%	7.7%	2.8%	39% [b]	20%	20%
8U	3.0%	4.5%	1.0%	1.0%	1.9%	0.9%
CGA 355190	2.4%	5.6%			4.2%	
L9			0.3%	0.3%		
NOA 404617			0.2%	0.8%	15%	
1-methyl-3-nitroguanidine	1.0%	1.4%	0.2%	0.4%	1.2%	0.7%
NOA 407475	0.8%	0.3%				6.1%
NOA 421275	1.9%	1.4%	1.2%	1.2%		1.3%

[a] microwave assisted extraction.

[b] major component of the residue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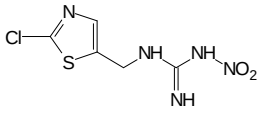
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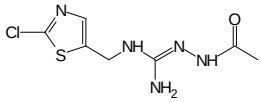
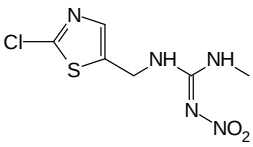

MU3


CGA 322704

Animal metabolism summary

When animals were dosed with labelled thiamethoxam, the ^{14}C was readily excreted in urine and faeces and an array of metabolites was produced.

Unchanged parent thiamethoxam was the major component while CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) was the major metabolite identified in urine after rats were subjected to oral dosing with labelled thiamethoxam.

When goats were dosed with labelled thiamethoxam, approximately 1% of the dose appeared in milk and 3–4% in the tissues. Metabolite CGA 322704 was the major component of the residue in milk, while parent thiamethoxam was the major component in muscle, fat and kidney. Further degraded metabolites occurred in the liver.

When laying hens were dosed with labelled thiamethoxam, most of the dose was excreted in the droppings. Eggs accounted for approximately 0.1% of the administered dose and tissues approximately 1.5%. Parent thiamethoxam was not the major component of the residue in any tissue or eggs, but did constitute approximately 21% of the ^{14}C in lean meat. Metabolite CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) was the major residue component in the eggs, in both egg whites and yolks and also in fat + skin. Metabolite CGA 322704 (*N*-(2-chlorothiazol-5-ylmethyl)-*N*'-methyl-*N*''-nitroguanidine) was the major residue component in liver while metabolite MU3 (amino-([(2-chlorothiazol-5-ylmethyl)-amino]-methylene)-hydrazide) was the major component of the lean meat residue.

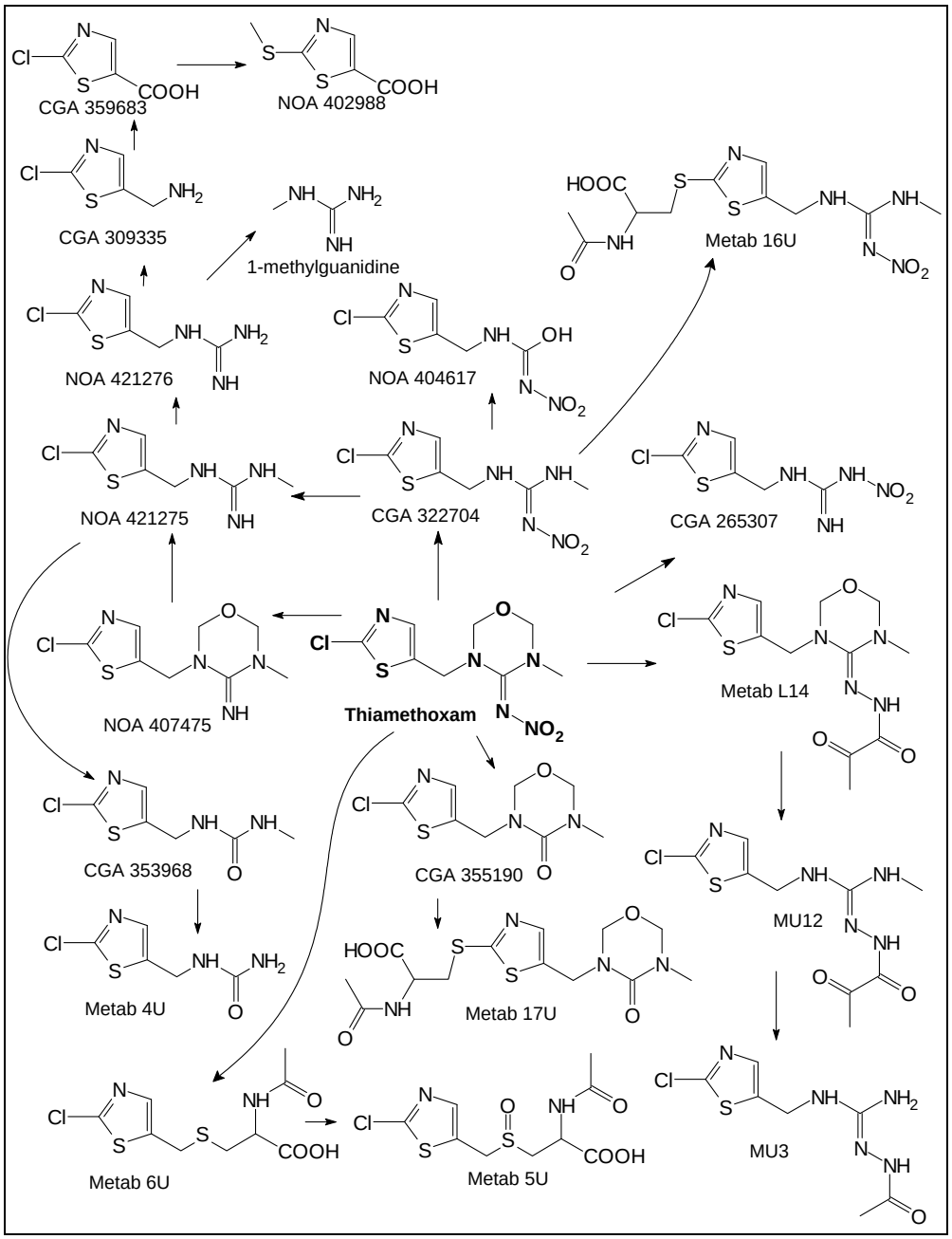


Figure 4 Proposed metabolic pathway for thiamethoxam in animals

Plant metabolism

The Meeting received plant metabolism studies with [^{14}C]thiamethoxam in maize, rice, pears, cucumbers, lettuce and potatoes. Thiamethoxam is readily taken up from treated seed and translocated within the plant and it produces many metabolites. Parent thiamethoxam is usually an important component of the residue.

Maize

Maize seeds treated with [^{14}C-oxadiazin]thiamethoxam formulated as a WS (water dispersible powder for slurry seed treatment) formulation at a rate equivalent to 0.145 kg ai/ha were sown to produce

field-grown maize plants (Sandmeier, 1996, 95PSA40PR1). Samples of plants taken 33 days after sowing, at forage stage 124 days after sowing, and fodder and grain samples taken at maturity 166 days after sowing, were analysed for total radioactive residue and for the composition of the residue. Data are summarised in Table 3.

A considerable amount of ^{14}C was taken up and translocated to the whole plant, as demonstrated by the TRR level of 18 mg/kg in the whole tops at day 33. At the longer intervals the TRR was much lower. Numerous metabolites were observed in the forage and fodder, but concentrations were generally too low for identification.

An overdose experiment was conducted where [^{14}C-oxadiazin]thiamethoxam was applied to the soil around maize plants (two-leaf stage) at 0.485 kg ai/ha (Sandmeier, 1996, 95PSA40PR1). An overdose directly on the seed may have been phytotoxic, so soil treatment was chosen. Samples of forage taken 89 days after treatment and grain and fodder at maturity were examined for ^{14}C content and composition of the residue (Table 3). Residue was readily taken up from the soil and translocated to all parts of the plant. A number of metabolites were observed in the plant tissues at levels from 1–17% of TRR. The pattern was similar to that from seed treatment.

To produce higher levels of metabolites for identification, indoor maize plants (27 days old, 6-leaf stage) were injected with [^{14}C-oxadiazin]thiamethoxam at 1.3 mg thiamethoxam per plant (Sandmeier, 1997, 95PSA40PR2). Grain leaf and stalk samples were taken 78 days after treatment for analysis and metabolite identification. The pattern of metabolites was similar to that from seed treatment, but levels were higher, which permitted identification. The identifications were then used in the interpretation of the seed treatment experiment.

Table 3 Distribution and identity of the residues in forage, fodder and grain of maize produced from seed treated with [^{14}C-oxadiazin]thiamethoxam, soil treatment or stem injection

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Whole tops, day 33	Forage	Grain	Fodder [a]	Stalks	Leaves
[^{14}C-oxadiazin]thiamethoxam—seed treatment at 0.145 kg ai/ha						
TRR	18 mg/kg	0.10 mg/kg	0.015 mg/kg	0.24 mg/kg		
Non-extracted	7.6%	21%	25%	31%		
Thiamethoxam	7.3 mg/kg	0.008 mg/kg	0.002 mg/kg	0.007 mg/kg		
Thiamethoxam	40%	7.9%	15%	3.0%		
I7 = NOA 421275	3.7%	12%		10%		
CGA 265307	1.0%	1.9%		0.5%		
CGA 322704	6.2%	9.8%	9.6%	3.6%		
CGA 353042	3.7%	4.0%		3.2%		
CGA 355190	3.0%	1.4%		0.4%		
1-methylguanidine	1.3%	7.7%		9.8%		
I3 = NOA 407475	9.4%	8.4%		8.5%		
1-methyl-3-nitroguanidine		2.6%		1.0%		
[^{14}C-oxadiazin]thiamethoxam—soil treatment at 0.485 kg ai/ha						
TRR		0.35 mg/kg	0.041 mg/kg	1.0 mg/kg		
Non-extracted		12%	26%	34%		
Thiamethoxam		0.098 mg/kg	0.006 mg/kg	0.032 mg/kg		
Thiamethoxam		28%	15%	3.1%		
I7 = NOA 421275		8.3%	1.9%	8.7%		
CGA 265307		1.0%	2.2%	0.5%		
CGA 322704		16%	16%	3.6%		
CGA 353042				3.8%		
CGA 355190		5.9%		3.6%		
1-methylguanidine		4.6%	1.8%	9.7%		
I3 = NOA 407475		10%	2.5%	6.9%		
1-methyl-3-nitroguanidine		2.1%	4.1%	0.8%		

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Whole tops, day 33	Forage	Grain	Fodder [a]	Stalks	Leaves
[^{14}C-oxadiazin]thiamethoxam—stem injection at 1.3 mg per plant.						
TRR			0.035 mg/kg		1.7 mg/kg	59 mg/kg
Non-extracted			70%		8.3%	9.4%
Thiamethoxam			0.001 mg/kg		1.1 mg/kg	31 mg/kg

[a] Fodder, 34% dry matter (seed treatment), 41% dry matter (soil treatment)

In a second maize metabolism study, maize seeds treated with [^{14}C-thiazol]thiamethoxam formulated as a WS formulation (water dispersible powder for slurry seed treatment) at a rate equivalent to 0.149 kg ai/ha were sown to produce field-grown maize plants (Sandmeier, 1996, 95PSA41PR1). Samples of plant taken 14 and 33 days after sowing, at forage stage 124 days after sowing, and fodder and grain samples taken at maturity 166 days after sowing, were analysed for total radioactive residue and for the composition of the residue. Data are summarised in Table 4.

An overdose experiment was also conducted, as previously described, where [^{14}C-thiazol]thiamethoxam was applied to the soil around maize plants (two-leaf stage) at 0.488 kg ai/ha (Sandmeier, 1996, 95PSA41PR1). Samples of forage taken 89 days after treatment and grain and fodder at maturity were examined for ^{14}C content and composition of the residue (Table 4). The metabolite pattern was similar to that from seed treatment.

As previously described for the oxadiazin-^{14}C label, indoor maize plants (27 days old, 6-leaf stage) were injected with [^{14}C-thiazol]thiamethoxam at 1.3 mg thiamethoxam per plant (Sandmeier, 1997, 95PSA41PR2). Grain, leaf and stalk samples were taken 78 days after treatment for analysis and metabolite identification. The pattern of metabolites was similar to that from seed treatment, but levels were higher, which permitted identification. The identifications were then used in the interpretation of the seed treatment experiment (Table 4).

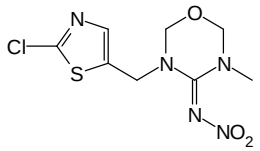
Table 4 Distribution and identity of the residues in forage, fodder and grain of maize produced from seed treated with [^{14}C-thiazol]thiamethoxam, soil treatment

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Tops, day 14	Roots, day 14	Tops, day 33	Forage	Grain	Fodder [a]
[^{14}C-thiazol]thiamethoxam—seed treatment at 0.149 kg ai/ha						
TRR	74 mg/kg	13 mg/kg	14 mg/kg	0.11 mg/kg	0.023 mg/kg	0.35 mg/kg
Non-extracted	0.9%	4.9%	7.9%	25%	65%	49%
Thiamethoxam	60 mg/kg	10 mg/kg	6.5 mg/kg	0.009 mg/kg	0.002 mg/kg	0.015 mg/kg
Thiamethoxam			47%	8.1%	6.5%	4.3%
I7 = NOA 421275			4.0%	12%		10%
CGA 265307			1.0%	2.8%		1.0%
CGA 322704			7.9%	12%	7.5%	4.3%
CGA 355190			2.8%	1.2%		0.5%
I3 = NOA 407475			9.9%	8.8%		7.1%
[^{14}C-thiazol]thiamethoxam—soil treatment at 0.488 kg ai/ha						
TRR				0.40 mg/kg	0.080 mg/kg [b]	0.88 mg/kg [b]
Non-extracted				16%	62%	42%
Thiamethoxam				0.11 mg/kg	0.006 mg/kg	0.047 mg/kg
Thiamethoxam				28%	7.9%	5.3%
I7 = NOA 421275				9.9%	1.2%	9.5%
CGA 265307				1.7%	1.4%	0.5%
CGA 322704				17%	9.2%	3.9%
CGA 355190				1.6%	0.4%	0.4%
I3 = NOA 407475				8.6%	0.5%	7.7%

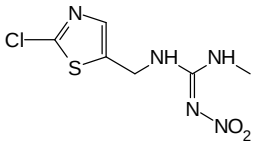
[a] Fodder, 39% dry matter (seed treatment), 43% dry matter (soil treatment).

[b] Samples of this maize grain and fodder were subsequently analysed by analytical method AG-675 (Campbell, 1998, 346001).

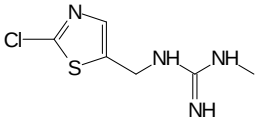
The composition of the residue from seed treatment was quite similar for the different ^{14}C label positions. In maize grain, thiamethoxam and CGA 322704 were the most important identified components. In maize forage and fodder, thiamethoxam, NOA 421275, CGA 322704 and NOA 407475 were the main identified components (above 1% TRR) .



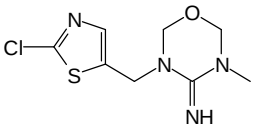
thiamethoxam



CGA 322704



NOA 421275



NOA 407475

Rice

Krauss (1997, 95JK17PR1) studied the metabolism of thiamethoxam in greenhouse-grown paddy rice after [^{14}C-oxadiazin]thiamethoxam formulated as granules was applied at a rate of 1.5 g ai/seedling box (30 × 60 cm), equivalent to 0.30 kg ai/ha when rice plants were at the 2–3 leaf stage 24 hours prior to planting out. Plant samples, taken 1, 34 and 71 days after application and grain, husks and straw at maturity 126 days after application, were analysed for TRR and examined for metabolite distribution.

Release of ^{14}C into the paddy water was rapid, reaching a maximum 20% of the applied dose approximately 1 week after the application. ^{14}C was readily translocated to all parts of the plant. Approximately 15 metabolite fractions were observed in the plant parts at harvest. The distribution of identified metabolites is summarised in Table 5.

In an analogous and parallel project, Krauss (1997, 95JK15PR1) studied the metabolism of thiamethoxam in greenhouse-grown paddy rice with [^{14}C-thiazol]thiamethoxam at the same rate and timing.

The non-extracted ^{14}C in grains, husk and straw from both rice studies was subjected to vigorous extraction followed by base, acid and enzyme hydrolysis. Most of the ^{14}C had apparently been incorporated into starch, cellulose, hemicellulose or proteins.

Table 5 Distribution and identity of the residues in foliage, grain, husks and straw of rice produced after seedling bed treatment with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam at the equivalent of 0.30 kg ai/ha

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Leaves, day 1	Leaves, day 34	Leaves, day 71	Grain	Husks	Straw
[^{14}C-oxadiazin]thiamethoxam—seedling bed treatment at 0.30 kg ai/ha						
TRR	32 mg/kg	1.2 mg/kg	0.30 mg/kg	0.23 mg/kg	0.53 mg/kg	2.8 mg/kg
Non-extracted	0.6%	16%	30%	88%	45%	21%
Thiamethoxam	30 mg/kg	0.51 mg/kg	0.060%	< 0.001 mg/kg	0.035 mg/kg	0.78 mg/kg
Thiamethoxam	94%	41%	20%		6.5%	27%
I3 = NOA 407475		3.3%	4.8%	0.3%	2.8%	5.8%
I13a = N-methylurea		2.9%	5.2%	1.4%	3.8%	3.6%
CGA 265307		1.0%	4.1%	0.1%		2.9%
CGA 322704		14%	10%	1.1%	16%	7.7%
CGA 355190	1.5%	6.5%	1.2%		6.5%	27%
[^{14}C-thiazol]thiamethoxam—seedling bed treatment at 0.30 kg ai/ha						
TRR	24 mg/kg	1.4 mg/kg	0.65 mg/kg	0.18 mg/kg	0.67 mg/kg	3.0 mg/kg
Non-extracted	1.7%	13%	24%	87%	34%	27%
Thiamethoxam	20 mg/kg	0.35 mg/kg	0.098 mg/kg	< 0.001 mg/kg	0.14	0.52 mg/kg
Thiamethoxam	84%	25%	15%		22%	17%

	Residues expressed as thiamethoxam, as mg/kg or % TRR					
	Leaves, day 1	Leaves, day 34	Leaves, day 71	Grain	Husks	Straw
CGA 353968				0.9%	2.5%	3.3%
CGA 265307		0.5%	2.0%	0.2%	0.9%	2.5%
CGA 322704	4.1%	10%	11%	2.3%	13%	5.7%
CGA 355190	4.1%	3.3%	2.0%		1.4%	1.9%

Krauss (1997, 95JK18PR1) studied the metabolism of thiamethoxam in greenhouse-grown paddy rice after [^{14}C-oxadiazin]thiamethoxam formulated as a wettable powder was sprayed twice on the foliage, at a rate per application equivalent to 0.025 kg ai/ha, at booting stage 49 days after transplanting and 50 days later, 21 days before harvest. Grains, husk and straw were analysed for TRR and composition of the residue. Results are summarised in Table 6.

Parent thiamethoxam was the major identified component of the residue in grain, husks and straw. Most of the ^{14}C in the grain was not extracted even after microwave extraction at 130 ºC. This was similar to the situation with granular application where the unextracted ^{14}C was found to be incorporated into starch, cellulose, hemicellulose or proteins.

In an analogous and parallel project, Krauss (1997, 95JK16PR1) studied the metabolism of thiamethoxam in greenhouse-grown foliar-treated paddy rice with [^{14}C-thiazol]thiamethoxam at the same rate and similar timing (48 days after transplanting and 50 days later, 21 days before harvest). Grains, husk and straw were analysed for TRR and composition of the residue. Results are summarised in Table 6.

Parent thiamethoxam was again the major identified component of the residue. The high percentage non-extracted residue in grain was again attributed to incorporation into natural plant components. The nature of the residue was quite similar for the two ^{14}C label positions, which reflects the fact that the major metabolites include both labelled positions.

Table 6 Distribution and identity of the residues in grain, husks and straw of rice produced after foliar treatment with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam at the equivalent of 0.025 kg ai/ha

	Residues expressed as thiamethoxam, as mg/kg or % TRR		
	Grain	Husks	Straw
[^{14}C-oxadiazin]thiamethoxam—2 foliar treatments at 0.025 kg ai/ha			
TRR	0.026 mg/kg	0.96 mg/kg	1.08 mg/kg
Non-extracted	63%	6.1%	6.0%
Thiamethoxam	0.003 mg/kg	0.63 mg/kg	0.57 mg/kg
Thiamethoxam	13%	65%	53%
CGA 265307	0.5%	0.1%	3.8%
CGA 322704	11%	6.3%	7.7%
CGA 353968	2.6%	0.8%	1.8%
CGA 355190	0.7%	3.7%	3.2%
[^{14}C-thiazol]thiamethoxam—2 foliar treatments at 0.025 kg ai/ha			
TRR	0.050 mg/kg	1.16 mg/kg	1.01 mg/kg
Non-extracted	91%	7.5%	14.5%
Thiamethoxam	0.002 mg/kg	0.82 mg/kg	0.51 mg/kg
Thiamethoxam	4.5%	71%	50%
CGA 265307	0.4%	0.7%	5.2%
CGA 322704	4.2%	3.6%	11%
CGA 353968	1.1%	0.9%	1.0%
CGA 355190	0.1%	4.4%	2.6%

Pears

Capps (1998, ABR-98041) sprayed Bartlett pear trees with labelled (thiazole and oxadiazin) thiamethoxam WP formulation in late season—two cover sprays 13 days apart with the second spray

15 days before harvest. At the 1× treatment, the application rate was 0.15 kg ai/ha per treatment and at 10× treatment, the rate was 1.5 kg ai/ha per treatment. Fruit were harvested at normal maturity; foliage samples were taken after the second treatment and at harvest. Samples were analysed for ^{14}C content and were examined for the nature of the residue. The ^{14}C residue levels and composition of the residues are summarised in Table 7.

TRR levels in leaves at the 0.15 kg ai/ha treatment rate were 43, 40, 61 and 51 mg/kg and at the high treatment rate (1.5 kg ai/ha) were 570, 420, 650 and 450 mg/kg, i.e. levels were proportional to application rates. Levels in fruit were also approximately proportional to application rates.

Thiamethoxam and CGA 322704 were the major identified components of the residue, together accounting for approximately 50% of the TRR.

Table 7 Distribution and identity of the residues in pears produced after foliar treatment of Bartlett pear trees with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam

	Residues in fruit expressed as thiamethoxam, as mg/kg or % TRR			
	[^{14}C-oxadiazin]thiamethoxam		[^{14}C-thiazol]thiamethoxam	
	Rate = 0.15 kg ai/ha	Rate = 1.5 kg ai/ha	Rate = 0.15 kg ai/ha	Rate = 1.5 kg ai/ha
TRR	0.70 mg/kg	7.1 mg/kg	0.49 mg/kg	6.8 mg/kg
Non-extracted	9.3%	4.6%	7.2%	7.0%
Thiamethoxam	0.196 mg/kg	2.2 mg/kg	0.14 mg/kg	2.3 mg/kg
Thiamethoxam	28% [b]	31% [b]	29% [b]	33% [b]
CGA 322704	19% [b]	14% [b]	24% [b]	19% [b]
CGA 322704-NO-glucoside [a]	1.1%	0.9%	1.1%	1.1%
CGA 353968	6.0%	8.4%	5.0%	8.0%
CGA 265307	1.7%	2.9%	4.8%	3.5%
CGA 355190	1.1%	2.8%	0.6%	2.7%
Metab 4U = desmethyl-CGA 353968	1.8%	3.0%	1.5%	2.9%
1-methyl-3-nitroguanidine		1.8%		
1-methylguanidine		1.6%		
NOA-407475		2.0%	2.5%	

[a] CGA 322704-NO-glucoside is the hydroxylamine glucoside of CGA 322704

[b] Major identified components of the residue

Cucumbers

Carlin (1998, ABR-98048) sprayed cucumber plots twice with labelled (thiazole and oxadiazin) thiamethoxam WP formulation as foliar sprays—first spray at full flowering and the second 10 days later, 14 days prior to mature harvest. At the 0.5× treatment, the application rate was 0.05 kg ai/ha per treatment. In the 10× treatment, the first application was as a soil drench at 1.5 kg ai/ha in a band at the first true leaf stage and the second was a foliar spray at 0.5 kg ai/ha, 14 days prior to mature harvest. Fruit samples were harvested for analysis and for residue identification. The TRR and composition of the residues are summarised in Table 8.

NOA 407475 and thiamethoxam were the major identified components of the residue, together accounting for approximately 30–40% the TRR.

Table 8 Distribution and identity of the residues in cucumbers produced after treatment of cucumber plots with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam

	Residues in cucumbers expressed as thiamethoxam, as mg/kg or % TRR			
	[^{14}C-oxadiazin]thiamethoxam		[^{14}C-thiazol]thiamethoxam	
	Rate = 0.05 kg ai/ha	Rate = 1.5 + 0.5 kg ai/ha	Rate = 0.05 kg ai/ha	Rate = 1.5 + 0.5 kg ai/ha
TRR	0.031 mg/kg	0.32 mg/kg	0.035 mg/kg	0.30 mg/kg
Non-extracted	6.5%	6.1%	33%	13%
Thiamethoxam	0.003 mg/kg	0.044 mg/kg	0.006 mg/kg	0.028 mg/kg

	Residues in cucumbers expressed as thiamethoxam, as mg/kg or % TRR			
	[^{14}C-oxadiazin]thiamethoxam		[^{14}C-thiazol]thiamethoxam	
	Rate = 0.05 kg ai/ha	Rate = 1.5 + 0.5 kg ai/ha	Rate = 0.05 kg ai/ha	Rate = 1.5 + 0.5 kg ai/ha
Thiamethoxam	9.2% [b]	14% [b]	16% [b]	9.6% [b]
NOA 407475	30% [b]	13% [b]	12% [b]	20% [b]
CGA 322704	0.7%	1.5%	1.3%	1.2%
CGA 353968	0.5%	1.1%	1.0%	0.9%
	0.3%	0.6%	0.4%	1.4%

[a] Also quoted as CGA-335190 in ABR-98048.

[b] Major identified components of the residue

Lettuce

Sandmeier (1999, 99PSA52) made three foliar sprays to field grown lettuce (cv. Sunny) at weekly intervals with labelled (thiazole and oxadiazin) thiamethoxam WG formulation. Application rates were equivalent to 0.054 and 0.052 kg ai/ha. Lettuce plants were harvested 0, 3, 7 and 14 days after the final application for analysis and metabolite identification (Table 9). Auxiliary experiments with 10× overdose rates (0.5 kg ai/ha) generated higher residue levels to assist with metabolite identification.

Parent thiamethoxam was the major component of the residue accounting for approximately 40% of the residue 14 days after the final treatment. The non-extracted residue fraction accounting for 13% and 19% of TRR was subjected to hot methanol extraction and acid and base hydrolysis. Most of the released ^{14}C material was of a very polar nature and was probably incorporated into natural plant components as already found with maize metabolism.

Table 9 Distribution and identity of the residues in lettuce after treatment three times with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam at a rate equivalent to 0.054 and 0.052 kg ai/ha and harvested 0, 3, 7 and 14 days after the final treatment

	Residues in lettuce expressed as thiamethoxam, as mg/kg or % TRR							
	Day 0		Day 3		Day 7		Day 14	
	thiazol	oxadiazin	thiazol	oxadiazin	thiazol	oxadiazin	thiazol	oxadiazin
TRR	1.74 mg/kg	1.98 mg/kg	1.0 mg/kg	1.5 mg/kg	0.63 mg/kg	0.72 mg/kg	0.57 mg/kg	0.69 mg/kg
Not extracted	5.8%	4.1%	9.4%	6.5%	12%	8.4%	19%	13%
Thiamethoxam	1.44 mg/kg	1.55 mg/kg	0.67 mg/kg	1.06 mg/kg	0.35 mg/kg	0.41 mg/kg	0.24 mg/kg	0.26 mg/kg
Thiamethoxam	83%	78%	66%	70%	55%	53%	42%	38%
CGA 265307	0.1%	0.2%	0.2%	0.3%	0.2%	0.4%	0.5%	0.7%
CGA 322704	2.1%	2.1%	3.3%	3.2%	3.5%	3.8%	5.8%	5.6%
CGA 353042		2.3%		3.3%		4.6%		6.6%
CGA 353968	1.4%	1.0%	2.1%	1.8%	2.4%	1.9%	2.4%	2.5%
CGA 353968 conj [a]	0.6%	0.4%	1.4%	0.6%	2.7%	1.4%	3.3%	2.0%
CGA 355190	1.8%	1.4%	3.1%	2.9%	2.6%	2.1%	0.8%	0.9%
CGA 359683	0.3%		0.3%		0.4%		1.0%	
CGA 382191		0.7%		1.0%		2.2%		3.8%
Methylurea		0.3%		0.4%		1.1%		1.5%
NOA 405217		2.5%		3.7%		6.8%		7.9%
NOA 407475	2.1%	1.4%	3.2%	2.4%	5.0%	4.1%	6.2%	4.7%
NOA 421275	0.6%	0.2%	1.1%	0.4%	1.6%	0.5%	2.2%	0.8%
NOA 424255		0.3%		0.3%		0.7%		1.5%
Metab 4U	0.1%	0.1%	0.3%	0.2%	0.5%	0.5%	0.4%	0.9%
I13 [b]	2.1%	0.6%	3.7%	1.0%	5.6%	1.6%	6.3%	2.0%

[a] N-glucose conjugate of CGA 353968.

[b] Mixture of O-glucose conjugate of CGA 349208 (thiazol label only) and O-glucose conjugate of 1-(2-clorothiazol-5-ylmethyl)-1-hydroxymethyl-3-methylurea

Potatoes

In a metabolism study on potatoes, Capps (1999, 601–99) sowed potato seed-pieces treated with [^{14}C-thiazol]thiamethoxam and [^{14}C-oxadiazin]thiamethoxam at (×1) 0.0075 kg ai/100 kg of tubers. An overdose experiment (×5) at 0.0375 kg ai/100 kg of tubers provided higher residue levels to assist with metabolite identification. Tubers and foliage were harvested 84 days (new potato size) and 106 days (mature harvest) after sowing for TRR analysis and to determine the composition of the residue. Capps and Brown (2000, 601-99 amendment 1) continued with identification of residue components. The results from the ×1 potato treatments are summarised in Table 10.

Parent thiamethoxam was the major identified residue in the harvested potatoes at 10–27% of TRR. Metabolite CGA 322704 was present at 6–13% of TRR. Metabolite CGA 282149 constituted approximately 6–10% TRR while CGA 349208 and its conjugate also accounted for approximately 6–10% TRR. A number of other metabolites were identified, but none exceeded 10% TRR.

No further metabolites were identified when the non-extracted fraction was subjected to vigorous extraction and hydrolysis, which generally produced a mixture of polar compounds, suggesting that much of the non-extracted ^{14}C was associated with polysaccharides and cellulose.

Table 10 Distribution and identity of the residues in potato tubers after potato seed-pieces were treated with [^{14}C-oxadiazin]thiamethoxam or [^{14}C-thiazol]thiamethoxam at the equivalent of 0.0075 kg ai/ 100 kg of tubers and the crop was grown to maturity

	Residues in potatoes expressed as thiamethoxam, as mg/kg or % TRR			
	New potatoes, day 84		Mature potatoes, day 106	
	thiazol	oxadiazin	thiazol	oxadiazin
TRR	0.32 mg/kg	0.215 mg/kg	0.22 mg/kg	0.13 mg/kg
Not extracted	24%	7.8%	25%	15%
Thiamethoxam	0.058 mg/kg	0.057 mg/kg	0.029 mg/kg	0.013 mg/kg
Thiamethoxam	18%	27%	13%	10%
CGA 265307	3.0%	3.0%	2.8%	3.0
CGA 322704	8.5%	13%	6.2%	6.0%
CGA 353968	1.9%	2.5%	2.3%	1.6%
CGA 353968 conj [a]		1.4%	1.0%	2.5%
NOA 407475	2.4%	1.8%	1.1%	3.1%
CGA 282149		9.8%		6.3%
CGA 340575		4.6%		4.4%
CGA 349208	3.5%		3.4%	
CGA 349208 conj [b]	6.1%		2.2%	
CGA 353042		0.5%		
CGA 382191				1.2%
NOA 405217		4.2%		0.7%
NOA 421275		2.0%		
NOA 421276 conj [c]	2.9%	2.2%		1.2%
NOA 436944 + CGA 382191		1.0%		

[a] N-glucoside conjugate of CGA 353968.

[b] Glucoside + malonyl-glucoside of CGA 349208.

[c] Hydroxylamine glucoside conjugate of NOA 421276.

Plant metabolism summary

Thiamethoxam was mobile within the plant and it produced an array of metabolites. Metabolic degradation pathways were similar in the various plants tested: maize, rice, pears, cucumbers, lettuce and potatoes.

Parent thiamethoxam and metabolite CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) appeared in plant metabolism profiles above 10% TRR more often than other metabolites. Other metabolites to appear above 10% TRR were: 1-methylguanidine, CGA 282149 (3,6-dihydro-3-methyl-N-nitro-2H-1,3,5-oxadiazin-4-amine), CGA 355190 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-one), NOA 407475 (3-(2-chlorothiazol-5-

ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) and NOA 421275 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-guanidine). These metabolites are shown in the proposed metabolic pathway for thiamethoxam in plants (Figure 5).

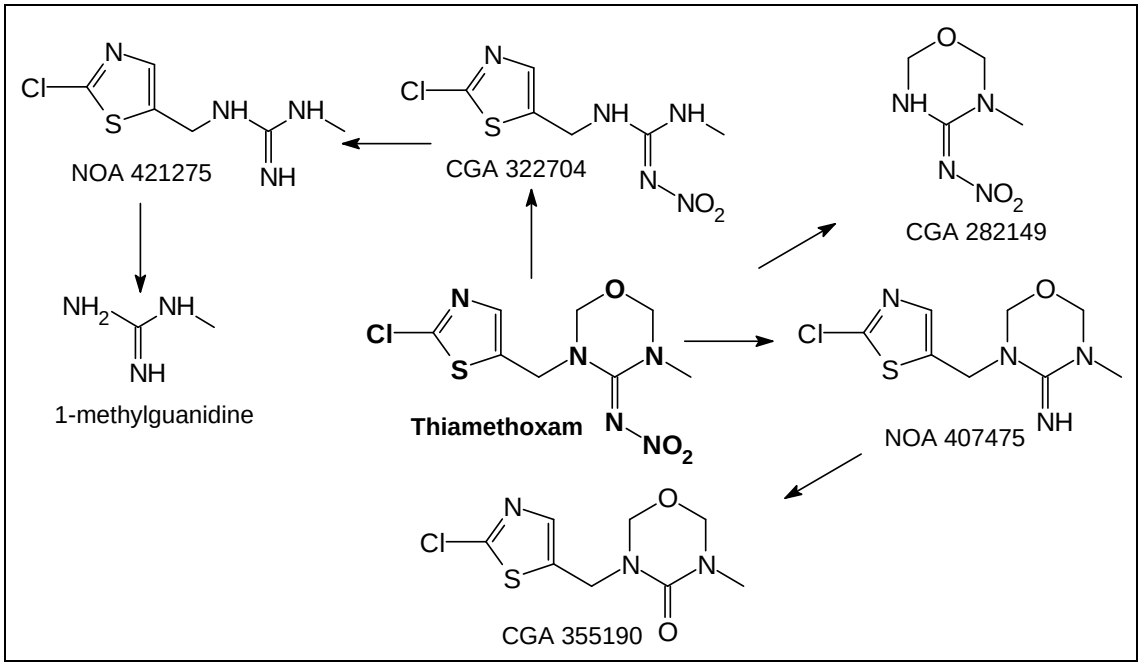
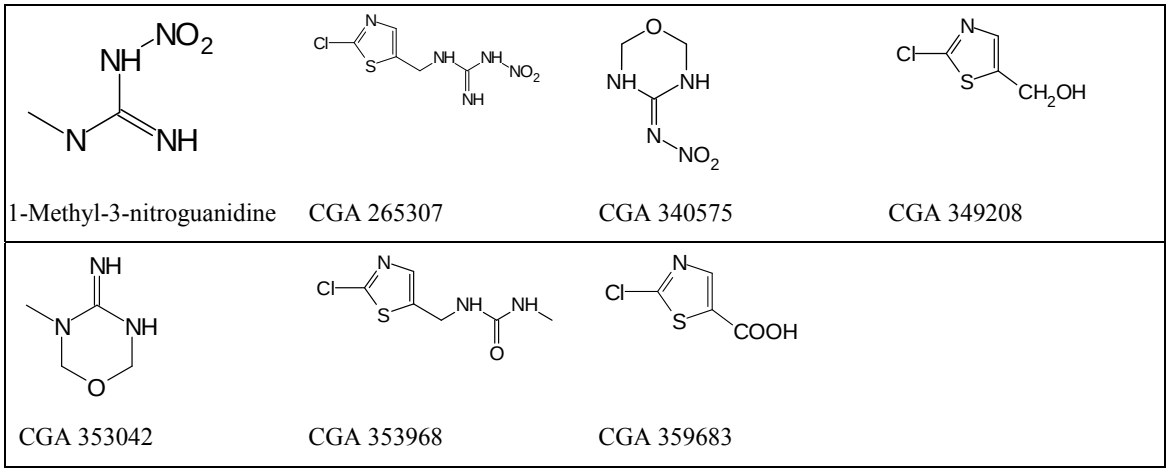
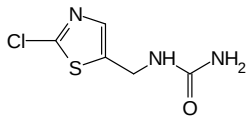


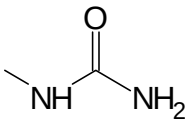
Figure 5 Proposed metabolic pathway for thiamethoxam in plants

Numerous other compounds were identified as plant metabolites. The metabolites that exceeded 1% TRR in at least one case, but did not exceed 10% TRR are shown in Figure 6.

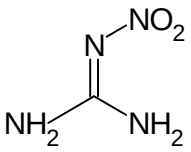




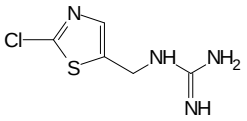
Metab 4U



Methylurea



N-nitroguanidine
NOA 424255



NOA 421276

Figure 6 Plant metabolites that exceeded 1% of TRR in at least one case, but did not exceed 10% of TRR in any case.

N-nitroguanidine was the only plant metabolite that did not also appear as an animal metabolite.

N-nitroguanidine is also an industrial chemical used in the manufacture of high explosives, especially flashless powder (with nitrocellulose). It is also a chemical intermediate (Chemwatch, 2004).

Environmental fate in soil

The FAO Manual explains the data requirements for studies of environmental fate. The focus should be on those aspects that are most relevant to the MRL setting. For thiamethoxam, supervised residue trials data are available for seed dressings, root and tuber vegetables and rice, which means that aerobic degradation in soil and soil photolysis are relevant, as well as the normal requirements for hydrolysis and rotational crop studies.

Soil metabolism

When [^{14}C-thiazol]thiamethoxam was incubated with five soils under aerobic conditions at 20 ºC and 40% field moisture capacity, it disappeared with half-lives from 140 to 280 days (Adam, 1996, 95DA03). CGA 322704 was the main metabolite. CGA 355190 and five other unidentified minor metabolites were also observed. Ellgehausen (1998, 98EH05) calculated the degradation half-life of CGA 322704 in the Collombey loamy sand as 75 days

Aerobic soil metabolism		Ref: Adam, 1996, 95DA03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.50 mg ai/kg dry weight	
Duration: 181 days	Temp:20 ± 2 °C	Moisture: 40% max water holding capacity	
Soil: loamy sand (Collombey)	pH: 7.4	Organic carbon: 1.7%	
Half-life thiamethoxam: 196 days		^{14}C accountability: 96–104%	
% thiamethoxam remaining, day 181 = 52% of dose		% mineralization, day 181 = 13.5% of dose	
		% unextracted, day 181 = 10% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	14.3%	153	
CGA 355190	1.3%	153	
Aerobic soil metabolism		Ref: Adam, 1996, 95DA03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.50 mg ai/kg dry weight	
Duration: 181 days	Temp:20 ± 2 °C	Moisture: 40% max water holding capacity	
Soil: sand (Speyer 2.1)	pH: 8.2	Organic carbon: 0.6%	
Half-life thiamethoxam: 280 days		^{14}C accountability: 97–104%	
% thiamethoxam remaining, day 181 = 61% of dose		% mineralization, day 181 = 12% of dose	
		% unextracted, day 181 = 16% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	4.6%	181	
Aerobic soil metabolism		Ref: Adam, 1996, 95DA03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.50 mgai/kg dry weight	
Duration: 181 days	Temp:20 ± 2 °C	Moisture: 40% max water holding capacity	

Soil: sandy loam (Weide)	pH: 7.6	Organic carbon: 1.3%	
Half-life thiamethoxam: 160 days		^{14}C accountability: 96–105%	
% thiamethoxam remaining, day 181 = 47% of dose		% mineralization, day 181 = 21% of dose	
		% unextracted, day 181 = 12.5% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	15%	181	
CGA 355190	1.2%	181	
Aerobic soil metabolism		Ref: Adam, 1996, 95DA03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.49 mg ai/kg dry weight	
Duration: 121 days	Temp:20 ± 2 °C	Moisture: 40% max water holding capacity	
Soil: loamy sand (Pappelacker)	pH: 7.6	Organic carbon: 1.1%	
Half-life thiamethoxam: 143 days		^{14}C accountability: 91–100%	
% thiamethoxam remaining, day 121 = 55% of dose		% mineralization, day 121 = 12% of dose	
		% unextracted, day 121 = 7.6% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	13%	121	
Aerobic soil metabolism		Ref: Adam, 1996, 95DA03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.49 mg ai/kg dry weight	
Duration: 121 days	Temp:20 ± 2 °C	Moisture: 40% max water holding capacity	
Soil: sandy loam (Weide)	pH: 7.5	Organic carbon: 1.3%	
Half-life thiamethoxam: 80 days		^{14}C accountability:87-100%	
% thiamethoxam remaining, day 121 = 36% of dose		% mineralization, day 121 = 14% of dose	
		% unextracted, day 121 = 9.6% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	19%	121	
CGA 355190	1.2%	62	

Phaff (1997, 95RP03) studied the effects of moisture level, temperature and dose level on the persistence of thiamethoxam and metabolite CGA 322704 in a soil under aerobic conditions in the dark. Higher temperature, higher moisture level and lower dose rate all increased the disappearance rate of thiamethoxam. Metabolite CGA 322704 reached 17–36% (expressed as thiamethoxam) of the dose applied to the soil. Details are summarised below.

Aerobic soil metabolism		Ref: Phaff, 1997, 95RP03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.91 mg ai/kg	
Duration: 363 days	Temp: 20 °C	Moisture: 60% field moisture capacity	
Soil: silty loam	pH: 7.15	Organic carbon: 2.5%	
Half-life thiamethoxam: 74 days		^{14}C accountability: 73–108%	
% thiamethoxam remaining, day 363 = 4.2% of dose		% mineralization, day 363 = 32% of dose	
		% unextracted, day 363 = 16% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	23.5%	128	
Aerobic soil metabolism		Ref: Phaff, 1997, 95RP03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.91 mg ai/kg	
Duration: 363 days	Temp: 20 °C	Moisture: 40% field moisture capacity	
Soil: silty loam	pH: 7.15	Organic carbon: 2.5%	
Half-life thiamethoxam: 143 days		^{14}C accountability: 69–107%	
% thiamethoxam remaining, day 363 = 17.6% of dose		% mineralization, day 363 = 24% of dose	
		% unextracted, day 363 = 20% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	17%	189	
Aerobic soil metabolism		Ref: Phaff, 1997, 95RP03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.91 mg ai/kg	
Duration: 363 days	Temp: 10 °C	Moisture:60% field moisture capacity	
Soil: silty loam	pH: 7.15	Organic carbon: 2.5%	
Half-life thiamethoxam: 233 days		^{14}C accountability: 91–107%	
% thiamethoxam remaining, day 363 = 34% of dose		% mineralization, day 363 = 17% of dose	

		% unextracted, day 363 = 8.4% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	29%	363	
Aerobic soil metabolism		Ref: Phaff, 1997, 95RP03	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.11 mg ai/kg	
Duration: 363 days	Temp: 20 °C	Moisture:60% field moisture capacity	
Soil: silty loam	pH: 7.15	Organic carbon: 2.5%	
Half-life thiamethoxam: 34 days		^{14}C accountability: 78–112%	
% thiamethoxam remaining, day 363 = 1.0% of dose		% mineralization, day 363 = 44% of dose	
		% unextracted, day 363 = 17% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	36%	90	

Cruz (1998, ABR-98046) incubated [^{14}C-oxadiazin]thiamethoxam in a clay loam soil for 12 months at 25 ºC in the dark and observed the disappearance of parent compound with a half-life of approximately 100 days. The disappearance rate from sterilized soil was much slower.

Aerobic soil metabolism		Ref: Cruz, 1998, ABR-98046	
Test material: [^{14}C-oxadiazin]thiamethoxam		Dose rate: 0.091 mg/kg	
Duration: 12 months	Temp: 25 °C	Moisture: 75 ± 12% field moisture capacity	
Soil: clay loam—viable	pH: 7.6	Organic carbon: 2.5%	
Half-life thiamethoxam: 101 days		^{14}C accountability: 92–105%	
% thiamethoxam remaining, 12 months = 9.0% of dose		% mineralization, 12 months = 39% of dose	
		% unextracted, 12 months = 6.9% of dose	
Metabolites	Max (% of dose)	Month	
CGA 322704	2.0%	Month 3	
CGA 282149	6.8%	Month 6	
CGA 355190	23%	Month 6	
CGA 353968	3.8%	Month 12	
Aerobic soil		Ref: Cruz, 1998, ABR-98046	
Test material: [^{14}C-oxadiazin]thiamethoxam		Dose rate: 0.091 mg/kg	
Duration: 6 months	Temp: 25 °C	Moisture: 75 ± 12% field moisture capacity	
Soil: clay loam—sterile	pH: 7.6	Organic carbon: 2.5%	
Half-life thiamethoxam: 6 months data too short for calculation		^{14}C accountability: 97–107%	
% thiamethoxam remaining, 6 months = 81% of dose		% mineralization, 6 months = 2.1% of dose	
		% unextracted, 6 months = 14% of dose	
Degradates	Max (% of dose)	Month	
CGA 322704	1.35%	Month 6	
CGA 355190	5.5%	Month 6	

Dixon (1998, ABR96059) incubated [^{14}C-thiazol]thiamethoxam in a sandy loam soil under aerobic conditions for 365 days, comparing metabolism in the viable soil and effects in the sterilized soil. The long term rates of disappearance of thiamethoxam were similar in viable and sterilized soil. However, growth was observed in the microbial test of the 'sterile' soil after 93 days of incubation and substantial counts of bacteria and fungi were observed on days 141 and 365, which demonstrates that the sterilized soil did not remain sterile for the duration of the test.

Aerobic soil metabolism		Ref: Dixon, 1998, ABR-96059	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.09 mg ai/kg	
Duration: 365 days	Temp: 25 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam—viable	pH: 7.3	Organic matter: 0.6%	
Half-life thiamethoxam: approx 400 days		^{14}C accountability: 88–120%	
% thiamethoxam remaining, day 365 = 46% of dose		% mineralization, day 365 = 7.4% of dose	
		% unextracted, day 365 = 28% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	2.4%	182	

CGA 355190	2.95	268	
CGA 353968	0.55%	268	
Aerobic soil		Ref: Dixon, 1998, ABR-96059	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.09 mg ai/kg	
Duration: 365 days	Temp: 25 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam—sterilized. Note[18]	pH: 7.3	Organic matter: 0.6%	
Half-life thiamethoxam: approx 310 days		^{14}C accountability: 94–104%	
% thiamethoxam remaining, day 365 = 41% of dose		% mineralization, day 365 = 5.8% of dose	
		% unextracted, day 365 = 18% of dose	
Degradates	Max (% of dose)	Day	
CGA 322704	2.6%	365	
CGA 355190	4.6%	365	
CGA 353968	0.54%%	365	

Schwarz (1998, ABR-96084) incubated [^{14}C-oxadiazin]thiamethoxam in a sandy loam soil under aerobic conditions for 365 days, comparing metabolism in the viable soil with effects in the sterilized soil. The rates of disappearance were similar.

Aerobic soil metabolism		Ref: Schwarz, 1998, ABR-96084	
Test material: [^{14}C-oxadiazin]thiamethoxam		Dose rate: 0.09 mg ai/kg	
Duration: 365–7 days	Temp: 25 ± 1 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam—viable	pH: 7.3	Organic matter: 0.6%	
Half-life thiamethoxam: approx 400 days		^{14}C accountability: 81–111%	
% thiamethoxam remaining, day 365–7 = 42% of dose		% mineralization, day 365–7 = 10% of dose	
		% unextracted, day 365–7 = 25% of dose	
Metabolites	Max (% of dose)	Day	
CGA 322704	3.8%	365–7	
CGA 282149	3.4%	120	
CGA 355190	3.8%	120	
CGA 353968	0.61	272–274	
Aerobic soil		Ref: Schwarz, 1998, ABR-96084	
Test material: [^{14}C-oxadiazin]thiamethoxam		Dose rate: 0.09 mg ai/kg	
Duration: 365 days	Temp: 25 ± 1 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam—sterile	pH: 7.3	Organic matter: 0.6%	
Half-life thiamethoxam: approx 400 days		^{14}C accountability: 94–106%	
% thiamethoxam remaining, day 365 = 54% of dose		% mineralization, day 365 = 3.6% of dose	
		% unextracted, day 365 = 33% of dose	
Degradates	Max (% of dose)	Day	
CGA 322704	1.8%	365	
CGA 282149	0.73%	181	
CGA 355190	3.2%	181	
CGA 353968	0.45	62	

Adam (1999, 99DA01) found similar disappearance rates of [^{14}C-thiazol]thiamethoxam and [^{14}C-thiazol]CGA 322704 in a loamy sand at 20 ºC under aerobic conditions. The main metabolite identified from CGA 322704 metabolism was CGA 265307, resulting from a demethylation of CGA 322704.

Aerobic soil metabolism		Ref: Adam, 1999, 99DA01	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.26 mg ai/kg dry soil	
Duration: 118 days	Temp: 20 °C	Moisture: 40% max water holding capacity	
Soil: loamy sand (Borstel soil)	pH: 5.0	Organic carbon: 1.2%	
Half-life thiamethoxam: approx 200–300 days		^{14}C accountability: 90–103%	
% thiamethoxam remaining, day 118 = 79% of dose		% mineralization, day 118 = 4.2% of dose	
		% unextracted, day 118 = 4.0% of dose	

[18] Sterilized soil did not remain sterile for the duration.

Metabolites	Max (% of dose)	Day	
CGA 322704	3.4%	118	
Aerobic soil metabolism		Ref: Adam, 1999, 99DA01	
Test material: [^{14}C-thiazol]CGA 322704		Dose rate: 0.13 mg test material/kg dry soil	
Duration: 118 days	Temp: 20 °C	Moisture: 40% max water holding capacity	
Soil: loamy sand (Borstel soil)	pH: 5.0	Organic carbon: 1.2%	
Half-life CGA 322704: approx 200–300 days		^{14}C accountability: 90–102%	
% CGA 322704 remaining, day 118 = 78% of dose		% mineralization, day 118 = 8.1% of dose	
		% unextracted, day 118 = 3.8% of dose	
Metabolites	Max (% of dose)	Day	
CGA 265307	1.2%	62–118	

When [^{14}C-thiazol]thiamethoxam was exposed to a paddy soil system, thiamethoxam disappeared with a half-life of approximately 50–70 days (Adam, 1997, 96DA04 and Amendment 1). The main metabolite was NOA 407475, produced under the reducing conditions. After 363 days, most of the dose had become unextracted residue, 63% remaining after harsh extraction. Fulvic and humic acids constituted 9% of the dose, but the remainder of the unextracted ^{14}C was not characterised.

Paddy soil metabolism		Ref: Adam, 1997, 96DA04 and Amendment 1	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.51 mg ai/kg dry soil, applied to water	
Duration: 363 days	Temp: 25 ± 2 °C	5 cm soil + water layer 2 cm above soil	
Soil: paddy soil	pH: 5.0 (KCl)	Organic carbon: 1.9%	pH water: 5.6–6.8
Half-life thiamethoxam: approx 50–70 days		^{14}C accountability: 95–102%	
% thiamethoxam remaining, day 363 = 2.0% of dose		% mineralization, day 363 = 2.2% of dose	
		% unextracted, day 363 = 63% of dose	
Metabolites	Max (% of dose)	Day	
NOA 407475	39%	120–182	

CGA 322704 disappeared from a sandy loam soil at 20 ºC under aerobic conditions with a half-life of approximately 100–200 days (Adam, 1999, 99DA06). The main identified metabolite was CGA 265307.

Aerobic soil metabolism		Ref: Adam, 1999, 99DA06	
Test material: [^{14}C-thiazol]CGA 322704		Dose rate: 0.12 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 40% max water holding capacity	
Soil: sandy loam, Schwaderloch soil	pH: 7.4	Organic carbon: 1.2%	
Half-life CGA 322704: approx 100–200 days		^{14}C accountability: 97–103%	
% CGA 322704 remaining, day 120 = 64% of dose		% mineralization, day 120 = 20% of dose	
		% unextracted, day 120 = 7.5% of dose	
Metabolites	Max (% of dose)	Day	
CGA 265307	5.8%	120	

Hein and Dorn (2001, NOV17) found 70% of the applied [^{14}C-thiazol]CGA 322704 remained 120 days after treatment of a loamy sand followed by maintenance of aerobic conditions at 20 ºC. In that time, 14% of the dose had mineralized and 10% was in the unextracted fraction.

Aerobic soil metabolism		Ref: Hein and Dorn, 2001, NOV17	
Test material: [^{14}C-thiazol]CGA 322704		Dose rate: 0.082 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 40% max water holding capacity	
Soil: loamy sand (Birkenheide)	pH: 6.0 ($CaCl_2$)	Organic carbon: 0.90%	
Half-life CGA 322704: approx 200–300 days		^{14}C accountability: 92–105%	
% CGA 322704 remaining, day 120 = 70% of dose		% mineralization, day 120 = 14% of dose	
		% unextracted, day 120 = 10% of dose	

Aerobic soil metabolism		Ref: Hein and Dorn, 2001, NOV17	
Metabolites	Max (% of dose)	Day	
no identifications			

The fate of CGA 355190 was investigated in three soils at 20 ºC under aerobic conditions for 120 days (Indergand and Nicollier, 2004, T002208-04). CGA 355190 disappeared readily (15–30 days half-life) in two of the soils, but was more persistent in the third. CGA 353968 was the only identified metabolite.

Aerobic soil metabolism		Ref: Indergand & Nicollier, 2004, T002208-04	
Test material: [^{14}C-thiazol]CGA 355190		Dose rate: 0.1 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 42 g water/100 g dry soil	
Soil: silt loam, 'Gartenacker'	pH: 7.4 (KCl)	Organic carbon: 3.4%	
Half-life CGA 355190: approx 15–20 days		^{14}C accountability: 91–100%	
% CGA 355190 remaining, day 120 = 3.2% of dose		% mineralization, day 120 = 60% of dose	
		% unextracted, day 120 = 15% of dose	
Metabolites	Max (% of dose)	Day	
CGA 353968	41%	28	
Aerobic soil metabolism		Ref: Indergand & Nicollier, 2004, T002208-04	
Test material: [^{14}C-thiazol]CGA 355190		Dose rate: 0.1 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 37 g water/100 g dry soil	
Soil: sandy clay loam, '18 acres'	pH: 6.7 (KCl)	Organic carbon: 3.8%	
Half-life CGA 355190: approx 25–30 days		^{14}C accountability: 91–101%	
% CGA 355190 remaining, day 120 = 4.6% of dose		% mineralization, day 120 = 22% of dose	
		% unextracted, day 120 = 33% of dose	
Metabolites	Max (% of dose)	Day	
CGA 353968	32%	91	
Aerobic soil metabolism		Ref: Indergand & Nicollier, 2004, T002208-04	
Test material: [^{14}C-thiazol]CGA 355190		Dose rate: 0.1 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 22 g water/100 g dry soil	
Soil: silty clay loam, 'Marsillargues'	pH: 7.7 (KCl)	Organic carbon: 0.98%	
Half-life CGA 355190: approx 100 days		^{14}C accountability: 97–102%	
% CGA 355190 remaining, day 120 = 41% of dose		% mineralization, day 120 = 18% of dose	
		% unextracted, day 120 = 11% of dose	
Metabolites	Max (% of dose)	Day	
CGA 353968	28%	120	

Aerobic soil metabolism		Ref: Buckel, 2001, 01MO01	
Test material: [^{14}C-oxadiazin]NOA 407475		Dose rate: 0.2 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 °C	Moisture: 40% max water holding capacity	
Soil: silt loam, 'Gartenacker'	pH: 7.3 (KCl)	Organic carbon: 2.1%	
Half-life NOA 407475: more than 300 days		^{14}C accountability: 105–107%	
% NOA 407475 remaining, day 120 = 86% of dose		% mineralization, day 120 = 11% of dose	
		% unextracted, day 120 = 4.3% of dose	
Metabolites	Max (% of dose)	Day	
NOA 421275	4.0%	120	
Aerobic soil metabolism		Ref: Indergand & Nicollier, 2004, T002207-04	
Test material: [^{14}C-oxadiazin]NOA 407475		Dose rate: 0.1 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 ± 2 °C	Moisture: 37 g water/100 g dry soil	
Soil: sandy clay loam, '18 acres'	pH: 6.7 (KCl)	Organic carbon: 3.8%	
Half-life NOA 407475: more than 300 days		^{14}C accountability: 90–103%	
% NOA 407475 remaining, day 120 = 77% of dose		% mineralization, day 120 = 1.3% of dose	
		% unextracted, day 120—10% of dose	
Metabolites	Max (% of dose)	Day	
no identifications, low levels			
Aerobic soil metabolism		Ref: Indergand & Nicollier, 2004, T002207-04	

Test material: [^{14}C-oxadiazin]NOA 407475		Dose rate: 0.1 mg test material/kg dry soil	
Duration: 120 days	Temp: 20 ± 2 °C	Moisture: 22 g water/100 g dry soil	
Soil: silty clay loam. 'Marsillargues'	pH: 7.7 (KCl)	Organic carbon: 0.98%	
Half-life NOA 407475: more than 300 days		^{14}C accountability: 90–101%	
% NOA 407475 remaining, day 120 = 78% of dose		% mineralization, day 120 = 0.9% of dose	
		% unextracted, day 120 = 11% of dose	
Metabolites	Max (% of dose)	Day	
no identifications, low levels			

Sparrow (1997, ABR-97012) subjected [^{14}C-oxadiazin]thiamethoxam on a sandy loam soil to photolysis for 30 days and determined a half-life for thiamethoxam disappearance as 54 days (12 hours photolysis/day) as compared with a dark control where the half-life was approximately 120 days. Four photolysis (and soil metabolism) products were identified on day 30 at 0.75–2.4% of the dose.

In a parallel study, Sparrow (1997, ABR-97011) subjected [^{14}C-thiazol]thiamethoxam on the same sandy loam soil to photolysis for 30 days and determined a half-life for thiamethoxam disappearance as approximately 45 days (12 hours photolysis/day) as compared with a dark control where the half-life was approximately 120 days. Three photolysis (and soil metabolism) products were identified at 0.53–2.1% of the dose.

Soil photolysis		Ref: Sparrow, 1997, ABR-97012	
Test material: [^{14}C-oxadiazin]thiamethoxam		Dose rate: 0.092 mg ai/kg	
Duration: 30 days (12 hours/day)	Temp: 25 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam	pH: 6.5	Organic matter: 0.9%	
Half-life thiamethoxam: 54 days (12 hours/day). Dark control thiamethoxam half-life, approx 120 days		^{14}C accountability: 93–111%	
% thiamethoxam remaining, day 30 = 66% of dose Dark control, % thiamethoxam remaining, day 30 = 83%		% mineralization, day 30 = 2.5% of dose Dark control, % mineralization, day 30 = 0.1%	
Xenon arc, 12 hours/day, 410 W/m^2		% unextracted, day 30 = 0.7% of dose	
Photolysis (and metabolism) products	Max (% of dose)	Day	
CGA 322704	2.4%	30	
CGA 355190	1.25%	30	
CGA 353968	1.1%	30	
CGA 282149	0.75%	30	
Soil photolysis		Ref: Sparrow, 1997, ABR-97011	
Test material: [^{14}C-thiazol]thiamethoxam		Dose rate: 0.092 mg ai/kg	
Duration: 30 days (12 hours/day)	Temp: 25 °C	Moisture: 75% field moisture capacity	
Soil: sandy loam	pH: 6.5	Organic matter: 0.9%	
Half-life thiamethoxam: approx 45 days (12 hours/day). Dark control thiamethoxam half-life, approx 120 days		^{14}C accountability: 97–113%	
% thiamethoxam remaining, day 30 = 59% of dose Dark control, % thiamethoxam remaining, day 30 = 83%		% mineralization, day 30 = 12% of dose Dark control, % mineralization, day 30 = 1.6%	
Xenon arc, 12 hours/day, 410 W/m^2		% unextracted, day 30 = 6.8% of dose	
Photolysis (and metabolism) products	Max (% of dose)	Day	
CGA 322704	2.1%	30	
CGA 355190	0.86%	7	
CGA 353968	0.53%	30	

Soil metabolism summary

When labelled thiamethoxam was incubated in soils under aerobic conditions at 20 ˚C, its half-life varied from 34 to 280 days. In 181 days of incubation, the percentage of dose mineralized was approximately 12 to 20% and the percentage that became unextractable was approximately 7 to 16%.

The main soil metabolites identified were: CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N"-nitroguanidine), CGA 355190 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-

[1,3,5]oxadiazinan-4-one), CGA 353968 (1-(2-chlorothiazol-5-ylmethyl)-3-methylurea) and CG 282149 (3,6-dihydro-3-methyl-N-nitro-2H-1,3,5-oxadiazin-4-amine). Metabolite NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) was identified under rice paddy conditions.

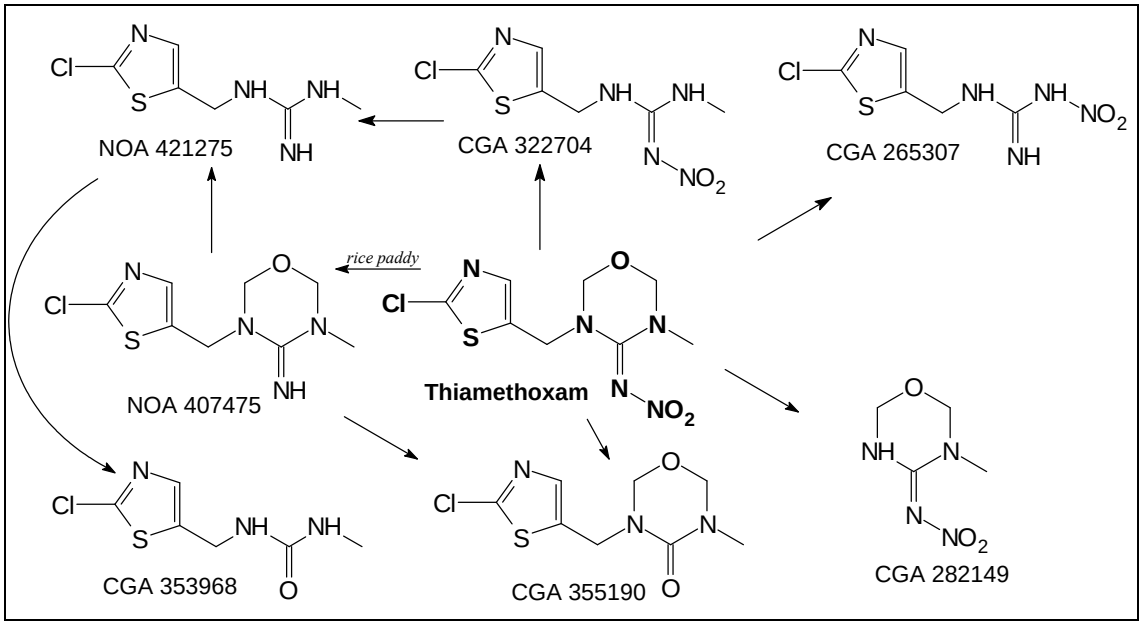


Figure 7 Proposed metabolic pathway for thiamethoxam in soils.

Rotational crops

Information on the fate of [^{14}C-oxadiazin]thiamethoxam and [^{14}C-thiazol]thiamethoxam in confined crop rotational studies was made available to the meeting.

Sandmeier (1997, 95PSA42PR1) applied [^{14}C-oxadiazin]thiamethoxam formulated as a WG to bare ground at a rate of 0.2 kg ai/ha and transplanted lettuce seedlings 29 days, 119 days and 362 days after the treatment and sowed radish, 29 days, 119 days and 362 days after the treatment, spring wheat, 29, 104 and 362 days after the treatment and winter wheat 180 days after the treatment. A parallel experiment was run with [^{14}C-thiazol]thiamethoxam (Sandmeier, 1997, 95PSA43PR1). The concentrations of ^{14}C radiolabel in the resulting plants and commodities are summarised in Table 11 and the identified metabolites in Table 12 and Table 13.

Table 11 Confined rotational crop studies with [^{14}C-oxadiazin]thiamethoxam and [^{14}C-thiazol]thiamethoxam in Switzerland in 1995

Application	Rotational crop (variety)	TSI days [a]	THI days [b]	Sample	[^{14}C-oxadiazin] thiamethoxam TRR, mg/kg	[^{14}C-thiazol] thiamethoxam TRR, mg/kg
0.2 kg ai/ha equiv	lettuce 1 (Prosper)	29 [c]	89	heads	0.034	0.035
0.2 kg ai/ha equiv	lettuce 2 (Rexado)	119 [d]	180	heads	0.012	0.013
0.2 kg ai/ha equiv	lettuce 3 (Prosper)	362 [f]	425	heads	0.008	0.004
0.2 kg ai/ha equiv	radish 1 (Selma 84)	29 [c]	89	tops roots	0.077 0.005	0.12 0.007
0.2 kg ai/ha equiv	radish 2 (Radis Rex)	119 [d]	180	tops roots	0.011 0.002	0.011 0.002
0.2 kg ai/ha equiv	radish 3 (Selma 84)	362 [f]	425	tops roots	0.008 0.002	0.009 0.003

Application	Rotational crop (variety)	TSI days [a]	THI days [b]	Sample	[^{14}C-oxadiazin] thiamethoxam TRR, mg/kg	[^{14}C-thiazol] thiamethoxam TRR, mg/kg
0.2 kg ai/ha equiv	spring wheat 1 (Lona)	29 [c]	89	whole tops	0.067	0.11
			124	straw	0.52	0.75
			124	husks	0.39	0.37
			124	grain	0.020	0.029
0.2 kg ai/ha equiv	spring wheat 2 (Lona)	104	180	whole tops	0.056	0.030
			250	straw	0.23	0.17
			250	husks	0.18	0.13
			250	grain	0.085	0.15
0.2 kg ai/ha equiv	spring wheat 3 (Lona)	362 [f]	474	whole tops	0.035	0.019
			492	straw	0.080	0.082
			492	husks	0.072	0.058
			492	grain	0.007	0.004
0.2 kg ai/ha equiv	winter wheat (Galaxie)	180 [e]	250	whole tops	0.023	0.014
			425	whole tops	0.010	0.009
			474	straw	0.057	0.051
			474	husks	0.069	0.052
			474	grain	0.006	0.005

[a] TSI: interval between treatment on soil and sowing of rotation crop, days

[b] THI: interval between treatment on soil and harvest of rotation crop (or sampling of soil), days

[c] Day 29. Oxadiazin label: Soil (0–10 cm) TRR = 0.15 mg/kg. Soil thiamethoxam = 0.10 mg/kg. Thiazol label: Soil (0-10 cm) TRR = 0.14 mg/kg. Soil thiamethoxam = 0.11 mg/kg

[d] Day 119. Oxadiazin label: Soil (0–10 cm) TRR = 0.0.079 mg/kg. Soil thiamethoxam = 0.033 mg/kg Thiazol label: Soil (0–10 cm) TRR = 0.086 mg/kg. Soil thiamethoxam = 0.042 mg/kg

[e] Day 180. Oxadiazin label: Soil (0–10 cm) TRR = 0.074 mg/kg. Soil thiamethoxam = 0.013 mg/kg Thiazol label: Soil (0–10 cm) TRR = 0.055 mg/kg. Soil thiamethoxam = 0.012 mg/kg

[f] Day 362. Oxadiazin label: Soil (0–10 cm) TRR = 0.050 mg/kg. Soil thiamethoxam = 0.008 mg/kg Thiazol label: Soil (0–10 cm) TRR = 0.041 mg/kg. Soil thiamethoxam = 0.006 mg/kg

For the [^{14}C-oxadiazin] label (Sandmeier, 1997, 95PSA42PR1, Table), parent thiamethoxam was the major identified component in lettuce, but the residue levels were very low, 0.0085 and 0.0015 mg/kg. Thiamethoxam (0.019 mg/kg) and CGA 322704 (0.012 mg/kg) were the major identified residues in radish tops from radish sown 29 days after the bare ground treatment. Residues in wheat grain were very low. The TRR was higher in wheat straw than in other wheat commodities and CGA 382191, NOA 421275, NOA 405217 and CGA 265307 were the main identified metabolites. CGA 265307 and CGA 322704 were apparently the most persistent residues, identifiable, but at very low levels, in wheat straw from wheat sown 180 and 362 days after the bare ground treatment.

Table 12 Identified components of the residue found in the rotational crop after a bare ground treatment with [^{14}C-oxadiazin]thiamethoxam at 0.2 kg ai/ha See also Table 11

Sample	Residues, expressed as parent thiamethoxam, mg/kg									
	TRR [a]	NE [b]	thiameth-oxam	NOA 407475	CGA 382191	NOA 421275	NOA 405217	CGA 265307	Metab 4U	CGA 322704
Lettuce 1, heads	0.034	0.0049	0.0085	0.0017	0.0016	0.0018	0.0038			0.004
Lettuce 2, heads	0.012	0.0023	0.0015							0.0016
lettuce 3, heads	0.008									
Radish 1, tops	0.077	0.006	0.019	0.0071	0.0049	0.0058	0.0022	0.0069	0.0014	0.012
roots	0.005									
Radish 2, tops	0.011	0.0017	0.0011					0.0003		0.0007
roots	0.002									
Radish 3, tops	0.008									
roots	0.002									
Spring wheat 1, tops	0.067	0.016	0.0037	0.0042	0.0049	0.0087	0.0033	0.002	0.001	0.005
straw	0.52	0.15	0.0096	0.0041	0.043 [c]	0.041	0.025	0.035	0.015	0.023
husks	0.39	0.091	0.0097	0.020	0.031	0.021	0.019	0.043	0.009	0.061
grain	0.020	0.0082	0.0002					0.0015 [c]		0.0007
Spring wheat 2, tops	0.056	0.0089	0.0011	0.0031	0.0038	0.005	0.0025	0.0021	0.001	0.0075

Sample	Residues, expressed as parent thiamethoxam, mg/kg									
	TRR [a]	NE [b]	thiameth-oxam	NOA 407475	CGA 382191	NOA 421275	NOA 405217	CGA 265307	Metab 4U	CGA 322704
straw	0.23	0.085	0.0034	0.0029	0.013	0.011	0.023 [c]	0.014	0.003	0.013
husks	0.18	0.048	0.0039		0.013	0.008	0.027	0.018	0.002	0.012
grain	0.085	0.070						0.0015	0.0008	0.0003
Spring wheat 3, tops	0.035	0.006						0.0011		0.0009
straw	0.080	0.032						0.0026		0.0022
husks	0.072	0.025						0.0031		0.0022
grain	0.007									
Winter wheat, tops	0.023	0.0051	0.0004					0.0006		0.0045
tops	0.010									
straw	0.057	0.021	0.0002					0.0018		0.0018
husks	0.069	0.020						0.003		0.0015
grain	0.006									

[a] TRR: total radioactive residues.

[b] NE: not extracted.

[c] Major identified components of the residue

For the [^{14}C-thiazol] label (Sandmeier, 1997, 95PSA43PR1, Table 13), parent thiamethoxam was also the major identified component in lettuce, but the residue levels were also very low, 0.0075 and 0.0024 mg/kg. Thiamethoxam (0.023 mg/kg) and CGA 265307 (0.011 mg/kg) were the major identified residues in radish tops from radish sown 29 days after the bare ground treatment. Residues in wheat grain were very low. The TRR was generally higher in wheat straw than in other wheat commodities and NOA 421275, CGA 265307 and CGA 322704 were the main identified metabolites. CGA 265307 and CGA 322704 were apparently the most persistent residues, identifiable, but at very low levels, in wheat straw from wheat sown 180 and 362 days after the bare ground treatment.

Table 13 Identified components of the residue found in the rotational crop after a bare ground treatment with [^{14}C-thiazol]thiamethoxam at 0.2 kg ai/ha See also Table 11

Sample	Residues, expressed as parent thiamethoxam, mg/kg							
	TRR [a]	NE [b]	thiamethoxam	NOA 407475	NOA 421275	CGA 265307	Metab 4U	CGA 322704
Lettuce 1, heads	0.035	0.006	0.0075	0.0016	0.003			0.004
Lettuce 2, heads	0.013	0.003	0.0024					0.002
lettuce 3, heads	0.004							
Radish 1, tops	0.12	0.011	0.023	0.008	0.007	0.011	0.002	0.008
roots	0.007							
Radish 2, tops	0.011							
roots	0.002							
Radish 3, tops	0.009							
roots	0.003							
Spring wheat 1, tops	0.11	0.011	0.005	0.007	0.023	0.004	0.0014	0.011
straw	0.75	0.23	0.038	0.023	0.066 [c]	0.038	0.024	0.044
husks	0.37	0.098	0.019	0.004	0.021	0.053		0.055
grain	0.029	0.019 [c]	0.0001			0.002		0.001
Spring wheat 2, tops	0.030	0.006		0.0005	0.003	0.001	0.0006	0.006
straw	0.17	0.075	0.007		0.008	0.013 [c]	0.003	0.010
husks	0.13	0.065	0.001		0.005	0.013	0.0016	0.008
grain	0.15	0.13				0.002		0.0003
Spring wheat 3, tops	0.019	0.005				0.0007		0.0008
straw	0.082	0.036				0.004		0.004
husks	0.058	0.024				0.004		0.003
grain	0.004							
Winter wheat, tops	0.014	0.004	0.0002			0.0006		0.004
tops	0.009							
straw	0.051	0.022				0.002		0.002
husks	0.052	0.017				0.003		0.002
grain	0.005							

[a] TRR: total radioactive residues.

[b] NE: not extracted.

[c] Major identified components of the residue

Summary of rotational crops

When lettuce, radish and wheat were grown in a rotational crop situation 29, 119 and 362 days after treatment of bare ground with labelled thiamethoxam, TRR levels were generally low: 0.035 mg/kg and below for lettuce; 0.12 mg/kg and below for radish tops; 0.007 mg/kg and below for radish roots and 0.15 mg/kg and below for wheat grain. Higher TRR levels were found in wheat straw: 0.05–0.75 mg/kg.

Parent thiamethoxam was the most commonly detected component of the residue and was present at higher concentrations (up to 0.023 mg/kg) than other components in lettuce and radish. In wheat straw and grain, parent thiamethoxam and metabolite CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) were the most commonly detected. However, in some cases other metabolites were present at higher levels: CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) in wheat grain and 1-methylguanidine (CGA 382191), NOA 405217 (N-nitro-N'-methylguanidine), NOA 421275 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-guanidine) and CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) in wheat straw.

Residues of parent thiamethoxam and some metabolites could occur in rotational crops, but generally at very low levels. Detections would be unlikely except for residues in commodities such as wheat straw.

METHODS OF RESIDUE ANALYSIS

Analytical methods

The Meeting received descriptions and validation data for analytical methods for residues of thiamethoxam and CGA 322704 in animal and plant matrices.

Residues of parent thiamethoxam and metabolite CGA 322704 in plant and animal matrices may be analysed by HPLC-MS or HPLC-UV with an LOQ of 0.01 mg/kg after a series of cleanup steps. A microwave extraction procedure is necessary for good extraction of residues from some animal commodities. Thiamethoxam, CGA 322704 and CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) were not suitable analytes for the multiresidue methods tested.

Animal commodities

Bovine and avian liver (Lin, 2002, 206-97)			
Analyte:	thiamethoxam, CGA 322704	HPLC-MS	Method AG-675—microwave extraction
LOQ:	0.01 mg/kg.		
Description	A portion of liver sample is ground with acetonitrile-water in a homogenizer and the extract is filtered through a filter paper. The filter paper and filter cake are then transferred to a microwave extraction vessel and are subject to further extraction with acetonitrile. During one hour, the extraction mixture is taken through a temperature program up to 150 ºC before filtration through a filter paper. An aliquot is cleaned up by liquid-liquid partition with hexane. Further cleanup is effected on cartridge columns ready for HPLC-MS analysis. See below for further description of the AG-675 procedure.		

Lin (2002, 206–97 and 858–00) showed that, in testing method AG-675, the microwave assisted extraction of avian and bovine livers from metabolism samples increased the extractability of ^{14}C from approximately 50% extracted to approximately 80% extracted.

Campbell (1998, 346001) analysed samples from the metabolism studies using method AG-675. The results are compared in Table 15. Where the concentrations are low, i.e. below approximately 0.05 mg/kg, it is difficult to draw conclusions because of the uncertainties in the data being compared (from different laboratories at different times). For pears and cucumbers, the analytical method concentration of thiamethoxam was approximately 40–90% of the metabolism

value. For thiamethoxam in goat meat, the analytical method result was 56–79% of the metabolism result. But the thiamethoxam concentration in goat milk, measured by method AG-675 was only about 20% of the value from the metabolism study. However, the data are from different laboratories on samples with different storage histories, making interpretation difficult; the metabolism analysis took place in a Swiss laboratory in September 1997 and the AG-675 analysis was in April 1998 in a US laboratory.

Method AG-675 was subject to a laboratory validation for residue analysis of thiamethoxam and CGA 322704 residues in milk, eggs, meat, kidney and liver (Boxwell C, 2004, RJ3513B). An LOQ of 0.01 mg/kg was demonstrated for eggs, meat, liver and kidney and an LOQ of 0.005 mg/kg was shown for milk. The microwave extraction step was included for the liver analyses. Recovery data with both the HPLC-UV finish and the confirmatory LC-MS/MS finish are recorded in Table 14. Linearity and proportionality of response were demonstrated for thiamethoxam and CGA 322704 with both HPLC-UV and HPLC-MS/MS over a 50–80 times concentration range. Enhancement and suppression effects for MS/MS detection were small.

Method AG-675 was subject to an independent laboratory validation for residue analysis of thiamethoxam and CGA 322704 residues in eggs (Bell, 2005, CEMR-2635). An LOQ of 0.01 mg/kg was demonstrated for eggs. Recovery data with both the HPLC-UV finish and the LC-MS finish are recorded in Table 14. Initial analyses produced variable recoveries for both thiamethoxam and CGA 322704. A minor modification to an evaporation step overcame the problem—heating block set at 40 ºC and a gentle stream of nitrogen for evaporation.

Method AG-675 was also subject to an independent laboratory validation for residue analysis of thiamethoxam and CGA 322704 residues in milk and bovine muscle and liver (Rawle, 2004, CEMR-2238). An LOQ of 0.005 mg/kg was demonstrated for milk and 0.01 mg/kg for muscle and liver. Recovery data with both the HPLC-UV finish and the LC-MS finish are recorded in Table 14. The method for liver included the microwave extraction step. Analysis of residues in liver was not possible with the HPLC-UV finish because of too many interfering peaks, but was successful with the LC-MS/MS finish.

Plant commodities

Plant material (Mair, 1995, REM 179.01)			
Analyte:	thiamethoxam	HPLC-UV	Method REM 179.01
LOQ:	0.02 mg/kg.		
Description	A representative sample is homogenized or shaken with water + methanol (8 + 2 by volume). The extract, after filtration through Celite, is diluted with water and cleaned up on a phenyl-phase extraction cartridge and a graphitised non-porous carbon cartridge. The eluate (water + tetrahydrofuran) is evaporated to leave a concentrated water phase which is diluted with water ready for reversed-phase HPLC analysis with UV detection at 255 nm.		
Plant material (Mair, 1998, REM 179.03)			
Analytes:	thiamethoxam, CGA 322704	HPLC-UV	Method REM 179.03
LOQ:	0.02 mg/kg, 0.05 mg/kg for cereal straw, cotton hulls.		
Description	A representative homogenized sample is extracted with water + methanol (1 + 1 by volume). The extract, after filtration through Celite, is diluted with water and cleaned up on a phenyl-phase extraction cartridge and a graphitised non-porous carbon cartridge. The eluate is evaporated to leave a concentrated water phase which is diluted with water ready for reversed-phase HPLC analysis with UV detection at 255 nm (thiamethoxam) and 270 nm (CGA 322704). For fatty or oily crops, samples are extracted with pure acetonitrile in place of the water + methanol and the acetonitrile phase is washed with hexane, which is discarded, in the first clean-up step. Confirmatory analysis: LC-MS-MS		
Animal and crop substrates (Campbell, 1998, 346001)			
Analytes:	thiamethoxam, CGA 322704	HPLC-UV, HPLC-MS	Method AG-675
LOQ:	0.01 mg/kg for most substrates, 0.005 mg/kg for milk and fruit juices.		
Description	Samples are extracted by homogenization in acetonitrile + water (80 + 20). Liquid samples, e.g. eggs, milk, juices, are extracted by shaking with acetonitrile + water (80 + 20). An aliquot of the extract is evaporated until only an aqueous phase remains and the residues are subject to cleanup on a phenyl		

	cartridge and then partition into ethyl acetate. Further cleanup is effected on an amino cartridge column and an alumina cartridge column. The eluate is then evaporated and the residues taken up in mobile phase (hexane + ethyl acetate + isopropanol + methanol) for normal phase HPLC-UV analysis. Confirmation analysis is possible by reversed phase HPLC-MS. Cotton, forages and fodders require an extra cleanup step with an anion exchange SPE column immediately after the extraction.		
Lettuce, tomato, grape, tobacco (Crook, 2004, REM 179.06)			
Analytes:	thiamethoxam, CGA 322704	LC-MS/MS	Method REM 179.06
LOQ:	0.02 mg/kg.		
Description	Samples are homogenized with water + methanol (50 + 50 by volume), but with adjustment of water volume for water content of sample. After the mixture is centrifuged, the supernatant liquid from lettuce and tomato samples may be taken, without cleanup, for dilution and LC-MS/MS analysis. The supernatant liquids from grape and tobacco samples are cleaned up on suitable cartridges, with residues eluting in acetonitrile. After the solvent is evaporated, the residues are taken up in acetonitrile + water for LC-MS/MS analysis. Protonated molecular ions (thiamethoxam m/z 292 and CGA 322704 m/z 250) are selected for fragmentation and produce the most abundant ions 211.3 and 169.3, respectively, for quantitative analysis.		
Tea leaves (Kato and Odanaka, 1998, 30-Nov-1998)			
Analytes:	thiamethoxam, CGA 322704	HPLC-UV	
LOQ:	0.05 mg/kg.		
Description	Tea leaves are swollen by added water for 2 hours and are then extracted with acetone. The extract is cleaned up on a porous diatomite column, a cation exchange column and an alumina column. The cleaned up extract is then analysed by HPLC-UV.		

Pears from the metabolism study were extracted and analysed by method REM 179.3 for comparison with the ^{14}C measurements (Tribolet, 1998, 103/98). The pear specimen was from the [^{14}C-oxadiazin]thiamethoxam treatment (Capps, 1998, ABR-98041). By combustion, the TRR content was 0.683 mg/kg, expressed as thiamethoxam equivalents. Extractability by method REM 179.3 of ^{14}C was 79% and 78% for shaking and maceration respectively. Measured concentrations of thiamethoxam in the pear were 0.196, 0.143 and 0.130 mg/kg for the original metabolism study, by radiolabel analysis on the LC fraction and by HPLC-UV respectively. Similarly, measured concentrations of CGA 322704 (expressed as thiamethoxam) were 0.134, 0.0875 and 0.0775 mg/kg for the same three situations.

Method REM 179.03 was subject to an independent laboratory validation for residue analysis of tomatoes and wheat grain (Rawle, 2004, CEMR-2237). Recovery data with both the HPLC-UV finish and the confirmatory LC-MS/MS finish are recorded in Table 14. Initially, recoveries were low on wheat grain and interfering peaks occurred in the HPLC-UV trace. A minor modification corrected the problem—dilution of an aliquot of extract with 20 ml water instead of 10 ml before the first solid-phase cartridge cleanup.

Quantitative analyses by the confirmatory LC-MS finish were generally in good agreement with those of the HPLC-UV finish for method AG-675 (Campbell, 1998, 346001) with highest relative deviations with concentrations near LOQ. Recovery data are included in Table 14.

Analytical method AG-675 was successfully subjected to independent laboratory validation (Tauber and McLean, 1999, 615-99) with recovery testing of thiamethoxam and CGA 322704 from a grass sample. Recovery testing data are included in Table 14.

Analytical method AG-675 was successfully subjected to independent laboratory validation (Crawford, 1998, 490-98) with recovery testing of thiamethoxam and CGA 322704 from samples of milk, eggs, bovine liver, tomatoes, apple wet pomace, lettuce, wheat grain, wheat straw, wheat forage and cotton seed[19]. The first test of the method was successful for all samples except eggs, where

[19] Crawford, 1998, 490–98. ILV of method 490–98. In this study, recoveries at low concentrations cannot be used because the analytical data are apparently rounded before the recovery is calculated. For example, recoveries from milk at 0.005 and 0.020 mg mg/kg are all exactly 100%.

bumping and foaming during an evaporation step resulted in loss of residues. The second attempt with eggs was successful after minor method modifications—taking a smaller aliquot and adjusting solvent volumes. Recovery testing data are included in Table 14.

Table 14 Analytical recoveries for spiked thiamethoxam and CGA 322704 in various substrates.

Commodity	Spiked compound	Spike conc, mg/kg	n	Mean recov%	Range recov%	Method	Ref
Apple	thiamethoxam	0.02	3	86%	79–92%	REM 179.03 HPLC-UV	503/98
Apple	thiamethoxam	0.2	3	88%	84–93%	REM 179.03 HPLC-UV	503/98
Apple	CGA 322704	0.02	3	88%	83–92%	REM 179.03 HPLC-UV	503/98
Apple	CGA 322704	0.2	3	80%	73–93%	REM 179.03 HPLC-UV	503/98
Apple	thiamethoxam	0.02 0.2	6	89%	84–97%	REM 179.01	REM 179.01
Apple juice	thiamethoxam	0.005–0.5	5	86%	82–89%	AG-675 HPLC-UV	346001
Apple juice	CGA 322704	0.005–0.5	5	82%	77–88%	AG-675 HPLC-UV	346001
Apple pomace	thiamethoxam	0.2	2		87, 90%	AG-675	490–98
Apple pomace	CGA 322704	0.2	2		89, 91%	AG-675	490–98
Apple wet pomace	thiamethoxam	0.01–1.0	4	73%	69–76%	AG-675 HPLC-UV	346001
Apple wet pomace	CGA 322704	0.01–1.0	4	78%	73–81%	AG-675 HPLC-UV	346001
Avian liver	thiamethoxam	0.01 1.0	2		77% 72%	AG-675-microwave	206–97
Avian liver	CGA 322704	0.01 1.0	6	100%	82–117%	AG-675-microwave	206–97
Barley grain	thiamethoxam	0.02	3	87%	79–96%	REM 179.03 HPLC-UV	503/98
Barley grain	thiamethoxam	0.2	3	87%	82–92%	REM 179.03 HPLC-UV	503/98
Barley grain	CGA 322704	0.02	3	81%	77–87%	REM 179.03 HPLC-UV	503/98
Barley grain	CGA 322704	0.2	3	79%	73–83%	REM 179.03 HPLC-UV	503/98
Barley straw	thiamethoxam	0.05	3	71%	65–77%	REM 179.03 HPLC-UV	503/98
Barley straw	thiamethoxam	0.5	3	76%	70–84%	REM 179.03 HPLC-UV	503/98
Barley straw	CGA 322704	0.05	3	88%	86–89%	REM 179.03 HPLC-UV	503/98
Barley straw	CGA 322704	0.5	3	75%	68–86%	REM 179.03 HPLC-UV	503/98
Bovine liver	thiamethoxam	0.01 1.0	4	84%	78–97%	AG-675-microwave	206–97
Bovine liver	CGA 322704	0.01 1.0	8	99%	82–112%	AG-675-microwave	206–97
Bovine liver	thiamethoxam	0.01 0.1	10	98%	76–115%	AG-675 LC-MS [c]	CEMR-2238
Bovine liver	CGA 322704	0.01 0.1	10	105%	75–118%	AG-675 LC-MS [c]	CEMR-2238
Bovine muscle	thiamethoxam	0.01 0.1	10	92%	77–104%	AG-675 LC-UV	CEMR-2238
Bovine muscle	thiamethoxam	0.01 0.1	10	85%	79–97%	AG-675 LC-MS	CEMR-2238
Bovine muscle	CGA 322704	0.01 0.1	10	95%	86–104%	AG-675 LC-UV	CEMR-2238
Bovine muscle	CGA 322704	0.01 0.1	10	87%	79–100%	AG-675 LC-MS	CEMR-2238
Broccoli	thiamethoxam	0.01–0.20	4	88%	76–101%	AG-675 HPLC-UV	346001
Broccoli	CGA 322704	0.01–0.20	4	90%	82–95%	AG-675 HPLC-UV	346001
Cabbage	thiamethoxam	0.02 0.2	6	96%	88–110%	REM 179.01	REM 179.01
Cotton hulls	thiamethoxam	0.05	3	90%	83–96%	REM 179.03 HPLC-UV	503/98
Cotton hulls	thiamethoxam	0.5	3	91%	89–94%	REM 179.03 HPLC-UV	503/98
Cotton hulls	CGA 322704	0.05	3	93%	86–99%	REM 179.03 HPLC-UV	503/98
Cotton hulls	CGA 322704	0.5	3	94%	91–96%	REM 179.03 HPLC-UV	503/98
Cotton seed	thiamethoxam	0.01–2.0	4	68%	58–74%	AG-675 LC-MS	346001
Cotton seed	CGA 322704	0.01–2.0	4	78%	70–89%	AG-675 LC-MS	346001
Cotton seed	thiamethoxam	0.10	2		100, 103%	AG-675	490–98
Cotton seed	CGA 322704	0.10	2		93, 99%	AG-675	490–98
Cotton seed	thiamethoxam	0.02	3	81%	77–85%	REM 179.03 HPLC-UV	503/98
Cotton seed	thiamethoxam	0.2	3	81%	73–88%	REM 179.03 HPLC-UV	503/98
Cotton seed	CGA 322704	0.02	3	83%	81–85%	REM 179.03 HPLC-UV	503/98
Cotton seed	CGA 322704	0.2	3	85%	80–88%	REM 179.03 HPLC-UV	503/98
Cotton seed oil	thiamethoxam	0.01–0.5	4	79%	61–100%	AG-675 HPLC-UV	346001
Cotton seed oil	CGA 322704	0.01–0.5	4	83%	60–108%	AG-675 HPLC-UV	346001
Cucumber	thiamethoxam	0.01 0.5	3	87%	83–91%	AG-675 HPLC-UV	346001
Cucumber	CGA 322704	0.01 0.5	2	91%	90, 92%	AG-675 HPLC-UV	346001
Cucumber	thiamethoxam	0.02	2	87%	86, 88%	REM 179.03 HPLC-UV	503/98
Cucumber	thiamethoxam	0.2	2	90%	83, 96%	REM 179.03 HPLC-UV	503/98
Cucumber	CGA 322704	0.02	2	89%	84, 94%	REM 179.03 HPLC-UV	503/98
Cucumber	CGA 322704	0.2	2	83%	74, 92%	REM 179.03 HPLC-UV	503/98
Eggs	thiamethoxam	0.01–2.0	4	85%	81–92%	AG-675 HPLC-UV	346001
Eggs	CGA 322704	0.01–2.0	4	89%	85–95%	AG-675 HPLC-UV	346001

Commodity	Spiked compound	Spike conc, mg/kg	n	Mean recov%	Range recov%	Method	Ref
Eggs	thiamethoxam	0.10	2		95, 92%	AG-675	490–98
Eggs	CGA 322704	0.10	2		99, 97%	AG-675	490–98
Eggs	thiamethoxam	0.01 0.1	10	87%	83–91%	AG-675 HPLC-UV	CEMR-2635
Eggs	thiamethoxam	0.01 0.1	10	90%	74–111%	AG-675 LC-MS	CEMR-2635
Eggs	CGA 322704	0.01 0.1	10	90%	84–98%	AG-675 HPLC-UV	CEMR-2635
Eggs	CGA 322704	0.01 0.1	10	88%	69–108%	AG-675 LC-MS	CEMR-2635
Eggs	thiamethoxam	0.01 0.1	10	83%	74–88%	AG-675 HPLC-UV	RJ3513B
Eggs	thiamethoxam	0.01 0.1	10	80%	72–88%	AG-675 HPLC-MS/MS	RJ3513B
Eggs	CGA 322704	0.01 0.1	10	96%	83–117%	AG-675 HPLC-UV	RJ3513B
Eggs	CGA 322704	0.01 0.1	10	81%	73–85%	AG-675 HPLC-MS/MS	RJ3513B
Fat, bovine	thiamethoxam	0.01–2.0	5	83%	79–86%	AG-675 HPLC-UV	346001
Fat, bovine	CGA 322704	0.01–2.0	5	87%	85–90%	AG-675 HPLC-UV	346001
Fat, poultry	thiamethoxam	0.01–1.0	5	89%	83–98%	AG-675 HPLC-UV	346001
Fat, poultry	CGA 322704	0.01–1.0	5	93%	89–94%	AG-675 HPLC-UV	346001
Grapes [b]	thiamethoxam	0.02 0.2	10	80%	73–91%	REM 179.06	REM 179.06
Grapes [b]	CGA 322704	0.02 0.2	10	94%	81–106%	REM 179.06	REM 179.06
Grass	thiamethoxam	0.05 0.50	10	92%	77–103%	AG-675 LC-MS/MS	615–99
Grass	CGA 322704	0.05 0.50	10	90%	72–107%	AG-675 LC-MS/MS	615–99
Kidney	thiamethoxam	0.01 0.1	10	92%	87–97%	AG-675 HPLC-UV	RJ3513B
Kidney	thiamethoxam	0.01 0.1	10	95%	92–102%	AG-675 HPLC-MS/MS	RJ3513B
Kidney	CGA 322704	0.01 0.1	10	97%	85–107%	AG-675 HPLC-UV	RJ3513B
Kidney	CGA 322704	0.01 0.1	10	99%	93–108%	AG-675 HPLC-MS/MS	RJ3513B
Kidney, bovine	thiamethoxam	0.01–1.0	4	86%	83–91%	AG-675 HPLC-UV	346001
Kidney, bovine	CGA 322704	0.01–1.0	4	90%	87–94%	AG-675 HPLC-UV	346001
Lettuce	thiamethoxam	2.0	2		100, 92%	AG-675	490–98
Lettuce	CGA 322704	2.0	2		101, 94%	AG-675	490–98
Lettuce	thiamethoxam	0.02	3	90%	82–94%	REM 179.03 HPLC-UV	503/98
Lettuce	thiamethoxam	0.2	3	93%	88–96%	REM 179.03 HPLC-UV	503/98
Lettuce	CGA 322704	0.02	3	83%	76–90%	REM 179.03 HPLC-UV	503/98
Lettuce	CGA 322704	0.2	3	83%	81–85%	REM 179.03 HPLC-UV	503/98
Lettuce	thiamethoxam	0.02 0.2	10	96%	82–109%	REM 179.06	REM 179.06
Lettuce	CGA 322704	0.02 0.2	10	85%	71–101%	REM 179.06	REM 179.06
Liver	thiamethoxam	0.01 0.1	10	82%	67–106%	AG-675 HPLC-MS/MS [c]	RJ3513B
Liver	CGA 322704	0.01 0.1	10	91%	72–105%	AG-675 HPLC-MS/MS [c]	RJ3513B
Liver, bovine	thiamethoxam	0.01–0.5	5	86%	84–90%	AG-675 HPLC-UV	346001
Liver, bovine	CGA 322704	0.01–0.5	5	89%	86–92%	AG-675 HPLC-UV	346001
Liver, bovine	thiamethoxam	0.10	2		88, 87%	AG-675	490–98
Liver, bovine	CGA 322704	0.10	2		90, 92%	AG-675	490–98
Maize grain	thiamethoxam	0.02 0.2	19	89%	81–102%	REM 179.01	REM 179.01
Maize plant	thiamethoxam	0.05 0.5	12	82%	71–98%	REM 179.01	REM 179.01
Meat	thiamethoxam	0.01 0.1	10	90%	74–106%	AG-675 HPLC-UV	RJ3513B
Meat	thiamethoxam	0.01 0.1	10	92%	77–105%	AG-675 HPLC-MS/MS	RJ3513B
Meat	CGA 322704	0.01 0.1	10	94%	78–103%	AG-675 HPLC-UV	RJ3513B
Meat	CGA 322704	0.01 0.1	10	96%	79–109%	AG-675 HPLC-MS/MS	RJ3513B
Milk	thiamethoxam	0.005 0.05	10	88%	79–99%	AG-675 LC-UV	CEMR-2238
Milk	thiamethoxam	0.005 0.05	10	89%	85–93%	AG-675 LC-MS	CEMR-2238
Milk	CGA 322704	0.005 0.05	10	75%	68–86%	AG-675 LC-UV	CEMR-2238
Milk	CGA 322704	0.005 0.05	10	92%	87–98%	AG-675 LC-MS	CEMR-2238
Milk	thiamethoxam	0.005 0.05	10	89%	79–104%	AG-675 HPLC-UV	RJ3513B
Milk	thiamethoxam	0.005 0.05	10	88%	79–97%	AG-675 HPLC-MS/MS	RJ3513B
Milk	CGA 322704	0.005 0.05	10	90%	80–103%	AG-675 HPLC-UV	RJ3513B
Milk	CGA 322704	0.005 0.05	10	92%	84–107%	AG-675 HPLC-MS/MS	RJ3513B
Milk, goat	thiamethoxam	0.005 0.5	3	102%	88–113%	AG-675 HPLC-UV	346001
Milk, goat	CGA 322704	0.005 0.5	3	94%	90–96%	AG-675 HPLC-UV	346001
Muscle, goat	thiamethoxam	0.01 1.0	3	87%	86–88%	AG-675 HPLC-UV	346001
Muscle, goat	CGA 322704	0.01 1.0	3	89%	88–89%	AG-675 HPLC-UV	346001
Oilseed rape	thiamethoxam	0.02	5	71%	61–89%	REM 179.03 HPLC-UV	RJ3509B
Oilseed rape	thiamethoxam	0.02	5	88%	85–91%	REM 179.03 LC-MS/MS	RJ3509B
Oilseed rape	thiamethoxam	0.2	5	79%	75–83%	REM 179.03 HPLC-UV	RJ3509B
Oilseed rape	thiamethoxam	0.2	5	85%	82–88%	REM 179.03 LC-MS/MS	RJ3509B

Commodity	Spiked compound	Spike conc, mg/kg	n	Mean recov%	Range recov%	Method	Ref
Oilseed rape	CGA 322704	0.02	5	85%	76–93%	REM 179.03 HPLC-UV	RJ3509B
Oilseed rape	CGA 322704	0.02	5	82%	79–85%	REM 179.03 LC-MS/MS	RJ3509B
Oilseed rape	CGA 322704	0.2	5	76%	71–81%	REM 179.03 HPLC-UV	RJ3509B
Oilseed rape	CGA 322704	0.2	5	83%	79–87%	REM 179.03 LC-MS/MS	RJ3509B
Orange	thiamethoxam	0.02	5	87%	80–98%	REM 179.03 HPLC-UV	RJ3509B
Orange	thiamethoxam	0.02	5	97%	92–102%	REM 179.03 LC-MS/MS	RJ3509B
Orange	thiamethoxam	0.2	5	87%	84–90%	REM 179.03 HPLC-UV	RJ3509B
Orange	thiamethoxam	0.2	5	95%	93–96%	REM 179.03 LC-MS/MS	RJ3509B
Orange	CGA 322704	0.02	5	88%	67–100%	REM 179.03 HPLC-UV	RJ3509B
Orange	CGA 322704	0.02	5	91%	87–95%	REM 179.03 LC-MS/MS	RJ3509B
Orange	CGA 322704	0.2	5	87%	84–92%	REM 179.03 HPLC-UV	RJ3509B
Orange	CGA 322704	0.2	5	93%	91–95%	REM 179.03 LC-MS/MS	RJ3509B
Peach	thiamethoxam	0.02	2	89%	84, 94%	REM 179.03 HPLC-UV	503/98
Peach	thiamethoxam	0.2	2	78%	77, 78%	REM 179.03 HPLC-UV	503/98
Peach	CGA 322704	0.02	2	81%	79, 82%	REM 179.03 HPLC-UV	503/98
Peach	CGA 322704	0.2	2	83%	76, 90%	REM 179.03 HPLC-UV	503/98
Pears	thiamethoxam	0.01 0.5	4	95%	85–104%	AG-675 HPLC-UV	346001
Pears	CGA 322704	0.01 0.5	4	97%	88–108%	AG-675 HPLC-UV	346001
Peas, empty pods	thiamethoxam	0.02 0.2	6	86%	82–91%	REM 179.01	REM 179.01
Peas, seeds	thiamethoxam	0.02	3	87%	77–88%	REM 179.03 HPLC-UV	503/98
Peas, seeds	thiamethoxam	0.2	3	78%	73–82%	REM 179.03 HPLC-UV	503/98
Peas, seeds	CGA 322704	0.02	3	79%	73–86%	REM 179.03 HPLC-UV	503/98
Peas, seeds	CGA 322704	0.2	3	75%	68–82%	REM 179.03 HPLC-UV	503/98
Peas, seeds	thiamethoxam	0.02 0.2	6	93%	82–101%	REM 179.01	REM 179.01
Peppers, green	thiamethoxam	0.01–1.0	5	89%	85–95%	AG-675 HPLC-UV	346001
Peppers, green	CGA 322704	0.01–1.0	5	90%	86–92%	AG-675 HPLC-UV	346001
Peppers, sweet	thiamethoxam	0.02	3	96%	93–100%	REM 179.03 HPLC-UV	503/98
Peppers, sweet	thiamethoxam	0.2	3	96%	94–99%	REM 179.03 HPLC-UV	503/98
Peppers, sweet	CGA 322704	0.02	3	77%	62–102%	REM 179.03 HPLC-UV	503/98
Peppers, sweet	CGA 322704	0.2	3	79%	67–90%	REM 179.03 HPLC-UV	503/98
Potato tubers	thiamethoxam	0.01–0.5	5	89%	83–96%	AG-675 HPLC-UV	346001
Potato tubers	CGA 322704	0.01–0.5	5	93%	89–100%	AG-675 HPLC-UV	346001
Potato tubers	thiamethoxam	0.02 0.2	6	90%	82–99%	REM 179.01	REM 179.01
Sorghum, forage	thiamethoxam	0.01–1.0	4	80%	68–86%	AG-675 LC-MS	346001
Sorghum, forage	CGA 322704	0.01–1.0	4	86%	78–96%	AG-675 LC-MS	346001
Spinach	thiamethoxam	0.01–0.50	5	98%	79–117%	AG-675 HPLC-UV	346001
Spinach	CGA 322704	0.01–0.50	5	98%	79–117%	AG-675 HPLC-UV	346001
Sugar beet leaves	thiamethoxam	0.05 0.5	6	98%	90–107%	REM 179.01	REM 179.01
Sugar beet roots	thiamethoxam	0.02 0.2	6	83%	80–86%	REM 179.01	REM 179.01
Sunflower seed	thiamethoxam	0.02	2	95%	89, 101%	REM 179.03 HPLC-UV	503/98
Sunflower seed	thiamethoxam	0.2	2	90%	78, 81%	REM 179.03 HPLC-UV	503/98
Sunflower seed	CGA 322704	0.02	2	79%	74, 86%	REM 179.03 HPLC-UV	503/98
Sunflower seed	CGA 322704	0.2	2	81%	77, 84%	REM 179.03 HPLC-UV	503/98
Tomato	thiamethoxam	0.01–1.0	5	86%	68–110%	AG-675 HPLC-UV	346001
Tomato	CGA 322704	0.01–1.0	5	95%	90–105%	AG-675 HPLC-UV	346001
Tomato	thiamethoxam	0.10	2		100, 82'	AG-675	490–98
Tomato	CGA 322704	0.10	2		102, 83%	AG-675	490–98
Tomato	thiamethoxam	0.02	5	89%	74–100%	REM 179.03 HPLC-UV	503/98
Tomato	thiamethoxam	0.02	7	90%	81–106%	REM 179.03 HPLC-UV	503/98
Tomato	thiamethoxam	0.2	5	97%	83–114%	REM 179.03 HPLC-UV	503/98
Tomato	thiamethoxam	0.2	7	94%	90–102%	REM 179.03 HPLC-UV	503/98
Tomato	CGA 322704	0.02	5	82%	67–102%	REM 179.03 HPLC-UV	503/98
Tomato	CGA 322704	0.02	7	84%	82–87%	REM 179.03 HPLC-UV	503/98
Tomato	CGA 322704	0.2	5	89%	78–109%	REM 179.03 HPLC-UV	503/98
Tomato	CGA 322704	0.2	7	84%	69–99%	REM 179.03 HPLC-UV	503/98
Tomato	thiamethoxam	0.02	5	100%	85–107% [a]	REM 179.03 HPLC-UV	CEMR-2237
Tomato	thiamethoxam	0.02	5	87%	78–95% [a]	REM 179.03 LC-MS/MS	CEMR-2237
Tomato	thiamethoxam	0.2	5	99%	85–123%	REM 179.03 HPLC-UV	CEMR-2237
Tomato	thiamethoxam	0.2	5	90%	80–95%	REM 179.03 LC-MS/MS	CEMR-2237
Tomato	CGA 322704	0.02	5	81%	74–87% [a]	REM 179.03 HPLC-UV	CEMR-2237

Commodity	Spiked compound	Spike conc, mg/kg	n	Mean recov%	Range recov%	Method	Ref
Tomato	CGA 322704	0.02	5	86%	77–95% [a]	REM 179.03 LC-MS/MS	CEMR-2237
Tomato	CGA 322704	0.2	5	85%	76–91%	REM 179.03 HPLC-UV	CEMR-2237
Tomato	CGA 322704	0.2	5	86%	71–93%	REM 179.03 LC-MS/MS	CEMR-2237
Tomato	thiamethoxam	0.02 0.2	6	87%	82–93%	REM 179.01	REM 179.01
Tomato	thiamethoxam	0.02 0.2	10	108%	102–113%	REM 179.06	REM 179.06
Tomato	CGA 322704	0.02 0.2	10	94%	87–102%	REM 179.06	REM 179.06
Tomato	thiamethoxam	0.02	5	92%	82–101%	REM 179.03 HPLC-UV	RJ3509B
Tomato	thiamethoxam	0.02	5	101%	99–103%	REM 179.03 LC-MS/MS	RJ3509B
Tomato	thiamethoxam	0.2	5	88%	86–90%	REM 179.03 HPLC-UV	RJ3509B
Tomato	thiamethoxam	0.2	5	95%	93–97%	REM 179.03 LC-MS/MS	RJ3509B
Tomato	CGA 322704	0.02	5	86%	70–97%	REM 179.03 HPLC-UV	RJ3509B
Tomato	CGA 322704	0.02	5	88%	85–90%	REM 179.03 LC-MS/MS	RJ3509B
Tomato	CGA 322704	0.2	5	90%	84–95%	REM 179.03 HPLC-UV	RJ3509B
Tomato	CGA 322704	0.2	5	90%	85–92%	REM 179.03 LC-MS/MS	RJ3509B
Tomato paste	thiamethoxam	0.01–2.0	5	78%	77–79%	AG-675 HPLC-UV	346001
Tomato paste	CGA 322704	0.01–2.0	5	81%	77–84%	AG-675 HPLC-UV	346001
Wheat forage	thiamethoxam	0.10	2		85, 82%	AG-675	490–98
Wheat forage	CGA 322704	0.10	2		89, 84%	AG-675	490–98
Wheat grain	thiamethoxam	0.01–0.5	5	91%	78–102%	AG-675 HPLC-UV	346001
Wheat grain	CGA 322704	0.01–0.5	5	88%	78–94%	AG-675 HPLC-UV	346001
Wheat grain	thiamethoxam	0.10	2		94, 94%	AG-675	490–98
Wheat grain	CGA 322704	0.10	2		96, 97%	AG-675	490–98
Wheat grain	thiamethoxam	0.02	3	75%	70–82%	REM 179.03 HPLC-UV	503/98
Wheat grain	thiamethoxam	0.2	3	79%	75–82%	REM 179.03 HPLC-UV	503/98
Wheat grain	CGA 322704	0.02	3	76%	68–84%	REM 179.03 HPLC-UV	503/98
Wheat grain	CGA 322704	0.2	3	73%	68–77%	REM 179.03 HPLC-UV	503/98
Wheat grain	thiamethoxam	0.02	5	79%	77–85%	REM 179.03 HPLC-UV	CEMR-2237
Wheat grain	thiamethoxam	0.02	5	83%	80–86%	REM 179.03 LC-MS/MS	CEMR-2237
Wheat grain	thiamethoxam	0.2	5	79%	75–85%	REM 179.03 HPLC-UV	CEMR-2237
Wheat grain	thiamethoxam	0.2	5	79%	74–84%	REM 179.03 LC-MS/MS	CEMR-2237
Wheat grain	CGA 322704	0.02	5	82%	73–89%	REM 179.03 HPLC-UV	CEMR-2237
Wheat grain	CGA 322704	0.02	5	79%	78–82%	REM 179.03 LC-MS/MS	CEMR-2237
Wheat grain	CGA 322704	0.2	5	78%	75–80%	REM 179.03 HPLC-UV	CEMR-2237
Wheat grain	CGA 322704	0.2	5	79%	78–80%	REM 179.03 LC-MS/MS	CEMR-2237
Wheat grain	thiamethoxam	0.02	5	72%	65–77%	REM 179.03 HPLC-UV	RJ3509B
Wheat grain	thiamethoxam	0.02	5	88%	86–90%	REM 179.03 LC-MS/MS	RJ3509B
Wheat grain	thiamethoxam	0.2	5	77%	75–79%	REM 179.03 HPLC-UV	RJ3509B
Wheat grain	thiamethoxam	0.2	5	83%	80–85%	REM 179.03 LC-MS/MS	RJ3509B
Wheat grain	CGA 322704	0.02	5	85%	78–92%	REM 179.03 HPLC-UV	RJ3509B
Wheat grain	CGA 322704	0.02	5	80%	77–82%	REM 179.03 LC-MS/MS	RJ3509B
Wheat grain	CGA 322704	0.2	5	81%	75–85%	REM 179.03 HPLC-UV	RJ3509B
Wheat grain	CGA 322704	0.2	5	79%	76–81%	REM 179.03 LC-MS/MS	RJ3509B
Wheat straw	thiamethoxam	0.10	2		88, 88%	AG-675	490–98
Wheat straw	CGA 322704	0.10	2		90, 94%	AG-675	490–98
Wheat straw	thiamethoxam	0.05	3	73%	67–79%	REM 179.03 HPLC-UV	503/98
Wheat straw	thiamethoxam	0.5	3	80%	70–86%	REM 179.03 HPLC-UV	503/98
Wheat straw	CGA 322704	0.05	3	71%	55–85%	REM 179.03 HPLC-UV	503/98
Wheat straw	CGA 322704	0.5	3	70%	66–74%	REM 179.03 HPLC-UV	503/98

[a] CEMR-2237. One analytical run produced recoveries of 206-260%, probably contamination, and was not included in the calculated mean.

[b] Grapes—validation data without including SPE cartridge cleanup.

[c] Microwave assisted extraction.

Table 15 Comparison of method AG-675 analytical results with concentrations of thiamethoxam and CGA 322704 measured during the ^{14}C metabolism studies (Campbell, 1998, 346001).

Substrate	Metabolism ref	Thiamethoxam, mg/kg		CGA 322704, mg/kg [a]	
		Metabolism analysis	AG-675 analysis [b]	Metabolism analysis	AG-675 analysis [b]
Pear	ABR-98041, 198–96	0.20	0.15–0.18	0.134 (0.11)	0.08–0.09
Maize grain[c]	95PSA41PR2, 19/97	0.006	< 0.01	0.007 (0.006)	< 0.01
Maize fodder	95PSA41PR2, 19/97	0.047	0.02–0.03	0.034 (0.029)	0.02–0.02
Cucumber	ABR-98048, 282–95	0.10	0.04–0.05	0.013 (0.011)	< 0.01
Cucumber	ABR-98048, 282–95	0.044	0.02–0.04	0.005 (0.0043)	0.01–0.02
Goat meat	027AM03	1.0	0.56–0.79	0.196 (0.17)	0.04–0.06
Goat milk	027AM03	0.37	0.06–0.09	0.514 (0.44)	0.12–0.17

[a] Residue concentrations of CGA 322704 in the metabolism studies are expressed as parent compound. Expression as CGA 322704 is shown in parentheses (MW correction of ×0.86).

[b] Samples were analysed in triplicate. The range is reported.

[c] Crook, 1998, 346001. Table VI. Sample identification numbers in the metabolism study were not provided for corn grain and corn fodder. Supplementary information was provided by the company to link the samples from the metabolism studies with the analyses by method AG-675.

Walser (1997, 175/97) examined multiresidue DFG Method S 19 for the analysis of thiamethoxam and CGA 322704 residues in potatoes, wheat grain and rapeseed.

DFG Method S 19 was suitable for the analysis of thiamethoxam residues in wheat grain and potatoes. It was not suitable for the analysis of thiamethoxam residues in rapeseed or for the analysis of CGA 322704 residues in any substrate. Too many interfering peaks occurred in the chromatograms from rapeseed samples. The GC peak of CGA 322704 shows strong tailing and is not suitable for quantitative analysis.

Pelz and Steinhauer (2001, SYN-0107V) tested an extended revision of Method DFG S 19 for the analysis of thiamethoxam residues in rapeseed and concluded that reliable determination of thiamethoxam residues at 0.02–0.2 mg/kg could not be achieved with sufficient accuracy. The method is not applicable to the determination of thiamethoxam residues in rapeseed.

Lin (1998, ABR-98054) examined the applicability of the FDA multiresidue methods (FDA Pesticide Analytical Manual, Volume I) for the analysis of residues of thiamethoxam, CGA 322704 and CGA 265307 in foods and animal feeds. Thiamethoxam provided adequate detector responses in the GLC systems and it was partially recovered in the method without cleanup. However, it was not recovered from the cleanup columns. CGA 322704 and CGA 265307 did not produce adequate detector responses to any of the multiresidue method systems. Thiamethoxam, CGA 322704 and CGA 265307 are not suitable analytes for the multiresidue methods tested.

Stability of residues in stored analytical samples

Information was received on the freezer storage stability of thiamethoxam and metabolite CGA 322704 at residue concentrations expected in apples, tomatoes, potatoes tubers, rape seed, maize grain, cranberries, hops, barley grain, barley hay, barley straw, pearled barley and barley flour. For the animal commodities, beef, liver, milk and eggs, freezer storage stability data were available for thiamethoxam and two metabolites CGA 322704 and CGA 265307.

Maier (1998, 112/96) tested the freezer storage stability of thiamethoxam residues in homogenized samples in a freezer below approximately –18 ºC for two years. The residues in apples were incurred residues from a field trial. Other homogenized commodities were spread in a thin layer and sprayed with a thiamethoxam solution to produce suitable residue levels for the tests. The analyses were validated with procedural recoveries at each testing interval (Table 16).

Table 16 Freezer storage stability data for thiamethoxam in plant matrices. Residues are unadjusted for analytical recoveries. The residues in apples were incurred residues. Other homogenized commodities were sprayed with a thiamethoxam solution.

Storage interval, days	Procedural recov %	thiamethoxam, mg/kg	Storage interval, days	Procedural recov %	thiamethoxam, mg/kg
APPLES, with incurred residues from a field residue trial, were homogenized and stored in polyethylene containers below approx –18 ˚C (Maier, 1998, 112/96).			TOMATOES were homogenized and sprayed with thiamethoxam and stored in polyethylene containers below approx –18 ˚C (Maier, 1998, 112/96).		
0	87% 94%	0.11 0.13 0.12	0	95% 94%	0.68 0.61 0.63
32	86% 88%	0.12 0.12 0.12	32	87% 86%	0.72 0.66 0.56
102	89% 90%	0.12 0.13 0.11	102	74% 78%	0.45 0.51 0.56
188	65% 77%	0.09 0.10 0.09	188	76% 78%	0.40 0.42 0.48
360	85% 82%	0.11 0.11 0.12	360	98% 92%	0.65 0.56 0.69
738	90% 94%	0.13 0.12 0.13	759	107% 105%	0.63 0.72 0.67
residues apparently stable			residues apparently stable		
POTATO TUBERS were homogenized and sprayed with thiamethoxam and stored in polyethylene containers below approx –18 ˚C (Maier, 1998, 112/96).			RAPE SEED was homogenized and sprayed with thiamethoxam and stored in polyethylene containers below approx –18 ˚C (Maier, 1998, 112/96).		
0	86% 95%	0.68 0.67 0.68	0	104% 91%	0.29 0.26 0.26
32	81% 81%	0.62 0.58 0.65	32	77% 80%	0.17 0.17 0.17
102	95% 85%	0.52 0.58 0.63	112	67% 89%	0.18 0.18 0.19
188	79% 82%	0.56 0.53 0.58	188	65% 70%	0.23 0.19 0.23
360	92% 87%	0.43 0.57 0.60	360	84% 68%	0.21 0.20 0.21
738	103% 93%	0.60 0.72 0.59	759	84% 91%	0.27 0.27 0.28
residues apparently stable			residues apparently stable		
MAIZE GRAIN was homogenized and sprayed with thiamethoxam and stored in polyethylene containers below approx –18 ˚C (Maier, 1998, 112/96).					
0	74% 87%	0.67 0.69 0.67			
32	67% 76%	0.50 0.55 0.51			
102	84% 86%	0.60 0.58 0.56			
188	71% 77%	0.51 0.57 0.47			
360	87% 83%	0.58 0.55			
738	90% 83%	0.59 0.60 0.57			
residues apparently stable					

Hohl (1999, 127/97) tested the freezer storage stability of CGA 322704 residues in homogenized samples in a freezer below approximately –18 ºC for two years. The homogenized commodities, (apples, tomatoes, potato tubers, rape seed and maize seed) were spread in a thin layer and sprayed with a CGA 322704 solution to produce suitable residue levels for the tests. The analyses were validated with procedural recoveries at each testing interval (Table 17). The stability of CGA 322704 residues in a soil sample was also tested. Hohl (1999, 127/97) explained that tomatoes are often difficult to homogenize because of tomato skin particles and the anomalous result at day 184 was believed to be an outlier and should not be taken into account in assessing the storage stability. For similar reasons, the author suggested that the rape seed data at day 29 should also be treated as an outlier.

Table 17 Freezer storage stability data for CGA 322704 sprayed onto homogenized plant matrices. Residues are unadjusted for analytical recoveries.

Storage interval, days	Procedural recov %	CGA 322704, mg/kg	Storage interval, days	Procedural recov %	CGA 322704, mg/kg
APPLES were homogenized and sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).			TOMATOES were homogenized and sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).		
0	84% 73%	0.29 0.29 0.30	0	83% 70%	0.38 0.33 0.28
29	82% 86%	0.31 0.31 0.31	29	88% 91%	0.50 0.43 0.42

Storage interval, days	Procedural recov %	CGA 322704, mg/kg	Storage interval, days	Procedural recov %	CGA 322704, mg/kg
91	79% 79%	0.33 0.32 0.32	111	74% 76%	0.36 0.43 0.43
184	75% 80%	0.32 0.30 0.29	184[20]	73% 82%	0.52 0.51 0.48
364	81% 81%	0.33 0.33 0.34	364	85% 73%	0.38 0.34 0.36
729	90% 95%	0.36 0.32 0.30	751	80% 91%	0.39 0.37 0.43
residues apparently stable			residues apparently stable		
POTATO TUBERS were homogenized and sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).			RAPE SEED was homogenized and sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).		
0	72% 76%	0.37 0.34 0.36	0	105% 96%	0.32 0.30 0.35
29	70% 68%	0.31 0.33 0.33	29[20]	90% 108%	0.41 0.45 0.46
91	71% 72%	0.37 0.36 0.34	91	77% 91%	0.31 0.35 0.33
184	79% 81%	0.38 0.37 0.35	184	73% 69%	0.24 0.25 0.23
364	84% 88%	0.38 0.35 0.39	364	106% 94%	0.34 0.32 0.31
729	91% 94%	0.43 0.37 0.38	729	83% 95%	0.33 0.31 0.32
residues apparently stable			residues apparently stable		
MAIZE GRAIN was homogenized and sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).			SOIL was sprayed with CGA 322704 and stored in polyethylene containers below approx –18 ˚C (Hohl, 1999, 127/97).		
0	76%	0.31 0.32	0[21]	87% 99%	0.060 0.034 0.061
29	60% 60%	0.27 0.26 0.27	29	94% 87%	0.057 0.056 0.055
91	71% 70%	0.32 0.33 0.30	62	88% 93%	0.055 0.051 0.053
184	75% 80%	0.37 0.35 0.33	184	108% 83%	0.045 0.053 0.053
364	91% 77%	0.39 0.38 0.38	364	95% 97%	0.057 0.055 0.058
729	86% 90%	0.42 0.39 0.40	729	87% 84%	0.041 0.046 0.042
residues apparently stable			residues apparently stable		

Starner (2003, 07754) tested the freezer storage stability of thiamethoxam and CGA 322704 fortified at 0.50 mg/kg into control samples of cranberries.

Starner (2006, 08451) tested the freezer storage stability of thiamethoxam and CGA 322704 fortified at 0.10 mg/kg into control samples of hops.

Table 18 Freezer storage stability data for thiamethoxam and CGA 322704 fortified into control samples of cranberries and hops. Residues are unadjusted for analytical recoveries.

Storage interval, days	Procedural recov %	thiamethoxam, mg/kg	Storage interval, days	Procedural recov %	CGA 322704, mg/kg
CRANBERRIES were fortified with thiamethoxam at 0.50 mg/kg and stored frozen below approx 0 ˚C (Starner, 2003, 07754).			CRANBERRIES were fortified with CGA 322704 at 0.50 mg/kg and stored frozen below approx 0 ˚C (Starner, 2003, 07754).		
110	85% 79% 88%	0.346 0.348 0.368	110	61% 63% 62%	0.276 0.306 0.295
inconclusive on stability or instability			inconclusive on stability or instability		
HOPS samples were fortified with thiamethoxam at 0.10 mg/kg and stored frozen below approx –20 ˚C (Starner, 2006, 08451).			HOPS samples were fortified with CGA 322704 at 0.10 mg/kg and stored frozen below approx –20 ˚C (Starner, 2006, 08451).		
73	111% 122% 123%	0.124 0.129 0.123	73	99% 115% 115%	0.112 0.112 0.111
residues apparently stable			residues apparently stable		

Corley (2006, 07746) tested the freezer storage stability of thiamethoxam and CGA 322704 fortified at 0.50 mg/kg into control samples of barley grain, straw, hay and processed commodities.

[20] Hohl, 1999, study 127/97. Suggested outlier.

[21] Soil. The soil data at day 0 are too variable to be of use.

Table 19 Freezer storage stability data for thiamethoxam and CGA 322704 fortified into control samples of barley grain, straw, hay and processed commodities (Corley, 2006, 07746). Residues are unadjusted for analytical recoveries.

Storage interval, days	Procedural recov %	thiamethoxam, mg/kg	Storage interval, days	Procedural recov %	CGA 322704, mg/kg
BARLEY GRAIN were ground and fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			BARLEY GRAIN were ground and fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
591	93%	0.36 0.38 0.39	591	76%	0.40 0.42 0.43
residues apparently stable			residues apparently stable		
BARLEY HAY was ground and fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			BARLEY HAY was ground and fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
593	100%	0.43 0.41 0.41	593	78%	0.47 0.46 0.46
residues apparently stable			residues apparently stable		
BARLEY STRAW was ground and fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			BARLEY STRAW was ground and fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
595	105%	0.435 0.42 0.43	595	81%	0.47 0.44 0.46
residues apparently stable			residues apparently stable		
PEARLED BARLEY was ground and fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			PEARLED BARLEY was ground and fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
182	93%	0.45 0.43 0.49	182	76%	0.38 0.37 0.40
residues apparently stable			residues apparently stable		
BARLEY BRAN was ground and fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			BARLEY BRAN was ground and fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
170	94%	0.49 0.44 0.48	170	85%	0.42 0.40 0.41
residues apparently stable			residues apparently stable		
BARLEY FLOUR was fortified with thiamethoxam at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.			BARLEY FLOUR was fortified with CGA 322704 at 0.50 mg/kg and stored frozen between –26 ºC and –4 ºC.		
171	105%	0.53 0.53 0.55	171	83%	0.41 0.40 0.42
residues apparently stable			residues apparently stable		

Grunenwald and Eudy (2000, 284–98) tested the freezer storage stability of thiamethoxam and metabolites CGA 322704 and CGA 265307 at residue levels in animal commodities. Control samples of bovine muscle, bovine liver, milk and eggs were individually fortified with thiamethoxam, CGA 322704 and CGA 265307 and stored at approximately –20 ºC for a minimum of 15–16 months. Lin and Oakes (2002, ABR-98102) extended the tests on CGA 322704 in bovine liver to 47 months.

Table 20 Freezer storage stability data for thiamethoxam, CGA 322704 and CGA 265307 fortified into animal commodities. Residues are unadjusted for analytical recoveries.

Storage interval, days	Procedural recov %	analyte, mg/kg	Storage interval, days	Procedural recov %	analyte, mg/kg
BOVINE MUSCLE homogenized and fortified with 0.50 mg/kg thiamethoxam and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			BOVINE LIVER homogenized and fortified with 0.50 mg/kg thiamethoxam and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).		
		thiamethoxam			thiamethoxam
0	88% 89% 89% 82% 80%		0	78% 92% 83% 89% 88%	
85	94% 92%	0.44 0.48	89	89% 95%	0.45 0.45
132	96% 94%	0.44 0.46	132	91% 92%	0.44 0.46
307	95% 97%	0.49 0.48	315	97% 97%	0.45 0.40
483	91% 90%	0.49 0.48	476	93%	0.47 0.39
residues apparently stable			residues apparently stable		
MILK fortified with 0.50 mg/kg thiamethoxam and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			EGG fortified with 0.50 mg/kg thiamethoxam and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).		
		thiamethoxam			thiamethoxam
0	86% 88% 90% 82% 79%		0	91% 88% 86% 87% 75%	

Storage interval, days	Procedural recov %	analyte, mg/kg	Storage interval, days	Procedural recov %	analyte, mg/kg
62	100% 92%	0.24 0.36	88	94% 92%	0.42 0.47
139	88%	0.44 0.44	132	89% 90%	0.46 0.46
322	91% 88%	0.47 0.46	326	96% 95%	0.33 0.38
495	74% 102%	0.45 0.43	480	94% 91%	0.44 0.46
residues apparently stable			residues apparently stable		
BOVINE MUSCLE homogenized and fortified with 0.50 mg/kg CGA 322704 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			BOVINE LIVER homogenized and fortified with 0.50 mg/kg CGA 322704 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98). (Lin and Oakes, 2002, ABR-98102)		
		CGA 322704			CGA 322704
0	92% 94% 94% 91% 87%		0	88% 89% 81% 94% 87%	
85	93% 95%	0.48 0.47	89	87% 96%	0.43 0.43
132	90% 90%	0.46 0.45	132	91% 92%	0.43 0.44
307	113% 117%	0.48 0.54	315	100% 99%	0.43 0.47
483	92% 90%	0.45 0.44	476	89%	0.37 0.41
			1426	105% 85%	0.42 0.32
residues apparently stable			residues apparently stable		
MILK fortified with 0.50 mg/kg CGA 322704 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			EGG fortified with 0.50 mg/kg CGA 322704 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).		
		CGA 322704			CGA 322704
0	91% 94% 95% 92% 88%		0	96% 94% 91% 94% 80%	
62	108% 99%	0.48 0.46	88	97% 93%	0.47 0.48
139	90%	0.49 0.46	132	91% 92%	0.47 0.48
322	97% 93%	0.49 0.38	326	98% 99%	0.46 0.48
495	76% 103%	0.43 0.44	480	94% 92%	0.43 0.44
residues apparently stable			residues apparently stable		
BOVINE MUSCLE homogenized and fortified with 0.50 mg/kg CGA 265307 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			BOVINE LIVER homogenized and fortified with 0.50 mg/kg CGA 265307 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).		
		CGA 265307			CGA 265307
0	94% 81% 89% 86%		0	77% 88% 77% 80% 81%	
85	91%	0.40 0.43	89	99% 78%	0.45 0.49
132	95% 97%	0.44 0.43	132	93% 89%	0.44 0.42
307	89% 83%	0.44 0.42	315	92% 92%	0.45 0.46
483	93% 89%	0.48 0.43	476	86% 81%	0.40 0.40
residues apparently stable			residues apparently stable		
MILK fortified with 0.50 mg/kg CGA 265307 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).			EGG fortified with 0.50 mg/kg CGA 265307 and stored in glass jars below approx -20 ˚C (Grunenwald and Eudy, 2000, 284–98).		
		CGA 265307			CGA 265307
0	64% 90% 92% 85% 93%		0	98% 94% 97% 93% 64%	
62	83% 89%	0.39 0.47	88	90% 101%	0.47 0.45
139	94% 90%	0.47 0.47	132	95% 93%	0.42 0.43
322	93%	0.47 0.48	326	102% 92%	0.51 0.51
495	81% 84%	0.37 0.36	480	94%	0.51 0.53
residues apparently stable			residues apparently stable		

USE PATTERN

Thiamethoxam, a nicotinoid compound, has broad spectrum activity against sucking and chewing insects in vegetables, ornamentals, field crops, deciduous fruit, citrus, cotton and rice. It possesses contact and stomach activity. Its action against foliar feeding insects following; seed treatment, application to soil, through irrigation systems, or when applied to the trunks of trees, results from its systemic properties.

Copies or English translations of thiamethoxam labels from the following countries were made available to the Meeting: Brazil, Bulgaria, Cameroon, Czech Republic, Germany, Ghana, Hungary, Italy, Japan, Romania, South Africa, Spain, UK and USA.

GAP information was also provided from Australia (labels provided), Côte d'Ivoire, Indonesia (label provided), Japan, Kenya and Netherlands.

Table 21 Registered foliar uses of thiamethoxam in horticultural and field crops

Crop	Country	Application						
		Form	Type	Max rate kg ai/ha	Max conc kg ai/hL	Spray vol, L/ha	Max number	PHI days
Almond	Spain	WG	foliar		0.0050		2	75
Apple	Italy	WG	foliar	0.11	0.010		1	
Apple	Japan	SG	foliar		0.005		2	7
Apple	Spain	WG	foliar		0.0075		2	14
Apples	Hungary	WG	foliar		0.0075	1000		28
Apricot	Japan	SG	foliar		0.005		2	7
Asparagus	Japan	SG	foliar		0.005		3	7
Balsam pear	Japan	SG	foliar		0.005		3	7
Banana	Japan	SG	foliar		0.005		3	7
Barley	USA	WG	foliar	0.070			0.14 [a]	21
Bean	Brazil	WG	foliar	0.05			2	14
Blackberry	USA	WG	foliar	0.053			0.11 [a]	3
Blueberry	USA	WG	foliar	0.070			0.21 [a]	3
Brassica greens, leafy [b]	USA	WG	foliar	0.096			0.19 [a]	7
Brassica leafy veg, non-heading (except Komatsuma, kale, pak-choi)	Japan	SG	foliar		0.005		2	3
Brassica, head and stem [c]	USA	WG	foliar	0.096			0.19 [a]	0
Broccoli	Italy	WG	foliar	0.050	0.005			
Broccoli	Japan	SG	foliar		0.0033		3	1
Broccoli	Spain	WG	foliar	0.10			2	3
Cabbage	Brazil	WG	foliar	0.0125			3	7
Cabbage	Brazil	WG	foliar		0.020		3	
Cabbage	Japan	AL	foliar		0.005		3	3
Cabbage	Japan	SG	foliar		0.0033		3	3
Cacao	Cameroon	WG	foliar, knapsack	0.025	0.0067		2	30
Cacao	Cameroon	WG	foliar, mist blower	0.025	0.030		2	30
Caneberry	USA	WG	foliar	0.053			0.11 [a]	3
Capsicum (forced)	Hungary	WG	foliar		0.010	2000		3
Capsicum (free-range)	Hungary	WG	foliar		0.0063	800		3
Cauliflower	Japan	SG	foliar		0.0033		3	7
Cherry	Italy	WG	foliar	0.11	0.010		1	7
Cherry	Spain	WG	foliar		0.0075		2	7
Cherry, sweet	Japan	SG	foliar		0.005		2	1
Chinese cabbage	Japan	SG	foliar		0.0033		3	3
Citrus	Australia	WG	foliar		0.0075			49
Citrus	Brazil	WG	foliar		0.005	0.5 L/tree	2	14
Citrus	Spain	WG	foliar		0.0075		1	28
Citrus	Indonesia	ZC includes lambda-cyhalothrin	foliar	0.085	0.0085		2	42
Citrus fruits	Italy	WG	foliar	0.075	0.003		1	

Crop	Country	Application						
		Form	Type	Max rate kg ai/ha	Max conc kg ai/hL	Spray vol, L/ha	Max number	PHI days
Citrus fruits	Japan	AL	foliar		0.005		3	14
Citrus fruits	Japan	SG	foliar		0.005		3	14
Citrus fruits	USA	WG	foliar	0.096			0.19 [a]	0
Cole crops	Hungary	WG	foliar		0.050	600		7
Common bean	Japan	SG	foliar		0.0033		3	1
Cotton	Australia	WG	foliar	0.050				28
Cotton	Brazil	WG	foliar	0.050			2	21
Cotton	Spain	WG	foliar	0.050			3	28
Cotton	USA	WG	foliar	0.070			0.14 [a]	21
Cotton	USA	ZC includes lambda-cyhalothrin	foliar	0.054			0.13 [a]	21
Courgette	Spain	WG	foliar		0.01		2	3
Courgettes	Italy	WG	foliar	0.10			2	3
Cranberry	USA	WG	foliar or irrigation	0.070			0.21 [a]	30
Cucumber	Italy	WG	foliar	0.10			2	3
Cucumber	Japan	AL	foliar		0.005		3	1
Cucumber	Japan	SG	foliar		0.005		3	1
Cucumber	Spain	WG	foliar		0.01		2	3
Cucumber (forced)	Hungary	WG	foliar		0.010	2000		3
Cucumber (free-range)	Hungary	WG	foliar		0.0063	800		3
Cucurbit vegetables	USA	WG	foliar	0.096			0.19 [a]	0
Egg plant	Italy	WG	foliar	0.10			2	3
Egg plant	Japan	AL	foliar		0.005		3	1
Egg plant	Japan	SG	foliar		0.005		3	1
Egg plant	Spain	WG	foliar		0.01		2	3
Fruiting vegetables [d]	USA	WG	foliar	0.096			0.19 [a]	0
Globe artichoke	USA	WG	foliar	0.053			0.11 [a]	4
Grapes	Hungary	WG	foliar		0.0075	1000		14
Grapes	Italy	WG	foliar	0.050	0.0050			21
Grapes	Japan	SG	foliar		0.005		2	7
Grapes	Spain	WG	foliar	0.050			3	21
Grapes	USA	WG	foliar	0.061			0.12 [a]	5
Guava	Japan	SG	foliar		0.005		2	7
Komatsuma	Japan	SG	foliar		0.005		2	3
Leafy vegetables, except Brassica	USA	WG	foliar	0.096			0.21 [a]	7
Lettuce and similar	Italy	WG	foliar	0.050				7
Lettuce and similar	Spain	WG	foliar	0.10			2	21
Lettuce, head	Japan	SG	foliar		0.005		2	7
Loofah, smooth	Japan	SG	foliar		0.005		3	1
Mango	Japan	SG	foliar		0.005		2	14
Melon	Brazil	WG	foliar	0.030			2	7
Melon	Italy	WG	foliar	0.10			2	3
Melon	Spain	WG	foliar		0.01		2	3
Melons except watermelon	Japan	SG	foliar		0.005		3	1
Nectarine	Italy	WG	foliar	0.075	0.0075		1	14
Nectarine	Spain	WG	foliar		0.0050		2	14
Okra	Kenya	WG	foliar, knapsack	0.10				3
Onion	Hungary	WG	foliar		0.050	500		7
Onion, Welsh	Japan	SG	foliar		0.01		3	3

Crop	Country	Application						
		Form	Type	Max rate kg ai/ha	Max conc kg ai/hL	Spray vol, L/ha	Max number	PHI days
Pak-choi	Japan	SG	foliar		0.005		2	3
Passion fruit	Kenya	WG	foliar	0.10			3	3
Pea	Brazil	WG	foliar	0.05			2	3
Peach	Hungary	WG	foliar		0.004	800		14
Peach	Italy	WG	foliar	0.075	0.0075		1	14
Peach	Japan	SG	foliar		0.005		3	1
Peach	Spain	WG	foliar		0.0050		2	14
Peanut	Brazil	WG	foliar	0.035			3	42
Pear	Italy	WG	foliar	0.11	0.010		1	14
Pear	Japan	SG	foliar		0.005		3	1
Pear	Spain	WG	foliar		0.0075		2	14
Peas	Hungary	WG	foliar		0.025	500		7
Pecan	USA	WG	foliar	0.070			0.14 [a]	14
Pecan	USA	ZC includes lambda-cyhalothrin	foliar	0.054			0.13 [a]	14
Peppers	Italy	WG	foliar	0.10			2	3
Peppers	Spain	WG	foliar		0.01		2	3
Peppers, bell	Japan	AL	foliar		0.005		3	1
Peppers, bell	Japan	SG	foliar		0.005		3	1
Peppers, chilli	Japan	SG	foliar		0.0033		3	1
Peppers, sweet (small size), shishitou	Japan	SG	foliar		0.0033		3	1
Persimmon, Japanese	Japan	SG	foliar		0.005		3	3
Plum	Italy	WG	foliar	0.075	0.0050		1	14
Plum	Spain	WG	foliar		0.0075		2	14
Plum, Japanese	Japan	SG	foliar		0.005		2	7
Pome fruits	USA	WG	foliar	0.096			0.29 [a]	35
Pome fruits	USA	WG	foliar	0.048			0.29 [a]	14
Potato	Brazil	WG	foliar	0.015			3	10
Potato	Hungary	WG	foliar	0.020		500		7
Potato	Italy	WG	foliar	0.050			2	7
Potato	Japan	SG	foliar		0.005		3	14
Potato	Japan	SG	foliar	0.033	0.0133	250	3	14
Potato	Spain	WG	foliar	0.025			4	7
Potatoes (starch and seed)	Netherlands	WG	aerial spray	0.02	0.005–0.01	200–400	1–3	
Radish	USA	WG	foliar	0.070			0.07 [a]	7
Radish, Japanese	Japan	SG	foliar		0.005		2	7
Raspberry	USA	WG	foliar	0.053			0.11 [a]	3
Rice	Brazil	WG	foliar	0.0375			2	21
Rice	Japan	SC	foliar		0.0065		2	14
Rice	Japan	SC includes azoxystrobin	foliar spray	0.0098	0.0065		2	14
Rice	Japan	SC includes azoxystrobin	foliar spray, helicopter	0.052	0.0125		2	14
Rice	Japan	SC includes azoxystrobin	foliar spray, aerial	0.065	0.81	8	2	14
Rocket salad	Italy	WG	foliar	0.050				7
Root vegetables (except radish and sugar beet) [e]	USA	WG	foliar	0.070			0.14 [a]	7
Soya bean	Japan	AL	foliar		0.005		2	7
Soya bean	Japan	SG	foliar		0.0033		2	7

Crop	Country	Application						
		Form	Type	Max rate kg ai/ha	Max conc kg ai/hL	Spray vol, L/ha	Max number	PHI days
Soya bean	USA	ZC includes lambda-cyhalothrin	foliar	0.045			0.090 [a]	30
Soya beans	Brazil	WG includes cyproconazole	foliar	0.060		250–200	2	30
Spinach	Japan	SG	foliar		0.005		2	3
Stone fruits	USA	WG	foliar	0.096			0.19 [a]	14
Strawberry	Brazil	WG	foliar		0.010	1000–2000	3	1
Strawberry	Japan	AL includes emamectin and difenoconazole	foliar		0.005		2	1
Strawberry	USA	WG	foliar	0.070			0.19 [a]	3
Sunflower	Hungary	WG	foliar	0.015		600		21
Tea	Japan	SG	foliar		0.005	200–400	1	7
Tea	Japan	WG includes lufenuron	foliar		0.005	200–400	1	7
Tea, green, black	Japan	SG	foliar		0.005		1	7
Tomato	Australia	WG	foliar		0.020			42
Tomato	Brazil	WG	foliar		0.020		2	3
Tomato	Cameroon	WG	foliar, knapsack	0.050	0.0067		4	3
Tomato	Italy	WG	foliar	0.10			2	3
Tomato	Japan	AL	foliar		0.005		3	1
Tomato	Japan	SG	foliar		0.005		3	1
Tomato	Spain	WG	foliar		0.01		2	3
Tomato (forced)	Hungary	WG	foliar		0.010	2000		3
Tomato (free-range)	Hungary	WG	foliar		0.0063	800		3
Tomato (small size)	Japan	SG	foliar		0.005		2	1
Tuberous and corm vegetables [f]	USA	WG	foliar	0.053			0.11 [a]	14
Tuberous and corm vegetables [f]	USA	ZC includes lambda-cyhalothrin	foliar	0.045			0.099 [a]	14
Watermelon	Brazil	WG	foliar	0.050			3	14
Watermelon	Italy	WG	foliar	0.10			2	3
Watermelon	Japan	SG	foliar		0.005		3	1
Watermelon	Spain	WG	foliar		0.01		2	3
Wheat	Brazil	WG	foliar	0.019			2	42
Wheat, autumn	Hungary	WG	foliar	0.040		300		14

[a] Maximum total kg ai/ha for season.

[b] US crop group. *Leafy Brassica greens vegetables*: Chinese cabbage (bok choy), collards, kale, mizuna, mustard greens, mustard spinach, rape greens.

[c] US crop group. *Head and stem Brassica vegetables*: broccoli, Chinese broccoli, Brussels sprouts, cabbage, Chinese mustard cabbage, Chinese cabbage, cauliflower, kohlrabi.

[d] US crop group. *Fruiting vegetables*: egg plant, ground cherry, pepino, peppers (bell, chilli, cooking, pimento, sweet), tomatillo, tomato.

[e] US crop group. *Root vegetables*: carrot, celeriac, chicory, edible burdock, garden beet, ginseng, horseradish, oriental radish, parsnip, rutabaga, salsify, black salsify, Spanish salsify, skirret, turnip, turnip rooted chervil, turnip rooted parsley.

[f] US crop group. *Tuberous and corm vegetables*: arracacha, arrowroot, canna, cassava (bitter and sweet), chayote (root), Chinese artichoke, chufa, dasheen, ginger, Jerusalem artichoke, leren, potato, sweet potato, tanier, turmeric, yams, yam bean.

Table 22 Registered uses (in-furrow, drench, band, base of tree, drip, trickle and other soil treatments) of thiamethoxam in horticultural and field crops.

Crop	Country	Application				
		Form	Type	Max rate kg ai/ha	Max number	PHI days
Apple	Brazil	WG	drench on soil at base of tree, 0.25 L per tree	0.50	1	60
Apple	South Africa	SC	apply with jug, 3 mL product per tree	0.72 g/tree		S[22]
Banana	Cameroon	WG	drench to stem, 100 mL water per plant, 0.20 kg ai/hL	0.36	2	0
Banana	Ghana	WG	drench to stem, 30–100 mL water per plant, 0.20 kg ai/hL	0.36	2	7
Brassica vegetables	USA	SG	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Brassica vegetables	USA	SG	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Brassica vegetables	USA	SG	shanked into root zone, after transplant	0.19	0.19 [a]	30
Brassica vegetables	USA	SG	trickle or drip irrigation water	0.19	0.19 [a]	30
Brassica vegetables	USA	SL	hill drench, post sowing	0.19	0.19 [a]	30
Brassica vegetables	USA	SL	in-furrow spray or surface band incorp after sowing	0.19	0.19 [a]	30
Brassica vegetables	USA	SL	shanked into root zone, after establishment	0.19	0.19 [a]	30
Brassica vegetables	USA	SL	trickle or drip irrigation water	0.19	0.19 [a]	30
Broccoli	Italy	WG	drip and drench	0.2	1	
Broccoli	Japan	GR	spreading at plant base, late nursery stage, 0.01 g ai per plant			
Broccoli	Spain	WG	drip irrigation	0.10	1	3
Bushberry	USA	SL	surface band on each side of row, incorp	0.20	0.20 [a]	75
Bushberry [b]	USA	SG	surface band on each side of row	0.21	0.21 [a]	75
Cabbage	Brazil	WG	drench or drip on soil soon after emergence	0.20	1	70
Cabbages, head	Japan	GR	spreading, late nursery stage, 0.15 g ai per nursery box			
Cabbages, head	Japan	SG	drench, late nursery stage, 0.5 g ai per nursery box			
Cauliflower	Japan	GR	spreading at plant base, late nursery stage, 0.0025 g ai per plant			
Celery	Japan	GR	soil incorporation, seedbed at potting, 0.01 g ai per plant			
Celery	Japan	GR	soil incorporation, planting hole, at transplanting, 0.01 g ai per plant			
Chinese cabbage	Japan	GR	soil incorp before sowing, 0.075 g ai per litre of soil			
Chinese cabbage	Japan	SG	drench, late nursery stage, 0.5 g ai per nursery box (soil 3–4 litres)			
Citrus	Brazil	WG	spray stem and soil under canopy	0.15	2	180
Citrus	South Africa	SC	apply with jug, 18 mL product per tree	4.3 g/tree		S[23]
Citrus fruits	USA	SL	chemigation in the root zone, drip, trickle, microsprinkler	0.19	0.19 [a]	0
Citrus fruits	USA	SL	drench around the tree trunk out to root zone	0.19	0.19 [a]	0
Citrus fruits	USA	SL	soil surface band each side of the row	0.19	0.19 [a]	0
Coffee	Brazil	GR includes cyproconazole	apply granules to soil	0.30	annual[24]	90
Coffee	Brazil	WG	drench on soil under coffee tree	0.50	1	90
Coffee	Brazil	WG includes cyproconazole	soil application by drench or spray, min 200 L/ha	0.30	1	90
Courgettes	Italy	WG	drip and drench	0.2	1	
Cranberry	USA	WG	foliar or irrigation	0.070	0.21 [a]	30
Cucumber	Brazil	WG	drench or drip on soil soon after emergence	0.15	1	45
Cucumber	Italy	WG	drip and drench	0.2	1	3
Cucumber	Japan	GR	spreading in planting hole at transplanting, 0.005 g ai per plant			
Cucurbit vegetables	USA	SG	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Cucurbit vegetables	USA	SG	shanked into root zone, after transplant	0.19	0.19 [a]	30

[22] Seasonal stage instruction. Apply in the last 2 weeks of September.

[23] Seasonal stage instruction. Apply from mid-August to mid-September.

[24] Coffee, Brazil. Maximum annual dose 0.60 kg ai/ha.

Crop	Country	Application				
		Form	Type	Max rate kg ai/ha	Max number	PHI days
Cucurbit vegetables	USA	SG	trickle or drip irrigation water	0.19	0.19 [a]	30
Cucurbit vegetables	USA	SL	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Cucurbit vegetables	USA	SL	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Cucurbit vegetables	USA	SL	shanked into root zone, after transplant	0.19	0.19 [a]	30
Cucurbit vegetables	USA	SL	trickle or drip irrigation water	0.19	0.19 [a]	30
Cucurbit vegetables [c]	USA	SG	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Egg plant	Brazil	WG	drench or drip on soil, soon after planting	0.15	1	40
Egg plant	Italy	WG	drip and drench	0.2	1	
Egg plant	Japan	GR	soil incorporation, planting hole at transplanting, 0.01 g ai per plant			
Egg plant	Spain	WG	drip irrigation indoor	0.20	1	3
Egg plant	Spain	WG	drip irrigation outdoor	0.10	1	3
Fruiting vegetables	USA	SG	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Fruiting vegetables	USA	SG	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Fruiting vegetables	USA	SG	shanked into root zone, after transplant	0.19	0.19 [a]	30
Fruiting vegetables	USA	SG	trickle or drip irrigation water	0.19	0.19 [a]	30
Fruiting vegetables	USA	SL	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Fruiting vegetables	USA	SL	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Fruiting vegetables	USA	SL	shanked into root zone, after transplant	0.19	0.19 [a]	30
Fruiting vegetables	USA	SL	trickle or drip irrigation water	0.19	0.19 [a]	30
Grapes	Brazil	WG	watering around plant base	0.17	2	45
Grapes	USA	SG	chemigation with sprinkler, trickle or drip	0.30	0.30 [a]	60
Grapes	USA	SG	hill drench, incorp	0.30	0.30 [a]	60
Grapes	USA	SG	surface band on each side of row, incorp	0.30	0.30 [a]	60
Grapes	USA	SL	chemigation in the root zone, drip, trickle, microsprinkler	0.29	0.29 [a]	60
Grapes	USA	SL	hill drench and use sufficient water to move dosage to root zone	0.29	0.29 [a]	60
Grapes	USA	SL	soil surface band each side of the row	0.29	0.29 [a]	60
Green beans	Spain	WG	drip irrigation indoor	0.20	1	3
Green beans	Spain	WG	drip irrigation outdoor	0.10	1	3
Haricot bean	Brazil	WG	drench or drip on soil soon after emergence	0.15	1	60
Hops	USA	SG	chemigation with sprinkler, trickle or drip	0.14	0.14 [a]	65
Hops	USA	SG	hill drench, incorp	0.14	0.14 [a]	65
Hops	USA	SG	surface band on each side of row, incorp	0.14	0.14 [a]	65
Hops	USA	SL	chemigation in the root zone, drip, trickle, microsprinkler	0.14	0.14 [a]	65
Hops	USA	SL	hill drench and use sufficient water to move dosage to root zone	0.14	0.14 [a]	65
Hops	USA	SL	soil surface band each side of the row	0.14	0.14 [a]	65
Komatsuma	Japan	GR	soil incorporation at transplanting	0.3		
Leafy vegetables [d]	USA	SG	hill drench, post sowing or transplant	0.19	0.19 [a]	30
Leafy vegetables [d]	USA	SG	shanked into root zone, after transplant	0.19	0.19 [a]	30
Leafy vegetables [d]	USA	SG	trickle or drip irrigation water	0.19	0.19 [a]	30
Leafy vegetables [d]	USA	SL	hill drench, post sowing or transplant	0.19	0.19 [a]	65
Leafy vegetables [d]	USA	SL	in-furrow spray or surface band incorp	0.19	0.19 [a]	65
Leafy vegetables [d]	USA	SL	shanked into root zone, after transplant	0.19	0.19 [a]	65
Leafy vegetables [d]	USA	SL	trickle or drip irrigation water	0.19	0.19 [a]	65
Leafy vegetables [d]	USA	SG	in-furrow spray or surface band incorp	0.19	0.19 [a]	30
Lettuce	Brazil	WG	irrigation on seedling tray	0.075	1	
Lettuce and similar	Italy	WG	drip and drench	0.2	1	
Lettuce and similar	Spain	WG	drip irrigation	0.10	1	7
Lettuce, head	Japan	GR	soil incorporation, seedbed, before sowing 0.075 g ai per litre of soil			
Lettuce, leaf	Japan	GR	soil incorporation, seedbed, before sowing 0.075 g ai per litre of soil			

Crop	Country	Application				
		Form	Type	Max rate kg ai/ha	Max number	PHI days
Lotus root	Japan	GR	spreading submerged	0.3	3	14
Mango	South Africa	SC	apply with jug or drip irrigation, 6 mL product per tree	1.4 g/tree		S[25]
Melon	Brazil	WG	drench or drip on soil soon after emergence	0.15	1	64
Melon	Italy	WG	drip and drench	0.2	1	
Melon	Spain	WG	drip irrigation indoor	0.20	1	3
Melon	Spain	WG	drip irrigation outdoor	0.10	1	3
Melons, except watermelon	Japan	GR	soil incorporation, planting hole at transplanting, 0.005 g ai per plant			
Pak choi	Japan	GR	soil incorporation at transplanting	0.3		
Papaya	Brazil	WG	drench on soil, 0.05 L per plant	0.20	1	14
Peppers	Italy	WG	drip and drench	0.2	1	
Peppers	Spain	WG	drip irrigation indoor	0.20	1	3
Peppers	Spain	WG	drip irrigation outdoor	0.10	1	3
Peppers sweet (small size), shishitou	Japan	GR	soil incorporation, planting hole at transplanting, 0.005 g ai per plant			
Peppers, bell	Japan	GR	soil incorporation, planting hole at transplanting, 0.01 g ai per plant			
Peppers, chilli	Japan	GR	soil incorporation, planting hole at transplanting, 0.005 g ai per plant			
Peppers, sweet	Brazil	WG	drench or drip on soil soon after emergence	0.15	1	46
Pineapple	Brazil	WG	pre-seedling transplant immersion, 0.075 kg ai/hL		1	485
Pineapple	Brazil	WG	soil drench at plant base, 45-60 days after transplant	0.20	1	485
Potato	Brazil	WG	in furrow or before mounding	0.20	2	89
Potato	Japan	GR	soil incorporation, row, at planting	0.3		
Potatoes (seed)	Netherlands	WG	ground treatment of row at planting	0.025		
Radish	USA	SG	in trickle or drip irrigation after sowing	0.11	0.11 [a]	
Radish	USA	SG	in-furrow spray or surface band incorp after sowing	0.11	0.11 [a]	
Radish	USA	SG	soil incorp after sowing	0.11	0.11 [a]	
Radish	USA	SL	after sowing, add sufficient water to ensure root zone is reached.	0.11	0.11 [a]	65
Radish	USA	SL	in-furrow spray or surface band incorp	0.11	0.11 [a]	65
Radish	USA	SL	trickle or drip irrigation water	0.11	0.11 [a]	65
Radish, Japanese	Japan	GR	soil incorp at sowing	0.2		
Rice	Japan	GR	seed box application, 50 g product in 5 litres soil	0.8 g per litre soil		
Rice	Japan	GR	spreading, submerged at full heading stage	0.05	1	35
Rocket salad	Italy	WG	drip and drench	0.2	1	
Root vegetables	USA	SG	in trickle or drip irrigation after sowing	0.21	0.21 [a]	
Root vegetables	USA	SG	in-furrow spray or surface band incorp after sowing	0.21	0.21 [a]	
Root vegetables	USA	SG	soil incorp after sowing	0.21	0.21 [a]	
Root vegetables	USA	SL	after sowing, add sufficient water to ensure root zone is reached.	0.20	0.20 [a]	65
Root vegetables	USA	SL	in-furrow spray or surface band incorp	0.20	0.20 [a]	65
Root vegetables	USA	SL	trickle or drip irrigation water	0.20	0.20 [a]	65
Spinach	Japan	GR	soil incorporation, row, at sowing	0.3		
Strawberry	Japan	GR	soil incorporation, planting hole at transplanting, 0.005 g ai per plant			
Strawberry	USA	SG	as a plant hole treatment at transplant	0.21	0.21 [a]	50
Strawberry	USA	SG	in trickle or drip irrigation	0.21	0.21 [a]	50
Strawberry	USA	SG	in-furrow spray or surface band incorp after transplanting	0.21	0.21 [a]	50

[25] Seasonal stage instruction. Apply from last week in July to mid August.

Crop	Country	Application				
		Form	Type	Max rate kg ai/ha	Max number	PHI days
Strawberry	USA	SG	post transplant drench	0.21	0.21 [a]	50
Strawberry	USA	SL	drench, post transplant, add sufficient water to ensure root zone is reached.	0.20	0.20 [a]	65
Strawberry	USA	SL	in-furrow spray or surface band incorp	0.20	0.20 [a]	65
Strawberry	USA	SL	plant hole treatment	0.20	0.20 [a]	65
Strawberry	USA	SL	trickle or drip irrigation water	0.20	0.20 [a]	65
Sugar beet	Japan	GR	drench seedbed, before transplanting, 0.2 g ai/hL 30000 L/ha	60		
Sugar cane	Brazil	WG	apply to stub base on both sides of row	0.25	1	205
Sugar cane	Brazil	WG	in furrow before planting	0.20	1	205
Sweet potato	Japan	GR	soil incorporation, row, at planting	0.45		
Taro	Japan	GR	soil incorporation, row, at planting	0.3		
Tomato	Brazil	WG	drench or drip on soil soon after emergence	0.20	1	10
Tomato	Brazil	WG	nursery application	0.6 g/m^2	1	
Tomato	Italy	WG	drip and drench	0.2	1	
Tomato	Japan	GR	soil incorporation, planting hole at transplanting, 0.01 g ai per plant			
Tomato	South Africa	SC	soil drench 0.03 mL product per plant, 50 mL water per plant	0.0072 g/plant	2	GS[26]
Tomato	Spain	WG	drip irrigation indoor	0.20	1	3
Tomato	Spain	WG	drip irrigation outdoor	0.10	1	3
Tuberous and corm vegetables	USA	SG	apply product at planting impregnated on dry granular fertilizer	0.14	0.14 [a]	
Tuberous and corm vegetables	USA	SG	broadcast spray on soil at final hilling operation	0.14	0.14 [a]	
Tuberous and corm vegetables	USA	SG	chemigation at plant emergence	0.14	0.14 [a]	
Tuberous and corm vegetables	USA	SG	direct spray on soil at plant emergence	0.14	0.14 [a]	
Tuberous and corm vegetables	USA	SG	in-furrow spray at sowing of seed pieces	0.14	0.14 [a]	
Tuberous and corm vegetables	USA	SL	apply product at planting impregnated on dry granular fertilizer	0.14	0.14 [a]	65
Tuberous and corm vegetables	USA	SL	broadcast spray on soil at final hilling operation	0.14	0.14 [a]	65
Tuberous and corm vegetables	USA	SL	chemigation at plant emergence	0.14	0.14 [a]	65
Tuberous and corm vegetables	USA	SL	direct spray on soil at plant emergence	0.14	0.14 [a]	65
Tuberous and corm vegetables	USA	SL	in-furrow spray at sowing	0.14	0.14 [a]	65
Watermelon	Brazil	WG	drench or drip on soil	0.15	1	14
Watermelon	Italy	WG	drip and drench	0.2	1	
Watermelon	Japan	GR	soil incorporation, planting hole at transplanting, 0.01 g ai per plant			
Watermelon	Spain	WG	drip irrigation indoor	0.20	1	3
Watermelon	Spain	WG	drip irrigation outdoor	0.10	1	3
Welsh onion	Japan	GR	soil incorporation, row, at transplanting	0.45		
Zucchini	Brazil	WG	drench or drip on soil, soon after emergence	0.15	1	45

[a] Maximum total kg ai/ha for season.

[b] US crop group. Bushberry: blueberry, currant, elderberry, gooseberry, huckleberry, juneberry, lingonberry, salal.

[c] US crop group. Cucurbit vegetables: chayote, Chinese wax gourd, citron melon, cucumber, edible gourd, gherkin, momordica species, muskmelon (includes cantaloupe and honeydew), pumpkin, summer squash:, winter squash, watermelon.

[d] US crop group. Leafy vegetables: amaranth, arugula, cardoon, celery, celtuce, Chinese celery, chrysanthemum, corn

[26] Growth stage instruction. Apply at transplant and 28 days later.

salad, cress, dandelion, dock, endive, fennel, head lettuce leaf lettuce, orach, parsley, purslane, radicchio, rhubarb, spinach, Swiss chard.

Table 23 Registered seed treatment uses of thiamethoxam in horticultural and field crops.

Crop	Country	Application		Use instructions and notes
		Form	Dose, g ai/100 kg seed	
Adzuki bean	Japan	SC	180	
Alfalfa	Romania	FS	123	
Barley	Romania	FS	52.5	1.5 L product + 7–9 L water per tonne seed
Barley	USA	FS	29–52	
Barley, autumn	Romania	FS	35	1 L product +7 –9 L water per tonne seed
Barley, winter	Czech Republic	FS	53	water dilution depends on seed treatment equipment
Barley, winter	Hungary	FS	35	100 mL product + 2000 mL water per 100 kg seed
Beans [a]	USA	FS	50	formulation includes mefenoxam and fludioxonil
Beet	Bulgaria	FS	700	2000 mL product + 200–300 mL water per 100 kg seed
Broad bean	USA	FS	50	formulation includes mefenoxam and fludioxonil
Cereals	Bulgaria	FS	35	100 mL product + 200 mL water per 100 kg seed
Chickpea	USA	FS	50	formulation includes mefenoxam and fludioxonil
Common bean	Japan	SC	180	
Cotton	Australia	FS	280	4.6 litres product per tonne of seed
Cotton	USA	FS	0.30–0.34 mg per seed	
Endive	Netherlands	WG	81 g/100,000 seeds	glasshouse use
Endive	Netherlands	WG	81 g/100,000 seeds	
Fodder beet	Netherlands	SC	35 g/100,000 seeds	
Fodder beet	UK	FS	60 g ai/100,000 seeds	100 mL product per 100,000 seeds
Lentil	USA	FS	50	formulation includes mefenoxam and fludioxonil
Lettuce	Netherlands	WG	81 g/100,000 seeds	glasshouse use
Lettuce	Netherlands	WG	81 g/100,000 seeds	
Maize	Australia	FS	49 g/100,000 seeds	1.4 mL product per 1000 seeds
Maize	Bulgaria	FS	280	800 mL product + 200 mL water per 100 kg seed
Maize	Czech Republic	FS	315	water dilution depends on seed treatment equipment
Maize	Hungary	FS	630	
Maize	Netherlands	SC	32 g/50,000 seeds	
Maize	Romania	FS	315	9 L product + 1–6 L water per tonne seed
Maize	USA	FS	1.25 mg per kernel	
Mustard	Czech Republic	FS	420	water dilution depends on seed treatment equipment
Oilseed crops [b]	USA	FS	400	
Pea	Czech Republic	FS	53	water dilution depends on seed treatment equipment
Pea	Hungary	FS	49	140 mL product + 2000 mL water per 100 kg seed
Peas [c]	USA	FS	25	formulation includes mefenoxam and fludioxonil
Pigeon pea	USA	FS	50	formulation includes mefenoxam and fludioxonil
Popcorn	USA	FS	1.25 mg per kernel	
Potato	Romania	FS	7.7	220 mL product + 14.8 L water per tonne seed
Potato	USA	FS	4.2–5.9	formulation includes fludioxonil
Potatoes	USA	FS	4.3–6.2	
Rapeseed	Germany	FS	420	maximum rate 0.034 kg ai/ha corresponding to 8 kg rape seed per hectare
Rapeseed	UK	FS	420	formulation includes fludioxonil and metalaxyl-M
Rapeseed, spring	Romania	FS	123	
Rice	Brazil	FS	100	200–400 mL product + 1.5 L water per 100 kg seed
Sorghum	Australia	FS	138	2.3 litres product per tonne seed
Sorghum	USA	FS	199–297	
Soya bean	Japan	SC	180	
Soya bean	USA	FS	50	
Soya bean	USA	FS	50	formulation includes mefenoxam and fludioxonil
Sugar beet	Netherlands	SC	35 g/100,000 seeds	

Crop	Country	Application		Use instructions and notes
		Form	Dose, g ai/100 kg seed	
Sugar beet	Romania	FS	700	20 L product +10–20 L water per tonne seed
Sugar beet	UK	FS	60 g ai/100,000 seeds	100 mL product per 100,000 seeds
Sunflower	Australia	FS	10.9 g/100,000 seeds	0.31 mL product per 1000 seeds
Sunflower	Bulgaria	FS	315	900 mL product + 1100 mL water per 100 kg seed
Sunflower	Hungary	FS	438	
Sunflower	Romania	FS	350	10 L product + 2–7 L water per tonne seed
Sunflower	USA	FS	0.25 mg per seed	
Sweet corn	Australia	FS	49 g/100,000 seeds	1.4 mL product per 1000 seeds
Sweet corn	USA	FS	1.25 mg per kernel	
Wheat	Romania	FS	52.5	1.5 L product + 7–9 L water per tonne seed
Wheat	USA	FS	29-52	
Wheat, winter	Czech Republic	FS	53	water dilution depends on seed treatment equipment
Wheat, winter	Hungary	FS	35	100 mL product + 2000 mL water per 100 kg seed

[a] US crop group. *Beans*: black bean, cranberry bean, field bean, great Northern bean, kidney bean, lima bean, navy bean, pinto bean, runner bean, small red bean, snap bean, tepary bean, wax bean, yellow bean, adzuki bean, asparagus bean, blackeyed pea, catjang, Chinese longbean, cowpea, Crowder pea, moth bean, mung bean, rice bean, southern pea, urd bean, yardlong bean.

[b] US crop group. *Oilseed crops*: black mustard seed, borage seed, crambe seed, field mustard seed, flax seed, Indian mustard seed, Indian rapeseed seed, rapeseed seed, and safflower seed.

[c] US crop group. *Peas*: dwarf pea, edible-pod pea, English pea, field pea, garden pea, green pea, snow pea, sugar snap pea.

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting received information on supervised field trials for thiamethoxam uses on crops that produced residue data. The commodities are grouped into Codex commodity groups.

Crop group	Commodities	Table No.
Citrus fruits	Oranges: Spain	Table 25
	Orange, Indonesia	Table 26
	Citrus: USA	Table 27
Pome fruits	Apples: France, Italy	Table 28
	Pome fruits: USA	Table 29
Stone fruits	Plums: USA	Table 30
	Peach: USA	Table 31
	Cherries: USA	Table 32
	Cherries: France, Italy, Spain, Switzerland	Table 33
Berries and other small fruits	Strawberry: USA	Table 34
	Cranberry: USA	Table 35
	Blueberry: USA	Table 36
	Caneberry: USA	Table 37
	Grapes: France, Italy, Spain, Switzerland	Table 38
Assorted tropical fruits – inedible peel	Banana: Cameroon	Table 39
	Mango: South Africa	Table 40
	Papaya: Brazil, Côte d'Ivoire	Table 41

Crop group	Commodities	Table No.
	Pineapple, Brazil	Table 42
Brassica veg	Broccoli, cabbage, mustard greens[27]: USA	Table 43
Fruiting vegetables, Cucurbits	Cucumber: USA	Table 44
	Cucumber: France, Netherlands, Spain	Table 45
	Melon: Italy, Spain	Table 46
	Cantaloupe: USA	Table 47
	Summer squash: USA	Table 48
Fruiting vegetables, other than Cucurbits	Sweet corn: USA	Table 49
	Tomato: France, Italy, Spain, Switzerland	Table 50
	Tomato, bell pepper, hot pepper: USA	Table 51
	Sweet peppers: France, Italy, Spain, Switzerland, UK	Table 52
	Egg plant: Switzerland, UK	Table 53
	Okra: Côte d'Ivoire	Table 54
Leafy vegetables	Lettuce: USA	Table 55
	Spinach: USA	Table 56
Legume vegetables	Snap beans, lima beans: USA	Table 57
	Succulent peas: USA	Table 58
Pulses	Dry beans: USA	Table 59
Legume, pulse	Peas (green pods), peas (dry seed): Denmark, France, Germany	Table 60
Pulses	Dry peas: USA	Table 61
	Soya beans, dry: USA	Table 62
Root and tuber vegetables	Carrot: USA	Table 63
	Radish: USA	Table 64
	Potato: France, Germany, Spain, Switzerland, UK	Table 65
	Potato: USA	Table 66
	Sugar beet: France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, UK	Table 67
Stalk and stem vegetables	Artichoke: USA	Table 68
	Celery: USA	Table 69
Cereal grains	Maize: France, Germany, Spain	Table 70
Cereal grains	Maize: USA	Table 71
	Barley: USA	Table 72

[27] Mustard greens. Note that mustard greens is a leafy Brassica greens vegetable crop, but the commodity is within the Codex leafy vegetables group.

Crop group	Commodities	Table No.
	Barley: France, Germany, UK	Table 73
	Wheat: France, Germany, Switzerland, UK	Table 74
	Wheat: France, Germany, UK	Table 75
	Rice: Brazil, Japan	Table 76
Tree nuts	Pecan: USA	Table 77
Oilseeds	Sunflower: USA	Table 78
	Cotton: USA	Table 79
	Cotton: Greece, Spain	Table 80
	Oilseed rape: France, Germany, Sweden, UK	Table 81
Seed for beverages	Cacao beans: Côte d'Ivoire	Table 82
	Coffee: Brazil	Table 83
Legume animal feeds	Pea forage and fodder: Denmark, France, Germany	Table 84
Fodder, cereals	Maize forage and fodder: USA	Table 85
	Maize forage and fodder: USA	Table 86
	Maize forage and fodder: France, Germany, Spain	Table 87
	Barley straw and fodder: USA	Table 88
	Barley straw and fodder: France, Germany, UK	Table 89
	Wheat straw and fodder: France, Germany, Switzerland, UK	Table 90
	Wheat straw and fodder: France, Germany, UK	Table 91
	Rice straw: Japan	Table 92
Fodder, miscellaneous	Beet leaves and tops: France, Germany, Netherlands, Spain, Sweden, Switzerland, UK	Table 93
	Oilseed rape fodder and forage: France, Germany, Sweden, UK	Table 94
	Cotton gin by-products: USA	Table 95
Dried herbs	Hops: USA	Table 96
Teas	Tea: Japan	Table 97

Trials were generally well documented with laboratory and field reports, although a number of trials from the USA contained no details on trial design, plot size and field sample size. Assurance was provided that protocols had been followed, so the trial data were accepted.

Laboratory reports included method validation with procedural recoveries from spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analyses or duration of residue sample storage were also provided. Although trials included control plots, no control data are recorded in the tables except where residues in control samples exceeded the LOQ. Control samples are indicated in the summary tables with a "c".

Residue data are recorded unadjusted for recovery except in particular cases (indicated) where unadjusted data were not available. In some studies, the reported residues had been adjusted for procedural recoveries for each set of analyses, but only when the recoveries were less than 100%.

Thiamethoxam is a systemic compound and may be applied by various methods: seed treatment, soil, furrow, basal and band treatments and foliar treatment. Some crops may be subject to these various uses or combinations of the uses.

Seed treatments may be described in terms of g ai/kg seed or as kg ai/ha if the sowing rate (weight of seed per hectare) is taken into account. For some sugar beet seed treatments, the application rate was provided as g ai/unit, where the unit is 100,000 seeds. When the sowing rate (number of seeds per hectare) is known, the application rate as kg ai/ha may be calculated.

In some seed treatment trials, the treated seed were analysed for thiamethoxam content for comparison with the nominal value. It was explained that the average seed loading achieved in the commercial seed-treatment industry was approximately 70%. Trials with seed loading exceeding 70% of nominal would not be considered as deviating from the protocol.

For seed treatments, the PHI is taken as the interval between sowing and sampling. Seed may be treated some time before sowing, so the interval between treatment and sampling is inappropriate as a PHI for a seed treatment.

Residues and application rates have generally been rounded to two significant figures or, for residues near the LOQ, to one significant figure. Residue values from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels and STMR and HR values. Those results included in the evaluation are underlined.

Most trial designs used non-replicated plots. Most field reports provided data on the sprayers used, plot size, field sample size and sampling date.

Table 24 Summary of sprayers, plot sizes and field sample sizes in the supervised trials

Crop	Place	Year	Sprayer	Plot size	Sample size
Apple	USA	1996, 2000	Air blast, back pack, commercial	?	?
Artichoke	USA	2002	CO_2 backpack	125–195 m^2	12 buds
Bananas	Cameroon	2002	knapsack	180 plants to 3 ha	?
Barley	France	1996–1998	seed treatment equipment	40–300 m^2	0.5–50 kg
Barley	Germany	1996–1997	seed treatment equipment	30 m^2	0.8–2.5 kg
Barley	UK	1996–1997	seed treatment equipment	72 m^2	0.4–1 kg
Barley	USA	2001–2002	CO_2 backpack, ATV CO_2 sprayer	46–790 m^2	?
Beans, dry	USA	2000	seed treatment equipment	37–440 m^2	min 1.5 kg
Blueberry	USA	2001	CO_2 backpack, tractor with hydraulic boom	34–380 m^2	0.5–1 kg
Broccoli	USA	1997–2001	CO_2 backpack	?	1.5 kg
Cabbage	USA	1997–2000	CO_2 backpack	?	12 plants
Cacao	Côte d'Ivoire	2000	motorized mist blower	1000 m^2	12–30 kg
Caneberry	USA	2002	CO_2 backpack	23–93 m^2	min 0.5 kg
Cantaloupe	USA	1996	?	?	?
Carrot	USA	2000	CO_2 backpack, R&D sprayer, commercial sprayers	18–74 m^2	min 2 kg
Celery	USA	1997	CO_2 backpack	?	?
Cherry	France	2004–2006	mist blower	5–8 trees	1–2 kg
Cherry	Italy	2004–2005	mist blower, knapsack	4–5 trees	1–2.7 kg
Cherry	Spain	2004–2005	mist blower, knapsack	6–13 trees	1 kg
Cherry	Switzerland	2004-2005	knapsack	6 trees	1–2.8 kg
Cherry	USA	2000	Air blast	?	?
Coffee	Brazil	2008	plastic syringe, soil drench, granules	30–70 m^2	1 kg
Cotton	Greece	1996–1998	knapsack	50–300 m^2	1–10 kg
Cotton	Spain	1996–1997	knapsack	74–100 m^2	1 kg
Cotton	USA	1997	seed treatment equipment + knapsack, tractor sprayer	?	?
Cotton	USA	1998	seed treatment equipment + CO_2 backpack, tractor sprayers	?	?

Crop	Place	Year	Sprayer	Plot size	Sample size
Cranberry	USA	2000	CO_2 backpack	15–31 m^2	1.5 kg
Cucumber	Europe	2002–2005	drench, syringe, drip	15–64 m^2	12 fruits
Cucumber	USA	1996–1997	?	?	?
Egg plant	Switzerland	1997	knapsack	8–12 m^2	12 fruits
Grapefruit	USA	2005	backpack, air blast	?	min 24 fruit
Grapes	France	2001–2006	knapsack, mist blower	26–463 m^2	1.3–200 kg
Grapes	Spain	2001–2002	knapsack, handgun sprayer, backpack	120 m^2	1.2–1.8 kg
Grapes	Switzerland	2001–2006	knapsack	20–204 m^2	1.3–2.6 kg
Hops	USA	2002	CO_2 backpack	49–78 m^2	min 0.5 kg
Lemon	Spain	1996–1999	motor sprayer, high pressure sprayer, spray gun	64–196 m^2	2.1–5.7 kg
Lemon	USA	2005	backpack, air blast, tractor	?	min 24 fruit
Lettuce	USA	1997–2001	CO_2 backpack, soil injector, research backpack sprayer	?	?
Lima beans	USA	2000	seed treatment equipment	46–223 m^2	1.5–2 kg
Maize	France	1996–1999	seed treatment equipment	25–68 m^2	1.2–7 kg
Maize	Germany	1996–1997	seed treatment equipment	30–31 m^2	1–1.9 kg
Maize	Spain	1996–1997	seed treatment equipment	20–44 m^2	0.5–2.4 kg
Maize	USA	1998	seed treatment equipment	?	?
Mandarin	Spain	1999–2003	knapsack	18–195 m^2	20–30 fruit
Mango	South Africa	2003–2004	jug for drench	10–20 trees	12 fruits
Melon	Italy, Spain	2002–2003	jug for drench, syringe, drip	40–125 m^2	12 fruits
Mustard greens	USA	1997–2000	CO_2 backpack	?	2 kg
Okra	Côte d'Ivoire	2004	seed treatment equipment, knapsack	225 m^2	6 kg
Orange	Indonesia	2009	knapsack	40 m^2	5 kg
Orange	Spain	1995–2003	backpack, air blast, motor sprayer	68–195 m^2	12–16 fruits
Orange	USA	2005	backpack, tractor, air blast	?	min 24 fruit
Papaya	Brazil	2002	syringe	30 trees	12 fruits
Papaya	Côte d'Ivoire	2004	atomizer	36 trees	12 fruits
Peach	USA	2000	Air blast	?	?
Pear	USA	1996	Air blast	?	?
Peas	Denmark	1996	seed treatment equipment	432 m^2	1 kg
Peas	France	1996–1998	seed treatment equipment	40–72 m^2	1–2.9 kg
Peas	Germany	1997	seed treatment equipment	30–31 m^2	0.5–1 kg
Peas	USA	2000	seed treatment equipment	22–442 m^2	1.5–2 kg
Pecan	USA	1998	Air blast, mist blower	?	?
Peppers	Italy	1996–1997	knapsack, motor sprayer	8–37 m^2	1.3–2.6 kg
Peppers	Spain	1996–2002	knapsack, motor sprayer, drip	20–74 m^2	1.1–3.4 kg
Peppers	Switzerland	1996–1997	knapsack	6–12 m^2	12 fruits
Peppers	USA	1996	?	?	?
Pineapple	Brazil	2005	drench	15–25 m^2	?
Plum	USA	2000	Air blast	?	?
Popcorn	USA	1998	seed treatment equipment	?	?
Potato	France	1997	knapsack	60 m^2	2–4 kg
Potato	Germany	1997	plot sprayer	30 m^2	2–3.8 kg
Potato	Spain	1997–1999	knapsack	18–100 m^2	2 kg
Potato	Switzerland	1996–1997	knapsack	30–45 m^2	2–2.9 kg
Potato	UK	1996–1997	compressed air, small plot	50–120 m^2	10–24 kg
Potato	USA	1998	CO_2 backpack, tractor, plot, R&D	?	?
Radish	USA	2000	CO_2 backpack, furrow applicator, banded boom	18–91 m^2	min 0.5–2 kg
Rapeseed	France	1996–1998	seed treatment equipment	40–70 m^2	1.3–2 kg
Rapeseed	Germany	1996–1998	seed treatment equipment, lab glass jar	30–62 m^2	0.5–1.4 kg
Rapeseed	UK	1996–1997	seed treatment equipment	72–84 m^2	0.4–1.8 kg
Rice	Brazil	2000–2004	CO_2 powered	45–90 m^2	1–1.5 kg
Rice	Japan	2008	knapsack, battery powered	24–52 m^2	2–2.6 kg
Snap beans	USA	2000	seed treatment equipment	22–220 m^2	1.5–2 kg
Soya bean	USA	2002	seed treatment equipment	?	?
Spinach	USA	1996–2000	CO_2 backpack, small plot, tractor plot	?	?
Strawberry	USA	2000–2001	CO_2 backpack, tractor, boom	?	?

Crop	Place	Year	Sprayer	Plot size	Sample size
Sugar beet	France	1996–1997	seed treatment equipment	27–48 m^2	12 plants
Sugar beet	Germany	1997–1998	seed treatment equipment	30 m^2	1.2–2.8 kg
Sugar beet	Italy	1996–1997	seed treatment equipment	13–40 m^2	2 kg
Sugar beet	Netherlands Italy Spain Sweden UK Switzerland	1995–1998	seed treatment equipment	20–72 m^2	1–4.8 kg
Summer squash	USA	1996	?	?	?
Sunflower	USA	1999	seed treatment equipment	?	?
Sweet corn	USA	1998	seed treatment equipment	?	?
Tea	Japan	1998, 2002	knapsack, manual sprayer	8–23 m^2	0.2–2 kg
Tomato	France	1999	plot sprayer	20 m^2	12–24 fruits
Tomato	Italy	1996–2006	motor sprayer, knapsack, plot sprayer	9–114 m^2	1.3-40 kg
Tomato	Spain	1996–2006	motor sprayer, knapsack, plot sprayer	10–120 m^2	12 fruits—40 kg
Tomato	Switzerland	1996–1997	knapsack	8–10 m^2	12 fruits
Tomato	USA	1996–2000	CO_2 backpack	?	?
Wheat	France	1996–1998	seed treatment equipment, knapsack,	30–60 m^2	0.5–3 kg
Wheat	Germany	1996–1997	seed treatment equipment, plot sprayer	30–124 m^2	0.5–27 kg
Wheat	Switzerland	1996–1997	knapsack	60 m^2	1–1.7 kg
Wheat	UK	1996–1997	plot sprayer, seed treatment	72 m^2	0.5–1 kg

Table 25 Thiamethoxam residues in citrus fruits resulting from supervised trials in Spain

CITRUS	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704	
ORANGE										
Spain, 1995 (Salustiano)	WG	0.30	0.01	3000	1	0	whole fruit	0.35		1137/95
						7	whole fruit	0.09		
						14	whole fruit	0.07		
						21	whole fruit	0.03		
						28	peel	0.06		
						28	pulp	< 0.02		
						28	fruit [a]	0.03		
Spain, 1995 (Washington Navel)	WG	0.30	0.01	3000	1	0	whole fruit	0.39		1138/95
						7	whole fruit	0.05		
						14	whole fruit	0.03		
						21	whole fruit	0.02		
						28	peel	0.04		
						28	pulp	< 0.02		
						28	fruit [a]	0.02		
Spain, 1995 (Navelino)	WG	0.30	0.01	3000	1	0	whole fruit	0.36		1139/95
						7	whole fruit	< 0.02		
						14	whole fruit	< 0.02		
						21	whole fruit	0.02		
						28	peel	< 0.02		
						28	pulp	< 0.02		
						28	fruit [a]	< 0.02		
						28	orange juice	< 0.005		
Spain, 1995 (Navelino)	WG	0.30	0.01	3000	1	0	whole fruit	0.49		1140/95
						7	whole fruit	0.02		
						14	whole fruit	0.02		
						21	whole fruit	0.02		
						28	peel	< 0.02		
						28	pulp	< 0.02		
						28	fruit [a]	< 0.02		
						28	orange juice	< 0.005		

CITRUS	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704	
Spain, 1997 (Valencia late)	WG	0.30	0.01	3000	1	0	whole fruit	0.24	< 0.02	1007/97
						7	whole fruit	0.15	< 0.02	
						14	whole fruit	0.08	< 0.02	
						20	whole fruit	0.05	< 0.02	
						28	peel	0.09	< 0.02	
						28	pulp	< 0.02	< 0.02	
						28	fruit [a]	0.04	< 0.02	
						28	orange juice	< 0.02	< 0.02	
						28	marmalade	0.02	< 0.02	
Spain, 1997 (Valencia late)	WG	0.30	0.01	3000	1	0	whole fruit	0.22	< 0.02	1008/97
						7	whole fruit	0.15	< 0.02	
						14	whole fruit	0.11	< 0.02	
						20	whole fruit	0.07	< 0.02	
						28	peel	0.09	< 0.02	
						28	pulp	< 0.02	< 0.02	
						28	fruit [a]	0.04	< 0.02	
						28	orange juice	< 0.02	< 0.02	
						28	marmalade	0.02	< 0.02	
Spain, 1997 (Valencia late)	WG	0.30	0.01	3000	1	0	whole fruit	0.18	< 0.02	1009/97
						7	whole fruit	0.15	< 0.02	
						14	whole fruit	0.09	< 0.02	
						20	whole fruit	0.07	< 0.02	
						28	peel	0.08	< 0.02	
						28	pulp	< 0.02	< 0.02	
						28	fruit [a]	0.04	< 0.02	
Spain, 1999 (Navelino)	WG	0.12	0.0075	1660	1	0	whole fruit	0.08	< 0.02	1020/99
						7	whole fruit	< 0.02	< 0.02	
						14	whole fruit	< 0.02	< 0.02	
						21	whole fruit	< 0.02	< 0.02	
						29	peel	0.02 0.02	< 0.02 (2)	
						29	pulp	< 0.02 (2)	< 0.02 (2)	
						29	fruit [a]	< 0.02 (2)	< 0.02 (2)	
Spain, 1999 (W. Nabel)	WG	0.16	0.0075	2180	1	0	whole fruit	0.06	< 0.02	1021/99
						8	whole fruit	0.02	< 0.02	
						14	whole fruit	0.02	< 0.02	
						22	whole fruit	0.02	< 0.02	
						28	peel	0.04 0.04	< 0.02 (2)	
						29	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.02 0.02	< 0.02 (2)	
Spain, 2002 (Navel Foios)	WG		0.0076	2020	1	0	whole fruit	0.27	< 0.02	02-1048
						29	peel	0.20 0.19	0.04 0.03	
						29	pulp	< 0.02 (2)	< 0.02 (2)	
						29	fruit [a]	0.06 0.05	0.02 0.02	
Spain, 2002 (Navelina)	WG		0.0075	1980	1	0	whole fruit	0.25	< 0.02	02-1049
						28	whole fruit	0.08 0.06	< 0.02 (2)	
						28	peel	0.21 0.13	0.02 0.02	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.06 0.04	< 0.02 (2)	
Spain, 2002 (Navel)	WG		0.0075	1990	1	0	whole fruit	0.09	< 0.02	02-1050
						7	whole fruit	0.13	< 0.02	
						14	whole fruit	0.09 c0.02	< 0.02	
						21	whole fruit	0.05	< 0.02	
						29	peel	0.19	0.03	
						29	pulp	< 0.02	< 0.02	
						29	fruit [a]	0.05	< 0.02	
Spain, 2002 (Navelina)	WG		0.0075	2090	1	0	whole fruit	0.15	< 0.02	02-1051
						7	whole fruit	0.10	0.02	
						14	whole fruit	0.09	0.02	
						21	whole fruit	0.09	0.03	
						28	peel	0.13	0.06	
						28	pulp	0.02	< 0.02	
						28	fruit [a]	0.05	0.03	

CITRUS	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704	
Spain, 2003 (Navel Lane Late)	WG		0.0075	1910	1	0	whole fruit	0.21	< 0.02	03-1004
						27	peel	0.12 0.10	0.02 < 0.02	
						27	flesh	< 0.02	< 0.02 (2)	
						27	fruit [a]	0.03 0.03	< 0.02 (2)	
LEMON										
Spain, 1996 (Verna)	WG		0.01	3170	1	0	whole fruit	0.57	< 0.02	1017/96
						7	whole fruit	0.36	< 0.02	
						14	whole fruit	0.23	0.02	
						21	whole fruit	0.23	0.03	
						28	peel	0.18	0.05	
						28	pulp	< 0.02	< 0.02	
						28	fruit [a]	0.09	0.03	
						28	lemon juice	0.026	0.005	
Spain, 1996 (Verna)	WG		0.01	3170	1	0	whole fruit	0.63	< 0.02	1018/96
						7	whole fruit	0.27	< 0.02	
						14	whole fruit	0.10	< 0.02	
						21	whole fruit	0.10	0.02	
						28	peel	0.20	0.05	
						28	pulp	< 0.02	< 0.02	
						28	fruit [a]	0.10	0.03	
						28	lemon juice	0.012	< 0.005	
Spain, 1999 (Verna)	WG	0.15	0.0075	1940	1	0	whole fruit	0.34	< 0.02	1117/99
						7	whole fruit	0.10	< 0.02	
						14	whole fruit	0.08	< 0.02	
						21	whole fruit	0.07	0.02	
						28	peel	0.14 0.10	0.04 0.03	
						28	pulp	0.02 0.02	< 0.02 (2)	
						28	fruit [a]	0.08 0.06	0.02 0.02	
Spain, 1999 (Finos)	WG	0.30	0.0075	4000	1	0	whole fruit	0.28	< 0.02	1118/99
						7	whole fruit	0.13	< 0.02	
						14	whole fruit	0.10	< 0.02	
						21	whole fruit	0.10	0.02	
						28	peel	0.14 0.12	0.04 0.03	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.07 0.07	0.03 0.02	
Spain, 1999 (Verna)	WG	0.33	0.0075	4380	1	0	whole fruit	0.25	< 0.02	1119/99
						7	whole fruit	0.16	< 0.02	
						14	whole fruit	0.15	0.03	
						21	whole fruit	0.10	0.03	
						28	peel	0.15 0.09	0.07 0.04	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.08 0.05	0.04 0.03	
Spain, 1999 (Finos)	WG	0.11	0.0075	1430	1	0	whole fruit	0.13	< 0.02	1120/99
						7	whole fruit	0.13	< 0.02	
						14	whole fruit	0.10	< 0.02	
						21	whole fruit	0.06	< 0.02	
						28	peel	0.09 0.12	0.02 0.03	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.06 0.07	0.02 0.02	
Spain, 1999 (Fino)	WG	0.23	0.0075	3040	1	0	whole fruit	0.33	< 0.02	1136/99
						7	whole fruit	0.17	0.02	
						14	whole fruit	0.09	0.03	
						21	whole fruit	0.06	0.02	
						28	peel	0.09 0.08	0.05 0.04	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.04 0.04	0.02 0.02	
Spain, 1999 (Verna)	WG	0.23	0.0075	3000	1	0	whole fruit	0.11	< 0.02	1137/99
						7	whole fruit	0.06	< 0.02	
						14	whole fruit	0.02	0.02	
						21	whole fruit	0.02	< 0.02	
						28	peel	0.02 0.03	< 0.02 0.02	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	< 0.02 0.02	< 0.02 (2)	

CITRUS	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704	
MANDARIN										
Spain, 1999 (Clementinos)	WG	0.20	0.0075	2630	1	0	whole fruit	0.15	< 0.02	1022/99
						7	whole fruit	0.08	< 0.02	
						14	whole fruit	0.04	< 0.02	
						21	whole fruit	0.03	0.02	
						28	peel	0.05 0.04	0.04 0.04	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.02 0.02	0.02 < 0.02	
Spain, 2002 (Clemenules)	WG		0.0075	1980	1	0	whole fruit	0.24	< 0.02	02-1044
						28	peel	0.33 0.31	0.16 0.15	
						28	pulp	0.02 < 0.02	< 0.02 (2)	
						28	fruit [a]	0.10 0.08	0.05 0.04	
Spain, 2002 (Clemenules)	WG		0.0075	2010	1	0	whole fruit	0.11	< 0.02	02-1045
						28	peel	0.05 0.04	0.05 0.04	
						28	pulp	< 0.02 (2)	< 0.02 (2)	
						28	fruit [a]	0.02 0.02	0.02 0.02	
Spain, 2002 (Tomatera)	WG		0.0075	2010	1	0	whole fruit	0.10	< 0.02	02-1046
						7	whole fruit	0.07	< 0.02	
						14	whole fruit	0.04	< 0.02	
						21	whole fruit	0.03	< 0.02	
						29	peel	0.09	0.04	
						29	pulp	< 0.02	< 0.02	
						29	fruit [a]	0.03	0.02	
Spain, 2002 (Clemenules)	WG		0.0075	1740	1	0	whole fruit	0.12	< 0.02	02-1047
						7	whole fruit	0.09	< 0.02	
						14	whole fruit	0.06	0.02	
						21	whole fruit	0.05	0.02	
						28	peel	0.09	0.05	
						28	pulp	0.02	0.02	
						28	fruit [a]	0.04	0.03	
Spain, 2003 (Ellendale)	WG		0.0075	1980	1	0	whole fruit	0.16	< 0.02	03-1000
						7	whole fruit	0.05	< 0.02	
						15	whole fruit	0.02	< 0.02	
						21	whole fruit	< 0.02	< 0.02	
						27	peel	0.03 0.03	< 0.02 (2)	
						27	flesh	< 0.02	< 0.02	
						27	fruit [a]	< 0.02	< 0.02	
Spain, 2003 (Fortune)	WG		0.0075	1550	1	0	whole fruit	0.13	< 0.02	03-1001[28]
						7	whole fruit	0.10	< 0.02	
						14	whole fruit	0.07	< 0.02	
						21	whole fruit	0.05	< 0.02	
						28	peel	0.07 0.07	< 0.02 (2)	
						28	flesh	< 0.02	< 0.02	
						28	fruit [a]	< 0.02	< 0.02	
Spain, 2003 (Fortune)	WG		0.0075	1940	1	0	whole fruit	0.28	< 0.02	03-1002
						27	peel	0.25 0.24	0.06 0.05	
						27	flesh	< 0.02 (2)	< 0.02 (2)	
						27	fruit [a]	0.07 0.06	< 0.02 (2)	
Spain, 2003 (Fortune)	WG		0.0075	1940	1	0	whole fruit	0.12	< 0.02	03-1003
						28	peel	0.06 0.07	< 0.02 (2)	
						28	flesh	< 0.02 (2)	< 0.02 (2)	

[a] Residues in fruit calculated from residues in peel and pulp.

[b] c: sample from untreated control plot.

[28] Ely and Clarke, 2004, 03-1001. Mandarins. The plot size appears anomalous: plot size 6 m × 3 m, 1 row, 6 trees in one line. In response to a query, it was suggested that the 6 m × 3 m is the distance between rows and trees.

Table 26 Thiamethoxam residues in oranges resulting from supervised trials in Indonesia

ORANGE	Application					PHI	Residue, mg/kg [a] (thiamethoxam + CGA 322704)		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days	whole fruit	peel	
Indonesia, 2009 (Siam Purworejo), dry season, Central Java	ZC	0.0846	0.0085		2 (28 days)	0	0.26	1.2	82/SPKS/PPK-PPI/V/2009
						1	0.28	1.2	
						2	0.21	0.78	
						3	0.21	1.1	
						5	0.15	0.46	
						7	0.17	0.95	
						10	0.13	0.86	
						14	0.18	0.68	
						21	0.10	0.48	
						28	0.09	0.36	
						35	0.07	0.34	
						42	0.05	0.35	
Indonesia, 2009 (Siam Garut), dry season, West Java	ZC	0.0846	0.0085		2 (28 days)	0	0.08	0.31	82/SPKS/PPK-PPI/V/2009
						1	0.11	0.31	
						2	0.24	0.98	
						3	0.11	0.63	
						5	0.15	0.51	
						7	0.12	0.32	
						10	0.11	0.33	
						14	0.02	0.08	
						21	0.02	0.10	
						28	0.01	0.09	
						35	0.01	0.06	
						42	< 0.01	0.01	
Indonesia, 2009 (Siam Garut), wet season, West Java	ZC	0.0846	0.0085		2 (28 days)	0	0.11	0.50	82/SPKS/PPK-PPI/V/2009
						1	0.12	0.54	
						2	0.06	0.20	
						3	0.10	0.30	
						5	0.08	0.27	
						7	0.12	0.36	
						10	0.12	0.42	
						14	0.09	0.23	
						21	0.07	0.18	
						28	0.06	0.20	
						35	0.04	0.13	
						42	0.03	0.12	

[a] CGA 322704 was not detected in pulp or peel. Residue in whole fruit was calculated from the thiamethoxam concentration in the peel and the weights of peel, pulp and whole fruit.

Thiamethoxam may be used as a soil treatment or in foliar applications during the production of citrus fruits. Several use patterns were examined in the supervised trials in the USA on citrus (Ediger, 2006, T018964-04):

- Soil surface spray application of SL (soluble concentrate) formulation at 0.19 kg ai/ha, spray volume 94–940 L/ha.
- Two foliar applications of WG (water dispersible granule) formulation as cover sprays at 0.096 kg ai/ha with spray volumes of 94–940 L/ha (low volume) and an interval of 7 days.
- Two foliar applications of WG formulation as cover sprays at 0.096 kg ai/ha with spray volumes of 940–3700 L/ha (high volume) and an interval of 7 days.
- Two foliar applications of WG formulation as cover sprays at 0.29 kg ai/ha with spray volumes of 940–3700 L/ha and an interval of 7 days.

- Two foliar applications of WG formulation as cover sprays at 0.48 kg ai/ha with spray volumes of 940–3700 L/ha and an interval of 7 days. This exaggerated rate (5×) was chosen to produce oranges for the processing trial

Table 27 Thiamethoxam residues in citrus resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CITRUS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
ORANGE									
USA (FL), 2005 (Valencia) orange	SL	0.19 soil surface	210	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6090
USA (FL), 2005 (Valencia) orange	SL	0.19 soil surface	280	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6092
USA (FL), 2005 (Valencia) orange	SL	0.19 soil surface	205	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6093
USA (FL), 2005 (Hamlin) orange	SL	0.19 soil surface	240	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6094
USA (FL), 2005 (Hamlin) orange	SL	0.19 soil surface	230	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6095
USA (FL), 2005 (Navel) orange	SL	0.19 soil surface	230	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6096
USA (FL), 2005 (Ambersweet) orange	SL	0.19 soil surface	205	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6097
USA (TX), 2005 (N-33) orange	SL	0.19 soil surface	290	1	0 14 21 28	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 SA-IR-05-6098
USA (CA), 2005 (Cutter Valencia) orange	SL	0.19 soil surface	190	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6099
USA (CA), 2005 (Valencia) orange	SL	0.19 soil surface	180	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6100
USA (CA), 2005 (Navel) orange	SL	0.19 soil surface	190	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6101
USA (FL), 2005 (Navel) orange	SL	0.19 soil surface	500	1	0 14 21 28	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6113
USA (FL), 2005 (Valencia) orange	WG	0.096	1170	2 7d	0 14 21	whole fruit	0.05 0.07 0.03 0.02 0.01 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6090
USA (FL), 2005 (Valencia) orange	WG	0.096	96	2 7d	0 14 21	whole fruit	0.06 0.06 0.01 0.01 0.02 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6092
USA (FL), 2005 (Valencia) orange	WG	0.096	1180	2 7d	0 14 21	whole fruit	0.10 0.19 0.07 0.06 0.05 0.05	< 0.01 (2) < 0.01 (2) 0.01 0.01	T018964-04 VK-IR-05-6093
USA (FL), 2005 (Hamlin) orange	WG	0.096	700	2 7d	0 14 21	whole fruit	0.26 0.21 0.10 0.09 0.10 0.15	< 0.01 (2) 0.01 0.01 0.02 0.02	T018964-04 VK-IR-05-6094
USA (FL), 2005 (Hamlin) orange	WG	0.096	1950	2 7d	0 14 21	whole fruit	0.21 0.21 0.14 0.12 0.16 0.12	< 0.01 (2) 0.02 0.01 0.02 0.01	T018964-04 VK-IR-05-6095

CITRUS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (FL), 2005 (Navel) orange	WG	0.096	420	2 7d	0 14 21	whole fruit	0.06 0.08 < 0.01 (2) 0.02 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6096
USA (FL), 2005 (Ambersweet) orange	WG	0.096	1410	2 7d	0 14 21	whole fruit	0.13 0.11 0.10 0.13 0.08 0.08	< 0.01 (2) 0.02 0.03 0.02 0.02	T018964-04 VK-IR-05-6097
USA (TX), 2005 (N-33) orange	WG	0.096	540	2 7d	0 14 21 28	whole fruit	0.06 < 0.01 < 0.01 0.02 < 0.01 0.02 < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 SA-IR-05-6098
USA (TX), 2005 (N-33) orange	WG	0.096	2700	2 7d	0 14 21 28	whole fruit	0.03 0.02 0.01 0.01 0.02 0.01 < 0.01 0.01	< 0.01 (2) < 0.01 (2) 0.02 < 0.01 < 0.01 (2)	T018964-04 SA-IR-05-6098
USA (CA), 2005 (Cutter Valencia) orange	WG	0.096	2680	2 7d	0 14 21	whole fruit	0.04 0.04 0.01 0.01 < 0.01 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6099
USA (CA), 2005 (Valencia) orange	WG	0.096	580	2 7d	0 14 21	whole fruit	0.07 0.07 0.02 0.03 0.02 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6100
USA (CA), 2005 (Navel) orange	WG	0.096	450	2 7d	0 14 21	whole fruit	0.02 0.06 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6101
USA (CA), 2005 (Navel) orange	WG	0.096	1980	2 7d	0 14 21	whole fruit	0.06 0.13 0.04 0.02 0.02 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6101
USA (FL), 2005 (Navel) orange	WG	0.096	500	2 7d	0 14 21 28	whole fruit	0.12 0.09 0.04 0.03 0.04 0.04 0.02 0.04	< 0.01 (2) < 0.01 (2) 0.02 0.01 0.01 0.02	T018964-04 VK-IR-05-6113
USA (CA), 2005 (Cutter Valencia) orange	WG	0.29	2680	2 7d	0	whole fruit	0.14 0.18	< 0.01 (2)	T018964-04 WC-IR-05-6099
USA (CA), 2005 (Cutter Valencia) orange	WG	0.47	2680	2 7d	0	whole fruit	0.17 0.22	< 0.01 (2)	T018964-04 WC-IR-05-6099
USA (FL), 2005 (Valencia) orange	WG	0.48	1170	2 7d	0	whole fruit	0.52 0.59	< 0.01 0.01	T018964-04 VK-IR-05-6090
GRAPEFRUIT									
USA (FL), 2005 (Flame) grapefruit	SL	0.19 soil surface	280	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6103
USA (FL), 2005 (Marsh White) grapefruit	SL	0.19 soil surface	230	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6104
USA (TX), 2005 (Rio Red) grapefruit	SL	0.19 soil surface	290	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 SA-IR-05-6105
USA (CA), 2005 (Mellogold) grapefruit	SL	0.19 soil surface	320	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6106
USA (CA), 2005 (Rio Red) grapefruit	SL	0.19 soil surface	180	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6107
USA (FL), 2005 (Flame) grapefruit	SL	0.19 soil surface	500	1	0 14 21 28	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6114
USA (FL), 2005 (Flame) grapefruit	WG	0.096	2120	2 7d	0 14 21	whole fruit	0.04 0.04 0.02 0.02 0.02 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6103

CITRUS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (FL), 2005 (Marsh White) grapefruit	WG	0.096	94	2 7d	0 14 21	whole fruit	0.06 0.04 0.02 0.02 0.02 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6104
USA (TX), 2005 (Rio Red) grapefruit	WG	0.096	2930	2 7d	0 14 21	whole fruit	0.02 0.02 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 SA-IR-05-6105
USA (TX), 2005 (Rio Red) grapefruit	WG	0.096	590	2 7d	0 14 21	whole fruit	0.02 0.03 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 SA-IR-05-6105
USA (CA), 2005 (Mellogold) grapefruit	WG	0.096	330	2 7d	0 14 21	whole fruit	0.04 0.06 0.02 0.05 0.02 0.03	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6106
USA (CA), 2005 (Rio Red) grapefruit	WG	0.096	2470 +1870	2 7d	0 14 21	whole fruit	0.04 0.08 0.07 0.07 0.01 0.01	< 0.01 (2) < 0.01 0.01 < 0.01 (2)	T018964-04 WC-IR-05-6107
USA (FL), 2005 (Flame) grapefruit	WG	0.096	2360	2 7d	0 14 21 28	whole fruit	0.12 0.17 0.04 0.02 0.04 0.04 0.03 0.05	0.01 0.01 0.01 0.01 0.02 0.02 0.02 0.03	T018964-04 VK-IR-05-6114
USA (FL), 2005 (Flame) grapefruit	WG	0.096	500	2 7d	0 14 21 28	whole fruit	0.08 0.10 0.03 0.03 0.02 0.05 0.04 0.04	< 0.01 (2) 0.02 0.02 < 0.01 0.03 0.03 0.02	T018964-04 VK-IR-05-6114
LEMON									
USA (FL), 2005 (Meyer) lemon	SL	0.19 soil surface	280	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 VK-IR-05-6108
USA (CA), 2005 (Pryor) lemon	SL	0.19 soil surface	290	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6109
USA (CA), 2005 (Lisbon) lemon	SL	0.19 soil surface	190	1	0 14 21 28	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6110
USA (CA), 2005 (Eureka) lemon	SL	0.19 soil surface	190	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 0.02 < 0.01 (2)	< 0.01 (2) < 0.01 0.01 < 0.01 (2)	T018964-04 WC-IR-05-6111
USA (AZ), 2005 (Limoneira) lemon	SL	0.19 soil surface	205	1	0 14 21	whole fruit	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6112
USA (FL), 2005 (Meyer) lemon	WG	0.096	1870	2 7d	0 14 21	whole fruit	0.05 0.06 0.03 0.02 0.02 0.02	< 0.01 (2) < 0.01 (2) 0.01 0.01	T018964-04 VK-IR-05-6108
USA (FL), 2005 (Meyer) lemon	WG	0.096	94	2 7d	0 14 21	whole fruit	0.12 0.10 0.06 0.05 0.04 0.04	< 0.01 (2) 0.02 0.02 0.02 0.02	T018964-04 VK-IR-05-6108
USA (CA), 2005 (Pryor) lemon	WG	0.096	740	2 7d	0 14 21	whole fruit	0.11 0.08 0.04 0.03 0.17 0.16	0.01 0.01 < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6109
USA (CA), 2005 (Lisbon) lemon	WG	0.096	1520	2 7d	0 14 21 28	whole fruit	0.06 0.12 0.08 0.14 0.02 0.03 0.07 0.07	< 0.01 (2) 0.02 0.02 < 0.01 (2) 0.02 0.02	T018964-04 WC-IR-05-6110
USA (CA), 2005 (Eureka) lemon	WG	0.096	470	2 7d	0 14 21	whole fruit	0.03 0.04 0.05 0.03 < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	T018964-04 WC-IR-05-6111
USA (AZ), 2005 (Limoneira) lemon	WG	0.096	1000	2 7d	0 14 21	whole fruit	0.11 0.08 0.09 0.10 0.07 0.09	< 0.01 (2) 0.02 0.02 < 0.01 (2)	T018964-04 WC-IR-05-6112

Table 28 Thiamethoxam residues in apples resulting from supervised trials in Europe

APPLES	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 1997 (Idared)	WG	0.10	0.01	1000	2 14 d	21	apples	< 0.02	< 0.02	9730501
Italy, 1997 (Stark Spur Red)	WG	0.10	0.008	1200	2 14 d	0- 0 7 14 28	apples apples apples apples apples	< 0.02 0.08 0.02 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1068/97
Italy, 1997 (Jonagold)	WG	0.10	0.007	1500	2 14 d	0- 0 7 14 28	apples apples apples apples apples	0.03 0.12 0.03 0.03 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1067/97

Thiamethoxam may be used as a foliar treatment during the production of pome fruits. Several use patterns were examined in the supervised trials in the USA on pome fruits (Campbell, 1998, ABR-98096):

- Four foliar applications of WG (water dispersible granule) formulation at ×1 rate. The first two are sprays with an application rate of 0.099 kg ai/ha with an interval of 10 days. The third and fourth applications, as a tank mix with pymetrozine, have an application rate of 0.049 kg ai/ha, with intervals of 10 and 7 days and a PHI of 14 days.
- Four foliar applications of WG (water dispersible granule) formulation at ×3 rate. The timing is the same as ×1 rate.
- Four foliar applications of WG (water dispersible granule) formulation at ×5 rate. The timing is the same as ×1 rate.

Table 29 Thiamethoxam residues in pome fruits resulting from supervised trials in the USA. Replicate values arise from replicate field samples.

POME FRUITS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no.	days		thiamethoxam	CGA 322704	
APPLE									
USA (PA), 1996 (Starkrimson Red Delicious) apple	WG	0.099 + 0.049 [a]	950	2 + 2	14	fruit, mature	0.08 0.09	< 0.01 (2)	ABR-98096 NE-IR-814-96
USA (NY), 1996 (Golden Delicious) apple	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.05 0.10	< 0.01 (2)	ABR-98096 NE-IR-813-96
USA (MI), 1996 (Red Delicious) apple	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.07 0.04	< 0.01 (2)	ABR-98096 NE-IR-723-96
USA (OH), 1996 (Summer Treat M7A root stock) apple	WG	0.099 + 0.049 [a]	470	2 + 2	14	fruit, mature	0.04 0.02	< 0.01 (2)	ABR-98096 NE-IR-208-96
USA (CO), 1996 (Golden Delicious) apple	WG	0.099 + 0.049 [a]	920	2 + 2	14	fruit, mature	0.03 0.04	< 0.01 (2)	ABR-98096 MW-IR-313-96
USA (ID), 1996 (Red Delicious) apple	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.05 0.09	< 0.01 (2)	ABR-98096 0W-IR-630-96
USA (OR), 1996 (Newtown Pippen) apple	WG	0.099 + 0.049 [a]	1330	2 + 2	14	fruit, mature	0.05 0.08	< 0.01 (2)	ABR-98096 0W-IR-629-96

POME FRUITS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no.	days		thiamethoxam	CGA 322704	
USA (WA), 1996 (Braeburn) apple	WG	0.099 + 0.049 [a]	94	2 + 2	14	fruit, mature	0.15 0.12	< 0.01 (2)	ABR-98096 0W-IR-628-96
USA (WA), 1996 (Red Delicious) apple	WG	0.099 + 0.049 [a]	940	2 + 2	15	fruit, mature	0.08 0.08	< 0.01 (2)	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.30 + 0.15 [a]	940	2 + 2	15	fruit, mature	0.39 0.31	< 0.01 (2)	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.50 + 0.25 [a]	940	2 + 2	15	fruit, mature	0.68 0.79	0.04 0.04	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.099 + 0.049 [a]	940	2 + 2	15	apples	0.12	0.02	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.30 + 0.15 [a]	940	2 + 2	15	apples	0.23	0.02	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.50 + 0.25 [a]	940	2 + 2	15	apples	0.68	0.05	ABR-98096 0W-IR-627-96
USA (CA), 1996 (Granny Smith) apple	WG	0.099 + 0.049 [a]	930	2 + 2	14	fruit, mature	0.04 0.06	< 0.01 0.01	ABR-98096 0W-IR-439-96
USA (CA), 1996 (Rome) apple	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.02 0.03	< 0.01 (2)	ABR-98096 0W-IR-440-96
USA (NC), 1996 (McIntosh) apple	WG	0.099 + .049 [a]	940	2 + 2	0 14	fruit, mature	0.14 0.14 0.04 0.06	< 0.01 (2) < 0.01 (2)	ABR-98096 0S-IR-607-96
USA (NY), 1996 (McIntosh) apple	WG	0.099 + 0.049 [a]	980	2 + 2	0 1 3 7 14 21	fruit fruit fruit fruit fruit, mature fruit, mature	0.07 0.06 0.04 0.06 0.07 0.05 0.06 0.03 0.05 0.05 0.06 0.04	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.30 + 0.15 [a]	980	2 + 2	14	fruit, mature	0.18 0.10	0.01 < 0.01	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.50 + 0.25 [a]	980	2 + 2	14	fruit, mature	0.16 0.16	< 0.01 (2)	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.099 + 0.049 [a]	980	2 + 2	14	apples	0.05	< 0.01	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.30 + 0.15 [a]	980	2 + 2	14	apples	0.13	< 0.01	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.50 + 0.25 [a]	980	2 + 2	14	apples	0.15	< 0.01	ABR-98096 05-IR-004-96
USA (CA), 2000 (Granny Smith) apple	SL	0.099	1470	2 8d	0 0 39 39	fruit fruit fruit, mature fruit, mature	0.15 0.05 0.11 0.09 < 0.01 (2) < 0.01 (2)	< 0.01 0.02 < 0.01 (2) < 0.01 (2) < 0.01 (2)	5-00 02-TR-002-00[29]
USA (CA), 2000 (Granny Smith) apple	WG	0.099	1470	2 8d	0 0 39 39	fruit fruit fruit, mature fruit, mature	0.13 0.12 0.10 0.09 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	5-00 02-TR-002-00[29]

[29] Apples. 02-TR-002-00. Side-by-side trials to compare residue levels from the use of a WG formulation and a SL formulation.

POME FRUITS	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no.	days		thiamethoxam	CGA 322704	
PEAR									
USA (NY), 1996 (Clapp's Favorite) pears	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.03 0.04	0.03 0.03	ABR-98096 NE-IR-815-96[30]
USA (CA), 1996 (Bartlett) pear	WG	0.099 + 0.049 [a]	1400	2 + 2	0 1 3 7 14 21	fruit fruit fruit fruit fruit, mature fruit, mature	0.08 0.08 0.08 0.07 0.07 0.05 0.05 0.05 0.03 0.03 < 0.01 (2)	< 0.01 (2) 0.01 < 0.01 0.01 < 0.01 0.02 0.01 0.02 0.02 < 0.01 (2)	ABR-98096 02-IR-047-96
USA (OR), 1996 (Anjou) pear	WG	0.099 + 0.049 [a]	1000 + 1160	2 + 2	14	fruit, mature	0.08 0.05	0.03 0.02	ABR-98096 0W-IR-633-96
USA (WA), 1996 (Bartlett) pear	WG	0.099 + 0.049 [a]	940	2 + 2	14	fruit, mature	0.04 0.05	0.02 0.02	ABR-98096 0W-IR-632-96
USA (WA), 1996 (Bartlett) pear	WG	0.099 + 0.049 [a]	94	2 + 2	14	fruit, mature	0.04 0.05	0.03 0.04	ABR-98096 0W-IR-631-96
USA (CA), 1996 (Bartlet) pear	WG	0.099 + 0.049 [a]	1310	2 + 2	14	fruit, mature	0.03 0.02	0.01 < 0.01	ABR-98096 0W-IR-441-96

[a] Applied as a tank mix with pymetrozine.

Two formulations may be used in foliar application of thiamethoxam during the production of plums: WG, water dispersible granules and SL, soluble concentrate (Moore and Ediger, 2002, 07674). The use pattern is: two applications of 0.096 kg ai/ha with an interval of 10 days and a PHI of 14 days.

The same use pattern applied to the production of peaches and cherries.

Table 30 Thiamethoxam residues in plums resulting from supervised trials in the USA. Replicate values arise from replicate field samples

PLUM	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (MI), 2000 (Early Golden)	WG	0.096	940	2 10d	14	fruit	0.02 0.02	0.02 0.01	07674. 562-00 IR4S02200
USA (CA), 2000 (Santa Rosa)	WG	0.096	1400	2 10d	14	fruit	< 0.01 (2)	< 0.01 (2)	07674. 562-00 IR4S04000
USA (CA), 2000 (Santa Rosa)	SL	0.096	1400	2 10d	14	fruit	< 0.01 (2)	< 0.01 (2)	07674. 562-00 IR4S04000
USA (CA), 2000 (Blue Sugar French)	WG	0.096	940	2 10d	14	fruit	< 0.01 (2)	< 0.01 (2)	07674. 562-00 IR4S04100
USA (OR), 2000 (Italian)	WG	0.096	600	2 10d	14	fruit	< 0.01 (2)	< 0.01 (2)	07674. 562-00 IR4S06800
USA (OR), 2000 (Italian)	SL	0.096	600	2 10d	14	fruit	< 0.01 (2)	< 0.01 (2)	07674. 562-00 IR4S06800
USA (CA), 2000 (French)	WG	0.096	1400	2 11d	14 14 14	fruit fruit to dry prune	0.02 0.01 < 0.01 < 0.01	0.01 < 0.01 < 0.01 < 0.01	07674. 562-00 IR4S03300
USA (CA), 2000 (French)	WG	0.34	1400	2 11d	14 14 14	fruit fruit to dry prune	0.06 0.06 0.05 0.03	< 0.01 0.02 0.01 0.02	07674. 562-00 IR4S03300

[30] NE-IR-815-96. ABR-98096. This trial is confirmed as a pear trial. "Apple" or "apples" appearing in the text or tables are typographical errors.

PLUM	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 2000 (French)	WG	0.096	930	2 9d	14 14 14	fruit fruit to dry prune	< 0.01 0.01 0.01 < 0.01	< 0.01 (2) < 0.01 < 0.01	07674. 562-00 IR4S04800
USA (CA), 2000 (French)	WG	0.34	930	2 9d	14 14 14	fruit fruit to dry prune	0.05 0.04 0.06 0.05	< 0.01 (2) 0.02 0.03	07674. 562-00 IR4S04800

Table 31 Thiamethoxam residues in peaches resulting from supervised trials in the USA. Replicate values arise from replicate field samples

PEACH	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (NJ), 2000 (Dixy Red)	WG	0.096	760	2 10d	13	fruit	0.04 0.02	0.04 0.02	07052. 559-00 IR4S05100
USA (NY), 2000 (Harcrest)	WG	0.096	940	2 10d	14	fruit	0.01 0.02	0.02 0.02	07052. 559-00 IR4S06600
USA (SC), 2000 (Red Globe)	WG	0.096	1000 + 980	2 10d	14	fruit	0.01 0.02	0.03 0.04	07052. 559-00 IR4S01000
USA (SC), 2000 (Red Globe)	SL	0.096	1000 + 980	2 10d	14	fruit	0.02 0.01	0.02 0.01	07052. 559-00 IR4S01000
USA (NC), 2000 (Biscoe)	WG	0.096	940	2 10d	14	fruit	< 0.01 0.01	< 0.01 0.02	07052. 559-00 IR4S02300
USA (MI), 2000 (Elberta)	WG	0.096	990	2 10d	14	fruit	0.03 < 0.01	0.04 0.02	07052. 559-00 IR4S05700
USA (TX), 2000 (Tex Star)	WG	0.096	1260 + 1320	2 5d [a]	13	fruit	0.10 0.19	0.07 0.12	07052. 559-00 IR4S00400
USA (CA), 2000 (Flamecrest)	WG	0.096	1400	2 9d	0 7 14 21	fruit	< 0.01 0.14 0.06 0.07 0.06 0.06 0.03 0.02	< 0.01 0.02 0.02 0.04 0.05 0.05 0.05 0.02	07052. 559-00 IR4S03800
USA (CA), 2000 (Flamecrest)	SL	0.096	1400	2 9d	14	fruit	0.02 0.05	< 0.01 0.04	07052. 559-00 IR4S03800
USA (CA), 2000 (September Sun)	WG	0.096	490	2 10d	14	fruit	0.03 0.04	< 0.01 0.01	07052. 559-00 IR4S06700
USA (CA), 2000 (Loadell)	WG	0.096	1800	2 10d	14	fruit	0.04 0.05	0.02 0.02	07052. 559-00 IR4S03900

[a] US label restraint: minimum interval between applications: 7 days.

Table 32 Thiamethoxam residues in cherries resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CHERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam [a]	CGA 322704 [a]	
USA (MI), 2000 (Hedeffmyer) sweet cherry	WG	0.096	560	2 10d	14	fruit	0.13 0.17	0.02 0.03	07673. 36-00 IR4S03100
USA (CA), 2000 (Bing) sweet cherry	WG	0.096	1400	2 11d	0 7 15 22	fruit	0.45 0.41 0.20 0.25 0.19 0.28 0.10 0.11	0.01 0.02 0.01 0.02 0.02 0.02 0.01 0.01	07673. 36-00 IR4S00700
USA (CA), 2000 (Bing) sweet cherry	SL	0.096	1400	2 11d	15	fruit	0.22 0.20	0.03 0.02	07673. 36-00 IR4S00700
USA (WA), 2000 (Bing) sweet cherry	WG	0.096	940	2 10d	14	fruit	0.21 0.21	0.03 0.02	07673. 36-00 IR4S03500
USA (WA), 2000 (Bing) sweet cherry	SL	0.096	940	2 10d	14	fruit	0.18 0.20	0.01 0.01	07673. 36-00 IR4S03500

CHERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam [a]	CGA 322704 [a]	
USA (OR), 2000 (Royal Anne) sweet cherry	WG	0.096	580 + 510	2 10d	13	fruit	0.24 0.24	0.02 0.02	07673. 36-00 IR4S01800
USA (MI), 2000 (Montmorency) tart cherry	WG	0.096	940	2 10d	14	fruit	0.18 0.22 c 0.02	< 0.01 0.01 c < 0.01	07673. 36-00 IR4S02000
USA (MI), 2000 (Montmorency) tart cherry	WG	0.096	940	2 10d	14	fruit	0.12 0.19	< 0.01 (2)	07673. 36-00 IR4S02100
USA (MI), 2000 (Montmorency) tart cherry	WG	0.096	940	2 10d	14	fruit	0.18 0.19	0.01 < 0.01	07673. 36-00 IR4S01900
USA (CO), 2000 (Montmorency) tart cherry	WG	0.096	580 + 520	2 10d	14	fruit	0.13 0.13	< 0.01 (2)	07673. 36-00 IR4S03600

[a] c: sample from control plot

Table 33 Thiamethoxam residues in cherries resulting from supervised trials in France, Italy, Spain and Switzerland

CHERRIES	Application					PHI	Commodity [b]	Residue, mg/kg				Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam		CGA 322704		
								fruit	flesh	fruit	flesh	
France, 2005 (Montmorency)	WG		0.0074 0.0077	1470 + 1540	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.32 0.61 0.34 0.31 0.20 0.13	0.36 0.68 0.38 0.34 0.22 0.14	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	05-0416 AF/8641/SY/1
France, 2005 (Chatel Morel)	WG		0.0072 0.0074	1450 + 1490	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.04 0.36 0.21 0.16 0.11 0.10	0.04 0.41 0.23 0.18 0.12 0.11	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	05-0416 AF/8641/SY/2
France, 2005 (Obiska)	WG		0.0075	1490	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.03 1.06 0.60 0.26 0.18 0.11	0.05 1.63 0.87 0.36 0.24 0.14	< 0.02 < 0.02 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 0.03 < 0.02 < 0.02 < 0.02	05-0417 AF/8642/SY/1
France, 2004 (Summit)	WG		0.005	1540 + 1470	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.13 0.38 0.21 0.13 0.14 0.09	0.14 0.42 0.22 0.14 0.15 0.10	< 0.02 < 0.02 0.04 0.03 0.03 < 0.02	< 0.02 < 0.02 0.04 0.03 0.03 0.02	CEMS-2331
France, 2004 (Summit)	WG		0.0075	1610 + 1520	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.19 0.43 0.31 0.17 0.20 0.17	0.21 0.47 0.34 0.18 0.22 0.18	< 0.02 < 0.02 0.05 0.04 0.06 0.04	< 0.02 0.02 0.05 0.04 0.06 0.04	CEMS-2331
France, 2006 (Chatel Morel)	WG		0.0073	1460 + 1540	2 7d	0- 0 3 7 10 14	whole fruit and flesh	0.24 0.64 0.61 0.46 0.35 0.36	0.28 0.73 0.69 0.52 0.40 0.41	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000641-06-REG AF/10411/SY/1 duplicate trial

CHERRIES	Application					PHI	Commodity [b]	Residue, mg/kg				Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam		CGA 322704		
								fruit	flesh	fruit	flesh	
France, 2006 (Chatel Morel)	WG		0.0077	1460 + 1480	2 7d	0-	whole fruit and flesh	0.29	0.35	< 0.02	< 0.02	T000641-06-REG AF/10411/SY/1 duplicate trial
						0		0.69	0.80	< 0.02	< 0.02	
						3		0.62	0.70	< 0.02	< 0.02	
						7		0.50	0.57	< 0.02	< 0.02	
						10		0.44	0.51	< 0.02	< 0.02	
						14		0.33	0.38	< 0.02	< 0.02	
France, 2006 (Orhin acide)	WG		0.0074	1530 + 1400	2 7d	0-	whole fruit and flesh	0.36	0.43	0.02	0.02	T000642-06-REG AF/10412/SY/1 duplicate trial
						0		1.0	1.2	0.02	0.03	
						3		0.60	0.69	0.03	0.03	
						7		0.49	0.57	0.04	0.04	
						10		0.43	0.51	0.03	0.04	
						14		0.28	0.33	0.02	0.03	
France, 2006 (Orhin acide)	WG		0.0076	1420	2 7d	0-	whole fruit and flesh	0.35	0.41	0.02	0.02	T000642-06-REG AF/10412/SY/1 duplicate trial
						0		0.97	1.14	< 0.02	< 0.02	
						3		0.60	0.74	0.03	0.04	
						7		0.46	0.53	0.03	0.04	
						10		0.42	0.49	0.04	0.04	
						14		0.26	0.31	0.02	0.03	
France, 2006 (Oblasinska)	WG		0.0074	1490 + 1410	2 7d	0-	whole fruit and flesh	0.63	0.70	0.02	0.02	T000642-06-REG AF/10412/SY/2 duplicate trial
						0		0.81	0.91	< 0.02	< 0.02	
						3		0.63	0.71	0.02	0.02	
						7		0.60	0.68	0.03	0.03	
						10		0.31	0.35	0.02	0.02	
						14		0.19	0.23	< 0.02	< 0.02	
France, 2006 (Oblasinska)	WG		0.0077	1460 1300	2 7d	0-	whole fruit and flesh	0.34	0.38	0.03	0.03	T000642-06-REG AF/10412/SY/2 duplicate trial
						0		0.81	0.92	< 0.02	< 0.02	
						3		0.71	0.81	0.03	0.03	
						7		0.51	0.58	0.03	0.03	
						10		0.26	0.30	0.02	0.02	
						14		0.20	0.23	0.02	0.02	
Italy, 2004 (Sweet cherry)	WG		0.0050	1480 + 1390	2 7d	0-	whole fruit and flesh	0.05	0.08	< 0.02	< 0.02	CEMS-2444 AF/8239/SY/1
						0		0.26	0.32	< 0.02	< 0.02	
						3		0.12	0.16	< 0.02	< 0.02	
						7		0.09	0.10	< 0.02	< 0.02	
						10		0.04	0.06	< 0.02	< 0.02	
						14		0.06	0.07	< 0.02	< 0.02	
Italy, 2004 (Sweet cherry)	WG		0.0075	1460 + 1420	2 7d	0-	whole fruit and flesh	0.10	0.15	< 0.02	< 0.02	CEMS-2444 AF/8239/SY/1
						0		0.46	0.62	< 0.02	< 0.02	
						3		0.17	0.29	< 0.02	< 0.02	
						7		0.09	0.12	< 0.02	< 0.02	
						10		0.13	0.16	0.02	0.03	
						14		0.08	0.09	< 0.02	< 0.02	
Italy, 2005 (Lapins)	WG		0.0075	1480	2 7d	0-	whole fruit and flesh	0.11	0.12	< 0.02	< 0.02	05-0506 IT-IR-05-0442
						0		0.38	0.40	< 0.02	< 0.02	
						3		0.20	0.21	0.02	0.02	
						7		0.17	0.18	0.02	0.02	
						10		0.16	0.17	0.02	0.02	
						14		0.09	0.10	< 0.02	< 0.02	
Italy, 2005 (Nero 1)	WG		0.0075	1620 + 1520	2 7d	0-	whole fruit and flesh	0.06	0.06	< 0.02	< 0.02	05-0506 IT-IR-05-0441
						0		0.21	0.23	< 0.02	< 0.02	
						3		0.18	0.19	< 0.02	< 0.02	
						7		0.15	0.18	< 0.02	< 0.02	
						10		0.11	0.12	< 0.02	< 0.02	
						14		0.07	0.07	< 0.02	< 0.02	
Spain, 2004 (Burlat)	WG		0.0050	1540	2 7d	0-	whole fruit and flesh	0.04	0.08	< 0.02	< 0.02	CEMS-2330 ES-IR-04-0064
						0		0.22	0.35	< 0.02	< 0.02	
						3		0.140.0.13	0.23	< 0.02	< 0.02	
						7		0.08	0.17	< 0.02	< 0.02	
						10		0.08	0.10	< 0.02	< 0.02	
						14			0.09	< 0.02	< 0.02	

CHERRIES	Application					PHI	Commodity [b]	Residue, mg/kg				Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam		CGA 322704		
								fruit	flesh	fruit	flesh	
Spain, 2004 (Burlat)	WG		0.0075	1540	2 7d	0-	whole fruit	0.12	0.16	< 0.02	< 0.02	CEMS-2330
						0	and flesh	0.40	0.53	< 0.02	< 0.02	ES-IR-04-0064
						3		0.24	0.28	< 0.02	< 0.02	
						7		0.16	0.19	< 0.02	< 0.02	
						10		0.10	0.11	< 0.02	< 0.02	
						14		0.11	0.12	< 0.02	< 0.02	
Spain, 2005 (Monzon)	WG		0.0075	1470	2 7d	0-	whole fruit	0.21	0.23	< 0.02	< 0.02	05-0417
						0	and flesh	0.34	0.37	< 0.02	< 0.02	AF/8642/SY/2
						3		0.31	0.34	< 0.02	< 0.02	
						7		0.19	0.20	< 0.02	< 0.02	
						10		0.16	0.17	< 0.02	< 0.02	
						14		0.15	0.17	< 0.02	< 0.02	
Switzerland, 2004 (Hedelfinger)	WG	0.074	0.005	1470	2 7d	0-	whole fruit	< 0.02	< 0.02	< 0.02	< 0.02	CEMS-2329
						0	and flesh	0.08	0.12	< 0.02	< 0.02	
						3		0.06	0.09	< 0.02	< 0.02	
						7		0.05	0.06	< 0.02	< 0.02	
						10		0.05	0.06	< 0.02	< 0.02	
						14		0.02	0.02	< 0.02	< 0.02	
Switzerland, 2004 (Hedelfinger)	WG	0.11	0.0075	1500	2 7d	0-	whole fruit	< 0.02	0.03	< 0.02	< 0.02	CEMS-2329
						0	and flesh	0.11	0.18	< 0.02	< 0.02	
						3		0.07	0.11	< 0.02	< 0.02	
						7		0.05	0.07	< 0.02	< 0.02	
						10		0.07	0.10	< 0.02	< 0.02	
						14		0.04	0.05	< 0.02	< 0.02	
Switzerland, 2005 (Burlat)	WG		0.0075	1500	2 7d	0-	whole fruit	0.07	0.08	< 0.02	< 0.02	05-0406
						0	and flesh	0.17	0.19	< 0.02	< 0.02	CH-IR-05-0364
						3		0.20	0.23	< 0.02	< 0.02	
						7		0.09	0.10	< 0.02	< 0.02	
						10		0.06	0.06	< 0.02	< 0.02	
						14		0.05	0.05	< 0.02	< 0.02	
Switzerland, 2005 (Hedelfinger)	WG		0.0075	1540	2 7d	0-	whole fruit	0.04	0.04	< 0.02	< 0.02	05-0406
						0	and flesh	0.09	0.10	< 0.02	< 0.02	CH-IR-05-0363
						3		0.12	0.13	< 0.02	< 0.02	
						7		0.06	0.06	< 0.02	< 0.02	
						10		0.05	0.05	< 0.02	< 0.02	
						14		0.03	0.03	< 0.02	< 0.02	

[a] PHI. 0-Sample taken just before the final application.

[b] Residues were measured in the cherry flesh and calculated on whole fruit including stone.

Thiamethoxam may be used as a soil treatment or in foliar applications during the production of strawberries. Two use patterns were examined in the supervised trials in the USA on strawberry (Ediger, 2003, 140-00):

- Single directed drench application of SL (soluble concentrate) formulation to the soil at the base of the strawberry plants at 0.22 kg ai/ha, with harvest 30 or 50 days after the application. At a minimum 200 gallons per acre (1870 L/ha), this use pattern simulated drip irrigation application.
- Three directed foliar applications of WG (water dispersible granule) formulation at 0.074 kg ai/ha and minimum spray volume of 230 L/ha with intervals of 10 days and harvest 0, 3, 7 and 10 days after the final application.

Table 34 Thiamethoxam residues in strawberries resulting from supervised trials in the USA. Replicate values arise from replicate field samples

STRAWBERRY	Application [a]				PHI	Commodity	Residue, mg/kg Note[b]		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (FL), 2001 (Camarosa)	SL	0.22 drench	1990	1	11 20 20 29 29 40 40 50 60	fruit	0.17 0.18 0.10 0.09 0.13 0.14 0.08 0.07 0.09 0.10 0.04 0.06 < 0.01 (2) 0.03 0.05 < 0.01 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 FL-IR-401-00/FL
USA (NC), 2000 (Camarosa)	SL	0.22 drench	1870	1	30 50	fruit	0.11 0.09 0.03 0.03	< 0.01 (2) < 0.01 (2)	140-00 0S-IR-602-00/NC
USA (OR), 2000 (Selva)	SL	0.22 drench	2020	1	30 50	fruit	0.01 < 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	140-00 0W-IR-601-00/OR
USA (CA), 2000 (Seascape)	SL	0.22 drench	2340	1	30 50	fruit	< 0.01 (2) < 0.01 0.01	< 0.01 (2) < 0.01 (2)	140-00 0W-IR-900-00/CA
USA (CA), 2000 (Driscoll E-26)	SL	0.22 drench	2060	1	12 20 22 30 32 40 42 50 60	fruit	0.03 0.03 0.05 0.02 0.04 0.03 0.02 0.07 0.03 0.03 0.02 0.02 0.03 0.02 0.02 0.02 0.02 < 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0W-IR-901-00/CA
USA (NY), 2000 (All Star)	SL	0.22 drench	1870	1	32 52	fruit	< 0.01 0.01 0.02 0.02	< 0.01 (2) < 0.01 (2)	140-00 NE-IR-801-00/NY
USA (CA), 2000 (Irvine)	SL	0.22 drench	2060	1	31 50	fruit	0.02 0.02 0.03 0.03	< 0.01 (2) < 0.01 (2)	140-00 0W-IR-902-00/CA
USA (MI), 2000 (Lester)	SL	0.22 drench	2010	1	31 51	fruit	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	140-00 NE-IR-701-00/MI
USA (FL), 2001 (Camarosa)	WG	0.078	280	3 11, 9d	0 3 5 7 9 12	fruit	0.21 0.20 0.13 0.14 0.11 0.11 0.09 0.06 0.05 0.05 0.06 0.08	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 FL-IR-401-00/FL
USA (NC), 2000 (Camarosa)	WG	0.078	230	3 9, 10d	0 3 7 10	fruit	0.12 0.10 0.05 0.04 0.04 0.04 0.01 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0S-IR-602-00/NC
USA (OR), 2000 (Selva)	WG	0.078	310	3 10d	0 3 10	fruit	0.10 0.08 0.05 0.06 0.01 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0W-IR-601-00/OR
USA (CA), 2000 (Seascape)	WG	0.078	470	3 10d	0 3 7 10	fruit	0.04 0.17 0.03 0.05 0.01 0.02 < 0.01 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0W-IR-900-00/CA
USA (CA), 2000 (Driscoll E-26)	WG	0.078	280	3 11, 10d	0 3 5 7 11 12	fruit	0.19 0.24 0.12 0.19 0.15 0.20 0.22 0.16 0.10 0.10 0.07 0.08	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0W-IR-901-00/CA

STRAWBERRY	Application [a]				PHI	Commodity	Residue, mg/kg Note[b]		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (NY), 2000 (All Star)	WG	0.078	280	3 10, 12d	0 3 7 10	fruit	0.04 0.05 0.01 0.02 0.01 0.02 0.01 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 NE-IR-801-00/NY
USA (CA), 2000 (Irvine)	WG	0.078	280	3 8, 9d	0 3 7 11	fruit	0.36 0.25 0.26 0.26 0.15 0.19 0.20 0.14	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 0W-IR-902-00/CA
USA (MI), 2000 (Lester)	WG	0.078	260	3 10, 12d	0 3 8 10	fruit	0.04 0.03 0.01 0.02 0.02 0.01 < 0.01 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	140-00 NE-IR-701-00/MI

[a] drench: directed drench application to simulate drip irrigation application.

[b] In study 140-00, the reported individual residue results had been adjusted for procedural recovery where it was less than 100% for that set of analyses.

Table 35 Thiamethoxam residues in cranberries resulting from supervised trials in the USA

CRANBERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (MA), 2000 (Early Black)	WG	0.070	770	3 7d	28	cranberry	< 0.01	< 0.01	07754 00-MA01
USA (NJ), 2000 (Early Black)	WG	0.074	390	3 7, 6d	30	cranberry	< 0.01	< 0.01	07754 00-NJ14
USA (WI), 2000 (Ben Lear)	WG	0.074	330	3 7, 6d	30	cranberry	< 0.01	< 0.01	07754 00-WI18
USA (WI), 2000 (Ben Lear)	WG	0.074	330	3 7, 6d	30	cranberry	< 0.01	< 0.01	07754 00-WI19
USA (OR), 2000 (Stevens)	WG	0.074	920	3 7d	30	cranberry	< 0.01	< 0.01	07754 00-OR19
USA (OR), 2000 (Stevens)	WG	0.074	920	3 7, 6d	30	cranberry	< 0.01	< 0.01	07754 00-OR20

Thiamethoxam may be used as a soil treatment or in foliar applications during the production of blueberries. Two use patterns were examined in the supervised trials in the USA on blueberries (Barney, 2003, 07051).

- Three directed foliar applications of WG (water dispersible granule) formulation at 0.074 kg ai/ha with intervals of 7 days and a PHI of 3 days.
- One soil-applied surface band of SL (soluble concentrate) formulation at 0.22 kg ai/ha followed by at least 25 mm of irrigation, growth stage: green tip to pink bud.

Table 36 Thiamethoxam residues in blueberries resulting from supervised trials in the USA. Duplicate values arise from duplicate field samples

BLUEBERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (MI), 2001 (Rubel)	SL	0.22 soil	340	1	86	fruit	< 0.01 (2)	< 0.01 (2)	07051 MI34
USA (MI), 2001 (Rubels)	SL	0.21 soil	330	1	94	fruit	< 0.01 (2)	< 0.01 (2)	07051 MI35
USA (MI), 2001 (Rubels)	SL	0.22 soil	340	1	94	fruit	< 0.01 (2)	< 0.01 (2)	07051 MI36
USA (NC), 2001 (Croatan)	SL	0.22 soil	280	1	78	fruit	< 0.01 (2)	< 0.01 (2)	07051 NC22

BLUEBERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (NJ), 2001 (Duke)	SL	0.22 soil	210	1	76	fruit	< 0.01 (2)	< 0.01 (2)	07051 NJ28
USA (NJ), 2001 (Blueray)	SL	0.21 soil	210	1	72	fruit	< 0.01 (2)	< 0.01 (2)	07051 NJ29
USA (OR), 2001 (Bluecrop)	SL	0.24 soil	190	1	85	fruit	< 0.01 (2)	< 0.01 (2)	07051 OR20
USA (ME), 2001 (Lowbush)	WG	0.074	230	3 6, 7d	3	fruit	0.06 0.06	0.02 0.03	07051 ME05
USA (MI), 2001 (Rubel)	WG	0.074	470	3 7d	3 7 10	fruit	0.07 0.06 0.06 0.05 0.04 0.05	< 0.01 (2) < 0.01 (2) < 0.01 (2)	07051 MI34
USA (MI), 2001 (Rubels)	WG	0.074	460	3 7d	3	fruit	0.11 0.10	< 0.01 (2)	07051 MI35
USA (MI), 2001 (Rubels)	WG	0.074	460	3 8, 6d	3	fruit	0.06 0.06	< 0.01 (2)	07051 MI36
USA (NC), 2001 (Croatan)	WG	0.074	290	3 7d	3 7 10	fruit	0.06 0.07 0.05 0.03 0.02 0.01	0.02 0.02 0.02 0.02 0.01 0.01	07051 NC22
USA (NC), 2001 (Blue Chip)	WG	0.074	280	3 7, 6d	3	fruit	0.04 0.05	0.05 0.04	07051 NC23
USA (NJ), 2001 (Duke)	WG	0.074	390	3 6, 7d	3	fruit	0.07 0.06	0.01 < 0.01	07051 NJ28
USA (NJ), 2001 (Blueray)	WG	0.074	390	3 6, 7d	3	fruit	0.07 0.06	0.01 0.01	07051 NJ29
USA (OR), 2001 (Bluecrop)	WG	0.074	490	3 6, 7d	3	fruit	< 0.01 (2)	< 0.01 (2)	07051 OR20

[a] soil: soil application.

Table 37 Thiamethoxam residues in caneberries resulting from supervised trials in the USA. Duplicate values arise from duplicate field samples

CANEBERRY	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. and interval	days		thiamethoxam	CGA 322704	
USA (NJ), 2002 (Canby), red raspberry	WG	0.054	440	2 6d	3	fruit	0.08 0.10	0.03 0.04	08039.02-NJ10
USA (OR), 2002 (Meeker), raspberry	WG	0.054	720	2 7d	3	fruit	0.06 0.05	0.01 0.01	08039.02-OR08
USA (OR), 2002 (Marion), blackberry	WG	0.054	480	2 6d	3	fruit	0.19 0.17	0.02 0.02	08039.02-OR09
USA (WA), 2002 (Meeker), raspberry	WG	0.053	280	2 7d	3	fruit	0.12 0.10	0.02 0.02	08039.02-WA11
USA (CA), 2002 Boysenberry	WG	0.053	710	2 7d	3	fruit	0.20 0.17	< 0.01 (2)	08039.02-CA36
USA (MI), 2002 (Heritage) raspberry	WG	0.052	210	2 7d	3	fruit	0.01 0.01	< 0.01 (2)	08039.02-MI27

Table 38 Thiamethoxam residues in grapes resulting from supervised trials in France, Italy, Spain and Switzerland

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2001 (Cabernet Sauvignon SO4)	WG	0.047 + 0.054 + 0.052	0.025	190 + 220 + 210	3 21d 20d	0 3 7 14 20 27	berries	0.04 0.05 0.03 < 0.02 0.02 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0131502

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2001 (Cabernet Sauvignon SO4)	WG	0.098 + 0.094	0.050	190	2 29d	0 3 7 14 21 27	berries	0.05 0.02 0.02 < 0.02 < 0.02 (2) 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0131502
France, 2001 (Pinot Noir)	WG	0.050– 0.055	0.028	180 + 190 + 200	3 21d 21d	0 21 28	berries	0.02 < 0.02 (2) < 0.02	< 0.02 < 0.02 (2) < 0.02	0131401
France, 2001 (Pinot Noir)	WG	0.11– 0.100	0.056	200 + 180 + 190	3 30d 30d	0 21 28	berries	< 0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 (2) < 0.02	0131401
France, 2002 (Cabernet Franc)	WG	0.050		400 + 200 + 200	3 21d 20d	0 22	berries berries	0.09 0.04 0.04	< 0.02 < 0.02 (2)	02-1111
France, 2002 (Cabernet Franc)	WG	0.0375		400 + 200 + 200	3 21d 20d	0 22	berries berries	0.11 0.05 0.04	< 0.02 < 0.02 (2)	02-1111
France, 2002 (Cabernet Franc)	WG	0.025		400 + 200 + 200	3 21d 20d	0 22	berries berries	0.05 0.03 0.02	< 0.02 < 0.02 (2)	02-1111
France, 2002 (Cabernet Franc) red	WG	0.050		350	3 21d 21d	0 3 7 14 21 28	berries	0.06 0.02 0.03 0.02 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1033
France, 2002 (Carignan 110R)	WG	0.050	0.014	350	3 21d 21d	0 21 28	berries	0.34 0.12 0.17 0.17	< 0.02 < 0.02 (2) 0.02	0131402
France, 2002 (Carignan 110R)	WG	0.10	0.029	350	3 29d 31d	0 21 28	berries	0.51 0.17 0.28 0.20	< 0.02 0.02 0.02 0.02	0131402
France, 2002 (Grenache, red)	WG	0.050		310	3 21d 21d	0 22	berries	0.07 < 0.02 (2)	< 0.02 < 0.02 (2)	02-1066
France, 2002 (Meunier)	WG	0.050		500	3 20d 22d	0 3 7 14 21 28	berries	0.05 0.02 0.02 < 0.02 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1110
France, 2002 (Meunier)	WG	0.0375		500	3 20d 22d	0 3 7 14 21 28	berries	0.05 0.02 0.02 < 0.02 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1110
France, 2002 (Meunier)	WG	0.025		500	3 20d 22d	0 3 7 14 21 28	berries	0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1110
France, 2006 (Cabernet Sauvignon)	WG	0.050		500	3 21 d 20 d	13	grapes, bunches	0.04	< 0.02	T000798-06 FR-IR-06-0232 "Les Crespys"

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2006 (Cabernet Sauvignon)	WG	0.051		600	3 21 d 20 d	14	grapes, bunches	0.07	< 0.02	T000798-06 FR-IR-06-0233 plot 2. "Chateau la Capelle"
France, 2006 (Carignan)	WG	0.050		1000	3 21 d	14	grapes, bunches	< 0.02	< 0.02	T000798-06 FR-IR-06-0230 "L'Houmet"
France, 2006 (Chardonnay)	WG	0.051		590 570 470	3 20 d 22 d	13	bunches, grapes	< 0.02	< 0.02	T000797-06 FR-IR-06-0237 "Jaille"
France, 2006 (Chardonnay)	WG	0.053		620 590 540	3 20 d 22 d	13	bunches, grapes	0.02	< 0.02	T000797-06 FR-IR-06-0236 "La Prole"
France, 2006 (Muscadet)	WG	0.050		590 570 620	3 21 d 21 d	13	bunches, grapes	< 0.02	< 0.02	T000797-06 FR-IR-06-0238 "Bonneau"
France, 2006 (Muscadet)	WG	0.050		610 850 560	3 22 d 20 d	14	bunches, grapes	< 0.02	< 0.02	T000797-06 FR-IR-06-0239 plot 2 "Les quatre routes"
France, 2006 (Syrah)	WG	0.050		1000	3 21 d	14	grapes, bunches	0.02	< 0.02	T000798-06 FR-IR-06-0231 "Campagnole"
Italy, 2001 (Vittoria) table grapes	WG	0.050	0.005	1000	3 9d 10d	0 7 14 21 28	berries	0.19 0.10 0.06 0.04 0.04 0.04	< 0.02 < 0.02 < 0.02 < 0.02 (2) < 0.02	1114/01
Spain, 2001 (Tempranillo)	WG	0.050	0.01	500	3 21d 21d	0 3 7 14 21 28	berries	0.81 0.65 0.24 0.18 0.18 0.21 0.16	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 (2) < 0.02	1165/01 Trial 1
Spain, 2001 (Tempranillo)	WG	0.10	Note[31]	500	2 29d	0 3 7 14 21 28	berries	2.2 1.5 0.36 0.41 0.27 0.29 0.37	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 (2) < 0.02	1165/01 Trial 2
Spain, 2002 (Cariñena, red)	WG	0.050		460 +470 +440	3 21d 21d	0 21	berries	0.25 0.13 0.11	< 0.02 < 0.02 (2)	02-1038
Spain, 2002 (Palomino) white	WG	0.050		480	3 21d 21d	0 3 7 14 21 28	berries	0.26 0.18 0.11 0.06 0.07 0.05	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1037

[31] Osborne, 2002, 1165/01 Trial 2. A check on the field raw data showed that the concentration was 0.02 kg ai/hL, not 0.01 kg ai/hL as reported in the study.

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Switzerland, 2001 (Chasselas)	WG	0.050		1440	3 11d 10d	0 7 14 21 28	berries	0.06 < 0.02 0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 (2) < 0.02	1003/01
Switzerland, 2001 (Pinot Noir)	WG	0.050		1040	3 11d 10d	0 21 28	berries	0.05 0.02 0.03 0.02	< 0.02 < 0.02 (2) < 0.02	1004/01
Switzerland, 2002 (Chasselas)	WG	0.050		500	3 21d 22d	0 7 14 21 28	berries	0.06 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1007
Switzerland, 2002 (Chasselas)	WG	0.050		500	3 21d 22d	21	berries	< 0.02	< 0.02	02-1007
Switzerland, 2002 (Pinot Noir)	WG	0.050		500	3 21d 20d	0 21	berries berries juice pomace wine	0.06 < 0.02 (2) < 0.01 (2) < 0.02 (2) < 0.01 (2)	< 0.02 < 0.02 (2) < 0.01 (2) < 0.02 (2) < 0.01 (2)	02-1006
Switzerland, 2006 (Chasselas)	WG	0.051		1130 1140 1140	3 21 d 22 d	13	bunches, grapes	0.03	< 0.02	T000797-06 CH-IR-06-0235 "Grand Blettay"
Switzerland, 2006 (Chasselas)	WG	0.052		1090 1160 1170	3 21 d 22 d	13	bunches, grapes	< 0.02	< 0.02	T000797-06 CH-IR-06-0234 "Le Sac"

Thiamethoxam may be used as a basal treatment during the production of bananas. Such a use pattern was examined in the supervised trials in Cameroon on bananas (Franceschi, 2003, 021169):

- The product was applied at 0.2 or 0.4 g ai/banana clump in an application volume of 100 mL by knapsack. The solution was applied around the clump source generally covering the mother and the most advanced sucker.

Table 39 Thiamethoxam residues in bananas resulting from supervised trials in Cameroon

BANANAS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai per clump	no. interval	days		thiamethoxam	CGA 322704	
Cameroon, 2002 (Grande naine)	WG	0.2 g ai per banana clump [a]	2 207d	8 21 38 49 62	whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	03-1032
Cameroon, 2002 (Grande naine)	WG	0.2 g ai per banana clump [a]	1	7 21 35 49 63	whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	03-1031
Cameroon, 2002 (Grande naine)	WG	0.4 g ai per banana clump [a]	1	7 24	whole fruit	< 0.02 < 0.02	< 0.02 < 0.02	03-1031
Cameroon, 2002 (Grande naine)	WG	0.2 g ai per banana clump [a]	2 188d	7 21 35 49 63	whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1169

BANANAS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai per clump	no. interval	days		thiamethoxam	CGA 322704	
Cameroon, 2002 (Grande naine)	WG	0.2 g ai per banana clump [a]	1	7	pulp	< 0.02	< 0.02	02-1168
				21	pulp	< 0.02	< 0.02	
				35	pulp	< 0.02	< 0.02	
				49	pulp	< 0.02	< 0.02	
				63	pulp	< 0.02	< 0.02	
				63	peel	< 0.02	< 0.02	

[a] Directed application, 100 mL of spray liquid applied around the clump source, generally covering the mother and most advanced sucker.

Thiamethoxam may be used as a drench treatment during the production of mangoes. A drench use pattern was examined in the supervised trials in South Africa on mangoes (Labuschagne, 2004, I 10 2004 ZA):

- The product was applied at 1.4 or 2.9 g ai/tree as a drench in an application volume of 1 litre. A jug was used to pour the application liquid around the base of the trees. Treatment was in August, with harvest of mature fruit anticipated in early to mid-summer.

Table 40 Thiamethoxam residues in mangos resulting from supervised trials in South Africa

MANGO	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form		no. interval	days		thiamethoxam [c]	CGA 322704	
South Africa (Limpopo), 2004 (Tommy Atkins)	SL[32]	1.4 g ai/tree drench [a]	1	88	Skin + flesh [b]	0.06 0.07	< 0.02 0.02	04/430
				102		0.11 0.10	0.02 0.02	
				109		0.06 0.05	< 0.02 (2)	
				116		0.08 0.07	0.02 0.02	
				123		0.06 0.06	0.02 0.02	
				130		0.05 0.05	< 0.02 0.02	
South Africa (Limpopo), 2004 (Tommy Atkins)	SL	2.9 g ai/tree drench [a]	1	88	Skin + flesh [b]	0.09 0.09	< 0.02 (2)	04/430
				102		0.26 0.23	0.05 0.04	
				109		0.11 0.11	0.02 0.02	
				116		0.19 0.19	0.04 0.04	
				123		0.12 0.11	0.03 0.03	
				130		0.12 0.11	0.05 0.05	
South Africa, 2003 (Kent)	SL	1.4 g ai/tree drench [a]	1	146	Skin + flesh [b]	0.04 0.04	< 0.02 (2)	04/339
South Africa, 2003 (Kent)	SL	2.9 g ai/tree drench [a]	1	146	Skin + flesh [b]	0.08 0.07	< 0.02 (2)	04/339
South Africa, 2003 (Kent)	SL	1.4 g ai/tree drench [a]	1	51	Skin + flesh [b]	0.18 0.23	0.02 0.03	04/338
				110		0.10 0.10	0.02 0.02	
				117		0.06 0.07	0.02 0.02	
				124		0.07 0.08	0.02 0.02	
				131		0.09 0.08	0.03 0.03	
				138		0.05 0.07	< 0.02 0.02	
						0.02[c]		
South Africa, 2003 (Kent)	SL	2.9 g ai/tree drench [a]	1	51	Skin + flesh [b]	0.21 0.24	0.03 0.03	04/338
				110		0.16 0.15	0.03 0.03	
				117		0.15 0.15	0.03 0.03	
				124		0.10 0.11	0.04 0.03	
				131		0.10 0.11	0.03 0.03	
				138		0.11 0.10	0.04 0.04	
						0.02[c]		
South Africa (Limpopo), 2003 (Keitt)	SL	1.4 g ai/tree drench [a]	1	175	Skin + flesh [b]	< 0.02 (2)	0.02 0.02	04/341
						0.02[c]	0.02[c]	

[32] van Zyl, 2005, 04/430 trial on mango. The formulation is described in the study as an SC. It is a soluble concentrate, SL. Presumably this applies to the other South African trials too.

MANGO	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form		no. interval	days		thiamethoxam [c]	CGA 322704	
South Africa (Limpopo), 2003 (Keitt)	SL	2.9 g ai/tree drench [a]	1	175	Skin + flesh [b]	0.03 0.03 0.02[c]	0.04 0.03 0.02[c]	04/341

[a] Drench application of 1 litre of water per tree, poured around the base of the tree.

[b] A homogeneous mixture of skin+flesh was analysed. Residue concentrations are probably expressed on skin+flesh, because there is no explicit statement that residues are expressed on whole fruit.

[c] sample from control plot.

Thiamethoxam may be used as a drench treatment during the production of papaya. A drench use pattern was examined in the supervised trials in Brazil on papaya (Krainz, 2003, 02-1061):

- The product was applied at 0.2 or 0.4 kg ai/ha as a drench around each tree. A syringe was used to dispense the application liquid at 100 mL/tree (equivalent to 175 litres per hectare) at 10–20 cm from the trunk on bare soil.

Table 41 Thiamethoxam residues in papaya resulting from supervised trials in Brazil and Côte d'Ivoire

PAPAYA	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Brazil (ES), 2002 (Golden)	WG	0.2 kg ai/ha drench [a]	175	1	0	whole fruit	< 0.01	< 0.01	02-1061
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Brazil (ES), 2002 (Golden)	WG	0.4 kg ai/ha drench [a]	175	1	0	whole fruit	< 0.01	< 0.01	02-1061
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Brazil (BA), 2002 (Golden)	WG	0.2 kg ai/ha drench [a]	178	1	0	whole fruit	< 0.01	< 0.01	02-1062
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	

PAPAYA	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Brazil (BA), 2002 (Golden)	WG	0.4 kg ai/ha drench [a]	177	1	0	whole fruit	< 0.01	< 0.01	02-1062
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Brazil (ES), 2002 (Golden)	WG	0.2 kg ai/ha drench [a]	196	1	0	whole fruit	< 0.01	< 0.01	02-1064
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Brazil (ES), 2002 (Golden)	WG	0.4 kg ai/ha drench [a]	196	1	0	whole fruit	< 0.01	< 0.01	02-1064
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Brazil (ES), 2002 (Taiwan)	WG	0.2 kg ai/ha drench [a]	159	1	0	whole fruit	< 0.01	< 0.01	02-1063
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	

PAPAYA	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Brazil (ES), 2002 (Taiwan)	WG	0.41 kg ai/ha drench [a]	165	1	0	whole fruit	< 0.01	< 0.01	02-1063
					3	peel	< 0.01 (2)	< 0.01 (2)	
					3	pulp	< 0.01 (2)	< 0.01 (2)	
					3	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					7	peel	< 0.01 (2)	< 0.01 (2)	
					7	pulp	< 0.01 (2)	< 0.01 (2)	
					7	whole fruit [b]	< 0.01 (2)	< 0.01 (2)	
					10	peel	< 0.01	< 0.01	
					10	pulp	< 0.01	< 0.01	
					10	whole fruit [b]	< 0.01	< 0.01	
					14	peel	< 0.01	< 0.01	
					14	pulp	< 0.01	< 0.01	
					14	whole fruit [b]	< 0.01	< 0.01	
Côte d'Ivoire, 2004 (Golden) Tiassalé. [c]	WG	0.20 kg ai/hL, 50 mL per tree as a drench at base of trunk		1 133d 2	3 7 3 7		< 0.01 < 0.01 < 0.01 < 0.01		CIV/CNRA/PA/2004
Côte d'Ivoire, 2004 (Golden) Azaguié. [c]	WG	0.20 kg ai/hL, 50 mL per tree as a drench at base of trunk		1 133d 2	3 7 3 7		< 0.01 < 0.01 < 0.01 < 0.01		CIV/CNRA/PA/2004

[a] Drench application at 0.1 litre of water per tree, around the trunk.

[b] Residues in whole fruit calculated from residues in peel and pulp.

[c] CIV/CNRA/PA/2004. No analytical report or analytical method available.

Table 42 Thiamethoxam residues in pineapples resulting from supervised trials in Brazil

PINEAPPLE	Application				PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	no. interval	days		thiamethoxam	CGA 322704	
Brazil (SP), 2005 (Havaiano)	WG	0.20 0.20[a]	0.075	3 60d various	0 15 30 45 60	fruit	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	M04037-LZF
Brazil (MG), 2005 (Havaiano)	WG	0.20 0.20[a]	0.075	3 60d various	0 15 30 45 60	fruit	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	M04037-JJB1
Brazil (MG), 2005 (Havaiano)	WG	0.20 0.20[a]	0.075	3 60d various	0 15 30 45 60	fruit	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	M04037-JJB2
Brazil (MG), 2005 (Havaiano)	WG	0.20 0.20[a]	0.075	3 60d various	0 15 30 45 60	fruit	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	M04037-JJB3

[a] Treatment 1: seedlings with 0.075 kg ai/hL. Treatments 2 and 3: row drench at 0.20 kg ai/ha. Interval between treatments 1 and 2: 60 days. Interval between treatments 2 and 3: various intervals, so that fruit with various PHIs were harvested at maturity.

Thiamethoxam may be used as an in-furrow spray, a surface band incorporated or a transplant drench at planting, and in foliar applications during the production of Brassica vegetables. Four use

patterns were examined in the supervised trials on broccoli, mustard greens and cabbage in the USA (Campbell, 1998, ABR-98050):

- Two foliar sprays of WG (water dispersible granules) formulation at 0.099 kg ai/ha with a 7 days interval and a 0 days PHI.
- Application as an in-furrow spray of SL (soluble concentrate) formulation at 0.14 kg ai/ha at planting, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.
- Application as a narrow surface band soil-incorporated, of SL (soluble concentrate) formulation at 0.14 kg ai/ha at planting, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.
- Transplant drench at 0.14 kg ai/ha, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.

Table 43 Thiamethoxam residues in Brassica vegetables resulting from supervised trials in the USA. Replicate values arise from replicate field samples

BRASSICA VEG	Application				PHI	Commodity [a]	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	water (L/ha)	no. interval	days		thiamethoxam [c]	CGA 322704[c]	
BROCCOLI									
USA (CA), 2000 (Greenbelt), broccoli	SL	0.099	94	2 7d	0	head + stem	0.34 0.37	0.01 0.01	121-00.02-TR-004-00/CA [d]
USA (CA), 2000 (Greenbelt), broccoli	WG	0.099	94	2 7d	0	head + stem	0.49 0.44	0.02 0.02	121-00.02-TR-004-00/CA [d]
USA (TX), 2001 (Buccaneer), broccoli	SL	0.099	170	2 7d	0	head + stem	0.38 0.41	0.02 0.04	121-00.0S-TR-301-00/TX [d]
USA (TX), 2001 (Buccaneer), broccoli	WG	0.099	170	2 7d	0	head + stem	0.32 0.34	0.03 0.02	121-00.0S-TR-301-00/TX [d]
USA (CA), 1997 (de Cicco) broccoli	WG	0.099	280	2 7d	0 7	broccoli	1.1 0.93 0.12 0.13	0.04 0.03 0.02 0.02	ABR-98050 02-IR-040-97
USA (CA), 1997 (de Cicco) broccoli	SL WG	0.14 dr 0.049	3740 280	1 1	0 7	broccoli	0.56 0.25 0.02 0.04	< 0.01 (2) < 0.01 (2)	ABR-98050 02-IR-040-97
USA (TX), 1997 (Southern Comet) broccoli	WG	0.099	230	2 7d	0 7	broccoli	0.95 1.1 0.16 0.15	0.02 0.02 0.04 0.02	ABR-98050 0S-IR-304-97
USA (TX), 1997 (Southern Comet) broccoli	SL WG	0.14 dr 0.049	3880 230	1 1	0 7	broccoli	0.38 0.32 0.13 0.06	< 0.01 (2) 0.01 < 0.01	ABR-98050 0S-IR-304-97
USA (CA), 1997 (Patriot) broccoli	WG	0.099	420	2 8d	0 7	broccoli	0.30 0.19 0.07 0.07	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-502-97
USA (CA), 1997 (Patriot) broccoli	SL WG	0.14 dr 0.049	3680 420	1 1	0 7	broccoli	0.12 0.07 0.04 0.04	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-502-97
USA (AZ), 1997 (Marithon) broccoli	WG	0.099	230	2 8d	0 7	broccoli	0.11 0.66 0.03 0.02	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-503-97
USA (AZ), 1997 (Marithon) broccoli	SL WG	0.14 dr 0.049	3740 230	1 1	0 7	broccoli	0.09 0.04 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-503-97
USA (OR), 1997 (Packman) broccoli	WG	0.099	270	2 7d	0 7	broccoli	0.57 0.50 0.06 0.05	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-610-97
USA (OR), 1997 (Packman) broccoli	SL WG	0.14 dr 0.049	5220 270	1 1	0 7	broccoli	0.28 0.06 0.02 0.02	< 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-610-97
USA (CA), 1997 (Patriot) broccoli	WG	0.099	430	2 8d	0 1 3 5 6 9	broccoli	0.26 0.14 0.22 0.30 0.09 0.11 0.21 0.22 0.05 0.07 0.07 0.09	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98050 0W-IR-501-97
USA (CA), 1997 (Patriot) broccoli	SL WG	0.14 dr 0.049	3680 430	1 1	0 6	broccoli	0.13 0.12 0.03 0.02	< 0.01 0.01 < 0.01 (2)	ABR-98050 0W-IR-501-97

BRASSICA VEG	Application				PHI	Commodity [a]	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	water (L/ha)	no. interval	days		thiamethoxam [c]	CGA 322704[c]	
MUSTARD GREENS									
USA (CA), 2000 (Florida Broadleaf), mustard greens	SL	0.099	280	2 7d	7	leaves	0.69 0.60	0.12 0.11	121-00.0W-TR-930-00/CA [d]
USA (CA), 2000 (Florida Broadleaf), mustard greens	WG	0.099	280	2 7d	7	leaves	0.69 0.75	0.18 0.23	121-00.0W-TR-930-00/CA [d]
USA (CA), 1998 (Florida Broadleaf) mustard greens	WG	0.099	230	2 7d	0 7	leaf	2.7 3.6 1.3 1.6 c 0.12 0.13 c 0.31 0.27	0.21 0.25 0.27 0.36 c 0.03 0.03 c 0.08 0.07	ABR-98050 02-IR-053-97
USA (CA), 1998 (Florida Broadleaf) mustard greens	SL WG	0.14 if 0.049	94 230	1 1	0 7	leaf	1.7 1.6 0.67 1.0 c 0.12 0.13 c 0.31 0.27	0.18 0.15 0.14 0.18 c 0.03 0.03 c 0.08 0.07	ABR-98050 02-IR-053-97
USA (CA), 1998 (Florida Broadleaf) mustard greens	SL WG	0.14 sb 0.049	94 230	1 1	0 7	leaf	1.6 2.0 0.70 0.92 c 0.12 0.13 c 0.31 0.27	0.11 0.16 0.11 0.12 c 0.03 0.03 c 0.08 0.07	ABR-98050 02-IR-053-97
USA (IL), 1997 (Southern Giant Curled) mustard greens	WG	0.099	230	2 7d	0 1 3 6 7 9	leaf	5.9 5.4 2.8 1.9 2.4 1.7 0.45 0.41 0.66 0.63 0.60 0.40	0.41 0.34 0.62 0.53 1.1 0.90 0.21 0.24 0.28 0.28 0.29 0.21	ABR-98050 04-IR-010-97
USA (IL), 1997 (Southern Giant Curled) mustard greens	SL WG	0.14 if 0.049	110 230	1 1	0 7	leaf	2.3 2.5 0.18 0.18	0.03 0.04 0.10 0.09	ABR-98050 04-IR-010-97
USA (IL), 1997 (Southern Giant Curled) mustard greens	SL WG	0.14 sb 0.049	110 230	1 1	0 7	leaf	2.6 2.4 0.23 0.18	0.04 0.08 0.13 0.10	ABR-98050 04-IR-010-97
USA (GA), 1997 (Southern Giant Curled) mustard greens	WG	0.099	280	2 7d	0 7	leaf	6.1 5.6 0.42 0.32	0.29 0.22 0.16 0.11	ABR-98050 0S-IR-872-97
USA (GA), 1997 (Southern Giant Curled) mustard greens	SL WG	0.14 if 0.049	110 280	1 1	0 7	leaf	3.0 2.1 0.15 0.14	0.04 0.03 0.08 0.07	ABR-98050 0S-IR-872-97
USA (GA), 1997 (Southern Giant Curled) mustard greens	SL WG	0.14 sb 0.049	140 280	1 1	0 7	leaf	2.1 2.7 0.14 0.14	0.02 0.03 0.07 0.05	ABR-98050 0S-IR-872-97
USA (TX), 1997 (Florida Broadleaf) mustard greens	WG	0.099	230	2 7d	0 7	leaf	3.7 3.2 0.42 0.33	0.11 0.09 0.08 0.06	ABR-98050 0S-IR-306-97
USA (TX), 1997 (Florida Broadleaf) mustard greens	SL WG	0.14 if 0.049	100 230	1 1	0 7	leaf	2.6 1.4 0.18 0.21	0.05 0.02 0.05 0.06	ABR-98050 0S-IR-306-97
USA (TX), 1997 (Florida Broadleaf) mustard greens	SL WG	0.14 sb 0.049	140 230	1 1	0 7	leaf	1.4 1.2 0.16 0.15	0.03 0.02 0.06 0.04	ABR-98050 0S-IR-306-97
USA (LA), 1997 (Florida Broadleaf) mustard greens	WG	0.099	230	2 7d	0 7	leaf	5.3 3.9 0.30 0.38 c 0.02	0.07 0.08 0.05 0.07 c < 0.01	ABR-98050 0S-IR-902-97
USA (LA), 1997 (Florida Broadleaf) mustard greens	SL WG	0.14 if 0.049	100 230	1 1	0 7	leaf	2.1 1.7 0.23 0.25 c 0.02	0.04 0.05 0.07 0.07 c < 0.01	ABR-98050 0S-IR-902-97

BRASSICA VEG	Application				PHI	Commodity [a]	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	water (L/ha)	no. interval	days		thiamethoxam [c]	CGA 322704[c]	
USA (LA), 1997 (Florida Broadleaf) mustard greens	SL WG	0.14 sb 0.049	100 230	1 1	0 7	leaf	1.6 2.3 0.30 0.36 c 0.02	0.04 0.04 0.09 0.09 c < 0.01	ABR-98050 0S-IR-902-97
CABBAGE									
USA (NY), 2000 (Augusta), cabbage	SL	0.099	470	2 7d	0 0 0	head + wl head only wl only	0.15 0.57 < 0.01 0.01 1.3 0.91	< 0.01 0.04 < 0.01 (2) 0.14 0.11	121-00.05-TR-002-00/NY [d]
USA (NY), 2000 (Augusta), cabbage	WG	0.099	470	2 7d	0 0 0	head + wl head only wl only	0.69 0.58 0.05 0.02 0.45 1.8	0.04 0.05 < 0.01 (2) 0.05 0.18	121-00.05-TR-002-00/NY [d]
USA (CA), 1997 (Copenhagen) cabbage	WG	0.099	280	2 7d	0 7	Head + wl	2.0 3.0 0.72 0.65 c 0.01 c < 0.01	0.07 0.08 0.07 0.06 c < 0.01 c 0.02	ABR-98050 02-IR-041-97
					0 7	head only	0.07 0.11 0.03 0.04	0.01 0.01 0.01 0.02	
USA (CA), 1997 (Copenhagen) cabbage	SL WG	0.14 dr 0.049	3740 280	1 1	0 7	Head + wl	0.58 0.64 0.09 0.13 c 0.01 c < 0.01	0.01 0.02 0.01 0.01 c < 0.01 c 0.02	ABR-98050 02-IR-041-97
					0 7	head only	0.06 0.05 < 0.01 (2) c < 0.01	< 0.01 0.01 0.01 < 0.01 c 0.01	
USA (FL), 1997 (Bravo) cabbage	WG	0.099	47	2 7d	0 7	Head + wl	0.26 0.91 0.06 0.05 c < 0.01	< 0.01 0.02 0.01 < 0.01 c 0.01	ABR-98050 07-IR-001-97
					0 7	head only	0.02 < 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	
USA (FL), 1997 (Bravo) cabbage	SL WG	0.14 dr 0.049	1870 47	1 1	0 7	Head + wl	0.36 0.21 0.03 0.02 c < 0.01	< 0.01 (2) < 0.01 (2) c 0.01	ABR-98050 07-IR-001-97
					0 7	head only	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	
USA (TX), 1997 (Gensis) cabbage	WG	0.099	230	2 8d	0 7	Head + wl	1.1 0.79 0.26 0.22	0.03 0.02 0.03 0.03	ABR-98050 0S-IR-305-97
					0 7	head only	0.03 0.05 0.01 0.02	< 0.01 (2) < 0.01 (2)	
USA (TX), 1997 (Gensis) cabbage	SL WG	0.14 dr 0.049	3880 230	1 1	0 7	Head + wl	0.68 0.48 0.05 0.03	0.02 0.03 < 0.01 (2)	ABR-98050 0S-IR-305-97
					0 7	head only	0.04 0.02 0.01 0.01	< 0.01 (2) < 0.01 (2)	
USA (NC), 1997 (Blue Thunder) cabbage	WG	0.099	230	2 7d	0 7	Head + wl	0.62 0.24 0.10 0.14 c 0.01	0.06 0.02 0.02 0.02 c < 0.01	ABR-98050 0S-IR-605-97
					0 7	head only	0.14 0.12 < 0.01 (2)	< 0.01 (2) 0.01 < 0.01	
USA (NC), 1997 (Blue Thunder) cabbage	SL WG	0.14 dr 0.049	3740 230	1 1	0 7	Head + wl	0.21 0.10 0.01 0.03 c 0.01	0.02 0.01 < 0.01 (2) c < 0.01	ABR-98050 0S-IR-605-97
					0 7	head only	0.07 0.06 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	
USA (WI), 1997 (Vantage Point) cabbage	WG	0.099	240	2 7d	0 7	Head + wl	0.67 0.78 0.30 0.24	0.01 0.02 0.02 0.02	ABR-98050 MW-IR-702-97
					0 7	head only	0.03 0.04 0.09 0.05	< 0.01 (2) < 0.01 (2)	
USA (WI), 1997 (Vantage Point) cabbage	SL WG	0.14 dr 0.049	3740 240	1 1	0 7	head+wl	0.25 0.35 0.13 0.15	< 0.01 (2) 0.02 0.01	ABR-98050 MW-IR-702-97
					0 7	head only	0.13 0.25 0.12 0.08	< 0.01 (2) < 0.01 (2)	

BRASSICA VEG	Application				PHI	Commodity [a]	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	water (L/ha)	no. interval	days		thiamethoxam [c]	CGA 322704[c]	
USA (NY), 1997 (Rio Verde) cabbage	WG	0.099	230	2 7d	0 1 3 5 7 9	Head + wl	0.59 0.41 0.23 0.20 0.18 0.14 0.12 0.11 0.15 0.14 0.13 0.12 c < 0.01	0.03 < 0.01 < 0.01 (2) < 0.01 (2) 0.03 < 0.01 0.04 0.02 0.01 0.02 c 0.02	ABR-98050 NE-IR-809-97
					0 7	head only	0.01 0.03 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	
USA (NY), 1997 (Rio Verde) cabbage	SL WG	0.14 dr 0.049	3740 230	1 1	0 7	Head + wl	0.21 0.33 0.06 0.05 c < 0.01	0.01 < 0.01 < 0.01 (2) c 0.02	ABR-98050 NE-IR-809-97
					0 7	head only	0.02 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	

[a] wl: wrapper leaves.

[b] if: in-furrow treatment at planting.

[c] c: sample from control plot.

[d] Side-by-side trials to provide bridging data that compare residues found when using WG (water dispersible granules) and SL (soluble concentrate) formulations.

[e] In study ABR-98050, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

sb: soil surface band treatment at planting, incorporated.

dr: drench treatment at transplanting.

Thiamethoxam may be used as a soil treatment at sowing or in foliar applications during the production of cucurbit fruiting vegetables. Three use patterns were examined in the supervised trials on cucumbers, cantaloupe and summer squash in the USA (Eudy, 1998, ABR-98085).

- Two foliar sprays of WG (water dispersible granules) formulation at 0.099 kg ai/ha with a 4–5 days interval and a 0 days PHI.
- Application as an in-furrow spray of SL (soluble concentrate) formulation at 0.14 kg ai/ha at sowing, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.
- Application as a narrow surface band soil-incorporated, of SL (soluble concentrate) formulation at 0.14 kg ai/ha at sowing, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.

Table 44 Thiamethoxam residues in cucumbers resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CUCUMBER	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1996 (Dasher II)	WG	0.099		230	2 5d	0 3	fruit	0.11 0.10 0.03 0.04	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-043-96
USA (CA), 1996 (Dasher II)	SL WG	0.14 if + 0.049		94 +230	1 +1	0 3	fruit	0.02 0.02 0.01 0.01	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-043-96
USA (CA), 1996 (Dasher II)	SL WG	0.14 sb + 0.049		94 +230	1 +1	0 3	fruit	0.01 0.02 0.01 0.01	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-043-96
USA (Fl), 1996 (Marketmore 76	WG	0.099		47	2 5d	0	fruit	0.01 0.02	< 0.01 (2)	ABR-98085 07-IR-017-96

CUCUMBER	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (Fl), 1996 (Marketmore 76)	SL WG	0.14 if + 0.049		190 + 470	1 + 1	0	fruit	0.02 0.01	< 0.01 (2)	ABR-98085 07-IR-017-96
USA (TX), 1996 (Poinsett 76)	WG	0.099		230	2 4d	0	fruit	0.04 0.04	< 0.01 (2)	ABR-98085 0S-IR-306-96
USA (TX), 1996 (Poinsett 76)	SL WG	0.14 if + 0.049		94 + 230	1 + 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98085 0S-IR-306-96
USA (NC), 1996 (National Pickle)	WG	0.099		230	2 5d	0	fruit	0.04 0.07	< 0.01 (2)	ABR-98085 0S-IR-604-96
USA (NC), 1996 (National Pickle)	SL WG	0.032 if + 0.049		19 + 230	1 + 1	0	fruit	0.03 0.03	< 0.01 (2)	ABR-98085 0S-IR-604-96
USA (NC), 1996 (National Pickle)	SL WG	0.032 sb + 0.049		19 + 230	1 + 1	0	fruit	< 0.01 0.02	< 0.01 (2)	ABR-98085 0S-IR-604-96
USA (SC), 1996 (Poinsett 76)	WG	0.099		290	2 5d	0	fruit	0.07 0.05	< 0.01 (2)	ABR-98085 0S-IR-605-96
USA (SC), 1996 (Poinsett 76)	SL WG	0.14 if + 0.049		100 + 290	1 + 1	0	fruit	0.02 0.03	< 0.01 (2)	ABR-98085 0S-IR-605-96
USA (CA), 1996 (Sweet Slice)	SL WG	0.007 if + 0.049		9.4 + 2 80	1 + 1	0	fruit	0.04 0.03	< 0.01 (2)	ABR-98085 0W-IR-438-96
USA (WI), 1996 (Fanicpak M)	WG	0.099		250	2 5d	0	fruit	0.07 0.08	< 0.01 (2)	ABR-98085 MW-IR-704-96
USA (WI), 1996 (Fanicpak M)	SL WG	0.14 if + 0.049		130 + 250	1 + 1	0	fruit	0.02 0.03	< 0.01 (2)	ABR-98085 MW-IR-704-96
USA (MI), 1996 (Market Moore 76)	WG	0.099		280	2 5d	0	fruit	0.09 0.04	< 0.01 (2)	ABR-98085 NE-IR-720-96
USA (MI), 1996 (Market Moore 76)	SL WG	0.14 if + 0.049		100 + 280	1 + 1	0	fruit	0.01 < 0.01	< 0.01 (2)	ABR-98085 NE-IR-720-96
USA (MI), 1996 (Market Moore 76)	SL WG	0.14 sb + 0.049		100 + 280	1 + 1	0	fruit	0.01 < 0.01	< 0.01 (2)	ABR-98085 NE-IR-720-96
USA (CA), 1997 (Market Moore 76)	WG	0.099		280	2 5d	0	fruit	0.05 0.05	< 0.01 (2)	ABR-98085 0W-IR-431-97

[a] if: in-furrow treatment at sowing. sb: soil surface band treatment at sowing, incorporated.

[b] In study ABR-98085, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 45 Thiamethoxam residues in cucumbers resulting from supervised trials in France, Netherlands and Spain

CUCUMBER	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2002 (Logica) protected	WG	0.10 drench		2600	2 7d	0	cucumbers	0.08	< 0.02	02-1107
						3		0.07	< 0.02	
						7		0.07	< 0.02	
						14		0.02	< 0.02	
						21		< 0.02	< 0.02	
						28		< 0.02	< 0.02	
Netherlands, 2004 (Euforia) protected	WG	0.10 syringe		0.1 l per plant	1	0	cucumbers	< 0.02	< 0.02	CEMS-2316
						3		0.08	< 0.02	
						7		0.04	< 0.02	
						14		< 0.02	< 0.02	
						21		< 0.02	< 0.02	
Netherlands, 2004 (Euforia) protected	WG	0.20 syringe		0.1 l per plant	1	0	cucumbers	< 0.02	< 0.02	CEMS-2316
						3		0.14	< 0.02	
						7		0.09	< 0.02	
						14		0.02	< 0.02	
						21		< 0.02	< 0.02	
Spain, 2002 (Borja) protected	WG	0.10 drip		1560	2 7d	0	cucumbers	0.12	< 0.02	02-1018
						3		0.09	< 0.02	
						7		0.12	< 0.02	
						14		0.10	< 0.02	
						21		0.06	< 0.02	
Spain, 2002 (Borja) protected	WG	0.20 drip		1560	1	0	cucumbers	< 0.02	< 0.02	02-1018
						3		0.09	< 0.02	
						7		0.12	< 0.02	
						14		0.11	< 0.02	
						21		0.09	< 0.02	
Spain, 2003 (Dosel) protected	WG	0.20 drip		4000	1	0	cucumbers	< 0.02	< 0.02	03-1022
						3		0.06	< 0.02	
						7		0.06	< 0.02	
						14		0.03	< 0.02	
Spain, 2003 (Sol verde, French type) protected	WG	0.20 drip		3130	1	0	cucumbers	< 0.02	< 0.02	03-1021
						3		0.06	< 0.02	
						7		0.09	< 0.02	
						13		0.07	< 0.02	
Spain, 2005 (Borja) protected, rockwool substrate	WG	0.10 syringe		630	1	0	cucumbers	< 0.02	< 0.02	CEMS-2317 AF/7830/SY/1
						3		0.17	< 0.02	
						7		0.09	< 0.02	
						14		0.03	< 0.02	
						21		< 0.02	< 0.02	
Spain, 2005 (Borja) protected, rockwool substrate	WG	0.20 syringe		630	1	0	cucumbers	< 0.02	< 0.02	CEMS-2317 AF/7830/SY/1
						3		0.29	< 0.02	
						7		0.22	< 0.02	
						14		0.03	< 0.02	
						21		< 0.02	< 0.02	
Spain, 2005 (Sinaloa) protected, cocofibre substrate	WG	0.10 syringe		670	1	0	cucumbers	< 0.02	< 0.02	CEMS-2317 AF/7830/SY/2
						3		< 0.02	< 0.02	
						7		0.04	< 0.02	
						14		0.03	< 0.02	
						21		< 0.02	< 0.02	
Spain, 2005 (Sinaloa) protected, cocofibre substrate	WG	0.20 syringe		670	1	0	cucumbers	< 0.02	< 0.02	CEMS-2317 AF/7830/SY/2
						3		0.06	< 0.02	
						7		0.04	< 0.02	
						14		0.05	< 0.02	
						21		0.03	< 0.02	

[a] drip: drip application, adapting the knapsack sprayer to the irrigation system. - drench: application by watering soil around plants. - syringe: application, prior to first irrigation, to the base of each plant with a syringe to simulate a drip application.

Table 46 Thiamethoxam residues in melons resulting from supervised trials in Italy and Spain

MELON	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Italy, 2002 (Baggio) protected	WG	0.10 drench		830	2 7d	0	whole fruit	< 0.02	< 0.02	02-1101
						7	whole fruit	< 0.02	< 0.02	
						14	whole fruit	< 0.02	< 0.02	
						21	pulp	< 0.02	< 0.02	
						21	peel	< 0.02	< 0.02	
						21	whole fruit [b]	< 0.02	< 0.02	
						28	whole fruit	< 0.02	< 0.02	
Italy, 2002 (Baggio) protected	WG	0.10 drench		560	2 7d	0	whole fruit	< 0.02	< 0.02	02-1106
						7	whole fruit	< 0.02	< 0.02	
						14	whole fruit	< 0.02	< 0.02	
						21	pulp	< 0.02	< 0.02	
						21	peel	< 0.02	< 0.02	
						21	whole fruit [b]	< 0.02	< 0.02	
						28	whole fruit	< 0.02	< 0.02	
Spain, 2002 (Galia) protected	WG	0.10 drip		2500	2 7d	0	whole fruit	< 0.02	< 0.02	02-1039
						7	pulp	< 0.02	< 0.02	
						7	peel	0.02	< 0.02	
						7	whole fruit [b]	0.02	< 0.02	
						14	whole fruit	0.02	< 0.02	
						21	pulp	< 0.02	< 0.02	
						21	peel	< 0.02	< 0.02	
						21	whole fruit [b]	< 0.02	< 0.02	
						28	whole fruit	< 0.02	< 0.02	
Spain, 2002 (Galia) protected	WG	0.20 drip		2500	1	0	whole fruit	< 0.02	< 0.02	02-1039
						7	pulp	< 0.02	< 0.02	
						7	peel	0.02	< 0.02	
						7	whole fruit [b]	0.02	< 0.02	
						14	whole fruit	< 0.02	< 0.02	
						21	pulp	< 0.02	< 0.02	
						21	peel	0.02	< 0.02	
						21	whole fruit [b]	0.02	< 0.02	
						28	whole fruit	< 0.02	< 0.02	
Spain, 2002 (Solarquin) protected	WG	0.10 drip		2440	2 7d	0	whole fruit	0.03	< 0.02	02-1040
						7	pulp	0.02	< 0.02	
						7	peel	0.05	< 0.02	
						7	whole fruit [b]	0.04	< 0.02	
						14	whole fruit	0.03	< 0.02	
						21	pulp	0.02	< 0.02	
						21	peel	0.02	< 0.02	
						21	whole fruit [b]	0.02	< 0.02	
						28	whole fruit	0.02	< 0.02	
Spain, 2002 (Solarquin) protected	WG	0.20 drip		2440	1	0	whole fruit	< 0.02	< 0.02	02-1040
						7	pulp	< 0.02	< 0.02	
						7	peel	0.05	< 0.02	
						7	whole fruit [b]	0.03	< 0.02	
						14	whole fruit	0.03	< 0.02	
						21	pulp	< 0.02	< 0.02	
						21	peel	0.02	< 0.02	
						21	whole fruit [b]	0.02	< 0.02	
						28	whole fruit	0.02	< 0.02	
Spain, 2003 (Aurabel, cantaloupe type) protected	WG	0.20 drip		800	1	0	whole fruit	< 0.02	< 0.02	03-1023
						3	whole fruit	0.02	< 0.02	
						7	pulp	< 0.02	< 0.02	
						7	peel	0.02	< 0.02	
						14	pulp	< 0.02	< 0.02	
						14	peel	0.02	< 0.02	

MELON	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Spain, 2003 (Campiño) protected	WG	0.20 drip		1670	1	0	whole fruit	< 0.02	< 0.02	03-1024
						3	whole fruit	< 0.02	< 0.02	
						7	pulp	< 0.02	< 0.02	
						7	peel	0.04	< 0.02	
						14	pulp	< 0.02	< 0.02	
						14	peel	0.05	< 0.02	

[a] drench: application of 100 mL per plant from a measuring jug or graduated syringe into the root zone. - drip: drip application, adapting the knapsack sprayer to the irrigation system.

[b] residues in whole fruit calculated from residues in pulp and peel.

Table 47 Thiamethoxam residues in cantaloupes resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CANTALOUPE	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1996 (Hale's Best Jumbo)	SL WG	0.14 if + 0.049		94 + 230	1 + 1	0 3	fruit	0.04 0.03 0.01 0.02	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-044-96
USA (CA), 1996 (Hale's Best Jumbo)	SL WG	0.14 sb + 0.049		94 + 230	1 + 1	0 3	fruit	0.02 0.02 0.02 0.02	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-044-96
USA (TX), 1996 (Tam Uvaide)	SL WG	0.14 if + 0.049		94 + 47	1 + 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98085 0S-IR-307-96
USA (TX), 1996 (Tam Uvaide)	SL WG	0.14 sb + 0.049		94 + 47	1 + 1	0	fruit	0.03 0.02	< 0.01 (2)	ABR-98085 0S-IR-307-96
USA (GA), 1996 (Hale's Best Jumbo)	SL WG	0.14 if + 0.049		100 + 230	1 + 1	0	fruit	< 0.01 (2)	< 0.01 (2)	ABR-98085 0S-IR-839-96
USA (CA), 1996 (Casaba)	SL WG	0.14 if +0.049		280 + 280	1 + 1	0	fruit	0.04 0.04	< 0.01 (2)	ABR-98085 0W-IR-522-96
USA (CA), 1996 (Hybrid Top Score)	SL WG	0.14 if +0.049		140 + 280	1 + 1	0	fruit	0.01 0.01	< 0.01 (2)	ABR-98085 0W-IR-523-96
USA (IN), 1996 (Burpee Hybrid)	SL WG	0.14 if +0.049		180 + 240	1 + 1	0	fruit	0.05 0.02	< 0.01 (2)	ABR-98085 NE-IR-107-96
USA (CA), 1996 (Hale's Best Jumbo)	WG	0.099		230	2 5d	0 3	fruit	0.05 0.07 0.05 0.03	< 0.01 (2) < 0.01 (2)	ABR-98085 02-IR-044-96
USA (TX), 1996 (Tam Uvaide)	WG	0.099		47	2 5d	0	fruit	0.04 0.02	< 0.01 (2)	ABR-98085 0S-IR-307-96
USA (GA), 1996 (Hale's Best Jumbo)	WG	0.099		230	2 5d	0	fruit	0.03 0.02	< 0.01 (2)	ABR-98085 0S-IR-839-96
USA (CA), 1996 (Casaba)	WG	0.099		280	2 5d	0	fruit	0.16 0.15	< 0.01 (2)	ABR-98085 0W-IR-522-96
USA (CA), 1996 (Hybrid Top Score)	WG	0.099		280	2 5d	0	fruit	0.03 0.02	< 0.01 (2)	ABR-98085 0W-IR-523-96
USA (IN), 1996 (Burpee Hybrid)	WG	0.099		240	2 5d	0	fruit	0.13 0.09	< 0.01 (2)	ABR-98085 NE-IR-107-96

[a] if: in-furrow treatment at planting. - sb: soil surface band treatment at planting, incorporated.

[b] In study ABR-98085, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 48 Thiamethoxam residues in summer squash resulting from supervised trials in the USA. Replicate values arise from replicate field samples

SUMMER SQUASH	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1996 (Ambassador)	SL WG	0.14 if + 0.049		94 + 230	1 + 1	0 3 3	fruit	0.13 0.06 0.03 0.05 c 0.04	< 0.01 (2) < 0.01 (2) c < 0.01	ABR-98085 02-IR-045-96
USA (CA), 1996 (Ambassador)	SL WG	0.14 sb + 0.049		94 + 230	1 + 1	0 3 3	fruit	0.06 0.03 0.03 0.04 c 0.04	< 0.01 (2) < 0.01 (2) c < 0.01	ABR-98085 02-IR-045-96
USA (FL), 1996 (Crookneck Early Summer)	SL WG	0.14 if + 0.049		190 + 47	1 + 1	0	fruit	0.01 < 0.01	< 0.01 (2)	ABR-98085 07-IR-020-96
USA (FL), 1996 (Crookneck Early Summer)	SL WG	0.14 sb + 0.049		190 + 47	1 + 1	0	fruit	< 0.01 (2)	< 0.01 (2)	ABR-98085 07-IR-020-96
USA (GA), 1996 (Yellow Crookneck)	SL WG	0.14 if + 0.049		100 + 240	1 + 1	0	fruit	0.06 0.09	< 0.01 (2)	ABR-98085 0S-IR-840-96
USA (MI), 1996 (Lemondrop L)	SL WG	0.14 if + 0.049		100 + 270	1 + 1	0	fruit	0.01 0.03	< 0.01 (2)	ABR-98085 NE-IR-721-96
USA (NY), 1996 (Super Select)	SL WG	0.14 if + 0.049		190 + 270	1 + 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98085 NE-IR-811-96
USA (CA), 1996 (Ambassador)	WG	0.099		230	2 5d	0 3 0 3	fruit	0.16 < 0.01 0.04 0.05 c < 0.01 c 0.04	< 0.01 (2) < 0.01 (2) c < 0.01 c < 0.01	ABR-98085 02-IR-045-96
USA (FL), 1996 (Crookneck Early Summer)	WG	0.099		47	2 5d	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98085 07-IR-020-96
USA (GA), 1996 (Yellow Crookneck)	WG	0.099		240	2 6d	0	fruit	0.05 0.05	< 0.01 (2)	ABR-98085 0S-IR-840-96
USA (MI), 1996 (Lemondrop L)	WG	0.099		230	2 5d	0	fruit	0.06 0.05	< 0.01 (2)	ABR-98085 NE-IR-721-96
USA (NY), 1996 (Super Select)	WG	0.099		230	2 5d	0	fruit	0.05 0.07	< 0.01 (2)	ABR-98085 NE-IR-811-96

[a] if: in-furrow treatment at planting. - sb: soil surface band treatment at planting, incorporated.

[b] In study ABR-98085, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 49 Thiamethoxam residues in sweet corn and popcorn resulting from supervised trials with seed treatment uses in the USA. Replicate values arise from replicate field samples

SWEET CORN	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
country, year (variety)	Form	g ai/kg seed		days		thiamethoxam	CGA 322704	
USA (CA), 1998 (Primetime)	FS	4.5	seed treatment	78	ears	< 0.01 (2)	< 0.01 (2)	158-98. 02-SR-032-98
USA (IL), 1998 (Kandy King)	FS	4.5	seed treatment	67	ears	< 0.01 (2)	< 0.01 (2)	158-98. 04-SR-008-98
USA (NY), 1998 (Kandy King)	FS	4.5	seed treatment	77	ears	< 0.01 (2)	< 0.01 (2)	158-98. 05-SR-004-98
USA (FL), 1998 (Golden Cross – Bantam Hybrid)	FS	4.5	seed treatment	76	ears	< 0.01 (2)	< 0.01 (2)	158-98. 07-SR-003-98
USA (NC), 1998 (Kandy King)	FS	4.5	seed treatment	60	ears	< 0.01 (2)	< 0.01 (2)	158-98. 0S-SR-615-98

SWEET CORN	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
country, year (variety)	Form	g ai/kg seed		days		thiamethoxam	CGA 322704	
USA (WA), 1998 (Jubilee)	FS	4.5	seed treatment	102	ears	< 0.01 (2)	< 0.01 (2)	158-98. 0W-SR-616-98
USA (WA), 1998 (Jubilee)	FS	1.0	seed treatment	102	ears	< 0.01 (2)	< 0.01 (2)	158-98. 0W-SR-616-98
USA (OR), 1998 (Primetime)	FS	4.5	seed treatment	98	ears	< 0.01 (2)	< 0.01 (2)	158-98. 0W-SR-617-98
USA (OR), 1998 (Primetime)	FS	1.0	seed treatment	98	ears	< 0.01 (2)	< 0.01 (2)	158-98. 0W-SR-617-98
USA (WI), 1998 (Jubilee)	FS	4.5	seed treatment	81	ears	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-702-98
USA (MN), 1998 (Jubilee)	FS	4.5	seed treatment	89	ears	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-805-98
USA (OH), 1998 (Kandy King)	FS	4.5	seed treatment	65	ears	< 0.01 (2)	< 0.01 (2)	158-98. NE-SR-205-98
POPCORN								
USA (KS), 1998 (M-212) popcorn	FS	4.5	seed treatment	144	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-315-98
USA (NE), 1998 (M-212) popcorn	FS	4.5	seed treatment	129	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-622-98
USA (IN), 1998 (M-212) popcorn	FS	4.5	seed treatment	131	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-108-98

[a] In study 158-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 50 Thiamethoxam residues in tomatoes resulting from supervised trials in France, Italy, Spain and Switzerland

TOMATO	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
France, 1999 (Cencara) greenhouse	WG	0.044	0.005	870	2 7d	0 1 3 7 10	fruit	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1028/99
France, 1999 (Cencara) greenhouse	WG	0.088	0.01	880	2 7d	0 1 3 7 10	fruit	0.02 < 0.02 0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1028/99
France, 1999 (Tamaris) greenhouse	WG	0.041	0.005	820	2 7 d	0 1 3 7 10	fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1027/99
France, 1999 (Tamaris) greenhouse	WG	0.085	0.01	850	2 7 d	0 1 3 7 10	fruit	0.03 0.03 0.02 0.03 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1027/99
Italy, 1996 (114 Precodor) greenhouse	WG	0.10	0.01	1000	2 14d	0- 0 2 3 7 14	fruit	0.02 0.06 0.06 0.03 0.02 0.03	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1098/96

TOMATO	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
Italy, 1996 (Boss)	WG	0.10	0.013	800	2 14d	0- 0 2 3 7 14	fruit	< 0.02 0.11 0.06 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1095/96
Italy, 1996 (Gincala) greenhouse	WG	0.10	0.008 + 0.007	1200 1400	2 14d	0- 0 2 3 7 14	fruit	< 0.02 0.10 0.04 0.06 0.02 0.02	< 0.02 0.02[33] < 0.02 < 0.02 < 0.02 < 0.02	1097/96
Italy, 1996 (HP 244)	WG	0.10	0.013	800	2 13d	0- 0 2 3 7 14	fruit	< 0.02 0.06 0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1096/96
Italy, 1997 (98063)	WG	0.10	0.017	600	2 7d	0- 0 2 3 7 14	fruit fruit fruit fruit fruit fruit	< 0.02 0.07 0.03 0.04 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1080/97
Italy, 1997 (Cuor di bue) greenhouse	WG	0.10	0.01	1000	2 7d	0- 0 2 3 7 14	fruit fruit fruit fruit fruit fruit	< 0.02 0.03 0.03 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1079/96
Italy, 1997 (Italdor)	WG	0.10	0.0083	1200	2 7d	0- 0 2 3 7 14	fruit	0.03 0.10 0.02 0.03 0.03 0.03	< 0.02 0.02 0.02 0.03 < 0.02 < 0.02	1078/97
Italy, 1997 (S Marzano)	WG	0.10	0.0083	1200	2 7d	0- 0 2 3 7 15	fruit fruit fruit fruit fruit fruit	0.02 0.10 0.04 0.03 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1081/97
Italy, 2006 (Magnum)	SL	0.10		540	2 7d	0- 0 3 7 14 21	fruit	0.02 0.12 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/3
Italy, 2006 (Magnum)	WG	0.10		540	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.13 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/3
Italy, 2006 (Perfect pill)	SL	0.10		600	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.10 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/4

[33] CGA 322704 corrected for procedural recovery (×1.38).

TOMATO	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
Italy, 2006 (Perfect pill)	WG	0.10		600	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.18 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/4
Spain, 1996 (Durinta)	WG	0.10	0.005	2000	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1009/96
Spain, 1996 (Royesta) greenhouse	WG	0.13	0.005	2500	2 7d	0- 0 1 3 7 21	fruit	0.05 0.20 0.09 0.09 0.03 0.08 note[34]	< 0.02 0.02 0.02 0.02 0.02 0.03	1008/96
Spain, 1997 (H 8893)	WG	0.10	0.005	2000	2 7d	3	fruit	< 0.02 (2)	< 0.02 (2)	1042/97
Spain, 1997 (Rento)	WG	0.10	0.005	2000	2 7d	3	fruit	< 0.02 (2)	< 0.02 (2)	1169/96
Spain, 1997 (Suan)	WG	0.10	0.005	2000	2 7d	3	fruit	< 0.02 (2)	< 0.02 (2)	1041/97
Spain, 1999 (Genaro) greenhouse	WG	0.079	0.005	1580	2 6d	0 1 3 3 7 10	fruit	0.07 0.03 0.07 0.06 0.02 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1026/99
Spain, 1999 (Genaro) greenhouse	WG	0.16	0.01	1570	2 6d	0 1 3 3 7 10	fruit	0.09 0.13 0.15 0.07 0.11 0.04 0.04	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1026/99
Spain, 1999 (Genaro) greenhouse	WG	0.090	0.005	1810	2 7 d	0 1 3 3 7 11	fruit	0.10 0.08 0.12 0.12 0.06 0.06 0.03	< 0.02 < 0.02 < 0.02 0.02 0.02 < 0.02	1025/99
Spain, 1999 (Genaro) greenhouse	WG	0.18	0.010	1820	2 7 d	0 1 3 3 7 11	fruit	0.11 0.05 0.11 0.08 0.08 0.07 0.06	0.03 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1025/99
Spain, 2002 (Julia) protected	WG	0.10		1020	2 7 d	0 1 3 5 7	fruit	0.02 0.02 0.02 0.03 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1120
Spain, 2002 (Julia) protected	WG	0.20 drip		5000	1	0 7 14 21 28	fruit	< 0.02 < 0.02 < 0.02 0.02 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1120

[34] Tomato, 1008/96. Residues of thiamethoxam and CGA 322704 on days 7 and 21 confirmed by second analysis.

TOMATO	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha [b]	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
Spain, 2006 (Manitu)	SL	0.10		1280	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.06 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/2
Spain, 2006 (Manitu)	WG	0.10		1280	2 7d	0- 0 3 7 14 21	fruit	< 0.02 0.05 0.03 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/2
Spain, 2006 (Tina)	SL	0.10		1500	2 7d	0- 0 3 7 14 21	fruit	0.03 0.05 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/1
Spain, 2006 (Tina)	WG	0.10		1500	2 7d	0- 0 3 7 14 21	fruit	0.02 0.05 0.04 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000803-06 AF/10409/SY/1
Switzerland, 1996 (Durina)	WG	0.10	0.005	2000	2 12d	0- 0 1 3 7	fruit	< 0.02 0.04 0.02 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1044/96
Switzerland, 1996 (Paola)	WG	0.10	0.005	2000	2 13d	0- 0 1 3 7	fruit	< 0.02 0.03 0.03 0.03 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1043/96
Switzerland, 1997 (Cannelli) greenhouse	WG	0.10	0.005	2000	2 7d	0- 0 1 3 7	fruit	< 0.02 0.05 0.05 0.02 0.03	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1121/97
Switzerland, 1997 (Durinta) greenhouse	WG	0.10	0.005	2000	2 7d	0- 0 1 3 7	fruit	< 0.02 0.05 0.03 0.03 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1122/97

[a] PHI. 0- Sample taken just before the final application.

[b] drip: drip application, adapting the knapsack sprayer to the irrigation system.

Thiamethoxam may be used as a soil treatment at planting or in foliar applications during the production of tomatoes and peppers. Several use patterns were examined in the supervised trials in the USA on tomatoes and peppers (Eudy, 1998, ABR-98105):

- Two foliar sprays of WG (water dispersible granules) formulation at 0.099, 0.30 or 0.49 kg ai/ha with a 5 days interval and a 0 days PHI.
- Application as an in-furrow spray of SL (soluble concentrate) formulation at 0.14 kg ai/ha at planting, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.

- Application as a narrow surface band of SL formulation at 0.14 kg ai/ha during planting and incorporation to a depth of approximately 40 mm with irrigation over 24 hours. Follow with a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.
- Application as a transplant drench of SL formulation at 0.14 kg ai/ha, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 days PHI.

Table 51 Thiamethoxam residues in tomatoes, bell peppers and, hot peppers, resulting from supervised trials in the USA. Replicate values arise from replicate field sample

FRUITING VEG	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	Note
BELL PEPPERS									
USA (CA), 1996 (Volo Wonder) bell pepper	SL WG	0.14 dr 0.049	3740 230	1 1	0 7	fruit	0.03 0.03 0.01 0.01	< 0.01 (2) < 0.01 (2)	ABR-98105 02-IR-050-96
USA (FL), 1996 (Jupiter) bell pepper	SL WG	0.14 dr 0.049	 330	1 1	0 7	fruit	0.03 0.01 0.04	0.01 < 0.01 0.02	ABR-98105 07-IR-021-96
USA (TX), 1996 (Tam Mild) bell pepper	SL WG	0.14 dr 0.049	310 290	1 1	0	fruit	0.10 0.08	0.02 0.01	ABR-98105 0S-IR-324-96
USA (TX), 1996 (Capistrano Hybrid) bell pepper	SL WG	0.14 dr 0.049	4050 290	1 1	0	fruit	0.05 0.05	0.02 0.02	ABR-98105 0S-IR-325-96
USA (NC), 1996 (Capistrano) bell pepper	SL WG	0.14 dr 0.049	3740 47	1 1	0	fruit	0.07	< 0.01	ABR-98105 0S-IR-609-96
USA (CA), 1996 (Calif Wonder) bell pepper	SL WG	0.14 dr 0.049	3720 280	1 1	0	fruit	0.03 0.03	< 0.01 (2)	ABR-98105 0W-IR-530-96
USA (MI), 1996 (Jupiter) bell pepper	SL WG	0.14 dr 0.049	3770 280	1 1	0	fruit	0.03 0.02	< 0.01 (2)	ABR-98105 NE-IR-724-96
USA (CA), 1996 (Volo Wonder) bell pepper	WG	0.099	47	2 5 d	0 7	fruit	0.06 0.05 0.04 0.04	< 0.01 (2) < 0.01 (2)	ABR-98105 02-IR-050-96
USA (FL), 1996 (Jupiter) bell pepper	WG	0.099	330	2 5 d	0 1 3 7 14	fruit	0.02 0.01 0.02 0.03 0.02 0.02 0.02 < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 < 0.01 (2) < 0.01 (2)	ABR-98105 07-IR-021-96
USA (TX), 1996 (Tam Mild) bell pepper	WG	0.099	280	2 5 d	0	fruit	0.13 0.08	0.01 < 0.01	ABR-98105 0S-IR-324-96
USA (NC), 1996 (Capistrano) bell pepper	WG	0.099	47	2 5 d	0	fruit	0.18 0.18	< 0.01 (2)	ABR-98105 0S-IR-609-96
USA (CA), 1996 (Calif Wonder) bell pepper	WG	0.099	280	2 5 d	0	fruit	0.10 0.08	< 0.01 (2)	ABR-98105 0W-IR-530-96
USA (MI), 1996 (Jupiter) bell pepper	WG	0.099	280	2 5 d	0	fruit	0.08 0.04	< 0.01 (2)	ABR-98105 NE-IR-724-96
HOT PEPPERS									
USA (CA), 1996 (Fresno Chili) hot pepper	SL WG	0.14 dr 0.049	3740 230	1 1	0 1 3 7 14	fruit	0.09 0.06 0.06 0.06 0.05 0.04 0.04 0.02 0.02 0.02	< 0.01 (2) < 0.01 (2) < 0.01 (2) 0.01 0.01 0.01 0.01	ABR-98105 02-IR-051-96
USA (NM), 1996 (Sandia) hot pepper	SL WG	0.14 if 0.049	100 280	1 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98105 0S-IR-772-96
USA (NM), 1996 (Sandia) hot pepper	SL WG	0.14 sb 0.049	100 280	1 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98105 0S-IR-772-96

FRUITING VEG	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	Note
USA (CA), 1996 (Fresno Chili) hot pepper	WG	0.099	230	2 5 d	0 1 3 7 14	fruit	0.22 0.11 0.22 0.19 0.16 0.14 0.08 0.05 0.05 0.04	0.01 < 0.01 0.02 0.01 0.03 0.03 0.03 0.01 0.06 0.04	ABR-98105 02-IR-051-96
USA (TX), 1996 hot pepper	WG	0.099	280	2 5 d	0	fruit	0.09 0.11	< 0.01 (2)	ABR-98105 0S-IR-325-96
USA (NM), 1996 (Sandia) hot pepper	WG	0.099	280	2 5 d	0	fruit	0.03 0.06	< 0.01 (2)	ABR-98105 0S-IR-772-96
TOMATOES									
USA (CA), 2000 (Ace) tomato	SL	0.099	94	2 7 d	0 2	fruit	0.03 0.07 < 0.01 0.02	< 0.01 0.01 < 0.01 0.02	9-00 02-TR-020-00 2/
USA (FL), 2000 (Solarset) tomato	SL	0.099	94	2 7 d	0 4	fruit	0.10 0.08 0.03 0.04	< 0.01 (2) < 0.01 (2)	9-00 0S-TR-832-00 2/
USA (CA), 1996 (Calace) tomato	SL WG	0.14 dr 0.049	3740 47	1 1		fruit	0.02 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	ABR-98105 02-IR-048-96
USA (CA), 1996 (Rio Grande) tomato	SL WG	0.14 if 0.049	94 230	1 1	0 7	fruit	< 0.01 0.01 0.01 < 0.01	< 0.01 (2) 0.01 < 0.01	ABR-98105 02-IR-049-96
USA (CA), 1996 (Rio Grande) tomato	SL WG	0.14 sb 0.049	94 230	1 1	0 7	fruit	0.02 0.01 0.01 < 0.01	< 0.01 (2) < 0.01 (2)	ABR-98105 02-IR-049-96
USA (FL), 1996 (Sunny) tomato	SL WG	0.14 dr 0.049	330	1 1	0 7	fruit	0.03 0.02 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	ABR-98105 07-IR-019-96
USA (SC), 1996 (Celebrity) tomato	SL WG	0.14 dr 0.049	3770 47	1 1	0 7	fruit	0.01 0.01 0.01 0.01	< 0.01 (2) 0.02 0.01	ABR-98105 0S-IR-608-96
USA (CA), 1997 (Heinz 3155) tomato	SL WG	0.14 dr 0.049	4070 410	1 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98105 0W-IR-425-97
USA (CA), 1996 (8892) tomato	SL WG	0.14 dr 0.049	3740 280	1 1	0 9	fruit	0.04 0.05 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	SL WG	0.14 dr 0.049	? ?	1 1	0	fruit	< 0.01 (2)	< 0.01 (2)	ABR-98105 0W-IR-444-96
USA (CA), 1996 (Peel Mech) tomato	SL WG	0.14 if 0.049	330 280	1 1	0	fruit	0.03 0.05	< 0.01 (2)	ABR-98105 0W-IR-524-96
USA (CA), 1996 (Peel Mech) tomato	SL WG	0.14 sb 0.049	330 280	1 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98105 0W-IR-524-96
USA (CA), 1996 (Peel Mech) tomato	SL WG	0.14 if 0.049	290 280	1 1	0	fruit	0.04 0.06	< 0.01 (2)	ABR-98105 0W-IR-529-96
USA (CA), 1996 (Peel Mech) tomato	SL WG	0.14 sb 0.049	290 280	1 1	0	fruit	0.03 0.04	< 0.01 (2)	ABR-98105 0W-IR-529-96
USA (FL), 1996 (Better Boy) tomato	SL WG	0.14 dr 0.049	4080 280	1 1	0	fruit	0.02 0.02	< 0.01 (2)	ABR-98105 FL-IR-404-96
USA (OH), 1996 (Heinz 9035) tomato	SL WG	0.14 dr 0.049	3890 230	1 1	0	fruit	0.06 0.08	< 0.01 (2)	ABR-98105 NE-IR-209-96
USA (PA), 1996 (Celebrity) tomato	SL WG	0.14 dr 0.049	240 270	1 1	0	fruit	0.06 0.03	< 0.01 (2)	ABR-98105 NE-IR-816-96
USA (CA), 2000 (Ace) tomato	WG	0.099	94	2 7 d	0 2	fruit	0.06 0.02 < 0.01 0.02	< 0.01 (2) < 0.01 0.01	9-00 02-TR-020-00 [b]
USA (FL), 2000 (Solarset) tomato	WG	0.099	94	2 7 d	0 4	fruit	0.05 0.06 0.02 0.02	< 0.01 (2) < 0.01 (2)	9-00 0S-TR-832-00 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	0	fruit	0.05	0.02	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	7	fruit	0.04	0.04	ABR-98105 02-IR-039-97

FRUITING VEG	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	Note
USA (CA), 1996 (Rio Grande) tomato	WG	0.30	230	2 5 d	0 7	fruit	0.20 0.29 0.05 0.07	0.04 0.06 0.04 0.07	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.30	230	2 5 d	0	fruit	0.14	0.03	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.30	230	2 5 d	7	fruit	0.16	0.09	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.49	230	2 5 d	0 7	fruit	0.31 0.40 0.26 0.44	0.07 0.07 0.13 0.19	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.49	230	2 5 d	0	fruit	0.28	0.07	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.49	230	2 5 d	7	fruit	0.23	0.13	ABR-98105 02-IR-039-97
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	0 7	fruit	0.06 0.07 < 0.01 0.03	0.03 0.03 < 0.01 0.03	ABR-98105[35] 02-IR-039-97
USA (CA), 1996 (Calace) tomato	WG	0.099	47	2 5 d	0 7	fruit	0.06 0.05 0.01 0.01	< 0.01 (2) < 0.01 (2)	ABR-98105 02-IR-048-96
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	0 1 3 7 21	fruit	0.06 0.02 0.04 0.03 0.03 0.04 0.04 0.02 0.01 0.02	0.02 < 0.01 < 0.01 (2) 0.01 0.01 0.02 0.01 0.01 0.03	ABR-98105 02-IR-049-96
USA (FL), 1996 (Sunny) tomato	WG	0.099	330	2 5 d	0 1 3 7 14	fruit	< 0.01 0.04 0.02 0.02 < 0.01 (2) < 0.01 (2) < 0.01	< 0.01 (2) 0.01 0.01 < 0.01 0.01 < 0.01 (2) 0.02	ABR-98105 07-IR-019-96
USA (CA), 1996 (HP108) tomato	WG	0.099	470	2 5 d	0	fruit	0.06 0.08	< 0.01 (2)	ABR-98105 0W-IR-442-96
USA (CA), 1996 (8892) tomato	WG	0.099	280	2 5 d	0 9	fruit	0.12 0.12 0.04 0.03	0.04 0.03 0.05 0.04	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.30	280	2 5 d	0 9	fruit	0.27 0.15 0.17 0.12	0.05 0.03 0.14 0.07	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.49	280	2 5 d	0 9	fruit	0.28 0.89 0.26 0.26	0.05 0.12 0.09 0.18	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.099	540	2 5 d	0	fruit	0.06 0.07	< 0.01 (2)	ABR-98105 0W-IR-444-96
USA (CA), 1996 (Peel Mech) tomato	WG	0.099	280	2 5 d	0	fruit	0.10 0.07	0.01 0.01	ABR-98105 0W-IR-524-96
USA (CA), 1996 (Peel Mech) tomato	WG	0.099	280	2 5 d	0	fruit	0.04 0.05	< 0.01 (2)	ABR-98105 0W-IR-529-96
USA (FL), 1996 (Better Boy) tomato	WG	0.099	280	2 5 d	0	fruit	0.04 0.03	< 0.01 (2)	ABR-98105 FL-IR-404-96
USA (OH), 1996 (Heinz 9035) tomato	WG	0.099	230	2 5 d	0	fruit	0.12 0.14	< 0.01 (2)	ABR-98105 NE-IR-209-96
USA (PA), 1996 (Celebrity) tomato	WG	0.099	270	2 5 d	0	fruit	0.12 0.15	0.01 0.01	ABR-98105 NE-IR-816-96
USA (SC), 1996 (Celebrity) tomato	WG	0.099	47	2 5 d	0 7	fruit	0.03 0.03 0.02 0.02	< 0.01 (2) 0.01 0.01	ABR-98105 0S-IR-608-96
USA (CA), 1996 (8892) tomato	WG	0.099	280	2 5 d	0	fruit, process	0.03	0.02	ABR-98105 0W-IR-443-96

[35] No field reports provided for ABR-98105.

FRUITING VEG	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	Note
USA (CA), 1996 (8892) tomato	WG	0.099	280	2 5 d	9	fruit, process	0.02	0.04	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.30	280	2 5 d	0	fruit, process	0.17	0.04	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.30	280	2 5 d	9	fruit, process	0.23	0.16	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.49	280	2 5 d	0	fruit, process	0.17	0.04	ABR-98105 0W-IR-443-96
USA (CA), 1996 (8892) tomato	WG	0.49	280	2 5 d	9	fruit, process	0.30	0.18	ABR-98105 0W-IR-443-96

[a] if: in-furrow treatment at planting. - sb: soil surface band treatment at planting, incorporated. - dr: drench treatment at transplanting.

[b] Side-by-side trial comparing the use of WG (water-dispersible granules) and SL (soluble concentrate) formulations as part of a bridging study for approval of SL uses on fruiting vegetables.

[c] In study ABR-98105, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 52 Thiamethoxam residues in sweet peppers resulting from supervised trials in France, Italy, Spain, Switzerland and the UK

PEPPERS	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days [a]		thiamethoxam	CGA 322704	
France, 1999 (Volga) sweet peppers, greenhouse	WG	0.077 + 0.075	0.005 0.005	1540 1490	2 7 d	0 1 3 7 10	fruits	0.09 0.10 0.08 0.03 0.03 0.04	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	1092/99 trial 1
France, 1999 (Volga) sweet peppers, greenhouse	WG	0.15 + 0.15	0.01 0.01	1520 1510	2 7 d	0 1 3 7 10	fruits	0.22 0.12 0.11 0.09 0.07 0.09	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	1092/99 trial 2
Italy, 1996 (Friarello) sweet peppers, greenhouse	WG	0.10	0.014	700	2 10 d	0- 0 2 3 7 14	fruits	0.11 0.31 0.11 0.12 0.10 0.08	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1100/96
Italy, 1996 (Friariello) sweet peppers	WG	0.10	0.014	700	2 14 d	0- 0 2 3 7 14	fruits	0.02 0.40 0.03 0.03 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1093/96
Italy, 1996 (Phatos) sweet peppers, greenhouse	WG	0.10	0.010	1000	2 14 d	0- 0 2 3 7 14	fruits	0.02 0.09 0.07 0.07 0.04 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.03	1099/96
Italy, 1996 (Rex) sweet peppers	WG	0.10		1000	2 14 d	0- 0 2 3 7 14	fruits	< 0.02 0.11 0.09 0.08 0.04 0.03	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1094/96

PEPPERS	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/h L	water (L/ha)	no. interval	days [a]		thiamethoxam	CGA 322704	
Italy, 1997 (Friarello) sweet peppers	WG	0.10	0.014	700	2 7 d	0- 0 2 3 7 14	fruits	0.07 0.24 0.19 0.13 0.09 0.04	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1083/97
Italy, 1997 (Peto) sweet peppers	WG	0.10	0.010	1000	2 7 d	0- 0 2 3 7 14	fruits	0.05 0.24 0.08 0.09 0.06 0.04	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1082/97
Spain, 1996 (Estrella) sweet peppers	WG	0.10	0.005	2000	2 7 d	0- 0 3 7 14 21	fruits	0.06 0.06 0.03 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1011/96
Spain, 1996 (Nr.6) sweet peppers	WG	0.10	0.005	2000	2 7 d	0- 0 3 7 14 21	fruits	0.03 0.09 0.08 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1012/96
Spain, 1997 (Italico) sweet peppers	WG	0.10	0.005	2000	2 7 d	0- 0 3 7 14 21	fruits	0.02 0.30 0.24 0.10 0.04 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1039/97
Spain, 1997 (Sonora) sweet peppers	WG	0.10	0.005	2000	2 7 d	0- 0 3 7 14 21	fruits	0.02 0.06 0.06 0.03 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1040/97
Spain, 1999 (Italico) sweet peppers, greenhouse	WG	0.040 +0.060	0.005 0.005	800 1200	2 7 d	0 1 4 7 14	fruits	0.24 0.24 0.14 0.06 0.09 0.04	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	1142/99 trial 1
Spain, 1999 (Italico) sweet peppers, greenhouse	WG	0.082 +0.12	0.010 0.010	820 1170	2 7 d	0 1 4 7 14	fruits	0.46 0.36 0.12 0.26 0.24 0.06	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	1142/99 trial 2
Spain, 1999 (Italico) sweet peppers, greenhouse	WG	0.050 +0.056	0.005 0.005	1000 1110	2 7 d	0 1 4 7 14	fruits	0.28 0.09 0.05 0.09 0.10 0.05	< 0.02 < 0.02 < 0.02 (2) < 0.02 < 0.02	1143/99 trial 1
Spain, 1999 (Italico) sweet peppers, greenhouse	WG	0.10 +0.11	0.010 0.010	1010 1140	2 7 d	0 1 4 7 14	fruits	0.36 0.33 0.12 0.47 0.15 0.15	< 0.02 < 0.02 < 0.02 0.02 < 0.02 < 0.02	1143/99 trial 2
Spain, 2002 (Gallego) sweet peppers, protected	WG	0.10 drip [b]		5000	2 7 d	0 3 7 14 21	fruits	0.02 0.02 0.02 0.03 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1020 plot 1

PEPPERS	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days [a]		thiamethoxam	CGA 322704	
Spain, 2002 (Gallego) sweet peppers, protected	WG	0.20 drip		5000	1	0 3 7 14 21	fruits	< 0.02 < 0.02 0.02 0.03 0.03	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	02-1020 plot 2
Switzerland, 1996 (Lamiyo) sweet peppers, greenhouse	WG	0.10	0.005	2000	2 14 d	0- 0 1 3 7	fruits	0.02 0.08 0.09 0.07 0.04	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1046/96
Switzerland, 1996 (Poivrons vert) sweet peppers, greenhouse	WG	0.10	0.005	2000	2 13 d	0- 0 1 3 7	fruits	< 0.02 0.08 0.07 0.08 0.04	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1045/96
Switzerland, 1997 (Bendico) sweet peppers, greenhouse	WG	0.10	0.02	500	2 7 d	0- 0 1 3 7	fruits	0.07 0.16 0.10 0.16 0.14	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1116/97
Switzerland, 1997 (Lamiyo) sweet peppers, greenhouse	WG	0.10	0.005	2000	2 7 d	0- 0 1 3 7	fruits	0.02 0.09 0.12 0.08 0.06	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1118/97
Switzerland, 1997 (Spirits) sweet peppers, greenhouse	WG	0.10	0.005	2000	2 7 d	0- 0 1 3 7	fruits	0.04 0.12 0.10 0.08 0.05	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1117/97
UK, 1997 (Bell Boy) sweet peppers, greenhouse	WG	0.10		1500	2 7 d	0- 0 3 7 14	fruits	0.07 0.11 0.09 0.10 0.07	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	NOV-9837

[a] PHI. 0- Sample taken just before the final application.

[b] drip: drip application, adapting the knapsack sprayer to the irrigation system.

Table 53 Thiamethoxam residues in egg plant resulting from supervised trials in Switzerland and the UK

EGG PLANT	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days [a]		thiamethoxam	CGA 322704	
Switzerland, 1997 (Baluroi F1)	WG	0.10	0.005	2000	2 7 d	0- 0 1 3 7	fruit	0.03 0.09 0.08 0.07 0.06	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1115/97
Switzerland, 1997 (Galine)	WG	0.10	0.005	2000	2 7 d	0- 0 1 3 7	fruit	0.02 0.05 0.04 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1114/97
Switzerland, 1997 (Marfa)	WG	0.10	0.02	500	2 7 d	0- 0 1 3 7	fruit	0.04 0.08 0.09 0.08 0.10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1113/97

EGG PLANT	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days [a]		thiamethoxam	CGA 322704	
UK, 1997 (Vista) greenhouse	WG	0.10		1500	2 7 d	0- 0 3 7 14	fruit	0.07 0.16 0.12 0.12 0.07	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	NOV-9836

[a] PHI. 0—Sample taken just before the final application.

Pesticide residue trials on okra were conducted in Côte d'Ivoire in 2004 (Doumbia M and Yoboue Kouassi, 2005, CI/AIPR/2004/03). Combinations of pesticides, including thiamethoxam, were tested at two different sites and in the different seasons. The analytical method used for thiamethoxam residue analysis was an imidacloprid residue analytical method, presumably adapted to thiamethoxam (Morris, 2005, PRES/064). No validation data were available, but procedural recoveries of 78% and 70% were recorded (Whetton, no date, 0106/22).

Metabolite CGA 322704 residues were not included in the analyses and the reported residues of thiamethoxam include only thiamethoxam (Table 54).

Table 54 Thiamethoxam residues in okra resulting from supervised trials in Côte d'Ivoire

OKRA	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
Country, year (variety)	Form	kg ai/ha		days		thiamethoxam	CGA 322704	
Côte d'Ivoire, 2004 (Indiana) Abengourou dry season	WS		seed treatment, 0.5 g ai/kg seed [a]		whole fruit	< 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Abengourou rainy season	WS		seed treatment , 0.5 g ai/kg seed [a]		whole fruit	< 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Dabou dry season	WS		seed treatment , 0.5 g ai/kg seed [a]		whole fruit	< 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Abengourou dry season	WG	0.10	2 apps, 21 days interval	2 [b] 7	whole fruit	0.07 0.03		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Dabou dry season	WG	0.10	2 apps, 21 days interval	2 7	whole fruit	0.24 0.02		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Abengourou rainy season	WG	0.10	3 apps, 14 days interval	2 [b] 7	whole fruit	0.03 < 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Dabou rainy season	WG	0.10	3 apps, 14 days interval	2 7	whole fruit	0.07 < 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Abengourou dry season	WG	0.10	1 app	21	whole fruit	< 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Dabou dry season	WG	0.10	1 app	21	whole fruit	< 0.01		CI/AIPR/2004/03
Côte d'Ivoire, 2004 (Indiana) Dabou rainy season	WG	0.10	1 app	14	whole fruit	< 0.01		CI/AIPR/2004/03

[a] CI/AIPR/2004/03. Described as a seed treatment on page 4-5 of report, Described as soil treatment before

[b] CI/AIPR/2004/03. Sampling was scheduled for 2 days after treatment, but took place 3 days after treatment (page 27 of report). The residue data table (page 69 of report) records residues 2 days after treatment.

Thiamethoxam may be used as a soil treatment at sowing or in foliar applications during the production of lettuce, celery and spinach. Several use patterns were examined in the supervised trials in the USA on lettuce, celery and spinach (Campbell, 1998, ABR-98051):

- Two foliar sprays of WG (water dispersible granules) formulation at 0.099 kg ai/ha with a 7 days interval and a 0 and 7 days PHI.
- Application as an in-furrow spray of SL (soluble concentrate) formulation at 0.14 kg ai/ha at planting, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 and 7 days PHI.
- Application as a narrow surface band of SL formulation at 0.14 kg ai/ha during planting and incorporation to a depth of approx 40 mm with irrigation over 24 hours. Follow with a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 and 7 days PHI.
- Application as a transplant drench of SL formulation at 0.14 kg ai/ha, followed by a foliar spray of WG formulation at 0.049 kg ai/ha with a 0 and 7 days PHI.

Several use patterns were also examined in the supervised trials in the USA on lettuce (Campbell and Pyles, 2001, 905-99):

- Application as an in-furrow spray of SL (soluble concentrate) formulation at 0.20 kg ai/ha at planting.
- Application as an in-furrow spray of SL formulation at 0.099 kg ai/ha at planting, followed by a 'shanked-in' soil application of SL formulation to the root zone at 0.099 kg ai/ha approximately 30 days PHI.
- Application as a transplant drench of SL formulation at 0.20 kg ai/ha at planting.
- Application as transplant drench of SL formulation at 0.099 kg ai/ha, followed by a 'shanked-in' soil application to the root zone of SL formulation at 0.099 kg ai/ha approximately 30 days PHI.
- Application as a 'shanked-in' soil application of SL formulation to the root zone at 0.20 kg ai/ha approximately 30 days PHI.
- Two foliar sprays of WG (water dispersible granules) formulation at 0.099 kg ai/ha with a 7 days interval and a 7 days PHI.

Table 55 Thiamethoxam residues in lettuce resulting from supervised trials in the USA. Replicate values arise from replicate field samples

LETTUCE	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (CA), 2000 (Aregan Red) leaf lettuce	SL	0.099		230	2 7 d	0 7	leaves	0.89 1.5 0.21 <u>0.22</u>	< 0.01 0.01 <u>0.01</u> 0.01	122-00 02-TR- 008-00
USA (FL), 1999 (Black Seeded Simpson) leaf lettuce	SL	0.20 if		94	1	61	leaf	<u>0.05</u> 0.05	< <u>0.01</u> (2)	905-99 07-IR-009- 99
USA (FL), 1999 (Black Seeded Simpson) leaf lettuce	SL	0.099 if + 0.099 si		94 +700	2 28d	33	leaf	0.02 <u>0.03</u>	< <u>0.01</u> (2)	905-99 07-IR-009- 99

LETTUCE	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704[b]	
USA (CA), 2001 (Great Lakes) head lettuce	SL	0.099		190	2 8 d	0 6 0 6 0 6	Head + wrapper Head Wrapper leaf	1.0 0.81 0.10 0.12 0.05 0.02 0.01 < 0.01 3.7 3.0 0.23 0.29	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) 0.03 0.02 0.02 0.02	122-00 0W-TR-931-00
USA (FL), 1999 (Black Seeded Simpson) leaf lettuce	SL	0.20 si		700	1	33	leaf	0.32 0.55	0.02 0.03	905-99 07-IR-009-99
USA (CA), 1999 (Green Genie) leaf lettuce	SL	0.20 dr		4700	1	68	leaf	0.11 0.12	0.03 0.03	905-99 0W-IR-907-99
USA (CA), 1999 (Green Genie) leaf lettuce	SL	0.099 dr + 0.099 si		4700 + 320	2 33d	35	leaf	0.11 0.36	0.02 0.05	905-99 0W-IR-907-99
USA (CA), 1999 (Green Genie) leaf lettuce	SL	0.20 si		320	1	35	leaf	0.73 0.85	0.11 0.14	905-99 0W-IR-907-99
USA (CA), 1999 (Green Genie) leaf lettuce		control plot					leaf	0.02 0.02	0.03 < 0.01	905-99 0W-IR-907-99
USA (AZ), 1997 (Crisp and Green), leaf lettuce	SL	0.14 sb		630	1 Note[36]	107 114	leaf leaf	< 0.01 (2) 0.11 0.03	< 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-509-97
USA (CA), 1998 (Great Lakes), head lettuce	SL WG	0.14 if + 0.05		94 + 230	1 + 1	0 0	head head + wrapper	0.12 0.05 0.69 0.57	< 0.01 (2) < 0.01 (2)	ABR-98051 02-IR-049-97
USA (CA), 1998 (Waldmanns green), leaf lettuce	SL WG	0.14 if + 0.05		94 + 230	1 + 1	0 7	leaf leaf	0.58 1.6 0.25 0.36	0.02 0.04 0.02 0.02	ABR-98051 02-IR-050-97
USA (CA), 1998 (Waldmanns green), leaf lettuce					control plot[37]	0 1 3 5 7 9	leaf leaf leaf leaf leaf leaf	c 0.04 0.03 c 0.05 0.04 c 0.14 0.08 c 0.07 0.07 c 0.09 0.07 c 0.03 0.09	c 0.01 < 0.01 c < 0.01 (2) c 02 0.01 c 01 0.01 c 0.01 < 0.01 c < 0.01 0.01	ABR-98051 02-IR-050-97
USA (FL), 1997 (Black Seeded), leaf lettuce	SL WG	0.14 if +0.05		470 +47	1 +1	0 7	leaf leaf	2.0 5.6 0.11 0.10	0.03 0.04 0.01 < 0.01	ABR-98051 07-IR-003-97
USA (FL), 1997 (Black Seeded), leaf lettuce	SL WG	0.14 sb +0.05		470 +47	1 +1	0 7	leaf leaf	2.5 0.91 0.04 0.05	0.02 < 0.01 < 0.01 0.01	ABR-98051 07-IR-003-97
USA (FL), 1997 (Michigan Peto), head lettuce	SL WG	0.14 dr + 0.05		1870 +47	1 +1	0 0 7 7	head head + wrapper head head + wrapper	< 0.01 (2) 0.09 0.14 0.01 0.01 0.06 0.06	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98051 07-IR-012-97

[36] 0W-IR-509-97. The planned foliar application was omitted.

[37] 02-IR-050-97. Field plots were reported as flooded by rainfall after the soil drench application, which apparently contaminated the control plot.

LETTUCE	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (CA), 1997 (Great Lakes), head lettuce	SL WG	0.14 sb + 0.05		485 +280	1 +1	0 0 7 7	head head + wrapper head head + wrapper	0.04 0.04 0.11 0.17 < 0.01 0.04 0.03 0.03	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-504-97
USA (CA), 1997 (Pipus), head lettuce	SL WG	0.14 if + 0.05		280 + 430	1 + 1	0 0 6 6	head head + wrapper head head + wrapper	0.01 0.02 0.18 0.21 < 0.01 0.02 0.04 0.05	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-505-97
USA (AZ), 1997 (Raider), head lettuce	SL WG	0.14 sb + 0.05		94 + 230	1 + 1	0 0 7 7	head head + wrapper head head + wrapper	0.04 0.01 0.96 0.10 0.01 0.03 0.37 0.15	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-506-97
USA (CA), 1997 (Prize Head), leaf lettuce	SL WG	0.14 sb +0.05		490 +280	1 + 1	0 7	leaf leaf	0.71 0.37 0.44 0.05	< 0.01 (2) 0.02 < 0.01	ABR-98051 0W-IR-507-97
USA (CA), 1997 (Green Vision), leaf lettuce	SL WG	0.14 if +0.05		280 + 430	1 + 1	0 7	leaf leaf	0.18 0.61 0.08 0.23	< 0.01 0.02 < 0.01 0.02	ABR-98051 0W-IR-508-97
USA (NY), 1997 (Black Seeded Simpson), leaf lettuce	SL WG	0.14 if + 0.05		230 + 230	1 + 1	0 7 0	leaf leaf leaf	2.4 2.3 0.30 0.19 c 0.02	0.02 0.02 0.02 0.01 c < 0.01	ABR-98051 NE-IR-806-97
USA (NY), 1997 (Black Seeded Simpson), leaf lettuce	SL WG	0.14 sb + 0.05		230 + 230	1 + 1	0 7 0	leaf leaf leaf	2.0 1.6 0.54 0.20 c 0.02	0.02 0.02 0.02 < 0.01 c < 0.01	ABR-98051 NE-IR-806-97
USA (NY), 1997 (Crispino), head lettuce	SL WG	0.14 if + 0.05		230 + 230	1 + 1	0 0 7 7	head head + wrapper head head + wrapper	0.19 0.20 1.4 1.2 0.02 0.01 0.05 0.04	< 0.01 (2) 0.01 < 0.01 < 0.01 (2) < 0.01 (2)	ABR-98051 NE-IR-807-97
USA (NY), 1997 (Crispino), head lettuce	SL WG	0.14 sb + 0.05		230 + 230	1 + 1	0 0 7 7	head head + wrapper head head + wrapper	0.35 0.28 1.2 1.0 0.03 0.01 0.08 0.09	< 0.01 (2) 0.01 < 0.01 < 0.01 (2) 0.01 0.02	ABR-98051 NE-IR-807-97
USA (CA), 2000 (Aregan Red) leaf lettuce	WG	0.099		230	2 7 d	0 7	leaves	0.52 0.60 0.07 0.13	< 0.01 (2) < 0.01 (2)	122-00 02-TR-008-00
USA (CA), 2001 (Great Lakes) head lettuce	WG	0.099		190	2 8 d	0 6 0 6 0 6	Head + wrapper head + wrapper head head wrapper leaf wrapper leaf	0.73 1.0 0.20 0.16 0.12 0.03 < 0.01 0.01 3.3 3.9 0.51 0.44	< 0.01 (2) 0.01 < 0.01 < 0.01 (2) < 0.01 (2) 0.02 0.03 0.03 0.04	122-00 0W-TR-931-00
USA (FL), 1999 (Black Seeded Simpson) leaf lettuce	WG	0.099		94	2 7d	7	leaf	1.14 0.95	0.04 0.04	905-99 07-IR-009-99

LETTUCE	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (CA), 1999 (Green Genie) leaf lettuce	WG	0.099		280	2 7d	7	leaf	0.12 0.53	0.02 0.07	905-99 0W-IR- 907-99
USA (CA), 1998 (Great Lakes), head lettuce	WG	0.10		230	2 7d	0 0 1 3 5 10 	head head + wrapper head + wrapper head + wrapper head + wrapper head + wrapper	0.11 0.07 1.1 1.5 0.63 0.75 0.47 0.42 0.30 0.14 0.24 0.45	< 0.01 (2) 0.01 0.02 0.02 0.02 0.02 0.02 < 0.01 (2) 0.01 0.03	ABR- 98051 02-IR-049- 97
USA (CA), 1998 (Waldmanns green), leaf lettuce	WG	0.10		230	2 7d	0 1 3 5 7 9	leaf leaf leaf leaf leaf leaf	2.6 1.5 1.1 2.4 1.2 1.4 0.81 0.97 0.40 0.55 0.31 0.49	0.04 0.03 0.04 0.05 0.04 0.05 0.03 0.03 0.02 0.03 0.02 0.03	ABR- 98051 02-IR-050- 97
USA (FL), 1997 (Black Seeded), leaf lettuce	WG	0.10		47	2 7d	0 7	leaf leaf	4.9 4.4 0.07 0.05	0.07 0.05 0.01 < 0.01	ABR- 98051 07-IR-003- 97
USA (FL), 1997 (Michigan Peto), head lettuce	WG	0.10		47	2 8d	0 0 7 7	head head + wrapper head head + wrapper	0.02 0.02 1.6 1.5 0.02 0.03 0.24 0.18	< 0.01 (2) 0.02 0.02 < 0.01 (2) 0.01 < 0.01	ABR- 98051 07-IR-012- 97
USA (CA), 1997 (Great Lakes), head lettuce	WG	0.10		280	2 7d	0 0 7 7	head head + wrapper head head + wrapper	0.02 0.06 0.28 0.17 < 0.01 0.02 0.02 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR- 98051 0W-IR- 504-97
USA (CA), 1997 (Pipus), head lettuce	WG	0.10		420	2 8d	0 0 6 6	head head + wrapper head head + wrapper	0.03 0.02 0.40 0.60 0.02 0.01 0.04 0.02	< 0.01 (2) < 0.01 0.01 < 0.01 (2) < 0.01 (2)	ABR- 98051 0W-IR- 505-97
USA (AZ), 1997 (Raider), head lettuce	WG	0.10		230	2 9d	0 0 7 7	head head + wrapper head head + wrapper	0.16 0.16 0.79 0.50 0.05 0.06 0.07 0.25	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	ABR- 98051 0W-IR- 506-97
USA (CA), 1997 (Prize Head), leaf lettuce	WG	0.10		280	2 7d	0 7	leaf leaf	2.0 3.0 0.86 0.73	0.03 0.05 0.03 0.03	ABR- 98051 0W-IR- 507-97
USA (CA), 1997 (Green Vision), leaf lettuce	WG	0.10		420	2 8d	0 7	leaf leaf	1.6 0.83 0.16 0.25	0.03 0.02 < 0.01 0.01	ABR- 98051 0W-IR- 508-97
USA (AZ), 1997 (Crisp and Green), leaf lettuce	WG	0.10		280	2 7d	0 7	leaf leaf	2.5 2.6 1.9 0.21	0.04 03 0.04 0.01	ABR- 98051 0W-IR- 509-97

LETTUCE	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (NY), 1997 (Black Seeded Simpson), leaf lettuce	WG	0.10		230	2 7d	0 7 0	leaf leaf leaf	5.6 6.0 0.88 0.81 c 0.02	0.09 0.08 0.04 0.04 c < 0.01	ABR-98051 NE-IR-806-97
USA (NY), 1997 (Crispino), head lettuce	WG	0.10		230	2 7d	0 0 7 7	head head + wrapper head head + wrapper	0.40 0.50 1.0 1.1 0.03 0.02 0.07 0.11	< 0.01 (2) 0.02 0.02 < 0.01 (2) < 0.01 (2)	ABR-98051 NE-IR-807-97

[a] if: in-furrow treatment at planting. - sb: soil surface band treatment at planting, - si: shanked in treatment along the root zone.

[b] c: sample from control plot

[c] In study ABR-98051, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 56 Thiamethoxam residues in spinach resulting from supervised trials in the USA. Replicate values arise from replicate field samples

SPINACH	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (TX), 2000 (Cascade)	SL	0.099		190	2 7 d	0 7	leaf leaf	4.4 3.9 0.01 0.02	0.31 0.34 0.08 0.13	122-00 0S-TR-302-00
USA (CA), 2001 (St Helens)	SL	0.099		190	2 7 d	0 7	leaf leaf	1.2 0.61 0.22 0.21	0.13 0.12 0.52 0.61	122-00 0W-TR-932-00
USA (CA), 1998 (St Helens)	SL WG	0.14 if + 0.05		94 + 230	1 + 1	0 7	leaf leaf	2.8 2.6 0.38 0.51	0.74 0.58 0.50 0.59	ABR-98051 02-IR-051-97
USA (TX), 1996 (Cascade)	SL WG	0.14 if + 0.05		100 + 230	1 + 1	0 7	leaf leaf	2.1 1.8 0.13 0.14	0.19 0.15 0.26 0.33	ABR-98051 0S-IR-307-97
USA (TX), 1996 (Cascade)	SL WG	0.14 sb + 0.05		140 + 230	1 + 1	0 7	leaf leaf	2.3 1.8 0.09 0.03	0.18 0.20 0.25 0.09	ABR-98051 0S-IR-307-97
USA (CA), 1997 (St Helens)	SL WG	0.14 sb + 0.05		200 + 230	1 + 1	0 7	leaf leaf	2.3 1.7 0.21 0.16	0.23 0.19 0.27 0.23	ABR-98051 0W-IR-514-97
USA (CO), 1997 (Melody)	SL WG	0.14 if + 0.05		990 + 230	1 + 1	0 7	leaf leaf	0.60, 1.5 0.07 0.07	0.09 0.16 0.22 0.15	ABR-98051 MW-IR-302-97
USA (CO), 1997 (Melody)	SL WG	0.14 sb + 0.05		250 + 230	1 + 1	0 7	leaf leaf	1.6 1.4 0.10 0.12	0.18 0.13 0.23 0.245	ABR-98051 MW-IR-302-97
USA (VA), 1997 (Bloomsdate Long)	SL WG	0.14 if + 0.05		94 + 230	1 + 1	0 7	leaf leaf	1.8 1.5 < 0.01 0.01	0.18 0.18 0.11 0.10	ABR-98051 NE-IR-302-97
USA (VA), 1997 (Bloomsdate Long)	SL WG	0.14 sb + 0.05		94 + 230	1 + 1	0 7	leaf leaf	1.7 1.9 0.01 < 0.01	0.13 0.15 0.09 0.07	ABR-98051 NE-IR-302-97
USA (NJ), 1997 (TYEE F1)	SL WG	0.14 if + 0.05		175 + 370	1 + 1	0 8	leaf leaf	1.3 1.9 0.03 0.02	0.28 0.41 0.35 0.32	ABR-98051 NE-IR-502-97
USA (NJ), 1997 (TYEE F1)	SL WG	0.14 sb +0.05		175 + 370	1 + 1	0 8	leaf leaf	2.1 1.6 0.01 < 0.01	0.36 0.29 0.27 0.21	ABR-98051 NE-IR-502-97
USA (TX), 2000 (Cascade)	WG	0.099		190	2 7 d	0 7	leaf leaf	4.4 4.5 0.01 0.02	0.32 0.46 0.10 0.10	122-00 0S-TR-302-00
USA (CA), 2001 (St Helens)	WG	0.099		190	2 7 d	0 7	leaf leaf	0.55 0.89 0.26 0.28	0.08 0.12 0.51 0.54	122-00 0W-TR-932-00
USA (CA), 1998 (St Helens)	WG	0.10		230	2 7d	0 7	leaf leaf	4.7 4.3 0.63 0.66	0.87 0.81 0.70 0.80	ABR-98051 02-IR-051-97
USA (CA), 1998 (St Helens)					control plot	0 7	leaf leaf	c < 0.01 c < 0.01	c 0.01 c 0.03	ABR-98051 02-IR-051-97
USA (TX), 1996 (Cascade)	WG	0.10		230	2 7d	0 7	leaf leaf	5.8 4.9 0.28 0.23	0.66 0.68 0.39 0.35	ABR-98051 0S-IR-307-97

SPINACH	Application					PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam [b]	CGA 322704 [b]	
USA (CA), 1997 (St Helens)	WG	0.10		230	2 6d	0 1 3 5 7 9	leaf leaf leaf leaf leaf leaf	4.5 1.7 1.1 3.3 1.3 0.84 0.71 0.65 0.62 0.41 0.22 0.22	0.15 0.17 0.22 0.53 0.58 0.36 0.54 0.41 0.49 0.35 0.34 0.36	ABR-98051 0W-IR-514-97
USA (CO), 1997 (Melody)	WG	0.10		230	2 7d	0 7	leaf leaf	3.9 3.5 0.26 0.28	0.61 0.57 0.55 0.62	ABR-98051 MW-IR-302-97
USA (VA), 1997 (Bloomsdate Long)	WG	0.10		230	2 7d	0 7	leaf leaf	4.3 4.2 0.04 0.05	0.66 0.59 0.18 0.21	ABR-98051 NE-IR-302-97
USA (NJ), 1997 (TYEE F1)	WG	0.10		240 +370	2 6d	0 8	leaf leaf	2.9 2.4 0.07 0.07	0.79 0.66 0.66 0.77	ABR-98051 NE-IR-502-97

[a] if: in-furrow treatment at sowing. sb: soil surface band treatment at sowing, incorporated.

[b] c: sample from control plot

[c] In study ABR-98051, the reported individual residue results had been adjusted for procedural recovery

Table 57 Thiamethoxam residues in beans (succulent) resulting from supervised trials in the USA

BEANS	Application			PHI	Commodity [b]	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (NY), 2000 (Flo) snap beans	FS	0.5	seed treatment	57	snap beans	< 0.01	< 0.01	07589.00-NY13
USA (NY), 2000 (Flo) snap beans	FS	1.4	seed treatment	57	snap beans	< 0.01	< 0.01	07589.00-NY13
USA (MD), 2000 (Provider) snap beans	FS	0.5	seed treatment	51	snap beans	< 0.01	< 0.01	07589.00-MD07
USA (MD), 2000 (Provider) snap beans	FS	1.4	seed treatment	51	snap beans	< 0.01	< 0.01	07589.00-MD07
USA (GA), 2000 (Strike) snap beans	FS	0.5	seed treatment	61	snap beans	< 0.01	< 0.01	07589.00-GA11
USA (GA), 2000 (Strike) snap beans	FS	1.4	seed treatment	61	snap beans	< 0.01	< 0.01	07589.00-GA11
USA (FL), 2000 (SB 4218) snap beans	FS	0.5	seed treatment	51	snap beans	< 0.01	< 0.01	07589.00-FL36
USA (FL), 2000 (SB 4218) snap beans	FS	1.4	seed treatment	51	snap beans	< 0.01	< 0.01	07589.00-FL36
USA (ID), 2000 (Burpee Stringless, Landreth) snap beans	FS	0.5	seed treatment	77	snap beans	< 0.01	< 0.01	07589.00-ID09
USA (ID), 2000 (Burpee Stringless, Landreth) snap beans	FS	1.4	seed treatment	77	snap beans	< 0.01	< 0.01	07589.00-ID09
USA (WI), 2000 (Hystyle, Green Podded Bush Bean) snap beans	FS	0.5	seed treatment	58	snap beans	< 0.01	< 0.01	07589.00-WI13
USA (WI), 2000 (Hystyle, Green Podded Bush Bean) snap beans	FS	1.4	seed treatment	58	snap beans	< 0.01	< 0.01	07589.00-WI13

BEANS	Application			PHI	Commodity [b]	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (WI), 2000 (BBL156) snap beans	FS	0.5	seed treatment	61	snap beans	< 0.01	< 0.01	07589.00-WI20
USA (WI), 2000 (BBL156) snap beans	FS	1.4	seed treatment	61	snap beans	< 0.01	< 0.01	07589.00-WI20
USA (NJ), 2000 (Fordhook 242) lima beans	FS	0.5	seed treatment	111	lima beans	< 0.01	< 0.01	07589.00-NJ12
USA (NJ), 2000 (Fordhook 242) lima beans	FS	1.4	seed treatment	111	lima beans	< 0.01	< 0.01	07589.00-NJ12
USA (MD), 2000 (Fordhook 242) lima beans	FS	0.5	seed treatment	87	lima beans	< 0.01	< 0.01	07589.00-MD08
USA (MD), 2000 (Fordhook 242) lima beans	FS	1.4	seed treatment	87	lima beans	< 0.01	< 0.01	07589.00-MD08
USA (GA), 2000 (Cangreen) lima beans	FS	0.5	seed treatment	83	lima beans	< 0.01	< 0.01	07589.00-GA12
USA (GA), 2000 (Cangreen) lima beans	FS	1.4	seed treatment	83	lima beans	< 0.01	< 0.01	07589.00-GA12
USA (ID), 2000 (Henderson) lima beans	FS	0.5	seed treatment	112	lima beans	< 0.01	< 0.01	07589.00-ID10
USA (ID), 2000 (Henderson) lima beans	FS	1.4	seed treatment	112	lima beans	< 0.01	< 0.01	07589.00-ID10
USA (CA), 2000 (Fordhook 242) lima beans	FS	0.5	seed treatment	120	lima beans	< 0.01	< 0.01	07589.00-CA59
USA (CA), 2000 (Fordhook 242) lima beans	FS	1.4	seed treatment	120	lima beans	< 0.01	< 0.01	07589.00-CA59
USA (WI), 2000 (Fordhook 242) lima beans	FS	0.5	seed treatment	109	lima beans	< 0.01	< 0.01	07589.00-WI23
USA (WI), 2000 (Fordhook 242) lima beans	FS	1.4	seed treatment	109	lima beans	< 0.01	< 0.01	07589.00-WI23

[a] Interval from sowing to harvest. Seed was treated days to months before sowing.

[b] Lima bean samples include only the succulent seed; pods are discarded. - Snap bean samples include succulent seeds and pods.

Table 58 Thiamethoxam residues in peas (succulent) resulting from supervised trials in the USA

PEAS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]	[b]	thiamethoxam	CGA 322704	
USA (NJ), 2000 (Improved Laxton's Progress)	FS	0.5	seed treatment	57	succulent shelled peas	< 0.01	< 0.01	07676.00-NJ18
USA (NJ), 2000 (Improved Laxton's Progress)	FS	1.4	seed treatment	57	succulent shelled peas	0.01	< 0.01	07676.00-NJ18

PEAS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]	[b]	thiamethoxam	CGA 322704	
USA (WI), 2000 (Dual)	FS	0.5	seed treatment	77	succulent shelled peas	< 0.01	< 0.01	07676.00-WI15
USA (WI), 2000 (Dual)	FS	1.4	seed treatment	77	succulent shelled peas	< 0.01	< 0.01	07676.00-WI15
USA (IN), 2000 (Knight)	FS	0.5	seed treatment	55	succulent shelled peas	< 0.01	< 0.01	07676.00-IN02
USA (IN), 2000 (Knight)	FS	1.4	seed treatment	55	succulent shelled peas	< 0.01	< 0.01	07676.00-IN02
USA (OH), 2000 (Bolero)	FS	0.5	seed treatment	57	succulent shelled peas	< 0.01	< 0.01	07676.00-OH10
USA (OH), 2000 (Bolero)	FS	1.4	seed treatment	57	succulent shelled peas	< 0.01	< 0.01	07676.00-OH10
USA (WA), 2000 (Oregon Trail)	FS	0.5	seed treatment	71	succulent shelled peas	< 0.01	< 0.01	07676.00-WA11
USA (WA), 2000 (Oregon Trail)	FS	1.4	seed treatment	71	succulent shelled peas	< 0.01	< 0.01	07676.00-WA11
USA (CA), 2000 (Cascadia)	FS	0.5	seed treatment	70	succulent shelled peas	< 0.01	< 0.01	07676.00-CA102
USA (CA), 2000 (Cascadia)	FS	1.4	seed treatment	70	succulent shelled peas	< 0.01	< 0.01	07676.00-CA102
USA (IN), 2000 (Knight)	FS	0.5	seed treatment	57	succulent shelled peas	< 0.01	< 0.01	07676.00-IN04
USA (IN), 2000 (Knight)	FS	1.4	seed treatment	57	succulent shelled peas	< 0.01	< 0.01	07676.00-IN04
USA (OR), 2000 (Oregon Sugar Pod II)	FS	0.5	seed treatment	65	peas, succulent edible pods	< 0.01	< 0.01	07676.00-OR18
USA (OR), 2000 (Oregon Sugar Pod II)	FS	1.4	seed treatment	65	peas, succulent edible pods	< 0.01	< 0.01	07676.00-OR18
USA (CA), 2000 (Oregon Sugar Pod II)	FS	0.5	seed treatment	65	peas, succulent edible pods	< 0.01	< 0.01	07676.00-CA100
USA (CA), 2000 (Oregon Sugar Pod II)	FS	1.4	seed treatment	65	peas, succulent edible pods	< 0.01	< 0.01	07676.00-CA100
USA (CA), 2000 (Oregon Sugar Pod II)	FS	0.5	seed treatment	65	peas, succulent edible pods	< 0.01	< 0.01	07676.00-CA101
USA (CA), 2000 (Oregon Sugar Pod II)	FS	1.4	seed treatment	65	peas, succulent edible pods	< 0.01-0.01	< 0.01	07676.00-CA101

[a] Interval between sowing and sampling.

[b] Succulent shelled pea samples include only the succulent seed; pods are discarded.

Samples of 'peas, succulent edible pods' include succulent seeds and pods.

Table 59 Thiamethoxam residues in beans (dry) resulting from supervised trials in the USA

BEANS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		days [a]		thiamethoxam	CGA 322704	
USA (NY), 2000 (California Light Red Kidney)	FS	0.5	seed treatment	90	dry beans	< 0.01	< 0.01	07675.00-NY14
USA (NY), 2000 (California Light Red Kidney)	FS	1.4	seed treatment	90	dry beans	< 0.01	< 0.01	07675.00-NY14

BEANS	Application			PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed		days [a]		thiamethoxam	CGA 322704	
USA (ND), 2000 (Maverick)	FS	0.5	seed treatment	105	dry beans	< 0.01	< 0.01	07675.00-ND07
USA (ND), 2000 (Maverick)	FS	1.4	seed treatment	105	dry beans	< 0.01	< 0.01	07675.00-ND07
USA (ND), 2000 (Maverick)	FS	0.5	seed treatment	105	dry beans	< 0.01	< 0.01	07675.00-ND08
USA (ND), 2000 (Maverick)	FS	1.4	seed treatment	105	dry beans	< 0.01	< 0.01	07675.00-ND08
USA (WA), 2000 (Othello)	FS	0.5	seed treatment	92	dry beans	< 0.01	< 0.01	07675.00-WA12
USA (WA), 2000 (Othello)	FS	1.4	seed treatment	92	dry beans	< 0.01	< 0.01	07675.00-WA12
USA (CO), 2000 (Winchester)	FS	0.5	seed treatment	93	dry beans	< 0.01	< 0.01	07675.00-CO04
USA (CO), 2000 (Winchester)	FS	1.4	seed treatment	93	dry beans	< 0.01	< 0.01	07675.00-CO04
USA (CO), 2000 (Winchester)	FS	0.5	seed treatment	102	dry beans	< 0.01	< 0.01	07675.00-CO05
USA (CO), 2000 (Winchester)	FS	1.4	seed treatment	102	dry beans	< 0.01	< 0.01	07675.00-CO05
USA (CA), 2000 (Bush Blue Lake 274)	FS	0.5	seed treatment	121	dry beans	< 0.01	< 0.01	07675.00-CA99
USA (CA), 2000 (Bush Blue Lake 274)	FS	1.4	seed treatment	121	dry beans	< 0.01	< 0.01	07675.00-CA99
USA (WI), 2000 (Red Kidney ROG802)	FS	0.5	seed treatment	86	dry beans	< 0.01	< 0.01	07675.00-WI05
USA (WI), 2000 (Red Kidney ROG802)	FS	1.4	seed treatment	86	dry beans	< 0.01	< 0.01	07675.00-WI05
USA (WI), 2000 (Red Kidney ROG802)	FS	0.5	seed treatment	86	dry beans	< 0.01	< 0.01	07675.00-WI06
USA (WI), 2000 (Red Kidney ROG802)	FS	1.4	seed treatment	86	dry beans	< 0.01	< 0.01	07675.00-WI06

[a] Interval between sowing and sampling.

Thiamethoxam may be used as a seed treatment on peas. In some trials the treated seed were analysed for thiamethoxam content for comparison with the nominal value. It was explained that the average seed loading achieved in industry was approximately 70%. Trials with seed loading exceeding 70% of nominal would not be considered as deviating from the protocol (Smith, 1998, gr 74197).

Table 60 Thiamethoxam residues in peas resulting from supervised trials with seed treatment in Europe

PEAS	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
Denmark, 1996 (4-9172, part 96-08)	WS	0.525 (nominal) 0.442 (by analysis)	72 90 90 119	green pods green pods green seed dry seed	< 0.05 < 0.05 < 0.05 < 0.02 (2)	< 0.05 < 0.05 < 0.05 < 0.02 (2)	IR0996 [c]
Denmark, 1996 (4-9172, part 96-08)	WS	0.525 (nominal) 0.442 (by analysis)	72 90 90 119	whole green pods empty green pods green seed dry seed	< 0.05 < 0.05 < 0.02 < 0.05	< 0.05 < 0.05 < 0.02 < 0.05	NOV-9838 [c]

PEAS	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
France, 1996 (Rustic)	WS	0.52	126	mature grains	< 0.02	< 0.02	OS96401/KJ95
France, 1996 (Tonus)	WS	0.52	118	mature grains	0.02	< 0.02	OS96401/SJ05
Germany, 1997 (Baccara)	WS	0.525 (nominal) 0.404 (by analysis) (0.10 kg ai/ha)	93 106 106 138	pods with seed pea seed empty pods dry peas	< 0.05 < 0.02 < 0.05 < 0.02	< 0.05 < 0.02 < 0.05 < 0.02	gr 74197
Germany, 1997 (Baccara)	WS	0.525 (nominal) 0.404 (by analysis) (0.10 kg ai/ha)	89 103 103 124	pods with seed pea seed empty pods dry peas	< 0.05 < 0.02 < 0.05 < 0.02	< 0.05 < 0.02 < 0.05 < 0.02	gr 75297
Germany, 1997 (Baccara)	FS	0.525 (nominal) 0.469 (by analysis) (0.10 kg ai/ha)	93 107 107 138	pods with seed pea seed empty pods dry peas	< 0.05 < 0.02 < 0.05 < 0.02	< 0.05 < 0.02 < 0.05 < 0.02	gr 76197
Germany, 1997 (Baccara)	FS	0.525 (nominal) 0.469 (by analysis) (0.10 kg ai/ha)	89 103 103 124	pods with seed pea seed empty pods dry peas	< 0.05 < 0.02 < 0.05 < 0.02	< 0.05 < 0.02 < 0.05 < 0.02	gr 77297
France, 1997 (Baccara)	WS	0.51	109	dry seeds, harvest	< 0.02	< 0.02	9740501
France, 1998 (Rustic)	FS	0.52	129	dry seeds, harvest	< 0.02 [b]	< 0.02	9841001
France, 1998 (Baccara)	FS	0.52	113	dry seeds, harvest	< 0.02 (2)	< 0.02 (2)	9840901
France, 1996 (Solara)	WS	0.51	106	grain at maturity	< 0.02	< 0.02	OS96401/AC02
France, 1996 (Tonus)	WS	0.49	83	grain at maturity	< 0.02	< 0.02	OS96401/AC32
France, 1996 (Solara)	WS	0.52	111	grain at maturity	< 0.02	< 0.02	OS96401/FP01
France, 1996 (Solara)	WS	0.52	104	grain at maturity	< 0.02	< 0.02	OS96401/LD99
France, 1997 (Solara)	WS	0.51	122	seeds at harvest	< 0.02	< 0.02	9740503
France, 1997 (Baccara)	WS	0.51	117	seeds at harvest	< 0.02	< 0.02	9740504
France, 1997 (Solara)	WS	0.53	127	seeds at harvest	< 0.02	< 0.02	9740505
France, 1997 (Baccara)	WS	0.51	119	seeds at harvest	< 0.02	< 0.02	9740506
France, 1998 (Baccara)	FS	0.54	96	seeds at harvest	< 0.02	< 0.02	9840902

[a] Interval between sowing and sampling.

[b] Study 9841001. Some recoveries were in the 40–70% range, but were adequate to assure that residues did not exceed the LOQs reported.

[c] The same treated seed was used and the seeds were sown on the same day, but the field locations were different in these Danish trials.

Table 61 Thiamethoxam residues in peas (dry) resulting from supervised trials in the USA

PEAS	Application			PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (ND), 2000 (Majoret)	FS	0.5	seed treatment	84	dry peas	< 0.01	< 0.01	07590.00-ND09
USA (ND), 2000 (Majoret)	FS	1.4	seed treatment	84	dry peas	< 0.01	< 0.01	07590.00-ND09

PEAS	Application			PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (ND), 2000 (Majoret)	FS	0.5	seed treatment	84	dry peas	< 0.01	< 0.01	07590.00-ND10
USA (ND), 2000 (Majoret)	FS	1.4	seed treatment	84	dry peas	< 0.01	< 0.01	07590.00-ND10
USA (WA), 2000 (Columbian)	FS	0.5	seed treatment	78	dry peas	< 0.01	< 0.01	07590.00-WA13
USA (WA), 2000 (Columbian)	FS	1.4	seed treatment	78	dry peas	< 0.01	0.02	07590.00-WA13
USA (WA), 2000 (Columbian)	FS	0.5	seed treatment	77	dry peas	< 0.01	< 0.01	07590.00-WA14
USA (WA), 2000 (Columbian)	FS	1.4	seed treatment	77	dry peas	< 0.01	0.01-0.02	07590.00-WA14
USA (ID), 2000 (Early Alaska)	FS	0.5	seed treatment	100	dry peas	< 0.01	< 0.01	07590.00-ID06
USA (ID), 2000 (Early Alaska)	FS	1.4	seed treatment	100	dry peas	< 0.01	< 0.01	07590.00-ID06

[a] Interval from sowing to harvest.

Table 62 Thiamethoxam residues in soya beans resulting from supervised trials in the USA

SOYA BEANS	Application			PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed		days [a]		thiamethoxam	CGA 322704	
USA (OH), 2002 (NK S34 B2)	FS	0.5	seed treatment	117	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NK-SR-001-02
USA (SD), 2002 (AG 1602)	FS	0.5	seed treatment	127	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NC-SR-002-02
USA (NC), 2002 (DP6880RR)	FS	0.5	seed treatment	192	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 SJ-SR-002-02
USA (AR), 2002 (Delta King 5366RR)	FS	0.5	seed treatment	134	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 SE-SR-001-02
USA (VA), 2002 (Hutcheson)	FS	0.5	seed treatment	172	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 EB-SR-002-02
USA (ND), 2002 (Mycogen 5007)	FS	0.5	seed treatment	118	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 WI-SR-002-02
USA (MN), 2002 (AgriPro 1702RR)	FS	0.5	seed treatment	126	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NF-SR-001-02
USA (IA), 2002 (NK S24-K4)	FS	0.5	seed treatment	138	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NE-SR-001-02
USA (IN), 2002 (S28-V8)	FS	0.5	seed treatment	123	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NJ-SR-001-02
USA (MS), 2002 (HBK 4891)	FS	0.5	seed treatment	128	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 S3-SR-001-02
USA (MO), 2002 (NK X139R)	FS	0.5	seed treatment	145	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 ND-SR-002-02
USA (IL), 2002 (H-3505RR)	FS	0.5	seed treatment	130	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 N4-SR-014-02
USA (NB), 2002 (Excel 8281RR)	FS	0.5	seed treatment	133	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NB-SR-002-02
USA (KS), 2002 (S39Q4)	FS	0.5	seed treatment	136	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 NA-SR-002-02
USA (MI), 2002 (92B71I)	FS	0.5	seed treatment	138	soya bean dry seed	< 0.01 (2)	< 0.01 (2)	26-02 ED-SR-001-02

[a] Interval from sowing to harvest.

Thiamethoxam may be used as a soil treatment at sowing or in foliar applications during the production of carrots. Three use patterns were examined in the supervised trials on carrots in the USA (Barney, 2004, 07468):

- Application to the soil (narrow band or below seed level) of SL (soluble concentrate) formulation at 0.22 kg ai/ha at sowing. The soil application was followed by approximately 12 mm irrigation within 24 to 48 hours.
- Two foliar sprays of WG (water dispersible granules) formulation at 0.071 kg ai/ha with a 7 days interval and a 7 days PHI.
- Two foliar sprays of SL formulation at 0.071 kg ai/ha with a 7 days interval and a 7 days PHI.

Table 63 Thiamethoxam residues in carrots resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CARROT	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 2000 (Minicor 'Baby Var')	SL	0.11 band		46	1	82	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA07
USA (CA), 2000 (Nantes)	SL	0.22 band		75	1	94	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA163
USA (CA), 2001 (Nantes)	SL	0.071		280	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA163
USA (CA), 2001 (Caro Pak)	SL	0.22 band		120	1	136	carrot root	0.02 0.02	< 0.01 (2)	07468.00-CA75
USA (FL), 2000 (Chantenay Red Core)	SL	0.22 band		48	1	92	carrot root	0.04 0.02	< 0.01 (2)	07468.00-FL08
USA (FL), 2000 (Chantenay Red Core)	SL	0.071		280	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-FL08
USA (OH), 2000 (Apache)	SL	0.22 band		94	1	86	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-OH08
USA (TX), 2000 (Nantes Coreless)	SL	0.23 band		84	1	85	carrot root	< 0.01 0.01	< 0.01 (2)	07468.00-TX12
USA (WA), 2000 (Bolero)	SL	0.23 band		80	1	70	carrot root	0.01 0.02	< 0.01 (2)	07468.00-WA47
USA (CA), 2000 (Minicor 'Baby Var')	WG	0.074 +0.069		550 +570	2 7d	8	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA07
USA (CA), 2001 (Nantes)	WG	0.071		280	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA163
USA (CA), 2000 (Caro Pak)	WG	0.071 +0.074		520 +540	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-CA75
USA (FL), 2000 (Chantenay Red Core)	WG	0.071		280	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-FL08
USA (OH), 2000 (Apache)	WG	0.071		470	2 7d	7	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-OH08
USA (TX), 2000 (Nantes Coreless)	WG	0.072		340	2 6d	7	carrot root	0.01 0.01	< 0.01 (2)	07468.00-TX12
USA (WA), 2000 (Bolero)	WG	0.072		370	2 7d	8	carrot root	< 0.01 (2)	< 0.01 (2)	07468.00-WA47

[a] band: narrow soil-applied spray band at or below seed level at sowing. This soil application was followed by approx 12 mm irrigation within 24 to 48 hours.

Thiamethoxam may be used as a soil treatment at sowing or in foliar applications during the production of radishes. Three use patterns were examined in the supervised trials in the USA on radishes (Barney, 2004, 07677).

- Application to the soil (narrow band or below seed level) of SL (soluble concentrate) formulation at 0.11 or 0.22 kg ai/ha at sowing. The soil application was followed by approximately 12 mm irrigation within 24 to 48 hours.
- One foliar spray of WG (water dispersible granules) formulation at 0.071 kg ai/ha with a 7 days PHI.
- One foliar spray of SL formulation at 0.071 kg ai/ha with a 7 days PHI.

Table 64 Thiamethoxam residues in radish resulting from supervised trials in the USA. Replicate values arise from replicate field samples

RADISH	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 2000 (Cherry Belle)	SL	0.22 band		94	1	41 41 41	radish tops radish tops radish roots	0.36 0.44 0.33 0.31 0.08 0.07	0.07 0.08 0.06 0.04 < 0.01 (2)	07677.00-CA13
USA (CA), 2000 (Cherry Belle)	SL	0.071		150	1	7 7 7	radish tops radish tops radish roots	0.07 0.07 0.08 0.10 0.01 0.01	0.02 0.02 0.02 0.02 < 0.01 (2)	07677.00-CA13
USA (FL), 2000 (Cherry Belle)	SL	0.22 band		48	1	37 37	radish tops radish roots	0.22 0.22 0.02 0.02	0.03 0.04 < 0.01 (2)	07677.00-FL32
USA (FL), 2000 (Cherry Belle)	SL	0.14		280	2 7d	7 7	radish tops radish roots	0.08 0.06 < 0.01 (2)	0.01 0.02 < 0.01 (2)	07677.00-FL32
USA (FL), 2000 (Cabernet)	SL	0.11 band		94	1	27 27	radish tops radish roots	0.06 0.09 < 0.01 (2)	0.02 0.03 < 0.01 (2)	07677.00-FL33
USA (MD), 2000 (Champion)	SL	0.11 band		72	1	43 43 43	radish tops radish tops radish roots	0.38 0.33 0.36 0.37 0.02 0.01	0.10 0.08 0.09 0.08 < 0.01 (2)	07677.00-MD06
USA (NY), 2000 (Vintage)	SL	0.11 band		94	1	36 36	radish tops radish roots	0.09 0.07 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	07677.00-NY22
USA (OH), 2000 (SRA 3503)	SL	0.11 band		93	1	37 37	radish tops radish roots	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	07677.00-OH21
USA (OH), 2000 (SRA 3503)	SL	0.071		460	1	7 7	radish tops radish roots	0.07 0.06 < 0.01 (2)	0.02 0.03 < 0.01 (2)	07677.00-OH21
USA (CA), 2000 (Cherry Belle)	WG	0.071		150	1	7 7 7	radish tops radish tops radish roots	0.13 0.17 0.13 0.16 0.01 < 0.01	0.05 0.05 0.04 0.03 < 0.01 (2)	07677.00-CA13
USA (FL), 2000 (Cherry Belle)	WG	0.14		280	2 7d	7 7	radish tops radish roots	0.08 0.09 < 0.01 (2)	0.02 0.02 < 0.01 (2)	07677.00-FL32
USA (FL), 2000 (Cabernet)	WG	0.071		290	1	6 6	radish tops radish roots	0.30 0.17 < 0.01 (2)	0.13 0.08 < 0.01 (2)	07677.00-FL33
USA (MD), 2000 (Champion)	WG	0.071		230	1	7 7 7	radish tops radish tops radish roots	0.14 0.11 0.18 0.12 < 0.01 (2)	0.03 0.04 < 0.01 (2)	07677.00-MD06
USA (NY), 2000 (Vintage)	WG	0.071		270	1	8 8	radish tops radish roots	0.58 0.64 < 0.01 (2)	0.02 0.02 < 0.01 (2)	07677.00-NY22

[a] band: narrow soil-applied spray band at or below seed level at sowing. This soil application was followed by approx 12 mm irrigation within 12 to 24 hours.

Table 65 Thiamethoxam residues in potato tubers resulting from supervised trials in France, Germany, Spain, Switzerland and the UK

POTATO	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no., interval	days		thiamethoxam	CGA 322704	
France, 1997 (Concurrente)	WG	0.024 0.025	0.0063	380 400	3 + 1 7, 7, 13 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1131/97
France, 1997 (Monalisa)	WG	0.026	0.0063	410	4 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1132/97
France, 1997 (Monalisa)	WG	0.025	0.0075	330	4 7 d	0- 0 7 14 20	tubers	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	9731502
France, 1997 (Monalisa)	WG	0.025	0.0063	400	4 7 d	0- 0 7 14 20	tubers	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	9731503
France, 1997 (O'Sirena)	WG	0.025	0.0063	400	4 6–8 d	0- 0 7 13 20	tubers	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	9731501
Germany, 1997 (Agria)	WG	0.025		400	4 6–8 d	0 7 14	tubers	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	gr 63497
Germany, 1997 (Elcana)	WG	0.025		400	4 7 d	0 7 13	tubers	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	gr 62297
Spain, 1997 (Kenebec)	WG	0.025	0.005	500	4 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1028/97
Spain, 1997 (Monalisa)	WG	0.025	0.005 0.0025	500 1000	1 + 3 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1027/97
Spain, 1997 (Spunta)	WG	0.025	0.005	500	4 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1026/97
Spain, 1999 (Red Pontiac)	WG	0.025	0.0071	350	4 7 d	0 3 7 14	tubers	< 0.02 < 0.02 < 0.02 (2) < 0.02	< 0.02 < 0.02 < 0.02 (2) < 0.02	1125/99
Switzerland, 1996 (Agria)	WG	0.025	0.005	500	4 7 d	14	tubers	< 0.02 (2)	< 0.02 (2)	1036/96
Switzerland, 1996 (Eba)	WG	0.025	0.005	500	4 7 d	14	tubers	< 0.02 (2)	< 0.02 (2)	1037/96
Switzerland, 1997 (Agria)	WG	0.025	0.05	500	4 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1130/97
Switzerland, 1997 (Bintje)	WG	0.025	0.003 0.005	800 500	1 + 3 7 d	7 14	tubers	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1126/97
UK, 1996 (Estima)	WG	0.025	0.005	500	4 10–11 d	14	tubers	< 0.02	< 0.02	IR1496
UK, 1996 (Saturna)	WG	0.025	0.005	500	4 9–10 d	14	tubers	< 0.02	< 0.02	IR1396
UK, 1997 (Maris Piper)	WG	0.025	0.005	500	4 10 d	7 14	tubers	< 0.02 (3) < 0.02 (3)	< 0.02 (3) < 0.02 (3)	NOV-9831

Thiamethoxam may be used as a seed-piece treatment or in foliar applications during the production of potatoes. Several use patterns were examined in the supervised trials on potatoes in the USA (Boyette, 2000, 159-98):

- Seed-piece treatment with FS (flowable concentrate for seed treatment) formulation at sowing at 8 g ai per 100 kg seed-pieces, equivalent to 0.20 kg ai/ha.
- Seed-piece treatment with FS formulation at sowing at 24 g ai per 100 kg seed-pieces, equivalent to 0.60 kg ai/ha.
- Seed-piece treatment with FS formulation at sowing at 6 g ai per 100 kg seed-pieces, equivalent to 0.15 kg ai/ha and foliar spray with WG (water-dispersible granules) formulation at 0.074 kg ai/ha and 14 days PHI.
- Two foliar sprays with WG formulation at 0.099 kg ai/ha each, 7 days interval and 14 days PHI.
- Two foliar sprays with WG formulation at 0.49 kg ai/ha each, 7 days interval and 14 days PHI.
- Seed-piece treatment with DS (powder for dry seed treatment) formulation at sowing at 8 g ai per 100 kg seed-pieces, equivalent to 0.20 kg ai/ha.

Table 66 Thiamethoxam residues in potato tubers resulting from supervised trials in the USA. Replicate values arise from replicate field samples

POTATO	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no., interval	days		Thiamethoxam [b]	CGA 322704 [b]	
USA (CA), 1998 (Cal White)	FS	0.20 spt8		1	90	mature tuber	0.05 0.05	0.06 0.04	159-98 02-SR-035-98
USA (CA), 1998 (Cal White)	DS	0.20 spt8		1	90	mature tuber	0.15 0.18	0.13 0.15	159-98 02-SR-035-98
USA (FL), 1998 (La Rouge)	WG	0.099	47	2 7d	0 2 6 10 14 18	tuber tuber tuber tuber mature tuber mature tuber	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 0.01 [38]	159-98 FL-SR-005-98
USA (FL), 1998 (La Rouge)	FS	0.20 spt8		1	85 87 91 95 99 103	tuber tuber tuber tuber mature tuber mature tuber	0.03 0.07 0.12 0.29 0.07 0.17 0.13 0.09 0.08 0.04 0.14 0.10	0.02 0.01 0.03 0.04 0.03 0.06 0.03 0.02 0.02 0.02 0.04 0.04	159-98 FL-SR-005-98
USA (FL), 1998 (La Rouge)	DS	0.20 spt8		1	85 87 91 95 99 103	tuber tuber tuber tuber mature tuber mature tuber	0.12 0.20 0.12 0.18 0.12 0.09 0.07 0.04 0.15 0.20 0.11 0.14	0.03 0.04 0.03 0.03 0.03 0.03 0.02 0.03 0.04 0.04 0.02 0.03	159-98 FL-SR-005-98
USA (FL), 1998 (La Rouge)	FS + WG	0.15 spt6 +0.074	47	1 +1	0 2 6 10 14 18	tuber tuber tuber tuber mature tuber mature tuber	0.07 0.09 0.11 0.12 0.03 0.10 0.03 0.03 0.07 0.07 0.08 0.05	0.02 0.03 0.03 0.03 0.02 0.03 0.02 0.01 0.02 0.02 0.02 0.02	159-98 FL-SR-005-98
USA (ID), 1998 (Ranger Russet)	WG	0.099	280	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-316-98
USA (ID), 1998 (Ranger Russet)	WG	0.49	280	2 7d	14	mature tuber	< 0.01	< 0.01	159-98 0W-SR-316-98

[38] 159-98, FL-SR-005-98. Potato sample, 18 days after treatment had a residue of 0.01 mg mg/kg of CGA 322704, but on analysis of a second aliquot from the same extract, no residue was detected.

POTATO	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no., interval	days		Thiamethoxam [b]	CGA 322704 [b]	
USA (ID), 1998 (Ranger Russet)	FS	0.20 spt8		1	141	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-316-98
USA (ID), 1998 (Ranger Russet)	FS	0.60 spt24		1	141	mature tuber	0.03	0.03	159-98 0W-SR-316-98
USA (ID), 1998 (Ranger Russet)	WG	0.099	280	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-304-98
USA (ID), 1998 (Ranger Russet)	FS	0.20 spt8		1	143	mature tuber	0.01 < 0.01	0.01 < 0.01	159-98 0W-SR-304-98
USA (ID), 1998 (Ranger Russet)	WG	0.099	280	2 7d	0 2 6 10 14 18	tuber tuber tuber tuber mature tuber mature tuber	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	159-98 0W-SR-305-98
USA (ID), 1998 (Ranger Russet)	FS	0.20 spt8		1	129 131 135 139 143 147	tuber tuber tuber tuber mature tuber mature tuber	< 0.01 (2) < 0.01 (2) 0.02 < 0.01 < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	159-98 0W-SR-305-98
USA (OR), 1998 (Russet Burbank)	WG	0.099	100	2 7d	15	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-307-98
USA (ND), 1998 (Red Pontiacs)	FS	0.20spt8		1	98	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-206-98
USA (ND), 1998 (Red Pontiacs)	FS	0.60spt24		1	98	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-206-98
USA (MN), 1998 (Red Pontiacs)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-207-98
USA (MN), 1998 (Red Pontiacs)	FS	0.20 spt8		1	118	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-207-98
USA (WA), 1998 (Russet Burbank)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-618-98
USA (WA), 1998 (Russet Burbank)	FS	0.20 spt8		1	123	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-618-98
USA (WA), 1998 (Russet Burbank)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-619-98
USA (WA), 1998 (Russet Burbank)	FS	0.20 spt8		1	121	mature tuber	0.02 0.01	< 0.01 (2)	159-98 0W-SR-619-98
USA (FL), 1998 (Atlantic)	WG	0.099	47	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 07-SR-004-98
USA (FL), 1998 (Atlantic)	FS	0.20 spt8		1	103	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 07-SR-004-98
USA (NC), 1998 (Kennebec)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0S-SR-616-98

POTATO	Application				PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no., interval	days		Thiamethoxam [b]	CGA 322704 [b]	
USA (NC), 1998 (Kennebec)	FS	0.20 spt8		1	107	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0S-SR-616-98
USA (ME), 1998 (FL 1625)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 NE-SR-801-98
USA (ME), 1998 (FL 1625)	FS	0.20 spt8		1	113	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 NE-SR-801-98
USA (MI), 1998 (Yukon Golds)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 NE-SR-720-98
USA (MI), 1998 (Yukon Golds)	FS	0.20 spt8		1	113	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 NE-SR-720-98
USA (WI), 1998 (Newleaf Russet Burbank)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 MW-SR-703-98
USA (WI), 1998 (Newleaf Russet Burbank)	FS	0.20 spt8		1	124	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 MW-SR-703-98
USA (NY), 1998 (Katahdin)	WG	0.099	700	2 7d	21	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 05-SR-005-98
USA (NY), 1998 (Katahdin)	FS	0.20 spt8		1	91	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 05-SR-005-98
USA (CO), 1998 (Norkata)	WG	0.099	94	2 7d	14 14 14 14 14 14	mature tuber [39]	0.01 0.02 0.02 0.02 0.02 0.01 c < 0.01 c 0.02 c < 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) c < 0.01 c < 0.01 c < 0.01	159-98 MW-SR-316-98
USA (CO), 1998 (Norkata)	FS	0.20 spt8		1	134	mature tuber	0.01 0.02	< 0.01 (2)	159-98 MW-SR-316-98
USA (CA), 1998 (Red Lasota)	WG	0.099	94	2 7d	14	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-524-98
USA (CA), 1998 (Red Lasota)	FS	0.20 spt8		1	122	mature tuber	< 0.01 (2)	< 0.01 (2)	159-98 0W-SR-524-98

[a] spt8: seed-piece treatment at sowing at 8 g ai/100 kg seed-pieces, equivalent to 0.20 kg ai/ha.

spt24: seed-piece treatment at sowing at 24 g ai/100 kg seed-pieces, equivalent to 0.60 kg ai/ha.

spt6: seed-piece treatment at sowing at 6 g ai/100 kg seed-pieces, equivalent to 0.15 kg ai/ha.

[b] c: sample from control plot

[c] In study 159-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Thiamethoxam may be used as a seed treatment during the production of sugar beet. In the supervised trials in Europe, the application rate was provided as g ai/unit, where the unit is 100,000

[39] Potato trial 159-98, MW-SR-316-98 in the USA (CO). Analyses were repeated twice. Residues of thiamethoxam were detected in a sample from the control plot in one of these analyses suggesting possible contamination.

seeds. When the sowing rate, number of seeds per hectare, is known, the application rate as kg ai/ha may be calculated (Smith, 1998, gr 78297).

Example: for thiamethoxam on sugar beet, the target seed treatment rate was 60 g ai per 100,000 seeds, equivalent to 0.10 kg ai/ha for a sowing rate of 167,000 seeds per hectare.

Table 67 Thiamethoxam residues in sugar beet resulting from supervised trials in France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and the UK

SUGAR BEET	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha seed treatment	days		thiamethoxam	CGA 322704	
France, 1996 (Gabriella)	WS	0.18 (87 g ai per 100,000 seeds, 210,000 seed per hectare)	128	roots	< 0.02 (2)	< 0.02 (2)	OS96407 AC10
France, 1996 (Gabriella)	WS	0.14 (87.1 g ai per 100,000 seeds, 157,000 seeds per hectare)	182	roots	< 0.02	< 0.02	OS96407/DE02
France, 1996 (Gabriella)	WS	0.087 (87.1 g ai per 100,000 seeds, 100,000 seeds per hectare)	183	roots	< 0.02	< 0.02	OS96407/KJ90
France, 1997 (Anik)	WS	0.051 (46 g ai per 100,000 seeds, 110,000 seed per hectare)	161	roots	< 0.02	< 0.02	9740602
France, 1997 (Elisa)	WS	0.078 (59.8 g ai per 100,000 seeds, 130,000 seeds per hectare)	178	roots	< 0.02	< 0.02	9740601
France, 1997 (Elisa)	WS	0.077note[40] (60 g ai per 100,000 seeds, 4.25 kg seed per hectare)	162	roots	< 0.02 (2)	< 0.02 (2)	9740603
Germany, 1997 (Patricia)	WS	0.10 (60 g ai per 100,000 seeds, 167,000 seeds per hectare)	113 161	beet beet	< 0.02 < 0.02	< 0.02 < 0.02	gr 78297
Germany, 1997 (Patricia)	WS	0.060 (60 g ai per 100,000 seeds, 100,000 seeds per hectare)	128 161	beet beet	< 0.02 < 0.02	< 0.02 < 0.02	gr 79497
Germany, 1998 (Patricia)	WS	0.072 (60 g ai per 100,000 seeds, 120,000 seeds per hectare)	83 118	beet beet	< 0.02 < 0.02	< 0.02 < 0.02	gr 67298
Italy, 1996 (Gabriela)	WS	0.13 (90 g ai per 100,000 seeds, 148,000 seeds per hectare)	132	roots	< 0.02 (2)	< 0.02 (2)	1085/96
Italy, 1996 (Gabriela)	WS	0.17 (90 g ai per 100,000 seeds, 185,000 seeds per hectare)	167	roots	< 0.02 (2)	< 0.02 (2)	1086/96
Italy, 1997 (Gabriela)	WS	0.12 (64 g ai per 100,000 seeds, 185,000 seeds per hectare)	158	roots	< 0.02 (2)	< 0.02 (2)	1091/97
Italy, 1997 (Gabriela, KWS seed)	WS	0.11 (64 g ai per 100,000 seeds, 178,000 seeds per hectare)	154	roots	< 0.02 (2)	< 0.02 (2)	1092/97
Netherlands, 1998 (Nicola)	WS	0.060 (60 g ai per 100,000 seeds, 100,000 seeds per hectare)	130	roots	< 0.02 (2)	< 0.02 (2)	1046/98
Spain, 1996 (Gabriela)	WS	0.090 (90 g ai per 100,000 seeds, 100,000 seeds per hectare)	156	roots	< 0.02 (2)	< 0.02 (2)	1005/96

[40] Sugar beet. 9740603. Assume 33 g per 1000 seeds. (Smith, 1998, gr 78927).

SUGAR BEET	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha seed treatment	days		thiamethoxam	CGA 322704	
Spain, 1997 (Gabriela)	WS	0.053 (64 g ai per 100,000 seeds, 83,000 seeds per hectare)	185	roots	< 0.02 (2)	< 0.02 (2)	1048/97
Sweden, 1998 (Patricia)	WS	0.072 (60 g ai per 100,000 seeds, 120,000 seeds per hectare)	70 95	beet beet	< 0.02 < 0.02	< 0.02 < 0.02	gr 69098
Switzerland, 1995 (KWS)	WS	0.09 (90 g ai per 100,000 seeds 100,000 seeds per hectare)	178	roots	< 0.02 (2)		1051/95
UK, 1998 (Nicola)	WS	(60 g ai per 100,000 seeds, sowing rate not reported)	119	roots	< 0.02 (2)	< 0.02 (2)	1006/98

Table 68 Thiamethoxam residues in artichokes resulting from supervised trials in the USA. Replicate values arise from replicate field samples

ARTICHOKE	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no., interval	days		thiamethoxam	CGA 322704	
USA (CA), 2002 (Green Globe)	WG	0.053	700	2 7d	4	artichoke	0.17 0.23	0.021 0.023	08282.02-CA38
USA (CA), 2002 (Green Globe)	WG	0.053	700	2 7d	4	artichoke	0.14 0.17	0.020 0.024	08282.02-CA39
USA (CA), 2002 (Green Globe)	WG	0.053	700	2 6d	4	artichoke	0.080 0.24	0.011 0.029	08282.02-CA40

Table 69 Thiamethoxam residues in celery resulting from supervised trials in the USA. Replicate values arise from replicate field samples

CELERY	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1997 (Conquistador)	SL WG	0.14 dr + 0.05		370 + 340	1 + 1	0 7	leaf stalk leaf stalk	0.27 0.25 0.05 0.06	< 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-510-97
USA (CA), 1997 (Conquistador)	SL WG	0.14 dr + 0.05		370 + 340	1 + 1	0 7	leaf stalk leaf stalk	0.19 0.09 0.01 0.02	< 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-511-97
USA (CA), 1997 (Conquistador)	SL WG	0.14 dr + 0.05		370 + 230	1 + 1	0 7	leaf stalk leaf stalk	0.17 0.18 0.19 0.02	< 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-512-97
USA (CA), 1997 (5275)	SL WG	0.14 dr + 0.05		360 + 230	1 + 1	0 7	leaf stalk leaf stalk	0.50 0.26 0.06 0.05	< 0.01 (2) < 0.01 (2)	ABR-98051 0W-IR-513-97
USA (FL), 1997 (June Bell 1622)	SL WG	0.14 dr + 0.05		3800 + 280	1 + 1	0 7	leaf stalk leaf stalk	0.29 0.28 0.04 0.07	< 0.01 (2) < 0.01 (2)	ABR-98051 FL-IR-411-97
USA (MI), 1997 (Florida 683k)	SL WG	0.14 dr + 0.05		3800 + 290	1 + 1	0 7	leaf stalk leaf stalk	1.5 1.3 0.15 0.15	< 0.01 0.01 < 0.01 (2)	ABR-98051 NE-IR-703-97
USA (CA), 1997 (Conquistador)	WG	0.10		330	2 8d	0 1 3 5 7 9	leaf stalk leaf stalk leaf stalk leaf stalk leaf stalk leaf stalk	0.78 1.09 0.71 0.96 0.49 0.69 0.36 0.57 0.21 0.38 0.08 < 0.01	< 0.01 0.01 < 0.01 0.02 < 0.01 0.01 < 0.01 0.01 < 0.01 0.01 < 0.01 (2)	ABR-98051 0W-IR-510-97

CELERY	Application					PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1997 (Conquistador)	WG	0.10		330	2 8d	0 7	leaf stalk leaf stalk	0.61 0.81 0.14 <u>0.25</u>	< 0.01 (2) < <u>0.01</u> (2)	ABR-98051 0W-IR-511-97
USA (CA), 1997 (Conquistador)	WG	0.10		230	2 6d	0 7	leaf stalk leaf stalk	0.57 1.2 0.04 <u>0.10</u>	< 0.01 0.01 < <u>0.01</u> (2)	ABR-98051 0W-IR-512-97
USA (CA), 1997 (5275)	WG	0.10		230	2 6d	0 7	leaf stalk leaf stalk	1.8 2.0 <u>0.16</u> 0.09	0.01 0.01 < <u>0.01</u> (2)	ABR-98051 0W-IR-513-97
USA (FL), 1997 (June Bell 1622)	WG	0.10		280	2 7d	0 7	leaf stalk leaf stalk	0.90 1.2 0.08 <u>0.09</u>	< 0.01 0.01 < <u>0.01</u> (2)	ABR-98051 FL-IR-411-97
USA (MI), 1997 (Florida 683k)	WG	0.10		280	2 7d	0 7	leaf stalk leaf stalk	1.5 1.4 0.37 <u>0.43</u>	0.02 0.02 <u>0.02</u> 0.02	ABR-98051 NE-IR-703-97

[a] dr: drench treatment at sowing.

[b] In study ABR-98051, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses

Table 70 Thiamethoxam residues in maize resulting from supervised trials with seed treatment uses in France, Germany and Spain

MAIZE	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
France, 1996 (Antarès)	WS	3.0	169	grain	< 0.02	< 0.02	OS96406/KJ92
France, 1996 (Bemol)	WS	3.25	184	grain	< 0.02	< 0.02	OS96406/SJ09
France, 1996 (Dunia)	WS	3.2	159	grain	< 0.02	< 0.02	OS96406/LD95
France, 1996 (Furio)	WS	3.1	147	grain	0.04	< 0.02	OS96406/AC08
France, 1997 (Antarès)	WS	3.1	173	grain	< 0.02	< 0.02	9741602
France, 1997 (Bahia)	WS	3.3	157	grain	< 0.02	< 0.02	9741601
France, 1997 (Furio)	WS	3.2	159	grain	< 0.02	< 0.02	9741101
France, 1997 (Occitan)	WS	3.2	141	grain	< 0.02	< 0.02	9741102
France, 1998 (Bahia)	FS	3.4	152	grain	< <u>0.02</u> (2)	< <u>0.02</u> (2)	9841401
France, 1998 (Furio)	FS	3.2	142	grain	< <u>0.02</u> (2)	< <u>0.02</u> (2)	9841501
France, 1998 (Occitan)	FS	3.2	145	grain	< <u>0.02</u> (2)	< <u>0.02</u> (2)	9841402
France, 1999 (Anjou 285)	FS	3.4	158	grain	< <u>0.02</u> (2)	< <u>0.02</u> (2)	9941201
France, 1999 (Anjou 285)	FS	3.4	89	grain	< 0.02	< 0.02	9941101
France, 1999 (Occitan)	FS	3.4 FS includes fludioxonil and metalaxyl-M	132	grain	< <u>0.02</u> (2)	< <u>0.02</u> (2)	9941202
France, 1999 (Occitan)	FS	3.4 FS includes fludioxonil and metalaxyl-M	140	grain	< 0.02	< 0.02	9941102

MAIZE	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
Germany, 1996 (Bahia)	WS	3.15 (0.083 kg ai/ha)	173	grain	< 0.02	< 0.02	gr 63296
Germany, 1997 (Antarès)	WS	3.15 (0.14 kg ai/ha)	174	grain	< 0.02	< 0.02	gr 80197
Germany, 1997 (Antarès)	WS	3.15 (0.13 kg ai/ha)	175	grain	< 0.02	< 0.02	gr 81297
Germany, 1997 (Antarès)	WS	3.15 (0.099 kg ai/ha)	155	grain	< 0.02	< 0.02	gr 82497
Germany, 1997 (Antarès)	FS	3.15 (0.13 kg ai/ha)	174	grain	< 0.02	< 0.02	gr 83197
Germany, 1997 (Antarès)	FS	3.15 (0.13 kg ai/ha)	175	grain	< 0.02	< 0.02	gr 84297
Spain, 1996 (Dracma)	WS	3.2	177	maize grain	< 0.02 (2)	< 0.02 (2)	1001/96
Spain, 1996 (Dracma)	WS	3.2	163	maize grain	< 0.02 (2)	< 0.02 (2)	1002/96
Spain, 1997 (Juanita)	WS	3.15 (nominal) 2.74 (analysis)	176	grain	< 0.02 (2)	< 0.02 (2)	1049/97

[a] Interval between sowing and sampling.

Table 71 Thiamethoxam residues in maize resulting from supervised trials with seed treatment uses in the USA. Replicate values arise from replicate field samples

MAIZE	Application			PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (CA), 1998 (Pioneer 3820)	FS[41]	4.5	seed treatment	151	grain	< 0.01 (2)	< 0.01 (2)	158-98. 02-SR-031-98
USA (IL), 1998 (Pioneer 3568)	FS	4.5	seed treatment	155	grain	< 0.01 (2)	< 0.01 (2)	158-98. 04-SR-006-98
USA (IL), 1998 (Pioneer 3568)	FS	4.5	seed treatment	155	grain	< 0.01 (2)	< 0.01 (2)	158-98. 04-SR-006-98
USA (NY), 1998 (Pioneer 3568)	FS	13.5	seed treatment	161	grain	< 0.01 (2)	< 0.01 (2)	158-98. 05-SR-003-98
USA (TX), 1998 (Pioneer 3394)	FS	4.5	seed treatment	131	grain	< 0.01 (2)	< 0.01 (2)	158-98. 0S-SR-201-98
USA (NC), 1998 (Pioneer 3394)	FS	4.5	seed treatment	117	grain	< 0.01 (2)	< 0.01 (2)	158-98. 0S-SR-614-98
USA (IA), 1998 (Pioneer 3394)	FS	4.5	seed treatment	171	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-152-98
USA (IA), 1998 (Pioneer 3394)	FS	4.5	seed treatment	173	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-153-98
USA (IA), 1998 (Pioneer 3394)	FS	13.5	seed treatment	173	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-153-98
USA (MO), 1998 (Pioneer 3394)	FS	4.5	seed treatment	135	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-205-98
USA (KS), 1998 (Pioneer 3394)	FS	4.5	seed treatment	147	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-314-98
USA (IL), 1998 (Pioneer 3223)	FS	4.5	seed treatment	136	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-407-98
USA (IA), 1998 (Pioneer 3751)	FS	4.5	seed treatment	161	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-504-98

[41] FS: flowable concentrate for seed treatment. Analysis for active ingredient content: 479 and 477 g g/kg.

MAIZE	Application			PHI	Commodity	Residue, mg/kg [c]		Ref
Country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (SD), 1998 (Pioneer 3751)	FS	4.5	seed treatment	159	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-505-98
USA (NE), 1998 (Pioneer 3751)	FS	4.5	seed treatment	133	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-620-98
USA (NE), 1998 (Pioneer 3751)	FS	4.5	seed treatment	121	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-621-98
USA (WI), 1998 (Pioneer 3751)	FS	4.5	seed treatment	157	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-701-98
USA (MN), 1998 (Pioneer 3820)	FS	4.5	seed treatment	161	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-803-98
USA (MN), 1998 (Pioneer 3820)	FS	4.5	seed treatment	158	grain	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-804-98
USA (IN), 1998 (Pioneer 3568)	FS	4.5	seed treatment	135	grain	< 0.01 (2)	< 0.01 (2)	158-98. NE-SR-106-98
USA (IN), 1998 (Pioneer 3394)	FS	4.5	seed treatment	146	grain	< 0.01 (2)	< 0.01 (2)	158-98. NE-SR-107-98
USA (OH), 1998 (Pioneer 3394)	FS	4.5	seed treatment	151	grain	< 0.01 (2)	< 0.01 (2)	158-98. NE-SR-204-98
USA (MI), 1998 (Pioneer 3568)	FS	4.5	seed treatment	143	grain	< 0.01 (2)	< 0.01 (2)	158-98. NE-SR-718-98

[a] Interval between sowing and sampling.

[b] In study 158-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100

% for that set of analyses.

Table 72 Thiamethoxam residues in barley resulting from supervised trials in the USA. Replicate values arise from replicate field samples

BARLEY	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (ID), 2001 (Steptoe)	WG	0.068		360	2 7 d	21	barley grain	0.01 0.01	< 0.01 (2)	07746.01-ID18
USA (ID), 2001 (Colter)	WG	0.069		370	2 7 d	21	barley grain	< 0.01 (2)	< 0.01 (2)	07746.01-ID19
USA (ID), 2002 (Eight Twelve)	WG	0.069		470	2 8 d	21	barley grain	0.12 0.14	< 0.01 (2)	07746.02-ID07
USA (ID), 2002 (Eight Twelve)	WG	0.069		470	2 8 d	21	barley grain	0.12	< 0.01	07746.02-ID07
USA (ND), 2002 (Drummound)	WG	0.070		280	2 6 d	24	barley grain	< 0.01 (2)	< 0.01 (2)	07746.02-ND06
USA (ND), 2002 (Robust)	WG	0.071		280	2 6 d	24	barley grain	< 0.01 (2)	< 0.01 (2)	07746.02-ND07
USA (SD), 2002 (Robust)	WG	0.071		180	2 7 d	20	barley grain	0.14 0.15	0.02 0.02	07746.02-SD04
USA (SD), 2002 (Lacey)	WG	0.070		180	2 7 d	20	barley grain	0.13 0.14	0.01 0.01	07746.02-SD05
USA (WA), 2002 (Columbia)	WG	0.069		330 +310	2 7 d	21	barley grain	0.18 0.21	< 0.01 (2)	07746.02-WA22

Table 73 Thiamethoxam residues in barley resulting from supervised seed treatment trials in France, Germany and the UK

BARLEY	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	days [a]		thiamethoxam	CGA 322704	
France, 1996 (Intro)	WS	0.62 sowing rate: 140 kg seed/ha	234	barley grain	< 0.02	< 0.02	OS97403/LD02
France, 1996 (Labea)	WS	0.62 sowing rate: 60 kg seed/ha	264	barley grain	< 0.02	< 0.02	OS97403/KJ03
France, 1996 (Nevada)	WS	0.63 sowing rate: 250 kg seed/ha	127	barley grain	< 0.02	< 0.02	OS96402/SJ06
France, 1996 (Plaisant)	WS	0.62 sowing rate: 180 kg seed/ha	218	barley grain	< 0.02	< 0.02	OS97403/AC97
France, 1996 (Prisma)	WS	0.63 sowing rate: 280 kg seed/ha	122	barley grain	< 0.02	< 0.02	OS96402/AC03
France, 1996 (Prisma)	WS	0.61 sowing rate: 210 kg seed/ha	126	barley grain	< 0.02	< 0.02	OS96402/LD98
France, 1997 (Nevada) spring barley	WS	0.61 sowing rate: 240 kg seed/ha	125	barley grain	< 0.02	< 0.02	9741401
France, 1997 (Prisma) spring barley	WS	0.65 sowing rate: 185 kg seed/ha	147	barley grain	< 0.02	< 0.02	9741402
France, 1998 (Esterel) winter barley	FS	0.76 sowing rate: 150 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	262	barley grain	0.02	< 0.05	9940501
France, 1998 (Gaelic) winter barley	FS	0.74 sowing rate: 140 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	242	barley grain	< 0.02	< 0.02	9940604
France, 1998 (Maeva) winter barley	FS	0.76 sowing rate: 185 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	212	barley grain	< 0.02	< 0.02	9940602
France, 1998 (Nevada) spring barley	FS	0.71 sowing rate: 130 kg seed/ha FS includes fludioxonil, CGA 219417, flutriafol	151	barley grain	< 0.02	< 0.02	9840701
France, 1998 (Nevada) spring barley	FS	0.70 sowing rate: 175 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	124	barley grain	< 0.02	< 0.02	9840802
France, 1998 (Pastoral) winter barley	FS	0.78 sowing rate: 200 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	224	barley grain	< 0.02	< 0.02	9940601
France, 1998 (Plaisant) winter barley	FS	0.76 sowing rate: 180 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	216	barley grain	< 0.02	< 0.02	9940603
France, 1998 (Prisma) spring barley	FS	0.78 sowing rate: 78 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	156	barley grain	< 0.02	< 0.02	9840801
France, 1998 (Prisma) spring barley	FS	0.77 sowing rate: 250 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	125	barley grain	< 0.02	< 0.02	9840702
France, 1999 (Cork) spring barley	FS	0.74 sowing rate: 130 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	125	barley grain	< 0.02 (2)	< 0.02 (2)	9940802

BARLEY	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	days [a]		thiamethoxam	CGA 322704	
France, 1999 (Scarlett) spring barley	FS	0.76 sowing rate: 142 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	133	barley grain	< 0.02 (2)	< 0.02 (2)	9940801
Germany, 1996 (Krona)	WS	0.60 sowing rate: 150 kg seed/ha	115	barley grain	< 0.02	< 0.02	gr 62596
Germany, 1997 (Baronesse) spring barley	WS	0.62 sowing rate: 140 kg seed/ha	122	barley grain	< 0.02	< 0.02	gr 69497
UK, 1996 (Optic) spring barley	WS	0.53 sowing rate: 230 kg seed/ha	118	barley grain	< 0.02	< 0.02	IR0296
UK, 1996 (Optic) spring barley	WS	0.56 sowing rate: 230 kg seed/ha	107	barley grain	< 0.02	< 0.02	IR0196
UK, 1997 (Fighter) winter barley	WS	0.57	272	barley grain	< 0.02 (2)	< 0.02 (2)	NOV-9825

[a] Interval between sowing and sampling.

Table 74 Thiamethoxam residues in wheat resulting from supervised trials in France, Germany, Switzerland and the UK

WHEAT	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 1996 (Eureka)	WG	0.050	0.013	400	1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	OI96304/AC21
France, 1996 (Soissons)	WG	0.050	0.013	400	1	13 21	grains grains	< 0.02 < 0.02	< 0.02 < 0.02	OI96304/KJ76
France, 1996 (Soissons) soft wheat	WG	0.050	0.013	400	1	14	wheat grain	< 0.02 (2)	< 0.02 (2)	OI96303
France, 1997 (Ami) soft wheat	WG	0.050	0.015	330	1	14	wheat grain	< 0.02	< 0.02	9730702
France, 1997 (Eureka) soft wheat	WG	0.050	0.013	400	1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730804
France, 1997 (Filou) spring wheat	WS WG	st [b] 0.050	0.013	400	1 + 1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730903
France, 1997 (Furio) spring wheat	WS WG	st [b] 0.050	0.013	400	1 + 1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730901
France, 1997 (Hugo) soft wheat	WG	0.050	0.013	400	1	14	wheat grain	< 0.02	< 0.02	9730703
France, 1997 (Prinqual) spring wheat	WS WG	st [b] 0.050	0.013	400	1 + 1	13 21	wheat grain wheat grain	0.02 < 0.02	< 0.02 < 0.02	9730904
France, 1997 (Prinqual) spring wheat	WS WG	st [b] 0.050	0.013	400	1 + 1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730902
France, 1997 (Soisson) soft wheat	WG	0.050	0.017	300	1	14 22	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730803
France, 1997 (Soissons) soft wheat	WG	0.050	0.013	400	1	13	wheat grain	< 0.02	< 0.02	9730701

WHEAT	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 1997 (Texel)	WG	0.050	0.013	400	1	14 21	grains grains	< 0.02 < 0.02	< 0.02 < 0.02	9730801
France, 1997 (Victo) soft wheat	WG	0.067	0.017	400	1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	9730802
Germany, 1997 (Devon) spring wheat	WS WG	st [a] 0.050		400	1 + 1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	gr 64497
Germany, 1997 (Devon) spring wheat	WS WG	st [a] 0.050		400	1 + 1	14	wheat grain	< 0.02	< 0.02	gr 64497
Germany, 1997 (Devon) spring wheat	WS WG	st [a] 0.050		400	1 + 1	14 21	wheat grain wheat grain	< 0.02 < 0.02	< 0.02 < 0.02	gr 65197
Germany, 1997 (Devon) spring wheat	WS WG	st [a] 0.050		400	1 + 1	14	wheat grain[42]	0.03	< 0.02	gr 65197
Switzerland, 1996 (Albis)	WG	0.050	0.013	400	1	12	wheat grain	< 0.02 (2)	< 0.02 (2)	1040/96
Switzerland, 1997 (Runal)	WG	0.050		500	1	14	wheat grain	0.03 < 0.02	< 0.02 (2)	1040/96
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat grain	< 0.02 0.02 0.02	< 0.02 (3)	NOV-9822
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat grain	0.03 0.03 0.04	< 0.02 (3)	NOV-9823
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat grain	0.02 < 0.02 (2)	< 0.02 (3)	NOV-9824

[a] st: seed treatment at 0.63 g ai/kg seed.

[b] st: seed treatment at 0.60 g ai/kg seed.

Table 75 Thiamethoxam residues in wheat resulting from supervised seed treatment trials in France, Germany and the UK

WHEAT	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1996 (Filou)	WS	0.59 sowing rate: 250 kg seed/ha	125	wheat grain	< 0.02	< 0.02	OS96403/AC06
France, 1996 (Furio)	WS	0.59 sowing rate: 250 kg seed/ha	139	wheat grain	< 0.02	< 0.02	OS96403/SJ07
France, 1996 (Soissons)	WS	0.59 sowing rate: 200 kg seed/ha	223	wheat grain	< 0.02	< 0.02	OS97402/AC98
France, 1996 (Trémie)	WS	0.58 sowing rate: 60 kg seed/ha	270	wheat grain	< 0.02	< 0.02	OS97402/KJ02
France, 1997 (Florence Aurore)	WS	0.61 sowing rate: 150 kg seed/ha	130	wheat grain	< 0.02	< 0.02	9741301

[42] Wheat grain and bran, gr 65197. Reported values have been adjusted for procedural recoveries, adjustment factor = 1.68 for thiamethoxam.

WHEAT	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1997 (Florence Aurore) spring wheat	FS	0.59 sowing rate: 80.5 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	156	wheat grain	< 0.02	< 0.02	9840502
France, 1997 (Florence Aurore) spring wheat	WS	0.63 sowing rate: 220 kg seed/ha	146	wheat grain	< 0.02	< 0.02	9741002
France, 1997 (Prinqual) spring wheat	WS	0.63 sowing rate: 180 kg seed/ha	147	wheat grain	< 0.02	< 0.02	9741001
France, 1997 (Prinqual) spring wheat	WS	0.61 sowing rate: 250 kg seed/ha	133	wheat grain	< 0.02	< 0.02	9741003
France, 1997 (Scipion) winter wheat	FS	0.61 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	223	wheat grain	< 0.02	< 0.02	9840404
France, 1997 (Sidéral)	WS	0.60 sowing rate: 160 kg seed/ha	173	wheat grain	< 0.02	< 0.02	OS97402/LD01
France, 1997 (Sidéral) winter wheat	FS	0.59 sowing rate: 80.5 kg seed/ha also contains fludioxonil, difenoconazole	251	wheat grain	< 0.02	< 0.02	9840302
France, 1997 (Sidéral) winter wheat	FS	0.61 sowing rate: 80.5 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	251	wheat grain	< 0.02	< 0.02	9840402
France, 1997 (Soissons) winter wheat	FS	0.61 sowing rate: 200 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	217	wheat grain	< 0.02	< 0.02	9840403
France, 1997 (Vivant) winter wheat	FS	0.58 sowing rate: 67 kg seed/ha also contains fludioxonil, difenoconazole	276	wheat grain	< 0.02	< 0.02	9840301
France, 1997 (Vivant) winter wheat	FS	0.59 sowing rate: 67 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	276	wheat grain	< 0.02	< 0.02	9840401

WHEAT	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1998 (Florence Aurore) spring wheat	FS	0.57 sowing rate: 230 kg seed/ha also contains fludioxonil, difenoconazole	147	wheat grain	< 0.02	< 0.02	9840603
France, 1998 (Florence Aurore) spring wheat	FS	0.57 sowing rate: 230 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	147	wheat grain	< 0.02	< 0.02	9840503
France, 1998 (Furio) spring wheat	FS	0.58 sowing rate: 140 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	153	wheat grain	< 0.02	< 0.02	9840501
France, 1998 (Furio) spring wheat	FS	0.56 sowing rate: 140 kg seed/ha also contains fludioxonil, difenoconazole	151	wheat grain	< 0.02	< 0.02	9840601
France, 1998 (Furio) spring wheat	FS	0.58 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	145	wheat grain	< 0.02	< 0.02	9840504
France, 1998 (Furio) spring wheat	FS	0.56 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole	145	wheat grain	< 0.02	< 0.02	9840604
France, 1998 (Orqual)	FS	0.60 sowing rate: 250 kg seed/ha also contains fludioxonil, difenoconazole	238	wheat grain	< 0.02 (2)	< 0.02 (2)	9940401
France, 1998 (Orqual)	FS	0.61 sowing rate: 250 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	237	wheat grain	< 0.02 (2)	< 0.02 (2)	9940303
France, 1998 (Prinqual) spring wheat	FS	0.56 sowing rate: 61 kg seed/ha also contains fludioxonil, difenoconazole	156	wheat grain	< 0.02	< 0.02	9840602

WHEAT	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1998 (Ritmo)	FS	0.62 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	262	wheat grain	< 0.02 (2)	< 0.02 (2)	9940301
France, 1998 (Ritmo) soft winter wheat	FS	0.62 sowing rate: 180 kg seed/ha also contains fludioxonil	262	wheat grain	< 0.02 (2)	< 0.02 (2)	9940201
France, 1998 (Sideral)	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil, difenoconazole	242	wheat grain	< 0.02 (2)	< 0.02 (2)	9940402
France, 1998 (Sideral)	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	242	wheat grain	< 0.02 (2)	< 0.02 (2)	9940304
France, 1998 (Sideral) soft winter wheat	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil	242	wheat grain	< 0.02 (2)	< 0.02 (2)	9940202
France, 1998 (Vivant)	FS	0.61 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	261	wheat grain	< 0.02 (2)	< 0.02 (2)	9940302
Germany, 1996 (Hanno) spring wheat	WS	0.63 sowing rate 185 kg seed/ha	127	wheat grain	< 0.02	< 0.02	gr 61496
Germany, 1997 (Hanno) spring wheat	WS	0.64 sowing rate 180 kg seed/ha	136	wheat grain	< 0.02	< 0.02	gr 68197
UK, 1996 (Hunter) winter wheat	WS	0.58	298	wheat grain	< 0.02 (3)	< 0.02 (3)	NOV-9821

[a] Interval between sowing and sampling.

[b] c: sample from control plot.

Thiamethoxam may be used as a granular treatment of the seed box and as a foliar spray during the production of rice. In rice trials in Japan (Table 76), residue data were provided in reverse decline trials, i.e. plots were sprayed at selected time intervals and the grain and straw samples were all harvested on the same day.

Table 76 Thiamethoxam residues in rice resulting from supervised trials in Brazil and Japan

RICE	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [d]	kg ai/hL	water (L/ha)	no.	days		thiamethoxam	CGA 322704 [c]	
Japan, 2008 (Yumemizuho)	GR SC	[a]	0.0065	150	1 + 2 [b]	7 14 21 28 35 42	hulled grain	0.045 0.050 0.052 0.064 0.012 0.013	0.030 0.034 0.068 0.088 0.024 0.029	26-Jun-2009
Japan, 2008 (Hinchikari)	GR SC	[a]	0.0065	150	1 +2 [b]	7 14 21 28 35 42	hulled grain	0.064 0.056 0.076 0.092 0.033 0.036	0.027 0.029 0.063 0.068 0.044 0.046	26-Jun-2009
Brazil (PR), 2000 (Guarani)	FS WG	1.4 st 0.050		200	1 +2 15 d	14 21 28	rice	0.07 0.03 0.03	< 0.02 < 0.02 < 0.02	M00049 trial M00049-RPK
Brazil (PR), 2000 (Guarani)	FS WG	2.8 st 0.10		200	1 + 2 15 d	14 21 28	rice	< 0.02 0.16 0.03	< 0.02 0.02 < 0.02	M00049 trial M00049-RPK
Brazil (MG), 2000 (Carajás)	FS WG	1.4 st 0.050		200	1 + 2 15 d	14 21 28	rice	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	M00049 trial M00049-JJB
Brazil (MG), 2000 (Carajás)	FS WG	2.8 st 0.10		200	1 + 2 15 d	14 21 28	rice	0.16 < 0.02 < 0.02	0.02 < 0.02 < 0.02	M00049 trial M00049-JJB
Brazil (SP), 2000 (IAC-202)	FS WG	1.4 st 0.050		300	1 + 2 15 d	14 21 28	rice	0.05 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	M00049 trial M00049-LZF
Brazil (SP), 2000 (IAC-202)	FS WG	2.8 st 0.10		300	1 + 2 15 d	14 21 28	rice	0.11 0.04 0.05	< 0.02 < 0.02 < 0.02	M00049 trial M00049-LZF
Brazil (GO), 2003 (Aimoré)	FS WG	1.4 st 0.028 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	0.47 0.60 0.53 0.32 0.46 0.34 0.30 0.43 0.25 0.27	0.04 0.06 0.08 0.06 0.08 0.07 0.05 0.06 0.08 0.07	M03025 trial HJF
Brazil (GO), 2003 (Aimoré)	FS WG	2.8 st 0.056 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	1.6 1.7 1.1 0.81 0.91 0.59 0.51 0.52 0.69 0.63	0.08 0.07 0.09 0.07 0.10 0.07 0.07 0.07 0.09 0.09	M03025 trial HJF
Brazil (SP), 2004 (Amarelão)	FS WG	1.4 st 0.028 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	1.6 1.5 0.98 0.57 0.53 0.30 0.07 0.32 0.15 0.22	0.02 0.03 0.05 0.03 0.02 0.01 < 0.01 0.03 0.02 0.02	M03025 trial LZF
Brazil (SP), 2004 (Amarelão)	FS WG	2.8 st 0.056 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	3.7 2.4 0.77 1.1 0.99 1.5 0.46 0.22 0.33 0.43	0.04 0.03 0.03 0.04 0.04 0.05 0.03 0.02 0.01 0.03	M03025 trial LZF
Brazil (MG), 2003 (Aymoré)	FS WG	1.4 st 0.028 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	0.77 0.85 0.66 0.25 0.38 0.46 0.28 0.60 0.19 0.32	0.08 0.07 0.10 0.07 0.09 0.09 0.07 0.10 0.05 0.07	M03025 trial JJB
Brazil (MG), 2003 (Aymoré)	FS WG	2.8 st 0.056 [e]		250	1 + 3 14 d	0 5 7 14 21	rice (duplicate plots)	0.68 1.3 0.89 0.89 0.81 0.77 0.39 0.76 0.52 0.46	0.07 0.11 0.13 0.13 0.13 0.13 0.11 0.12 0.10 0.08	M03025 trial JJB

[a] Seed box treatment with granules (thiamethoxam 80 g/kg, also contains pyroquilon) at 50 g product per box.

[b] Reverse decline trial. Plots were sprayed on separate occasions with sampling all on the same day.

[c] No study numbers or report numbers appeared on the documents of the trials in Japan, so they are identified by date.

[d] st: seed treatment, expressed as g ai/kg seed.

[e] Lambda-cyhalothrin included in the foliar application.

In five of the pecan trials in the USA, applications with a low-volume concentrated spray simulated aerial application. The spray volumes for the low-volume applications were 190–930 L/ha, while spray volumes for high volume were 930–3740 L/ha.

Table 77 Thiamethoxam residues in pecans resulting from supervised trials in the USA. Replicate values arise from replicate field samples

PECAN	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (GA), 1998 (Desirable)	WG [a]	0.074		1300	2 7d	0 3 10 14 18	pecan kernel	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	134-98 0S-IR-832-98
USA (AL), 1998 (Cape Fear)	WG [a]	0.074		94	2 7d	14	pecan kernel	< 0.01 (2)	< 0.01 (2)	134-98 0S-IR-841-98
USA (NM), 1998 (Western Schley)	WG [a]	0.074		1460	2 7d	12	pecan kernel	< 0.01 (2)	< 0.01 (2)	134-98 0S-IR-721-98
USA (NM), 1998 (Western Schley)	WG [a]	0.074		710	2 7d	12	pecan kernel	< 0.01 (2)	< 0.01 (2)	134-98 0S-IR-721-98
USA (LA), 1998 (Jackson)	WG [a]	0.074		1800	2 7d	14	pecan kernel	< 0.01 (2)	< 0.01 (2)	134-98 0S-IR-901-98
USA (LA), 1998 (Jackson)	WG [a]	0.074		94	2 7d	14	pecan kernel	< 0.01 (2)	< 0.01 (2)	134-98 0S-IR-901-98
USA (TX), 1998 (Pawnee)	WG [a]	0.074		1500	2 7d	0 3 10 14 18	pecan kernel	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	134-98 0S-IR-202-98
USA (TX), 1998 (Pawnee)	WG [a]	0.074		700	2 7d	0 3 10 14 18	pecan kernel	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	134-98 0S-IR-202-98

[a] WG also contains pymetrozine.

Thiamethoxam may be used as a seed treatment on sunflower seeds. Two seed-treatment formulations were examined in the supervised trials on sunflower in the USA (Campbell and Pyles, 2001, 100-99). Treated seed were analysed to determine the actual treatment rate:

- FS (flowable concentrate for seed treatment) formulation used in a seed-treatment slurry at 4 g ai per kg seeds.
- WS (water dispersible powder for slurry seed treatment) formulation used in a seed-treatment slurry at 4 or 12 g ai per kg seeds.

Table 78 Thiamethoxam residues in sunflower seed resulting from supervised trials in the USA. Replicate values arise from replicate field samples.

SUNFLOWER	Application			PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (ND), 1999 (SF270)	FS	3.8	seed treatment	126 133 140 147	seed, premature seed, premature seed, mature seed, post mature	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	100-99 0W-SR-202-99
USA (ND), 1999 (SF270)	WS	3.4	seed treatment	126 133 140 147	seed, premature seed, premature seed, mature seed, post mature	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	100-99 0W-SR-202-99
USA (ND), 1999 (SF270)	WS	3.8	seed treatment	140	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 0W-SR-204-99
USA (ND), 1999 (SF270)	WS	12.2	seed treatment	140	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 0W-SR-204-99
USA (SD), 1999 (SF270)	FS	3.5	seed treatment	124 131 138 145	seed, premature seed, premature seed, mature seed, post mature	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	100-99 0W-SR-206-99
USA (SD), 1999 (SF270)	WS	3.7	seed treatment	124 131 138 145	seed, premature seed, premature seed, mature seed, post mature	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	100-99 0W-SR-206-99
USA (SD), 1999 (SF270)	WS	4.0	seed treatment	117	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 MW-SR-504-99
USA (SD), 1999 (SF270)	WS	11.3	seed treatment	117	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 MW-SR-504-99
USA (NE), 1999 (SF270)	WS	4.6	seed treatment	127	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 MW-SR-620-99
USA (KS), 1999 (SF270)	WS	3.1	seed treatment	122	seed, mature	< 0.01 (2)	< 0.01 (2)	100-99 MW-SR-307-99

[a] Interval between sowing and sampling.

Thiamethoxam may be used as a seed treatment and in foliar applications during the production of cotton. Three use patterns were examined in the supervised trials in the USA on cotton (Campbell, 1998, 34-97):

- FS formulation used in a seed-treatment slurry at 3 g ai per kg seed, followed by WG formulation as two foliar sprays at 0.050 kg ai/ha, minimum 47 L/ha, 14 days interval and 21 days PHI.
- FS formulation used in a seed-treatment slurry at 3 g ai per kg seed, followed by WG formulation as two foliar sprays at 0.15 kg ai/ha, minimum 47 L/ha, 14 days interval and 21 days PHI.
- FS formulation used in a seed-treatment slurry at 3 g ai per kg seed, followed by WG formulation as two foliar sprays at 0.25 kg ai/ha, minimum 47 L/ha, 14 days interval and 21 days PHI.

Thiamethoxam may be used as a seed treatment and in foliar applications during the production of cotton. Three use patterns were examined in the supervised and processing trials in the USA on cotton (Eudy *et al.,* 1999, 132-98).

- 8 FS formulation used in a seed-treatment slurry at 3 g ai per kg seed, followed by WG formulation as two foliar sprays at 0.032 kg ai/ha, minimum 47 L/ha, 5 days interval.
- 9 WG formulation as two foliar sprays at 0.045 kg ai/ha, minimum 47 L/ha, 5 days interval
- 11 WG formulation as two foliar sprays at 0.225 kg ai/ha, minimum 47 L/ha, 5 days interval, in combination with emamectin as an EC.

Table 79 Thiamethoxam residues in cotton seed resulting from supervised trials in the USA. Replicate values arise from replicate field samples

COTTON	Application				PHI	Commodity	Residue, mg/kg [b, c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (AL) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	110	1 + 2 14d	21	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0S-1R-843-97
USA (AR) 1997 (D&PL 50)	FS + WG	3 g ai/kg seed 0.05	84	1 + 2 14d	21	cotton seed	0.02 0.02	< 0.01 (2)	34-97 0S-1R-102-97
USA (AZ) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	190	1 + 2 14d	22	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0W-1R-522-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.05	190	1 + 2 14d	22	cotton seed	< 0.01 0.04	< 0.01 (2)	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.15	190	1 + 2 14d	22	cotton seed	0.06 0.06	< 0.01 (2)	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.25	190	1 + 2 14d	22	cotton seed	0.10 0.09	< 0.01 (2)	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.05	190	1 +2 14d	22	cotton seed	0.03	< 0.01	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.15	190	1 + 2 14d	22	cotton seed	0.05	< 0.01	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.25	190	1 + 2 14d	22	cotton seed	0.13	< 0.01	34-97 02-1R-038-97
USA (CA) 1997 (Maxxa)	FS + WG	3 g ai/kg seed 0.05	170	1 + 2 14d	21	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0W-1R-424-97
USA (LA) 1997 (DP-50)	FS + WG	3 g ai/kg seed 0.05	84	1 + 2 14d	23	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0W-1R-907-97
USA (MS) 1997 (DPL 50)	FS + WG	3 g ai/kg seed 0.05	130	1 + 2 14d	20	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 03-1R-002-97
USA (NM) 1997 (HS-200)	FS + WG	3 g ai/kg seed 0.05	56	1 + 2 14d	28	cotton seed	0.02 0.01	< 0.01 (2)	34-97 0S-1R-724-97
USA (OK) 1997 (Paymaster 330)	FS + WG	3 g ai/kg seed 0.05	150	1 + 2 14d	21	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0S-1R-723-97
USA (TX) 1997 (DPL 50)	FS + WG	3 g ai/kg seed 0.05	120	1 + 2 16d	25	cotton seed	0.03 0.03	< 0.01 (2)	34-97 0S-1R-204-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	84	1 + 2 14d	21	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0S-1R-308-97

COTTON	Application				PHI	Commodity	Residue, mg/kg [b, c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.15	84	1 + 2 14d	21	cotton seed	< 0.01 (2)	< 0.01 (2)	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.25	84	1 + 2 14d	21	cotton seed	< 0.01 0.01	< 0.01 (2)	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	84	1 + 2 14d	21	cotton seed	< 0.01	< 0.01	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.15	84	1 +2 14d	21	cotton seed	< 0.01	< 0.01	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.25	84	1 + 2 14d	21	cotton seed	< 0.01	< 0.01	34-97 0S-1R-308-97
USA (TX) 1997 (DPL 50)	FS + WG	3 g ai/kg seed 0.05	120	1 + 2 16d	0 7 13 25 28	cotton seed cotton seed cotton seed cotton seed cotton seed	0.14 0.06 0.02 0.02 0.04 0.03 0.01 < 0.01 0.02 0.07	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	34-97 0S-1R-203-97
USA (CA) 1998 (Acala Maxxa)	FS WG	3 g ai/kg seed 0.032	190	2 (5d)	21	cotton seed	0.03 0.04	< 0.01 (2)	132-98 02-IR-022-98/CA
USA (CA) 1998 (Acala Maxxa)	WG	0.045	190	2 (5d)	21	cotton seed	0.14 0.05	< 0.01 (2)	132-98 02-IR-022-98/CA
USA (CA) 1998 (Acala Maxxa)	WG	0.225	190	2 (5d)	21	cotton seed	0.17 0.14	< 0.01 (2)	132-98 02-IR-022-98/CA
USA (MS) 1998 (DP 50)	FS WG	3 g ai/kg seed 0.032	19	2 (5d)	20	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 03-IR-001-98/MS
USA (MS) 1998 (DP 50)	WG	0.045	19	2 (5d)	20	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 03-IR-001-98/MS
USA (AR) 1998 (DPL 50)	FS WG	3 g ai/kg seed 0.032		2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-102-98/AR
USA (AR) 1998 (DPL 50)	WG	0.045		2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-102-98/AR
USA (TX) 1998 (DP 50)	FS WG	3 g ai/kg seed 0.032	120	2 (5d)	20	cotton seed	0.01 0.01	< 0.01 (2)	132-98 0S-IR-203-98/TX
USA (TX) 1998 (DP 50)	WG	0.045	120	2 (5d)	20	cotton seed	0.01 0.01	< 0.01 (2)	132-98 0S-IR-203-98/TX
USA (TX) 1998 (DPL 5557)	FS WG	3 g ai/kg seed 0.032	94	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-306-98/TX
USA (TX) 1998 (DPL 5557)	WG	0.045	94	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-306-98/TX
USA (TX) 1998 (DPL 5557)	WG	0.225	94	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-306-98/TX
USA (TX) 1998 (PM 2326)	FS WG	3 g ai/kg seed 0.032	94	2 (5d)	0 7 14 23 28	cotton seed cotton seed cotton seed cotton seed cotton seed	0.04 0.02 0.01 0.01 < 0.01 0.01 0.01 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	132-98 0S-IR-722-98/TX

COTTON	Application				PHI	Commodity	Residue, mg/kg [b, c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (TX) 1998 (PM 2326)	WG	0.045	94	2 (5d)	0 7 14 23 28	cotton seed cotton seed cotton seed cotton seed cotton seed	0.04 0.03 0.02 0.02 0.02 0.02 0.01 < 0.01 < 0.01 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	132-98 0S-IR-722-98/TX
USA (OK) 1998 (PM 183)	FS WG	3 g ai/kg seed 0.032	140	2 (5d)	24	cotton seed	0.02 0.03	< 0.01 (2)	132-98 0S-IR-724-98/OK
USA (OK) 1998 (PM 183)	WG	0.045	140	2 (5d)	24	cotton seed	0.02 < 0.01	< 0.01 (2)	132-98 0S-IR-724-98/OK
USA (AL) 1998 (DPL 50)	FS WG	3 g ai/kg seed 0.032	180	2 (5d)	20	cotton seed	0.04 0.02	< 0.01 (2)	132-98 0S-IR-835-98/AL
USA (AL) 1998 (DPL 50)	WG	0.045	180	2 (5d)	20	cotton seed	0.06 0.04	< 0.01 (2)	132-98 0S-IR-835-98/AL
USA (LA) 1998 (DPL 50)	FS WG	3 g ai/kg seed 0.032	75	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0S-IR-902-98/LA
USA (LA) 1998 (DPL 50)	WG	0.045	75	2 (5d)	21	cotton seed	0.01 0.01	< 0.01 (2)	132-98 0S-IR-902-98/LA
USA (CA) 1998 (MAXXA)	FS WG	3 g ai/kg seed 0.032	56	2 (5d)	0 7 14 21 28	cotton seed cotton seed cotton seed cotton seed cotton seed	0.02 0.01 < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	132-98 0W-IR-111-98/CA
USA (CA) 1998 (MAXXA)	WG	0.045	56	2 (5d)	0 7 14 21 28	cotton seed cotton seed cotton seed cotton seed cotton seed	0.03 0.03 < 0.01 (2) < 0.01 0.03 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	132-98 0W-IR-111-98/CA
USA (AZ) 1998 (Acala 90)	FS WG	3 g ai/kg seed 0.032	190	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0W-IR-508-98/AZ
USA (AZ) 1998 (Acala 90)	WG	0.045	190	2 (5d)	21	cotton seed	< 0.01 (2)	< 0.01 (2)	132-98 0W-IR-508-98/AZ

[a] Study 132-98. The nominal seed treatment rate, 3 g ai/kg seed, is recorded in the table. Measured concentrations of thiamethoxam on the treated seed ranged from 2.26% to 3.04%, mean 2.66%, SD 0.22%, n=20.

[b] In study 34-97, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

[c] In study 132-98, the reported residues had been adjusted for procedural recoveries.

Table 80 Thiamethoxam residues in cotton seed resulting from supervised trials in Greece and Spain. Replicate values arise from replicate field samples

COTTON	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Greece, 1996 (Express)	WG	0.050	0.005	1000	3 12, 10 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1071/96
Greece, 1996 (Z2)	WG	0.050	0.005	1000	3 18, 10 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1072/96
Greece, 1997 (Eva)	WS WG	2.7 ST 0.050	0.0063	790	1 + 3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1096/97

COTTON	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [a]	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Greece, 1997 (Eva)	WS WG	2.6 ST 0.050	0.0072	700	1 + 3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1097/97
Greece, 1998 (324 Stoneville)	WG	0.050	0.0083	600	3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1066/98
Greece, 1998 (Korina)	WG	0.050	0.0083	600	3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1065/98
Greece, 1999 (ETH.I.AG.E-1)	WS WG	1.9 ST 0.050	0.010	500	1 + 3 13, 14 d	0 0 28	dehulled seed cotton hulls dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.05 (2)	1134/99
Greece, 1999 (ETH.I.AG.E-1)	WS WG	1.9 ST 0.050	0.010	500	1 + 3 13, 14 d	0 0 7 7 14 14 21 21 28 28	dehulled seed cotton hulls dehulled seed cotton hulls dehulled seed cotton hulls dehulled seed cotton hulls dehulled seed cotton hulls	< 0.02 < 0.05 < 0.02 < 0.05 < 0.02 < 0.05 < 0.02 < 0.05 < 0.02 (2) < 0.05 (2)	< 0.02 < 0.05 < 0.02 < 0.05 < 0.02 < 0.05 < 0.02 < 0.05 < 0.02 (2) < 0.05 (2)	1135/99
Spain, 1996 (Corona)	WG	0.050	0.010	500	3 7 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1019/96
Spain, 1996 (Vulcano)	WG	0.050	0.010	500	3 7 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1020/96
Spain, 1997 (Austral)	WS WG	2.5 ST 0.050	0.012	400	1 + 3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1045/97
Spain, 1997 (Condor)	WS WG	2.5 ST 0.050	0.010	500	1 + 3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1043/97
Spain, 1997 (Condor)	WS WG	2.5 ST 0.050	0.012	400	1 +3 14 d	28	dehulled seed cotton hulls	< 0.02 (2) < 0.05 (2)	< 0.02 (2) < 0.05 (2)	1044/97

[a] ST: seed treatment, expressed as g ai per kg seed.

Table 81 Thiamethoxam residues in rape seed resulting from supervised trials in France, Germany, Sweden and the UK

OILSEED RAPE	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1996 (Bristol)	WS	4.5 sowing rate: 9 kg seed/ha	247	rapeseed	< 0.02	< 0.02	OS97404/AC96
France, 1996 (Bristol)	WS	4.5 sowing rate: 2 kg seed/ha	289	rapeseed	< 0.02	< 0.02	OS97404/KJ04
France, 1996 (Bristol)	WS	4.5 sowing rate: 3.5 kg seed/ha	278	rapeseed	< 0.02	< 0.02	OS97404/LD03
France, 1996 (Goeland)	FS	4.4 sowing rate: 3 kg seed/ha FS includes fludioxonil and metalaxyl-M	278	rapeseed	< 0.02	< 0.02	1178/97
France, 1996 (Goeland)	WS	4.7 sowing rate: 9 kg seed/ha	247	rapeseed	< 0.02	< 0.02	OS97404/AC95
France, 1996 (Goeland)	WS	4.7 sowing rate: 3.5 kg seed/ha	286	rapeseed	< 0.02	< 0.02	OS97404/LD04
France, 1996 (Tanto)	WS	5.4 sowing rate: 6 kg seed/ha	131	rapeseed	< 0.02	< 0.02	OS96405/AC04

OILSEED RAPE	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1996 (Tanto)	WS	5.4 sowing rate: 9 kg seed/ha	134	rapeseed	< 0.02	< 0.02	OS96405/AC05
France, 1996 (Tanto)	WS	5.2 sowing rate: 5 kg seed/ha	127	rapeseed	< 0.02	< 0.02	OS96405/FP02
France, 1996 (Tanto)	WS	5.2 sowing rate: 5 kg seed/ha	170	rapeseed	< 0.02	< 0.02	OS96405/KJ94
France, 1997 (Bristol)	FS	4.4 sowing rate: 4 kg seed/ha FS includes fludioxonil and metalaxyl-M	282	rapeseed	< 0.02 c 0.02	< 0.02	1179/97
France, 1997 (Navajo)	FS	4.2 sowing rate: 1.5 kg seed/ha FS includes fludioxonil and metalaxyl-M	300	rapeseed	< 0.02	< 0.02	1176/97
France, 1997 (Navajo)	FS	4.2 sowing rate: 2.8 kg seed/ha FS includes fludioxonil and metalaxyl-M	293	rapeseed	< 0.02	< 0.02	1177/97
France, 1997 (Tanto)	WS	4.8 sowing rate: 8 kg seed/ha	153	rapeseed	< 0.02	< 0.02	9741201
France, 1998 (Bristol)	FS	4.5 sowing rate: 6 kg seed/ha FS includes fludioxonil and metalaxyl-M	285	rapeseed	< 0.02 (2)	< 0.02 (2)	1113/98
France, 1998 (Capitol)	FS	4.4 sowing rate: 8 kg seed/ha FS includes fludioxonil and metalaxyl-M	274	rapeseed	< 0.02 (2)	< 0.02 (2)	1110/98
France, 1998 (Columbus)	FS	4.3 sowing rate: 2.5 kg seed/ha FS includes fludioxonil and metalaxyl-M	277	rapeseed	< 0.02 (2)	< 0.02 (2)	1112/98
Germany, 1996 (Evita) spring oil seed rape	WS	4.7 sowing rate: 5 kg seed/ha	127	rapeseed	< 0.02	< 0.02	gr 65496
Germany, 1996 (Evita) spring oil seed rape	WS	4.8 sowing rate: 10 kg seed/ha	115	rapeseed	< 0.02	< 0.02	gr 66596
Germany, 1997 (Evita) spring oil seed rape	WS	5.1 sowing rate: 3.5 kg seed/ha	138	rapeseed	< 0.02	< 0.02	gr 73297
Germany, 1997 (Evita) spring oil seed rape	WS	5.1 sowing rate: 4.5 kg seed/ha	144	rapeseed	< 0.02	< 0.02	gr 72197
Germany, 1998 (Evita) spring oilseed rape	FS	4.3 sowing rate: 5.0 kg seed/ha FS includes fludioxonil and metalaxyl-M	133	rapeseed	< 0.02	< 0.02	gr 71199
Germany, 1998 (Laser) winter oilseed rape	FS	4.2 sowing rate: 3.5 kg seed/ha FS includes fludioxonil and metalaxyl-M	330	rapeseed	< 0.02	< 0.02	gr 61299
Germany, 1998 (Laser) winter oilseed rape	FS	4.2 sowing rate: 7.0 kg seed/ha FS includes fludioxonil and metalaxyl-M	319	rapeseed	< 0.02	< 0.02	gr 62499
Germany, 1998 (Licosmos) spring oilseed rape	FS	4.2 sowing rate: 10 kg seed/ha FS includes fludioxonil and metalaxyl-M	124	rapeseed	< 0.02	< 0.02	gr 65498

OILSEED RAPE	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
Germany, 1998 (Licosmos) spring oilseed rape	FS	4.2 sowing rate: 6 kg seed/ha FS includes fludioxonil and metalaxyl-M	130	rapeseed	< 0.02	< 0.02	gr 66298
Sweden, 1998 (Sponsor) spring oilseed rape	FS	4.1 sowing rate: 10 kg seed/ha FS includes fludioxonil and metalaxyl-M	145	rapeseed	< 0.02	< 0.02	gr 68098
UK, 1996 (Apex) winter oil seed rape	WS	5.0	323	rapeseed	< 0.02 (3)	< 0.02 (3)	NOV-9819
UK, 1996 (Sprinter) spring oil seed rape	WS	4.7 sowing rate: 7 kg seed/ha	122	rapeseed	< 0.02	< 0.02	IR0396
UK, 1997 (Acrobat) spring oil seed rape	WS	5.0	146	rapeseed	< 0.02 (3)	< 0.02 (3)	NOV-9820
UK, 1997 (Apex)	FS	3.8 FS includes fludioxonil and metalaxyl-M	323	rapeseed	< 0.02 (3)	< 0.02 (3)	1025/98
UK, 1997 (Apex)	FS	3.8 FS includes fludioxonil and metalaxyl-M	322	rapeseed	< 0.02 (3)	< 0.02 (3)	1026/98

[a] Interval between sowing and sampling.

[b] c: sample from control plot

In the cocoa trials, the cacao beans were fermented and dried (Table 82).

Fermentation: beans and pulp were removed from the pods, placed in black plastic containers which were hermetically closed. Every 48 hours the containers were opened and the beans stirred. The fermentation process took 5 days.

Drying: fermented beans were placed in a thin layer on a black plastic sheet under the open sky in the day and were covered each night. They were stirred 2–3 times a day. The drying process took 5 days.

Table 82 Thiamethoxam residues in cacao beans resulting from supervised trials at four different farms in Côte d'Ivoire

CACAO	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Côte d'Ivoire, 2000 (Selectioné IRCC)	WG	0.030	0.030	100	2 42 d	29	fermented dried beans	< 0.02 [a,b] < 0.02 [c]	< 0.02 < 0.02	1128/00
Côte d'Ivoire, 2000 (Tout Venant)	WG	0.030	0.030	100	2 42 d	30	fermented dried beans	< 0.02 [a,b] < 0.02 [c]	< 0.02 < 0.02	1129/00
Côte d'Ivoire, 2000 (Selectioné IRCC)	WG	0.030	0.030	100	2 42 d	30	fermented dried beans	< 0.02 [a,b] < 0.02 [c]	< 0.02 < 0.02	1130/00
Côte d'Ivoire, 2000 (Tout Venant)	WG	0.030	0.030	100	2 42 d	29	fermented dried beans	< 0.02 [a,b] < 0.02 [c]	< 0.02 < 0.02	1131/00

[a] Cultural practices.

[b] care was taken to avoid cross-contamination while separating the beans from the pod and pulp.

[c] traditional method, where no special precaution is taken to avoid cross-contamination.

Thiamethoxam may be used as a soil drench during the production of coffee. Three use patterns with WG formulations were examined in the supervised trials in Brazil on coffee (Góis Marconi and Casallanovo, 2009, M09200):

- WG formulation containing thiamethoxam and cyproconazole used as a drench at 0.30 kg ai/ha of thiamethoxam, and 90 days later a WG formulation of thiamethoxam only applied as a second drench at 0.50 kg ai/ha.
- WG formulation containing thiamethoxam and cyproconazole used as a single drench at 0.30 kg ai/ha of thiamethoxam.
- WG formulation of thiamethoxam only applied as a single drench at 0.50 kg ai/ha.

Three similar use patterns with the same application rates but based on GR application to the soil were also examined in supervised trials in Brazil on coffee (Góis Marconi and Casallanovo, 2009, M09201).

Coffee cherries were collected, then dried and shelled to produce coffee beans. In four of the trials (M09200), beans were also roasted.

Table 83 Thiamethoxam residues in coffee beans resulting from supervised trials in Brazil

COFFEE	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	method	no. interval	days		thiamethoxam	CGA 322704	
Brazil (MG), 2008 (Mundo Novo)	WG WG	0.30 [a] +0.50	soil drench	2 90 d	60 90 100	coffee beans coffee beans coffee beans	0.07 0.07 0.07	0.03 0.03 0.03	M09200 trial JJB1 Note [c]
Brazil (MG), 2008 (Mundo Novo)	WG	0.30 [a]	soil drench	1	150 180 190	coffee beans coffee beans coffee beans	0.05 0.05 0.05	0.03 0.03 0.03	M09200 trial JJB1 Note [c]
Brazil (MG), 2008 (Mundo Novo)	WG	0.50	soil drench	1	60 90 100	coffee beans coffee beans coffee beans	0.05 0.04 0.04	0.02 0.02 0.02	M09200 trial JJB1 Note [c]
Brazil (MG), 2008 (Mundo Novo)			control plot		(60) (90) (100)	coffee beans coffee beans coffee beans	c 0.03 c 0.03 c 0.03	c 0.02 c 0.02 c 0.02	M09200 trial JJB1
Brazil (MG), 2008 (Catuai)	WG WG	0.30 [a] +0.50	soil drench	2 90 d	60 90 100	coffee beans coffee beans coffee beans	0.07 0.07 0.07	0.03 0.03 0.03	M09200 trial JJB2 Note [d]
Brazil (MG), 2008 (Catuai)	WG	0.30 [a]	soil drench	1	150 180 190	coffee beans coffee beans coffee beans	0.05 0.05 0.05	0.03 0.03 0.03	M09200 trial JJB2 Note [d]
Brazil (MG), 2008 (Catuai)	WG	0.50	soil drench	1	60 90 100	coffee beans coffee beans coffee beans	0.07 0.05 0.05	0.03 0.03 0.02	M09200 trial JJB2 Note [d]
Brazil (MG), 2008 (Catuai)			control plot		(60) (90) (100)	coffee beans coffee beans coffee beans	c 0.02 c 0.02 c 0.04	c 0.02 c 0.02 c 0.02	M09200 trial JJB2
Brazil (MG), 2008 (Catuai)	WG WG	0.30 [a] +0.50	soil drench	2 90 d	60 90	coffee beans coffee beans	0.06 0.06	0.02 0.03	M09200 trial JJB3 Note [e]
Brazil (MG), 2008 (Catuai)	WG	0.30 [a]	soil drench	1	150 180	coffee beans coffee beans	0.04 0.04	0.02 0.02	M09200 trial JJB3 Note [e]
Brazil (MG), 2008 (Catuai)	WG	0.50	soil drench	1	60 90	coffee beans coffee beans	0.04 0.04	0.02 0.02	M09200 trial JJB3 Note [e]
Brazil (MG), 2008 (Catuai)			control plot		(60) (90)	coffee beans coffee beans	c 0.03 c 0.02	c 0.02 c 0.02	M09200 trial JJB3
Brazil (MG), 2008 (Catuai)	WG WG	0.30 [b] +0.50	soil drench	2 90 d	60 90 100	coffee beans coffee beans coffee beans	0.06 0.05 0.06	0.02 0.03 0.03	M09200 trial JJB4

COFFEE	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	method	no. interval	days		thiamethoxam	CGA 322704	
Brazil (MG), 2008 (Catuai)	WG	0.30 [a]	soil drench	1	150 180 190	coffee beans coffee beans coffee beans	0.04 0.03 0.03	0.02 0.02 0.02< 0.01	M09200 trial JJB4
Brazil (MG), 2008 (Catuai)	WG	0.50	soil drench	1	60 90 100	coffee beans coffee beans coffee beans	0.04 0.04 0.04	< 0.01 < 0.01 < 0.01	M09200 trial JJB4
Brazil (MG), 2008 (Mundo Novo)	WG WG	0.30 [a] +0.50	soil drench	2 90 d	60 90	coffee beans coffee beans	0.04 0.04	0.02 0.02	M09200 trial JJB5
Brazil (MG), 2008 (Mundo Novo)	WG	0.30 [a]	soil drench	1	150 180	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09200 trial JJB5
Brazil (MG), 2008 (Mundo Novo)	WG	0.50	soil drench	1	60 90	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09200 trial JJB5
Brazil (SP), 2008 (Mundo Novo)	WG WG	0.30 [a] +0.50	soil drench	2 90 d	60 90 100	coffee beans coffee beans coffee beans	0.03 0.03 0.03	< 0.01 < 0.01 0.02	M09200 trial LZF
Brazil (SP), 2008 (Mundo Novo)	WG	0.30 [a]	soil drench	1	150 180 190	coffee beans coffee beans coffee beans	0.02 0.02 0.04	< 0.01 < 0.01 0.02	M09200 trial LZF
Brazil (SP), 2008 (Mundo Novo)	WG	0.50	soil drench	1	60 90 100	coffee beans coffee beans coffee beans	0.02 0.03 0.02	< 0.01 < 0.01 < 0.01	M09200 trial LZF
Brazil (MG), 2008 (Mundo Novo)	GR GR	0.30 [b] +0.50	soil treatment	2 90 d	60 90	coffee beans coffee beans	0.02 0.03	0.02 0.02	M09201 trial JJB1
Brazil (MG), 2008 (Mundo Novo)	GR	0.30 [b]	soil treatment	1	150 180	coffee beans coffee beans	0.03 0.02	0.02 0.02	M09201 trial JJB1
Brazil (MG), 2008 (Mundo Novo)	GR	0.50	soil treatment	1	60 90	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09201 trial JJB1
Brazil (MG), 2008 (Catuai)	GR GR	0.30 [b] +0.50	soil treatment	2 90 d	60 90	coffee beans coffee beans	0.04 0.04	0.03 0.03	M09201 trial JJB2 Note [f]
Brazil (MG), 2008 (Catuai)	GR	0.30 [b]	soil treatment	1	150 180	coffee beans coffee beans	0.04 0.05	0.03 0.03	M09201 trial JJB2 Note [f]
Brazil (MG), 2008 (Catuai)	GR	0.50	soil treatment	1	60 90	coffee beans coffee beans	0.04 0.04	0.02 0.02	M09201 trial JJB2 Note [f]
Brazil (MG), 2008 (Catuai)			control plot		(60) (90)	coffee beans coffee beans	c 0.03 c 0.03	c 0.02 c 0.02	M09201 trial JJB2
Brazil (MG), 2008 (Catuai)	GR GR	0.30 [b] +0.50	soil treatment	2 90 d	60 90	coffee beans coffee beans	0.04 0.04	0.02 0.02	M09201 trial JJB3
Brazil (MG), 2008 (Catuai)	GR	0.30 [b]	soil treatment	1	150 180	coffee beans coffee beans	0.03 0.02	< 0.01 < 0.01	M09201 trial JJB3
Brazil (MG), 2008 (Catuai)	GR	0.50	soil treatment	1	60 90	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09201 trial JJB3
Brazil (MG), 2008 (Mundo Novo)	GR GR	0.30 [b] +0.50	soil treatment	2 90 d	60 90	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09201 trial JJB4
Brazil (MG), 2008 (Mundo Novo)	GR	0.30 [b]	soil treatment	1	150 180	coffee beans coffee beans	0.02 < 0.01	< 0.01 < 0.01	M09201 trial JJB4
Brazil (MG), 2008 (Mundo Novo)	GR	0.50	soil treatment	1	60 90	coffee beans coffee beans	0.02 0.02	< 0.01 < 0.01	M09201 trial JJB4

[a] The WG in the first application contains cyproconazole (300 g/kg) and thiamethoxam (300 g/kg). Thiamethoxam is the only active ingredient in the WG used in the second application.

[b] The GR in the first application contains cyproconazole (10 g/kg) and thiamethoxam (10 g/kg). Thiamethoxam is the only active ingredient in the GR used in the second application.

[c] M09200 trial JJB1. Trial results are suspect because of significant residues in samples from control plot.

[d] M09200 trial JJB2. Trial results are suspect because of significant residues in samples from control plot.

[e] M09200 trial JJB3. Trial results are suspect because of significant residues in samples from control plot.

[f] M09201 trial JJB2. Trial results are suspect because of significant residues in samples from control plot.

Table 84 Thiamethoxam residues in pea forage and fodder resulting from supervised trials with seed treatment in Denmark, France and Germany

PEA FORAGE AND FODDER	Application		PHI	Commodity	Residue, mg/kg [d]		Ref
Country, year (variety)	Form	g ai/kg seed	Days [a]	[b]	thiamethoxam	CGA 322704	
Denmark, 1996 (4-9172, part 96-08)	WS	0.525 (nominal) 0.442 (by analysis)	30 50 72 90 119	whole plant whole plant haulm haulm haulm	1.9 < 0.05 < 0.05 < 0.05 < 0.05 (2)	0.29 < 0.05 < 0.05 < 0.05 < 0.05 (2)	IR0996 [e]
Denmark, 1996 (4-9172, part 96-08)	WS	0.525 (nominal) 0.442 (by analysis)	30 50 72 90 119	whole plant whole plant haulm haulm dry haulm	0.38 0.07 < 0.05 < 0.05 < 0.05	0.08 < 0.05 < 0.05 < 0.05 < 0.05	NOV-9838 [e]
Germany, 1997 (Baccara)	WS	0.525 (nominal) 0.404 (by analysis) (0.10 kg ai/ha)	70 138	whole plant haulm	< 0.05 < 0.05	< 0.05 < 0.05	gr 74197
Germany, 1997 (Baccara)	WS	0.525 (nominal) 0.404 (by analysis) (0.10 kg ai/ha)	62 124	whole plant haulm	0.05 < 0.05	< 0.05 < 0.05	gr 75297
Germany, 1997 (Baccara)	FS	0.525 (nominal) 0.469 (by analysis) (0.10 kg ai/ha)	70 138	whole plant haulm	< 0.05 < 0.05	< 0.05 < 0.05	gr 76197
Germany, 1997 (Baccara)	FS	0.525 (nominal) 0.469 (by analysis) (0.10 kg ai/ha)	62 124	whole plant haulm	0.07 < 0.05	< 0.05 < 0.05	gr 77297
France, 1997 (Baccara)	WS	0.51	61 109	whole plant haulm	0.02 0.06	< 0.04 < 0.04	9740501
France, 1998 (Rustic)	FS	0.52	65 129	whole plant haulm	< 0.05 < 0.1 [c]	< 0.05 < 0.1	9841001
France, 1998 (Baccara)	FS	0.52	113	haulm	0.11 0.10	< 0.1 (2)	9840901
France, 1997 (Solara)	WS	0.51	66 122	whole plant haulm at harvest	0.04 0.02	< 0.04 < 0.04	9740503
France, 1997 (Baccara)	WS	0.51	75 117	whole plant haulm at harvest	0.02 < 0.04 c 0.04	< 0.04 0.04 c 0.04	9740504
France, 1997 (Solara)	WS	0.53	76 127	whole plant haulm at harvest	0.05 < 0.04	< 0.04 0.02	9740505
France, 1997 (Baccara)	WS	0.51	69 119	whole plant haulm at harvest	0.10 0.18	< 0.04 0.09	9740506
France, 1998 (Baccara)	FS	0.54	96	haulm at harvest	0.21	< 0.1	9840902

[a] Interval between sowing and sampling.

[b] Haulm: whole plants with pods removed or straw with empty pods.

[c] Study 9841001. Some recoveries were in the 40-70% range, but were adequate to assure that residues did not exceed the LOQs reported.

[d] c: sample from control plot.

[e] The same treated seed was used and the seeds were sown on the same day, but the field locations were different in these Danish trials.

Table 85 Thiamethoxam residues in maize forage and fodder resulting from supervised trials with seed treatment uses on sweet corn and popcorn in the USA. Replicate values arise from replicate field samples

MAIZE FORAGE & FODDER	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
Country, year (variety)	Form	g ai/kg seed		days		thiamethoxam	CGA 322704	
USA (CA), 1998 (Primetime)	FS	4.5	seed treatment	60 78 151	forage, incl ears forage, no ears stover	0.04 0.02 < 0.01 0.01 < 0.01 (2)	0.01 < 0.01 < 0.01 (2) < 0.01 (2)	158-98. 02-SR-032-98
USA (IL), 1998 (Kandy King)	FS	4.5	seed treatment	60 67 103	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. 04-SR-008-98
USA (NY), 1998 (Kandy King)	FS	4.5	seed treatment	62 77 119	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. 05-SR-004-98
USA (FL), 1998 (Golden Cross – Bantam Hybrid)	FS	4.5	seed treatment	38 45 52 59 66 76 80	forage, incl ears forage, incl ears forage, incl ears forage, incl ears forage, incl ears forage, no ears stover	0.03 0.04 < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. 07-SR-003-98
USA (NC), 1998 (Kandy King)	FS	4.5	seed treatment	60 60 89	forage, incl ears forage, no ears stover	0.02 0.04 0.03 0.08 0.01 0.01	< 0.01 < 0.01 0.02 < 0.01 (2)	158-98. 0S-SR-615-98
USA (WA), 1998 (Jubilee)	FS	4.5	seed treatment	60 102 141	forage, incl ears forage, no ears stover	0.04 0.04 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. 0W-SR-616-98
USA (WA), 1998 (Jubilee)	FS	1.0	seed treatment	60 102	forage, incl ears forage, no ears	0.01 < 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. 0W-SR-616-98
USA (OR), 1998 (Primetime)	FS	4.5	seed treatment	56 98 131	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) 0.02 < 0.01 < 0.01 (2)	158-98. 0W-SR-617-98
USA (OR), 1998 (Primetime)	FS	1.0	seed treatment	56 98	forage, incl ears forage, no ears	0.02 < 0.01 < 0.01 (2)	0.01 < 0.01 < 0.01 (2)	158-98. 0W-SR-617-98
USA (WI), 1998 (Jubilee)	FS	4.5	seed treatment	39 46 53 60 67 81 118	forage, incl ears forage, incl ears forage, incl ears forage, incl ears forage, incl ears forage, no ears stover	0.04 0.05 0.01 0.01 < 0.01 0.01 0.01 < 0.01 < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. MW-SR-702-98
USA (MN), 1998 (Jubilee)	FS	4.5	seed treatment	62 89 112	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. MW-SR-805-98
USA (OH), 1998 (Kandy King)	FS	4.5	seed treatment	59 65 82	forage, incl ears forage, no ears stover	< 0.01 0.01 < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. NE-SR-205-98
USA (PA), 1998 (Hybrid Sweet Fortune SD8912-82)	FS	4.5	seed treatment	60 76 109	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. NE-SR-604-98
USA (MI), 1999 (Kandy King)	FS	4.5	seed treatment	60 75 123	forage, incl ears forage, no ears stover	< 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. NE-SR-701-99

MAIZE FORAGE & FODDER	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
Country, year (variety)	Form	g ai/kg seed		days		thiamethoxam	CGA 322704	
USA (KS), 1998 (M-212) popcorn	FS	4.5	seed treatment	144	stover	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-315-98
USA (NE), 1998 (M-212) popcorn	FS	4.5	seed treatment	129	stover	< 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-622-98
USA (IN), 1998 (M-212) popcorn	FS	4.5	seed treatment	131	stover	< 0.01 (2)	< 0.01 (2)	158-98. MW-SR-108-98

[a] In study 158-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100% for that set of analyses.

Table 86 Thiamethoxam residues in maize forage and fodder resulting from supervised trials with seed treatment uses in the USA. Replicate values arise from replicate field samples

MAIZE FORAGE & FODDER	Application			PHI	Commodity	Residue, mg/kg [b, c]		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (CA), 1998 (Pioneer 3820)	FS[43]	4.5	seed treatment	60 151	forage stover	0.01 0.02 0.02 0.03	< 0.01 0.01 < 0.01 (2)	158-98. 02-SR-031-98
USA (IL), 1998 (Pioneer 3568)	FS	4.5	seed treatment	59 155	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. 04-SR-006-98
USA (IL), 1998 (Pioneer 3568)	FS	4.5	seed treatment	59 155	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. 04-SR-006-98
USA (NY), 1998 (Pioneer 3568)	FS	13.5	seed treatment	62 161	forage stover	0.01 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. 05-SR-003-98
USA (TX), 1998 (Pioneer 3394)	FS	4.5	seed treatment	63 131	forage stover	0.02 0.02 0.01 0.02	< 0.01 (2) < 0.01 (2)	158-98. 0S-SR-201-98
USA (NC), 1998 (Pioneer 3394)	FS	4.5	seed treatment	60 117	forage stover	< 0.01 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. 0S-SR-614-98
USA (IA), 1998 (Pioneer 3394)	FS	4.5	seed treatment	61 171	forage stover	< 0.01 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-152-98
USA (IA), 1998 (Pioneer 3394)	FS	4.5	seed treatment	61 173	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-153-98
USA (IA), 1998 (Pioneer 3394)	FS	13.5	seed treatment	61 173	forage stover	0.01 < 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-153-98
USA (MO), 1998 (Pioneer 3394)	FS	4.5	seed treatment	59 135	forage stover	0.02 < 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-205-98
USA (KS), 1998 (Pioneer 3394)	FS	4.5	seed treatment	61 147	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-314-98
USA (IL), 1998 (Pioneer 3223)	FS	4.5	seed treatment	39 46 53 60 67 136	forage forage forage forage forage stover	< 0.01 (2) < 0.01 (2) 0.01 < 0.01 < 0.01 (2) < 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2)	158-98. MW-SR-407-98
USA (IA), 1998 (Pioneer 3751)	FS	4.5	seed treatment	60 161	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-504-98
USA (SD), 1998 (Pioneer 3751)	FS	4.5	seed treatment	60 159	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-505-98
USA (NE), 1998 (Pioneer 3751)	FS	4.5	seed treatment	60 133	forage stover	0.02 0.02 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-620-98

[43] FS: flowable concentrate for seed treatment. Analysis for active ingredient content: 479 and 477 g.

MAIZE FORAGE & FODDER	Application			PHI	Commodity	Residue, mg/kg [b, c]		Ref
country, year (variety)	Form	g ai/kg seed		Days [a]		thiamethoxam	CGA 322704	
USA (NE), 1998 (Pioneer 3751)	FS	4.5	seed treatment	61 121	forage stover	0.04 0.04 < 0.01 0.01	0.02 0.01 < 0.01 (2)	158-98. MW-SR-621-98
USA (WI), 1998 (Pioneer 3751)	FS	4.5	seed treatment	60 157	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-701-98
USA (MN), 1998 (Pioneer 3820)	FS	4.5	seed treatment	39 46 53 60 67 161 39	forage forage forage forage forage stover forage	0.03 0.05 0.02 0.02 < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) c 0.01 < 0.01	0.01 0.02 < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 (2) c < 0.01 (2)	158-98. MW-SR-803-98
USA (MN), 1998 (Pioneer 3820)	FS	4.5	seed treatment	59 158	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. MW-SR-804-98
USA (IN), 1998 (Pioneer 3568)	FS	4.5	seed treatment	62 135	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. NE-SR-106-98
USA (IN), 1998 (Pioneer 3394)	FS	4.5	seed treatment	62 146	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. NE-SR-107-98
USA (OH), 1998 (Pioneer 3394)	FS	4.5	seed treatment	60 151	forage stover	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. NE-SR-204-98
USA (MI), 1998 (Pioneer 3568)	FS	4.5	seed treatment	60 143	forage stover	0.01 0.01 < 0.01 (2)	< 0.01 (2) < 0.01 (2)	158-98. NE-SR-718-98

[a] Interval between sowing and sampling.

[b] c: sample from control plot.

[c] In study 158-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 87 Thiamethoxam residues in maize fodder and forage resulting from supervised trials with seed treatment uses in France, Germany and Spain

MAIZE FODDER & FORAGE	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
France, 1996 (Antarès)	WS	3.0	112 112 133 133	cobs, milky stage plant without cobs cobs, silage stage plant without cobs	< 0.02 < 0.02 < 0.04 < 0.04	< 0.02 < 0.02 < 0.04 < 0.04	OS96406/KJ92
France, 1996 (Bemol)	WS	3.25	105 105 127 127	cobs, milky stage plant without cobs cobs, silage stage plant without cobs	< 0.02 < 0.02 < 0.04 < 0.04	< 0.02 < 0.02 < 0.04 < 0.04	OS96406/SJ09
France, 1996 (Dunia)	WS	3.2	88 88 123 123	cobs, milky stage leaves + stalks cobs, silage stage leaves + stalks	< 0.02 < 0.02 < 0.04 < 0.04	< 0.02 < 0.02 < 0.04 < 0.04	OS96406/LD95
France, 1996 (Furio)	WS	3.1	88 88 105 105	cobs, milky stage leaves + stalks cobs, silage stage leaves + stalks	< 0.02 < 0.02 < 0.04 < 0.04	< 0.02 < 0.02 < 0.04 < 0.04	OS96406/AC08
France, 1997 (Antarès)	WS	3.1	75 132 132 140 140	whole plant cobs, milky stage leaves + stalks cobs, silage stage leaves + stalks	< 0.04 < 0.02 < 0.04 < 0.02 < 0.04	< 0.04 < 0.02 < 0.04 < 0.02 < 0.04	9741602

MAIZE FODDER & FORAGE	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
France, 1997 (Bahia)	WS	3.3	78	whole plant	< 0.04	< 0.04	9741601
			119	cobs, milky stage	< 0.02	< 0.02	
			119	leaves + stalks	< 0.04	< 0.04	
			135	cobs, silage stage	< 0.02	< 0.02	
			135	leaves + stalks	< 0.04	< 0.04	
France, 1997 (Furio)	WS	3.2	105	cobs, milky stage	< 0.02	< 0.02	9741101
			105	leaves + stalks	< 0.04	< 0.04	
			132	cobs, silage stage	< 0.02	< 0.02	
			132	leaves + stalks	< 0.04	< 0.04	
France, 1997 (Occitan)	WS	3.2	92	cobs, milky stage	< 0.02	< 0.02	9741102
			92	leaves + stalks	< 0.04	< 0.04	
			109	cobs, silage stage	< 0.02	< 0.02	
			109	leaves + stalks	< 0.04	< 0.04	
France, 1998 (Bahia)	FS	3.4	111	cobs, milky stage	< 0.02 (2)	< 0.02 (2)	9841401
			111	plant without cobs	< 0.05 (2)	< 0.05 (2)	
France, 1998 (Furio)	FS	3.2	63	whole plant	< 0.05 (2)	< 0.05 (2)	9841501
			92	cobs, milky stage	< 0.02 (2)	< 0.02 (2)	
			92	remaining plant	< 0.05 (2)	< 0.05 (2)	
France, 1998 (Occitan)	FS	3.2	92	cobs, milky stage	< 0.02 (2)	< 0.02 (2)	9841402
			92	remaining plant	< 0.05 (2)	< 0.05 (2)	
France, 1999 (Anjou 285)	FS	3.4	45	whole plant	< 0.05 (2)	< 0.05 (2)	9941101
			93	cobs	< 0.02	< 0.02	
			93	plant without cobs\	< 0.05 (2)\	< 0.05 (2)\	
France, 1999 (Anjou 285)	FS	3.4	106	cobs	< 0.02 (2)	< 0.02 (2)	9941201
			106	plant without cobs	< 0.05 (2)	< 0.05 (2)	
France, 1999 (Occitan)	FS	3.4 FS includes fludioxonil and metalaxyl-M	56	whole plant	< 0.05 (2)	< 0.05 (2)	9941102
			78	cobs	< 0.02	< 0.02	
			78	remainder	< 0.05 (2)	< 0.05 (2)	
France, 1999 (Occitan)	FS	3.4 FS includes fludioxonil and metalaxyl-M	86	cobs	< 0.02 (2)	< 0.02 (2)	9941202
			86	remainder	< 0.05 (2)	< 0.05 (2)	
Germany, 1996 (Bahia)	WS	3.15 (0.083 kg ai/ha)	113	cobs, milky stage	< 0.02	< 0.02	gr 63296
			113	plant without cobs	< 0.02	< 0.02	
			140	cobs, silage stage	< 0.02	< 0.02	
			140	plant without cobs	< 0.02	< 0.02	
Germany, 1997 (Antarès)	WS	3.15 (0.14 kg ai/ha)	80	whole plant	< 0.02	< 0.02	gr 80197
			119	cobs	< 0.02	< 0.02	
			119	remainder	< 0.02	< 0.02	
			142	cobs	< 0.02	< 0.02	
			142	remainder	< 0.02	< 0.02	
Germany, 1997 (Antarès)	WS	3.15 (0.13 kg ai/ha)	69	whole plant	< 0.02	< 0.02	gr 81297
			99	cobs	< 0.02	< 0.02	
			99	remainder	< 0.02	< 0.02	
			140	cobs	< 0.02	< 0.02	
			140	remainder	< 0.02	< 0.02	
Germany, 1997 (Antarès)	WS	3.15 (0.099 kg ai/ha)	70	whole plant	< 0.02	< 0.02	gr 82497
			124	cobs	< 0.02	< 0.02	
			124	remainder	< 0.02	< 0.02	
			141	cobs	< 0.02	< 0.02	
			141	remainder	< 0.02	< 0.02	
Germany, 1997 (Antarès)	FS	3.15 (0.13 kg ai/ha)	80	whole plant	< 0.02	< 0.02	gr 83197
			118	cobs	< 0.02	< 0.02	
			118	remainder	0.02	< 0.02	
			142	cobs	< 0.02	< 0.02	
			142	remainder	< 0.02	< 0.02	

MAIZE FODDER & FORAGE	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai/kg seed	days [a]		thiamethoxam	CGA 322704	
Germany, 1997 (Antarès)	FS	3.15 (0.13 kg ai/ha)	69 99 99 140 140	whole plant cobs remainder cobs remainder	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	gr 84297
Spain, 1997 (Juanita)	WS	3.15 (nominal) 2.74 (analysis)	128 128	cobs remainder	< 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.02 (2)	1049/97

[a] Interval between sowing and sampling.

Table 88 Thiamethoxam residues in barley straw and fodder resulting from supervised trials in the USA. Replicate values arise from replicate field samples

BARLEY STRAW & FODDER	Application					PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (ID), 2001 (Steptoe)	WG	0.068		360	2 7 d	21 21	barley straw barley hay	0.03 0.02 0.02 0.01	0.03 0.03 0.02 0.02	07746.01-ID18
USA (ID), 2001 (Colter)	WG	0.069		370	2 7 d	21 21	barley straw barley hay	0.02 0.03 0.02 0.02	0.02 0.03 0.02 0.02	07746.01-ID19
USA (ID), 2002 (Eight Twelve)	WG	0.069		470	2 8 d	21 21	barley straw barley hay	0.26 0.26 0.21 0.16	0.01 0.01 0.01 < 0.01	07746.02-ID07
USA (ND), 2002 (Drummound)	WG	0.070		280	2 6 d	24 24	barley straw barley hay	< 0.01 (2) < 0.01 (2)	< 0.01 (2) < 0.01 (2)	07746.02-ND06
USA (ND), 2002 (Robust)	WG	0.071		280	2 6 d	24 24	barley straw barley hay	< 0.01 (2) < 0.01 (2)	< 0.01 0.01 < 0.01 (2)	07746.02-ND07
USA (SD), 2002 (Robust)	WG	0.071		180	2 7 d	20 20	barley straw barley hay	0.27 0.24 0.24 0.25	0.03 0.03 0.03 0.03	07746.02-SD04
USA (SD), 2002 (Lacey)	WG	0.070		180	2 7 d	20 20	barley straw barley hay	0.19 0.17 0.20 0.20	0.02 0.01 0.02 0.01	07746.02-SD05
USA (WA), 2002 (Columbia)	WG	0.069		330 + 310	2 7 d	21 21	barley straw barley hay	0.33 0.26 0.27 0.26	< 0.01 (2) < 0.01 (2)	07746.02-WA22

Table 89 Thiamethoxam residues in barley straw and fodder resulting from supervised seed treatment trials in France, Germany and the UK

BARLEY STRAW AND FODDER	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	days[a]		thiamethoxam	CGA 322704	
France, 1996 (Intro)	WS	0.62 sowing rate: 140 kg seed/ha	157 234	whole plant barley straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97403/LD02
France, 1996 (Labea)	WS	0.62 sowing rate: 60 kg seed/ha	186 264	whole plant barley straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97403/KJ03
France, 1996 (Nevada)	WS	0.63 sowing rate: 250 kg seed/ha	127	barley straw	< 0.05	< 0.05	OS96402/SJ06
France, 1996 (Plaisant)	WS	0.62 sowing rate: 180 kg seed/ha	153 218	whole plant barley straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97403/AC97
France, 1996 (Prisma)	WS	0.63 sowing rate: 280 kg seed/ha	122	barley straw	< 0.05	< 0.05	OS96402/AC03
France, 1996 (Prisma)	WS	0.61 sowing rate: 210 kg seed/ha	126	barley straw	< 0.05	< 0.05	OS96402/LD98

BARLEY STRAW AND FODDER	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	days[a]		thiamethoxam	CGA 322704	
France, 1997 (Nevada) spring barley	WS	0.61 sowing rate: 240 kg seed/ha	77 125	whole plant barley straw	< 0.04 < 0.04	< 0.04 0.04	9741401
France, 1997 (Prisma) spring barley	WS	0.65 sowing rate: 185 kg seed/ha	89 147	whole plant barley straw	< 0.04 < 0.04	< 0.04 < 0.04	9741402
France, 1998 (Esterel) winter barley	FS	0.76 sowing rate: 150 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	262	barley straw	< 0.05	< 0.05	9940501
France, 1998 (Gaelic) winter barley	FS	0.74 sowing rate: 140 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	242	barley straw	< 0.05	< 0.05	9940604
France, 1998 (Maeva) winter barley	FS	0.76 sowing rate: 185 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	212	barley straw	< 0.05	< 0.05	9940602
France, 1998 (Nevada) spring barley	FS	0.71 sowing rate: 130 kg seed/ha FS includes fludioxonil, CGA 219417, flutriafol	151	barley straw	< 0.05	< 0.05	9840701
France, 1998 (Nevada) spring barley	FS	0.70 sowing rate: 175 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	53 89 124	whole plant whole plant barley straw	0.05 < 0.02 < 0.05	< 0.02 < 0.02 < 0.05	9840802
France, 1998 (Pastoral) winter barley	FS	0.78 sowing rate: 200 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	224	barley straw	< 0.05	< 0.05	9940601
France, 1998 (Plaisant) winter barley	FS	0.76 sowing rate: 180 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	216	barley straw	< 0.05	< 0.05	9940603
France, 1998 (Prisma) spring barley	FS	0.77 sowing rate: 250 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	125	barley straw	< 0.05	< 0.05	9840702
France, 1998 (Prisma) spring barley	FS	0.78 sowing rate: 78 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	65 91 156	whole plant whole plant barley straw	< 0.02 < 0.02 < 0.05	< 0.02 < 0.02 < 0.05	9840801
France, 1999 (Cork) spring barley	FS	0.74 sowing rate: 130 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	51 83 83 125	whole plant ears stalks barley straw	0.11 0.11 < 0.02 (2) < 0.05 (2) < 0.05 (2)	< 0.05 (2) < 0.02 (2) < 0.05 (2) < 0.05 (2)	9940802
France, 1999 (Scarlett) spring barley	FS	0.76 sowing rate: 142 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol	48 83 83 133	whole plant ears stalks barley straw	< 0.05 (2) < 0.02 (2) < 0.05 (2) < 0.05 (2)	< 0.05 (2) < 0.02 (2) < 0.05 (2) < 0.05 (2)	9940801
Germany, 1996 (Krona)	WS	0.60 sowing rate: 150 kg seed/ha	115	barley straw	< 0.02	< 0.02	gr 62596
Germany, 1997 (Baronesse) spring barley	WS	0.62 sowing rate: 140 kg seed/ha	49 63 69 122	whole plant whole plant whole plant barley straw	0.05 < 0.05 < 0.05 < 0.05	< 0.05 < 0.05 < 0.05 < 0.05	gr 69497
UK, 1996 (Optic) spring barley	WS	0.56 sowing rate: 230 kg seed/ha	107	barley straw	< 0.05	< 0.05	IR0196

BARLEY STRAW AND FODDER	Application		PHI	Commodity	Residue, mg/kg		Ref
country, year (variety)	Form	g ai per kg seed seed treatment	days[a]		thiamethoxam	CGA 322704	
UK, 1996 (Optic) spring barley	WS	0.53 sowing rate: 230 kg seed/ha	118	barley straw	< 0.05	< 0.05	IR0296
UK, 1997 (Fighter) winter barley	WS	0.57	272	barley straw	< 0.05 (2)	< 0.05 (2)	NOV-9825

[a] Interval between sowing and sampling.

Table 90 Thiamethoxam residues in wheat straw and fodder resulting from supervised trials in France, Germany, Switzerland and the UK

WHEAT STRAW AND FODDER	Application					PHI	Commodity	Residue, mg/kg [d]		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
France, 1996 (Eureka)	WG	0.050	0.013	400	1	0 7 14 21	whole plant whole plant wheat straw wheat straw	0.96 0.50 0.22 0.11	< 0.05 < 0.05 < 0.05 0.05	OI96304/AC21
France, 1996 (Soissons)	WG	0.050	0.013	400	1	0 7 13 21	whole plant whole plant straw straw	1.0 0.73 0.78 0.80	< 0.05 < 0.05 0.07 0.06	OI96304/KJ76
France, 1996 (Soissons) soft wheat	WG	0.050	0.013	400	1	14	wheat straw	0.15 < 0.05	< 0.05 (2)	OI96303
France, 1997 (Ami) soft wheat	WG	0.050	0.015	330	1	14	wheat straw	0.05	< 0.04	9730702
France, 1997 (Eureka) soft wheat	WG	0.050	0.013	400	1	0 7 14 21	whole plant whole plant wheat straw wheat straw	1.6 0.58 0.44 0.34	< 0.04 < 0.04 < 0.04 < 0.04	9730804
France, 1997 (Filou) spring wheat	WS WG	st [b] 0.050	0.013	400	1 +1	0- 0 6 14 21	whole plant whole plant whole plant wheat straw wheat straw	< 0.04 0.76 < 0.04 < 0.04 < 0.04	< 0.04 0.23 0.04 < 0.04 < 0.04 Note[45]	9730903
France, 1997 (Furio) spring wheat	WS WG	st [b] 0.050	0.013	400	1 +1	0- 0 7 14 21	whole plant whole plant whole plant wheat straw[44] wheat straw[44]	< 0.04 0.75 0.38 0.42 0.39	< 0.04 0.10 0.05 0.04 0.06	9730901
France, 1997 (Hugo) soft wheat	WG	0.050	0.013	400	1	14	wheat straw	0.17	< 0.04	9730703
France, 1997 (Prinqual) spring wheat	WS WG	st [b] 0.050	0.013	400	1 +1	0- 0 7 10 13 21	whole plant whole plant whole plant whole plant wheat straw wheat straw	< 0.04 1.4 0.51 0.45 0.65 0.49	< 0.04 < 0.04 0.05 < 0.04 0.06 0.05 Note[45]	9730904

[44] Wheat straw, 9730901 and 9730902. Reported values for thiamethoxam have been adjusted for average straw recovery of 76%.

[45] 9730904 and 9730903. Whole plant CGA 322704 residues adjusted for average recovery = 62 %, wheat straw residues adjusted for average recovery = 68 %.

WHEAT STRAW AND FODDER	Application					PHI	Commodity	Residue, mg/kg [d]		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	Days [a]		thiamethoxam	CGA 322704	
France, 1997 (Prinqual) spring wheat	WS WG	st [b] 0.050	0.013	400	1 +1	0- 0 7 10 14 21	whole plant whole plant whole plant whole plant wheat straw[44] wheat straw[44]	< 0.04 0.77 0.55 0.54 <u>0.51</u> 0.16	< 0.04 0.05 0.04 < 0.04 < <u>0.04</u> < 0.04	9730902
France, 1997 (Soisson) soft wheat	WG	0.050	0.017	300	1	0 7 14 22	whole plant whole plant wheat straw wheat straw	1.5 0.61 <u>0.28</u> 0.27	0.05 < 0.04 < <u>0.04</u> < 0.04	9730803
France, 1997 (Soissons) soft wheat	WG	0.050	0.013	400	1	13	wheat straw	0.25	< 0.04	9730701
France, 1997 (Texel)	WG	0.050	0.013	400	1	0 7 14 21	whole plant whole plant straw straw	0.84 0.66 0.29 <u>0.34</u>	< 0.04 < 0.04 < <u>0.04</u> < 0.04	9730801
France, 1997 (Victo) soft wheat	WG	0.067	0.017	400	1	0 7 14 21	whole plant whole plant wheat straw wheat straw	1.5 c 0.08 0.41 <u>0.14</u> 0.06	0.06 c < 0.04 < 0.04 <u>0.03</u> 0.05	9730802
Germany, 1997 (Devon) spring wheat	WS WG	st [c] 0.050		400	1 +1	0- 0- 0 0 7 7 10 10 14 21	ears remainder ears remainder ears remainder ears remainder wheat straw[46] wheat straw[46]	< 0.02 < 0.05 0.55 0.88 0.21 0.28 0.28 0.31 0.27 <u>0.32</u>	< 0.02 < 0.05 < 0.02 < 0.05 0.06 0.06 0.09 0.06 <u>0.10</u> 0.10	gr 64497
Germany, 1997 (Devon) spring wheat	WS WG	st [c] 0.050		400	1 +1	0- 0- 0 0 7 7 10 10 14 21	ears remainder ears remainder ears remainder ears remainder wheat straw[46] wheat straw[46]	< 0.02 < 0.05 0.62 0.61 0.44 0.63 0.44 0.89 <u>1.4</u> 0.23	< 0.02 < 0.05 < 0.02 < 0.05 < 0.02 < 0.05 < 0.02 0.06 <u>0.12</u> 0.08	gr 65197
Switzerland, 1996 (Albis)	WG	0.050	0.013	400	1	12	wheat straw	<u>0.37</u> 0.36	<u>0.08</u> 0.08	1040/96
Switzerland, 1997 (Runal)	WG	0.050		500	1	14	wheat straw	<u>0.35</u> 0.13	<u>0.10</u> < 0.05	1040/96
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat straw	0.40 <u>0.51</u> 0.44	< <u>0.05</u> (3)	NOV-9822
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat straw	1.3 1.1 <u>1.5</u>	< <u>0.05</u> (3)	NOV-9823
UK, 1997 (Riband) winter wheat	WG	0.050	0.025	200	1	14	wheat straw	0.11 <u>0.33</u> 0.33	< <u>0.05</u> (3)	NOV-9824

[a] PHI. 0—Sample taken just before the final application.

[b] st: seed treatment at 0.60 g ai/kg seed.

[46] Wheat straw, gr 64497 and gr 65197. Reported values have been adjusted for procedural recoveries, adjustment factor = 1.44 for thiamethoxam and 1.63 for CGA 322704 .

[c] st: seed treatment at 0.63 g ai/kg seed.

[d] c: sample from control plot

Table 91 Thiamethoxam residues in wheat straw and fodder resulting from supervised seed treatment trials in France, Germany and the UK

WHEAT STRAW & FODDER	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	days [a]		thiamethoxam	CGA 322704	
France, 1996 (Filou)	WS	0.59 sowing rate: 250 kg seed/ha	125	wheat straw	< 0.05	< 0.05	OS96403/AC06
France, 1996 (Furio)	WS	0.59 sowing rate: 250 kg seed/ha	139	wheat straw	< 0.05	0.05	OS96403/SJ07
France, 1996 (Soissons)	WS	0.59 sowing rate: 200 kg seed/ha	153 223	whole plant wheat straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97402/AC98
France, 1996 (Trémie)	WS	0.58 sowing rate: 60 kg seed/ha	178 270	whole plant wheat straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97402/KJ02
France, 1997 (Florence Aurore)	WS	0.61 sowing rate: 150 kg seed/ha	46 67 76 130	whole plant whole plant whole plant wheat straw	< 0.04 < 0.04 < 0.04 < 0.04	< 0.04 < 0.04 < 0.04 < 0.04	9741301
France, 1997 (Florence Aurore) spring wheat	WS	0.63 sowing rate: 220 kg seed/ha	82 146	whole plant wheat straw	< 0.04 < 0.04	< 0.04 < 0.04	9741002
France, 1997 (Florence Aurore) spring wheat	FS	0.59 sowing rate: 80.5 kg seed/ha also contains fludioxonil, difenoconazole and tefluthrin	65 91 156	whole plant whole plant wheat straw	< 0.02 < 0.02 < 0.05	< 0.02 < 0.02 < 0.05	9840502
France, 1997 (Prinqual) spring wheat	WS	0.63 sowing rate: 180 kg seed/ha	75 147	whole plant wheat straw	0.02 < 0.04	0.02 < 0.04	9741001
France, 1997 (Prinqual) spring wheat	WS	0.61 sowing rate: 250 kg seed/ha	77 133	whole plant wheat straw	0.02 < 0.04	0.02 < 0.04	9741003
France, 1997 (Scipion) winter wheat	FS	0.61 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	223	wheat straw	< 0.05	< 0.05	9840404
France, 1997 (Sidéral)	WS	0.60 sowing rate: 160 kg seed/ha	96 173	whole plant wheat straw	< 0.04 < 0.04	< 0.04 < 0.04	OS97402/LD01
France, 1997 (Sidéral) winter wheat	FS	0.59 sowing rate: 80.5 kg seed/ha also contains fludioxonil and difenoconazole	251	wheat straw	< 0.05	< 0.05	9840302
France, 1997 (Sidéral) winter wheat	FS	0.61 sowing rate: 80.5 kg seed/ha also contains fludioxonil, difenoconazole and tefluthrin	251	wheat straw	< 0.05	< 0.05	9840402
France, 1997 (Soissons) winter wheat	FS	0.61 sowing rate: 200 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	217	wheat straw	< 0.05	< 0.05	9840403
France, 1997 (Vivant) winter wheat	FS	0.58 sowing rate: 67 kg seed/ha also contains fludioxonil and difenoconazole	276	wheat straw	< 0.05	< 0.05	9840301

WHEAT STRAW & FODDER	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	days [a]		thiamethoxam	CGA 322704	
France, 1997 (Vivant) winter wheat	FS	0.59 sowing rate: 67 kg seed/ha also contains fludioxonil, difenoconazole and tefluthrin	276	wheat straw	< 0.05	< 0.05	9840401
France, 1998 (Florence Aurore) spring wheat	FS	0.57 sowing rate: 230 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	64 192 147	whole plant whole plant wheat straw	< 0.02 < 0.02 < 0.05	< 0.02 < 0.02 < 0.05	9840503
France, 1998 (Florence Aurore) spring wheat	FS	0.57 sowing rate: 230 kg seed/ha also contains fludioxonil, difenoconazole	147	wheat straw	< 0.05	< 0.05	9840603
France, 1998 (Furio) spring wheat	FS	0.58 sowing rate: 140 kg seed/ha also contains fludioxonil, difenoconazole and tefluthrin	71 92 153	whole plant whole plant wheat straw	< 0.02 < 0.02 < 0.05	< 0.02 < 0.02 < 0.05	9840501
France, 1998 (Furio) spring wheat	FS	0.58 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	60 101 145	whole plant whole plant wheat straw	< 0.02 < 0.02 c 0.04 < 0.05	0.02 < 0.02 < 0.05	9840504
France, 1998 (Furio) spring wheat	FS	0.56 sowing rate: 140 kg seed/ha also contains fludioxonil and difenoconazole	151	wheat straw	< 0.05	< 0.05	9840601
France, 1998 (Furio) spring wheat	FS	0.56 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole	145	wheat straw	< 0.05	< 0.05	9840604
France, 1998 (Orqual)	FS	0.61 sowing rate: 250 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	237	wheat straw	< 0.05 (2)	< 0.05 (2)	9940303
France, 1998 (Orqual)	FS	0.60 sowing rate: 250 kg seed/ha also contains fludioxonil, difenoconazole	238	wheat straw	< 0.05 (2)	< 0.05 (2)	9940401
France, 1998 (Prinqual) spring wheat	FS	0.56 sowing rate: 61 kg seed/ha also contains fludioxonil and difenoconazole	156	wheat straw	< 0.05	< 0.05	9840602
France, 1998 (Ritmo)	FS	0.62 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	262	wheat straw	< 0.05 (2)	< 0.05 (2)	9940301
France, 1998 (Ritmo) soft winter wheat	FS	0.62 sowing rate: 180 kg seed/ha also contains fludioxonil	262	wheat straw	< 0.05 (2)	< 0.05 (2)	9940201
France, 1998 (Sideral)	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	242 242	wheat straw	< 0.05 (2)	< 0.05 (2)	9940304
France, 1998 (Sideral)	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil, difenoconazole	242	wheat straw	< 0.05 (2)	< 0.05 (2)	9940402
France, 1998 (Sideral) soft winter wheat	FS	0.61 sowing rate: 170 kg seed/ha also contains fludioxonil	242	wheat straw	< 0.05 (2)	< 0.05 (2)	9940202

WHEAT STRAW & FODDER	Application		PHI	Commodity	Residue, mg/kg [b]		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	days [a]		thiamethoxam	CGA 322704	
France, 1998 (Vivant)	FS	0.61 sowing rate: 180 kg seed/ha also contains fludioxonil, difenoconazole, tefluthrin	261	wheat straw	< 0.05 (2)	< 0.05 (2)	9940302
Germany, 1996 (Hanno) spring wheat	WS	0.63 sowing rate 185 kg seed/ha	127	wheat straw	< 0.05	< 0.05	gr 61496
Germany, 1997 (Hanno) spring wheat	WS	0.64 sowing rate 180 kg seed/ha	49 70 79 136	whole plant whole plant whole plant wheat straw	0.05 < 0.05 < 0.05 < 0.05	< 0.05 < 0.05 < 0.05 < 0.05	gr 68197
UK, 1996 (Hunter) winter wheat	WS	0.58	298	straw	< 0.05 (3)	< 0.05 (3)	NOV-9821

[a] Interval between sowing and sampling.

[b] c: sample from control plot.

Table 92 Thiamethoxam residues in rice straw resulting from supervised trials in Japan

RICE STRAW	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha [d]	kg ai/hL	water (L/ha)	no.	days		thiamethoxam	CGA 322704	[c]
Japan, 2008 (Yumemizuho)	GR SC	[a,] [b]	0.0065	150	1 +2	7 14 21 28 35 42	straw	0.31 0.22 0.13 0.08 0.04 0.04	0.03 0.02 0.02 < 0.02 < 0.02 < 0.02	26-Jun-2009
Japan, 2008 (Hinchikari)	GR SC	[a] [b]	0.0065	150	1 +2	7 14 21 28 35 42	straw	0.22 0.08 0.06 0.04 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	26-Jun-2009

[a] Seed box treatment with granules (thiamethoxam 80 g/kg, also contains pyroquilon) at 50 g product per box.

[b] Reverse decline trial. Plots were sprayed on separate occasions with sampling all on the same day.

[c] No study numbers or report numbers appeared on the documents of the trials in Japan, so they are identified by date.

Table 93 Thiamethoxam residues in sugar beet leaves and tops resulting from supervised trials in France, Germany, Netherlands, Spain, Sweden, Switzerland and the UK

SUGAR BEET LEAVES AND TOPS	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha seed treatment	days		thiamethoxam	CGA 322704	
France, 1996 (Gabriella)	WS	0.18 (87 g ai per 100,000 seeds, 210,000 seed per hectare)	128	Leaves + tops	< 0.02 (2)	< 0.02 (2)	OS96407 AC10
France, 1996 (Gabriella)	WS	0.14 (87.1 g ai per 100,000 seeds, 157,000 seeds per hectare)	182	Leaves + tops	< 0.02	< 0.02	OS96407/DE02

SUGAR BEET LEAVES AND TOPS	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha seed treatment	days		thiamethoxam	CGA 322704	
France, 1996 (Gabriella)	WS	0.087 (87.1 g ai per 100,000 seeds, 100,000 seeds per hectare)	183	Leaves + tops	< 0.02	< 0.02	OS96407/KJ90
France, 1997 (Anik)	WS	0.051 (46 g ai per 100,000 seeds, 110,000 seed per hectare)	161	Leaves + tops	< 0.02	< 0.02	9740602
France, 1997 (Elisa)	WS	0.078 (59.8 g ai per 100,000 seeds, 130,000 seeds per hectare)	178	Leaves + tops	< 0.02	< 0.02	9740601
France, 1997 (Elisa)	WS	0.077 note[47] (60 g ai per 100,000 seeds, 4.25 kg seed per hectare)	162	Leaves + tops	< 0.02 (2)	< 0.02 (2)	9740603
Germany, 1997 (Patricia)	WS	0.10 (60 g ai per 100,000 seeds, 167,000 seeds per hectare)	71 113 161	whole plant crowns + leaves crowns + leaves	< 0.02 < 0.02 < 0.02	0.02 < 0.02 < 0.02	gr 78297
Germany, 1997 (Patricia)	WS	0.060 (60 g ai per 100,000 seeds, 100,000 seeds per hectare)	79 128 161	whole plant crowns + leaves crowns + leaves	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	gr 79497
Germany, 1998 (Patricia)	WS	0.072 (60 g ai per 100,000 seeds, 120,000 seeds per hectare)	69 83 118	whole plant crowns+leaves crowns+leaves	< 0.02 < 0.02 < 0.02	0.02 < 0.02 < 0.02	gr 67298
Netherlands, 1998 (Nicola)	WS	0.060 (60 g ai per 100,000 seeds, 100,000 seeds per hectare)	130	leaves	< 0.02 (2)	< 0.02 (2)	1046/98
Spain, 1997 (Gabriela)	WS	0.053 (64 g ai per 100,000 seeds, 83,000 seeds per hectare)	185	leaves	< 0.02 (2)	< 0.02 (2)	1048/97
Sweden, 1998 (Patricia)	WS	0.072 (60 g ai per 100,000 seeds, 120,000 seeds per hectare)	54 70 95	whole plant crowns + leaves crowns + leaves	0.04 < 0.02 < 0.02	0.03 < 0.02 < 0.02	gr 69098
Switzerland, 1995 (KWS)	WS	0.09 (90 g ai per 100,000 seeds 100,000 seeds per hectare)	178	leaves	< 0.02 (2)		1051/95
UK, 1998 (Nicola)	WS	 (60 g ai per 100,000 seeds, sowing rate not available	119	leaves	< 0.02 (2)	< 0.02 (2)	1006/98

Table 94 Thiamethoxam residues in rape seed forage and fodder resulting from supervised trials in France, Germany, Sweden and the UK

OILSEED RAPE FORAGE AND FODDER	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1996 (Goeland)	FS	4.4 sowing rate: 3 kg seed/ha FS includes fludioxonil and metalaxyl-M	162	whole plant	< 0.05	< 0.05	1178/97

[47] Sugar beet. 9740603. Assume 33 g per 1000 seeds. (Smith, 1998, gr 78927).

OILSEED RAPE FORAGE AND FODDER	Application		PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	g ai per kg seed seed treatment	Days [a]		thiamethoxam	CGA 322704	
France, 1997 (Bristol)	FS	4.4 sowing rate: 4 kg seed/ha FS includes fludioxonil and metalaxyl-M	176	whole plant	< 0.05	< 0.05	1179/97
France, 1997 (Navajo)	FS	4.2 sowing rate: 1.5 kg seed/ha FS includes fludioxonil and metalaxyl-M	184	whole plant	< 0.05	< 0.05	1176/97
France, 1997 (Navajo)	FS	4.2 sowing rate: 2.8 kg seed/ha FS includes fludioxonil and metalaxyl-M	173	whole plant	< 0.05	< 0.05	1177/97
Germany, 1997 (Evita) spring oil seed rape	WS	5.1 sowing rate: 3.5 kg seed/ha	55 138	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 73297
Germany, 1997 (Evita) spring oil seed rape	WS	5.1 sowing rate: 4.5 kg seed/ha	61 144	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 72197
Germany, 1998 (Evita) spring oilseed rape	FS	4.3 sowing rate: 5.0 kg seed/ha FS includes fludioxonil and metalaxyl-M	56 133	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 71199
Germany, 1998 (Laser) winter oilseed rape	FS	4.2 sowing rate: 3.5 kg seed/ha FS includes fludioxonil and metalaxyl-M	217 330	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 61299
Germany, 1998 (Laser) winter oilseed rape	FS	4.2 sowing rate: 7.0 kg seed/ha FS includes fludioxonil and metalaxyl-M	219 319	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 62499
Germany, 1998 (Licosmos) spring oilseed rape	FS	4.2 sowing rate: 10 kg seed/ha FS includes fludioxonil and metalaxyl-M	51 124	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 65498
Germany, 1998 (Licosmos) spring oilseed rape	FS	4.2 sowing rate: 6 kg seed/ha FS includes fludioxonil and metalaxyl-M	46 130	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 66298
Sweden, 1998 (Sponsor) spring oilseed rape	FS	4.1 sowing rate: 10 kg seed/ha FS includes fludioxonil and metalaxyl-M	34 145	whole plant straw	< 0.05 < 0.05	< 0.05 < 0.05	gr 68098
UK, 1997 (Apex)	FS	3.8 FS includes fludioxonil and metalaxyl-M	177	whole plant	< 0.05 (3)	< 0.05 (3)	1025/98
UK, 1997 (Apex)	FS	3.8 FS includes fludioxonil and metalaxyl-M	176	whole plant	< 0.05 (3)	< 0.05 (3)	1026/98

[a] Interval between sowing and sampling.

Table 95 Thiamethoxam residues in cotton gin by-products resulting from supervised trials in the USA. Replicate values arise from replicate field samples

COTTON	Application				PHI	Commodity	Residue, mg/kg [b,c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.05	190	1 + 2 14d	22	gin trash	0.91 1.1	0.01 0.01	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.15	190	1 + 2 14d	22	gin trash	2.4 3.9	0.03 0.05	34-97 02-1R-038-97
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.25	190	1 + 2 14d	22	gin trash	5.3 5.1	0.08 < 0.01	34-97 02-1R-038-97
USA (MS) 1997 (DPL 50)	FS + WG	3 g ai/kg seed 0.05	130	1 + 2 14d	20	gin trash	0.07 0.07 c < 0.01	0.03 0.09 c 0.03	34-97 03-1R-002-97
USA (NM) 1997 (HS-200)	FS + WG	3 g ai/kg seed 0.05	56	1 + 2 14d	28	gin trash	0.34 0.37 c < 0.01	< 0.01 (2) c 0.01	34-97 0S-1R-724-97
USA (OK) 1997 (Paymaster 330)	FS + WG	3 g ai/kg seed 0.05	150	1 + 2 14d	21	gin trash	0.09 0.10	< 0.01 (2)	34-97 0S-1R-723-97
USA (TX) 1997 (DPL 50)	FS + WG	3 g ai/kg seed 0.05	120	1 + 2 16d	25	gin trash	0.49 0.50	0.01 0.01	34-97 0S-1R-204-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	84	1 + 2 14d	21	gin trash	0.13 0.10	< 0.01 (2)	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.15	84	1 + 2 14d	21	gin trash	0.72 0.80	0.03 0.04	34-97 0S-1R-308-97
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.25	84	1 + 2 14d	21	gin trash	1.0 1.2	0.05 0.08	34-97 0S-1R-308-97
USA (CA) 1998 (Acala Maxxa)	FS WG	3 g ai/kg seed 0.032	190	2 (5d)	21	gin trash	0.92 0.92	0.01 < 0.01	132-98 02-IR-022-98/CA
USA (CA) 1998 (Acala Maxxa)	WG	0.045	190	2 (5d)	21	gin trash	3.5 6.7	0.04 0.06	132-98 02-IR-022-98/CA
USA (CA) 1998 (Acala Maxxa)	WG	0.225	190	2 (5d)	21	gin trash	12 12	0.15 0.13	132-98 02-IR-022-98/CA
USA (MS) 1998 (DP 50)	FS WG	3 g ai/kg seed 0.032	19	2 (5d)	20	gin trash	0.24 0.28	< 0.01 0.01	132-98 03-IR-001-98/MS
USA (MS) 1998 (DP 50)	WG	0.045	19	2 (5d)	20	gin trash	0.28 0.31	0.01 0.02	132-98 03-IR-001-98/MS
USA (TX) 1998 (DP 50)	FS WG	3 g ai/kg seed 0.032	120	2 (5d)	20	gin trash	0.36 0.33	< 0.01 (2)	132-98 0S-IR-203-98/TX
USA (TX) 1998 (DP 50)	WG	0.045	120	2 (5d)	20	gin trash	0.20 0.17	0.02 0.02	132-98 0S-IR-203-98/TX

COTTON	Application				PHI	Commodity	Residue, mg/kg [b,c]		Ref
Country, year (variety)	Form	kg ai/ha [a]	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (TX) 1998 (DPL 5557)	FS WG	3 g ai/kg seed 0.032	94	2 (5d)	21	gin trash	0.14 0.23	< 0.01 0.01	132-98 0S-IR-306-98/TX
USA (TX) 1998 (DPL 5557)	WG	0.045	94	2 (5d)	21	gin trash	0.24 0.23	0.03 0.02	132-98 0S-IR-306-98/TX
USA (TX) 1998 (DPL 5557)	WG	0.225	94	2 (5d)	21	gin trash	1.8 1.9	0.14 0.13	132-98 0S-IR-306-98/TX
USA (OK) 1998 (PM 183)	FS WG	3 g ai/kg seed 0.032	140	2 (5d)	24	gin trash	0.19 0.19	< 0.01 (2)	132-98 0S-IR-724-98/OK
USA (OK) 1998 (PM 183)	WG	0.045	140	2 (5d)	24	gin trash	0.32 0.06	< 0.01 (2)	132-98 0S-IR-724-98/OK

[a]Study 132-98. The nominal seed treatment rate, 3 g ai/kg seed, is recorded in the table. Measured concentrations of thiamethoxam on the treated seed ranged from 2.26% to 3.04%, mean 2.66%, SD 0.22%, n = 20.

[b] In study 34-97, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

[c] In study 132-98, the reported residues had been adjusted for procedural recoveries.

Thiamethoxam may be used as a soil-surface application during the production of hops. A use pattern with SL formulation applied at 0.14 kg ai/ha with harvest 7 weeks later was examined in the supervised trials in the USA on hops (Starner, 2006, 08451).

Table 96 Thiamethoxam residues in hops resulting from supervised trials in the USA. Replicate values arise from replicate field samples

HOPS	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	For m	kg ai/ha [a]	water (L/ha)	no.	days		thiamethoxam	CGA 322704	
USA (ID), 2002 (Nugget)	SL	0.14	270	1	64	dry cones	0.027	0.025	08451. 02-ID09
USA (OR), 2002 (Nugget)	SL	0.14	420	1	66	dry cones	< 0.025	< 0.025	08451. 02-OR21
USA (WA), 2002 (Nugget)	SL	0.13	370	1	62	dry cones	0.055 0.055	0.028 0.027	08451. 02-WA30

[a] Soil surface application.

Thiamethoxam may be used as a foliar spray during the production of tea. In tea trials in Japan (Table 97), residue data were provided in reverse decline trials, i.e. plots were sprayed at selected time intervals and the tea leaf samples were all harvested on the same day.

Immediately after harvest, the leaves were processed with an in-house tea processing machine and then enclosed in aluminium bags for delivery to the laboratory.

The tea was processed in accordance with the standard tea manufacturing method using specialised equipment. Black tea is produced by first a withering process designed to remove as much moisture as possible from the tea, to prepare it for oxidation and drying. Usually, the tea leaves are spread on a wire mesh tray, and dried by hot air blowers. At this point, the leaf has become limp and turned into a darker shade of green. Next, the roller process twists and turns the leaf and breaks it, which releases the enzymes from the leaf and exposes the tissues to oxidation. After being spread on large trays, the leaf is allowed to oxidise by exposing it to air. As the leaf oxidizes, it generates heat, and slowly changes in colour from green to red to brown to eventually black

Tea infusions were prepared by adding 500 mL of boiling water to 5 g intact crude processed tea leaves and allowing to stand for 5 minutes (Nakanishi, and Iwatani, 1998, 1763). The infusion was filtered and an aliquot was analysed for residues. Residue levels were expressed on the weight of tea leaves to prepare the infusion, allowing calculation of the rate of infusion (% of residue extracted into the boiling water).

Table 97 Thiamethoxam residues in tea resulting from supervised trials in Japan

TEA	Application					PHI	Commodity	Residue, mg/kg		Ref[c]
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Japan, 1998 (Kyogen #129)	SG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	7.1 2.4 0.84	0.25 0.11 0.05	30-Nov-1998
Japan, 1998 (Yabukita)	SG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	2.1 1.3 0.90	0.06 0.05 0.05	30-Nov-1998
Japan, 1998 (Kyogen #129)	SG		0.005	200	1 [a]	7 14 21	tea infusion [b]	6.1 (110%) 1.7 (84%) 0.68 (94%)	0.27 (96%) 0.11 (92%) 0.06 (100%)	07-Jul-1998
Japan, 1998 (Yabukita)	SG		0.005	200	1 [a]	7 14 21	tea infusion [b]	1.5 (68%) 0.90 (74%) 0.70 (90%)	0.07 (88%) 0.06 (100%) 0.06 (100%)	07-Jul-1998
Japan, 1998 (Kyogen #129)	SG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	5.5 2.0 0.72	0.28 0.12 0.06	07-Jul-1998
Japan, 1998 (Yabukita)	SG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	2.3 1.2 0.78	0.08 0.06 0.06	07-Jul-1998
Japan, 2002 (Yabukita)	WG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	0.17 0.10 0.07	9.6 2.8 1.5	26-Dec-2002[d]
Japan, 2002 (Okumidori)	WG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	0.09 < 0.05 < 0.05	3.2 0.45 0.42	26-Dec-2002[d]
Japan, 2002 (Yabukita)	WG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	8.6 2.7 1.4	0.16 0.11 0.06	30-Jul-2002
Japan, 2002 (Okumidori)	WG		0.005	200	1 [a]	7 14 21	crude processed tea leaves	2.7 0.34 0.32	0.08 < 0.05 < 0.05	30-Jul-2002
Japan, 2002 (Yabukita)	WG		0.005	200	1 [a]	7 14 21	tea infusion [b]	8.4 (97%) 2.8 (102%) 1.22 (88%)	0.15 (94%) 0.10 (91%) 0.05 (80%)	30-Jul-2002
Japan, 2002 (Okumidori)	WG		0.005	200	1 [a]	7 14 21	tea infusion [b]	2.8 (105%) 0.45 (130%) 0.38 (120%)	0.08 (100%) < 0.05 < 0.05	30-Jul-2002

[a] Reverse decline trial. Plots were sprayed on separate occasions with sampling all on the same day.

[b] Residue level in infusion expressed on the weight of tea leaves to prepare the infusion. Calculated rate of infusion (percentage of residue extracted into the boiling water), shown in parentheses

[c] No study numbers or report numbers appeared on the documents, so they are identified by date.

[d] 26-Dec-2002. The data appear to be incorrect (data for thiamethoxam and CGA 322704 are transposed). The trials should be considered invalid until corrected and validated.

FATE OF RESIDUES IN STORAGE AND PROCESSING

In processing

The Meeting received information on the fate of thiamethoxam residues during the processing of apples to juice and pomace; barley to pearled barley, barley bran, barley flour, beer, wort, malt; coffee beans to roasted coffee; cotton seed to meal and refined oil; grapes to juice, pomace and wine; maize

to grits, flour, oil, starch; oranges to pulp, juice and oil; plums to dried prunes; potato to wet peelings, flakes and chips; tomatoes to juice, pulp, puree, paste; wheat to semolina, bran, flour and bread.

Also information was provided on hydrolysis studies of thiamethoxam to assist with identification of the nature of the residue during processing.

The data from some trials could not be used because residue levels in the raw agricultural commodity did not exceed the LOQs.

Processing factors have been calculated for thiamethoxam residues during the following processes: apples processing to juice, washed apples and wet pomace; barley processing to pearled barley, bran, flour, and beer; coffee beans to roasted coffee; cotton seed to meal and oil; grapes to pomace wine; oranges to pulp, juice and orange oil; plums to dried prunes; tomatoes to juice, paste and puree; and wheat to semolina, wheat bran, wheat bead and wheat flour. Processing factors were also calculated for CGA 322704 residues in the following processes: apples to apple juice and wet pomace; coffee beans to roasted coffee; plums to dried prunes; tomatoes to paste and puree.

Ulbrich (1998, 98UL05) measured the hydrolysis of [^{14}C-thiazol]thiamethoxam in sterile aqueous buffers at pHs and temperatures experienced during food processing and cooking. Buffers were used at a low concentration, 0.01M, to prevent possible catalytic effects. Recoveries of total ^{14}C ranged from 95–107%. Very little of the thiamethoxam was hydrolysed (Table 98). Thiamethoxam was essentially stable during the hydrolysis conditions simulating food processing conditions.

Table 98 Hydrolysis of [^{14}C-thiazol]thiamethoxam under conditions representing food processes (Ulbrich, 1998, 98UL05)

Thiamethoxam concentration	Hydrolysis conditions	Represent	% thiamethoxam remaining
5 mg/L	pH 4 90 ˚C 20 mins	pasteurisation	100%
5 mg/L	pH 5 100 ˚C60 mins	baking, brewing and boiling	100%
5 mg/L	pH 6 120 ˚C20 mins	sterilisation	98.3%

In the hydrolysis studies on thiamethoxam, Clark (1998, ABR-96106) showed that CGA 322704 is a minor product of thiamethoxam hydrolysis. Because little of the thiamethoxam was hydrolysed under simulated processing conditions and because CGA 322704 is a minor product of thiamethoxam hydrolysis, it was assumed that very little CGA 322704 should be produced during food processing. Therefore it is legitimate to calculate food processing factors for CGA 322704 residues occurring in raw agricultural commodities.

Kravets and Amos (2000, MG6178) described the processing of plums to dried prunes. Initially, a representative sample (approximately 1 kg) of plums was taken from the lot for analysis as the raw unwashed plums. The first step in the process was to clean the lot by removing leaves, twigs and extraneous material. The next step was a cold water (approx 24 ºC) dip which allowed light extraneous material to float to the top and be removed; it also removed surface dirt.

The plums were then dried in a forced air dryer (76–83 ºC) to a moisture level below 25% over 15–16 hours. The next step was storage in sweat-box conditions of 19–21 ºC for 14–15 days, which allowed moisture equilibration throughout the dried fruit. The prunes were then rehydrated to typical retail flesh moisture levels (28–32%) by immersion in hot water (82–84 ºC) until the desired moisture level was achieved. Residue data for the plums and dried prunes are summarised in Table 99.

Table 99 Thiamethoxam and CGA 322704 residues in plums and prunes from trials with thiamethoxam in the USA

PLUMS	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 2000 (French)	WG	0.096	0.0072	1400	2 11d	14	fruit unwashed prune	< 0.01 < 0.01	< 0.01 < 0.01	07674. 562-00 IR4S03300

PLUMS	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 2000 (French)	WG	0.34	0.024	1400	2 11d	14	fruit unwashed prune	0.05 0.03	0.01 0.02	07674. 562-00 IR4S03300
USA (CA), 2000 (French)	WG	0.096	0.011	930	2 9d	14	fruit unwashed prune	0.01 < 0.01	< 0.01 < 0.01	07674. 562-00 IR4S04800
USA (CA), 2000 (French)	WG	0.34	0.036	930	2 9d	14	fruit unwashed prune	0.06 0.05	0.02 0.03	07674. 562-00 IR4S04800

Table 100 Thiamethoxam residues in grapes and processed commodities resulting from supervised trials in Europe

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2006 (Muscadet)	WG	0.20		570	3 22 d 20 d	14	whole grapes must wet pomace dry pomace AF wine[48] lees sediments white wine wine, 6 months	0.10 0.07 0.13 0.44 0.07 0.12 0.08 0.07 0.07	< 0.02 < 0.02 < 0.02 0.04 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000797-06 FR-IR-06-0239 plot 3
France, 2006 (Muscadet)	Processing—replicate 2						whole grapes must AF wine white wine	0.05 0.07 0.07 0.08	< 0.02 < 0.02 < 0.02 < 0.02	T000797-06 FR-IR-06-0239 plot 3
France, 2006 (Muscadet)	Processing—replicate 3						whole grapes must AF wine white wine	0.05 0.08 0.08 0.08	< 0.02 < 0.02 < 0.02 < 0.02	T000797-06 FR-IR-06-0239 plot 3
France, 2006 (Muscadet)	Processing—replicate 4						whole grapes must AF wine white wine	0.06 0.07 0.08 0.08	< 0.02 < 0.02 < 0.02 < 0.02	T000797-06 FR-IR-06-0239 plot 3
France, 2006 (Cabernet Sauvignon)	WG	0.20		600	3 21 d 20 d	14	whole grapes must wet pomace dry pomace AF wine MLF wine[49] lees sediments red wine wine, 6 months	0.19 0.23 0.28 0.65 0.19 0.20 0.19 0.20 0.20 0.21	< 0.02 < 0.02 < 0.02 0.03 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	T000798-06 FR-IR-06-0233 plot 3
France, 2006 (Cabernet Sauvignon)	Processing—replicate 2						whole grapes must AF wine red wine	0.37 0.35 0.27 0.27	< 0.02 0.02 < 0.02 < 0.02	T000798-06 FR-IR-06-0233 plot 3
France, 2006 (Cabernet Sauvignon)	Processing—replicate 3						whole grapes must AF wine red wine	0.29 0.28 0.23 0.23	< 0.02 0.02 < 0.02 < 0.02	T000798-06 FR-IR-06-0233 plot 3

[48] AF wine: wine after alcoholic fermentation.

[49] MLF wine: wine after malolactic fermentation.

GRAPES	Application					PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	kg ai/hL	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2006 (Cabernet Sauvignon)	Processing—replicate 4						whole grapes must AF wine red wine	0.16 0.18 0.16 0.16	< 0.02 < 0.02 < 0.02 < 0.02	T000798-06 FR-IR-06-0233 plot 3

Table 101 Thiamethoxam residues in maize and processed products resulting from supervised trials with seed treatment uses in the USA

MAIZE	Application			PHI	Commodity	Residue, mg/kg [a]		Ref
country, year (variety)	Form	g ai/kg seed		days		thiamethoxam	CGA 322704	
USA (IA), 1998 (Pioneer 3394)	FS	450	seed treatment	61 173 173	forage stover grain kernels aspirated grain fractions meal large grits medium grits small grits flour refined oil, dry milling starch refined oil, wet milling	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	158-98. MW-SR-153-98
USA (IA), 1998 (Pioneer 3394)	FS	1350	seed treatment	61 173 173	forage stover grain kernels aspirated grain fractions meal large grits medium grits small grits flour refined oil, dry milling starch refined oil, wet milling	0.01 < 0.01 < 0.01 (2) < 0.01 (2) < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 (2) < 0.01 (2) < 0.01 (2) < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	158-98. MW-SR-153-98

[a] In study 158-98, the reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

Table 102 Thiamethoxam and CGA 322704 residues in oranges, apples, grapes, tomatoes, potatoes, barley, wheat, cotton and coffee and their processed commodities resulting from trials with thiamethoxam. Data on residues in the raw agricultural commodities in these trials are separately recorded in the section on supervised residue trials

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
ORANGE PROCESSING									
USA (FL), 2005 (Valencia) orange	WG	0.096	1170	2 7d	0	whole fruit dried pulp oil juice	0.04 0.13 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	T018964-04 VK-IR-05-6090

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (FL), 2005 (Valencia) orange	WG	0.48	1170	2 7d	0	whole fruit dried pulp oil juice	not analysed not analysed not analysed not analysed	0.01 0.01 0.01 0.01 c 0.01	T018964-04 VK-IR-05-6090
USA (CA), 2005 (Cutter Valencia) orange	WG	0.096	2680	2 7d	0	whole fruit dried pulp oil juice	0.02 0.04 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	T018964-04 WC-IR-05-6099
APPLE PROCESSING									
France, 1997 (Idared)	WG	0.10	1000	2 14 d	21	apples apple juice apple puree apple pomace	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	9730501
Italy, 1997 (Stark Spur Red)	WG	0.10	1200	2 14 d	21 21 21	apples juice wet pomace (35% DM)	0.02 0.02 0.03	< 0.02 < 0.02 < 0.02	1068/97
Italy, 1997 (Jonagold)	WG	0.10	1500	2 14 d	21 21 21	apples juice wet pomace (24% DM)	0.02 < 0.02 0.04	< 0.02 < 0.02 < 0.02	1067/97
USA (WA), 1996 (Red Delicious) apple	WG	0.099 + 0.049 [a]	940	2 +2	15	apples, unwashed apples, washed wet pomace apple juice	0.12 0.10 0.13 0.11	0.02 0.02 0.03 0.02	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.30 + 0.15 [a]	940	2 +2	15	apples, unwashed apples, washed wet pomace apple juice	0.23 0.15 0.44 0.24	0.02 0.01 0.03 0.02	ABR-98096 0W-IR-627-96
USA (WA), 1996 (Red Delicious) apple	WG	0.50 + 0.25 [a]	940	2 +2	15	apples, unwashed apples, washed wet pomace apple juice	0.68 0.39 0.96 0.64	0.05 0.03 0.07 0.05	ABR-98096 0W-IR-627-96
USA (NY), 1996 (McIntosh) apple	WG	0.099 + 0.049 [a]	980	2 + 2	14	apples, unwashed apples, washed wet pomace apple juice	0.05 0.04 0.08 0.01	< 0.01 < 0.01 < 0.01 < 0.005	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.30 + 0.15 [a]	980	2 + 2	14	apples, unwashed apples, washed wet pomace apple juice	0.13 0.11 0.18 0.05	< 0.01 < 0.01 0.01 < 0.005	ABR-98096 05-IR-004-96
USA (NY), 1996 (McIntosh) apple	WG	0.50 + 0.25 [a]	980	2 + 2	14	apples, unwashed apples, washed wet pomace apple juice	0.15 0.08 0.25 0.04	< 0.01 < 0.01 0.02 < 0.005	ABR-98096 05-IR-004-96
GRAPES PROCESSING									
Switzerland, 2002 (Pinot Noir)	WG	0.050	500	3 21d 20d	21	berries juice pomace wine	< 0.02 (2) < 0.01 (2) < 0.02 (2) < 0.01 (2)	< 0.02 (2) < 0.01 (2) < 0.02 (2) < 0.01 (2)	02-1006
Switzerland, 2002 (Chasselas)	WG	0.050	500	3 21d 22d	21	berries juice pomace wine	< 0.02 < 0.01 0.01 0.03 0.02 < 0.01 (2)	< 0.02 < 0.01 (2) < 0.02 (2) < 0.01 (2)	02-1007
France, 2002 (Cabernet Franc)	WG	0.050	400 + 200 + 200	3 21d 20d	22	berries juice juice pomace pomace wine wine	0.04 0.04 0.06 0.06 0.04 0.05 0.19 0.19 0.17 0.12 0.06 0.07 0.06 0.06	< 0.01 (2) < 0.01 (2) 0.02 0.02 0.02 < 0.02 < 0.01 (2) < 0.01 (2)	02-1111

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 2002 (Grenache, red)	WG	0.050	310	3 21d 21d	22 22	berries berries juice juice pomace pomace wine wine	< 0.02 (2) < 0.02 (2) 0.01 0.01 0.01 0.01 0.02 0.02 0.02 0.02 0.01 0.01 0.01 < 0.01	< 0.02 (2) < 0.02 (2) < 0.01 (2) < 0.01 (2) < 0.02 (2) < 0.02 (2) < 0.01 (2) < 0.01 (2)	02-1066
TOMATO PROCESSING									
Italy, 1997 (98063)	WG	0.10	600	2 7d	3	fruit tomato juice preserves tomato pulp	< 0.04 < 0.02 < 0.02 0.05	< < 0.02 < 0.02 < 0.02 < 0.02	1080/97
Italy, 1997 (S Marzano)	WG	0.10	1200	2 7d	3	fruit tomato juice preserves tomato pulp	0.03 0.02 < 0.02 0.03	< 0.02 < 0.02 < 0.02 0.03	1081/97
Italy, 1997 (Cuor di bue) greenhouse	WG	0.10	1000	2 7d	3	fruit fruit, peeled fruit, washed tomato juice preserves tomato pulp	0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1079/96
Spain, 1997 (Rento)	WG	0.10	2000	2 7d	3	fruit fruit, peeled fruit, washed tomato juice preserves tomato pulp	< 0.02 (2) < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 (2) < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	1169/96
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	0	fruit fruit, washed tomato puree tomato paste	0.05 0.02 0.02 0.12	0.02 0.02 0.01 0.13	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.099	230	2 5 d	7	fruit fruit, washed tomato puree tomato paste	0.04 0.02 0.02 0.05	0.04 0.02 0.04 0.08	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.30	230	2 5 d	0	fruit fruit, washed tomato puree tomato paste	0.14 0.08 0.09 0.54	0.03 0.07 0.02 0.34	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.30	230	2 5 d	7	fruit fruit, washed tomato puree tomato paste	0.16 0.12 0.24 0.47	0.09 0.10 0.31 0.52	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.49	230	2 5 d	0	fruit fruit, washed tomato puree tomato paste	0.28 0.17 0.62 1.18	0.07 0.10 0.42 0.68	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (Rio Grande) tomato	WG	0.49	230	2 5 d	7	fruit fruit, washed tomato puree tomato paste	0.23 0.12 0.43 0.90	0.13 0.14 0.46 0.78	ABR-98105 02-IR-039-97 [b]
USA (CA), 1996 (8892) tomato	WG	0.099	280	2 5 d	0	fruit, process fruit, washed tomato puree tomato paste	0.03 < 0.01 0.06 0.13	0.02 0.01 0.05 0.11	ABR-98105 0W-IR-443-96[b]
USA (CA), 1996 (8892) tomato	WG	0.099	280	2 5 d	9	fruit, process fruit, washed tomato puree tomato paste	0.02 0.01 0.05 0.12	0.04 0.03 0.07 0.15	ABR-98105 0W-IR-443-96[b]

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
USA (CA), 1996 (8892) tomato	WG	0.30	280	2 5 d	0	fruit, process fruit, washed tomato puree tomato paste	0.17 0.03 0.18 0.38	0.04 0.02 0.12 0.24	ABR-98105 0W-IR-443-96[b]
USA (CA), 1996 (8892) tomato	WG	0.30	280	2 5 d	9	fruit, process fruit, washed tomato puree tomato paste	0.23 0.12 0.21 0.46	0.16 0.09 0.19 0.38	ABR-98105 0W-IR-443-96[b]
USA (CA), 1996 (8892) tomato	WG	0.49	280	2 5 d	0	fruit, process fruit, washed tomato puree tomato paste	0.17 0.04 0.19 0.50	0.04 0.03 0.11 0.26	ABR-98105 0W-IR-443-96[b]
USA (CA), 1996 (8892) tomato	WG	0.49	280	2 5 d	9	fruit, process fruit, washed tomato puree tomato paste	0.30 0.11 0.34 0.93	0.18 0.07 0.24 0.60	ABR-98105 0W-IR-443-96[b]
POTATO PROCESSING									
USA (ID), 1998 (Ranger Russet)	WG	0.099		2 7d	14	tuber, to process wet peelings flakes chips [50]	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	159-98 0W-SR-316-98[b]
USA (ID), 1998 (Ranger Russet)	WG	0.49		2 7d	14	tuber, to process wet peelings flakes chips [50]	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	159-98 0W-SR-316-98[b]
USA (ID), 1998 (Ranger Russet)	FS	0.20 spt8		1	141	tuber, to process wet peelings flakes chips	< 0.01 < 0.01 0.02 0.01	< 0.01 < 0.01 0.01 < 0.01	159-98 0W-SR-316-98[b]
UK, 1997 (Maris Piper)	WG	0.025	500	4 10 d	7 14 7 14 	tubers tubers boiled potato peeled potato crisp French fry boiled potato peeled potato crisp French fry	< 0.02 (3) < 0.02 (3) < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 (3) < 0.02 (3) < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	NOV-9831
BARLEY PROCESSING									
USA (ID), 2002 (Eight Twelve)	WG	0.069	470	2 8 d	21	barley grain pearled barley barley bran barley flour	0.12 0.03 0.04 0.01	< 0.01 < 0.01 < 0.01 < 0.01	07746.02-ID07
France, 1998 (Esterel) winter barley	FS	0.76 sowing rate: 150 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol			262	barley grain beer wort malt	0.02 < 0.01 < 0.01 < 0.02	< 0.05 < 0.01 < 0.01 < 0.02	9940501
France, 1999 (Cork) spring barley	FS	0.74 sowing rate: 130 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol			125	barley grain beer wort malt	< 0.02 (2) < 0.01 < 0.01 < 0.02	< 0.02 (2) < 0.01 < 0.01 < 0.02	9940802

[50] Potato processing, 159-98, 0W-SR-316-98. Residues of thiamethoxam and CGA 322704 were detected in control and treatment chip samples by HPLC-UV analysis, but no residues were detected on LC-MS analysis.

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
France, 1999 (Scarlett) spring barley	FS	0.76 sowing rate: 142 kg seed/ha FS includes fludioxonil, cyprodinil, flutriafol			133	barley grain beer wort malt	< 0.02 (2) < 0.01 < 0.01 < 0.02	< \0.02 (2) < 0.01 < 0.01 < 0.02	9940801
WHEAT PROCESSING									
Germany, 1997 (Devon) spring wheat	WS WG	st [d] 0.050	 400	1 + 1	14	wheat grain semolina bran flour bread	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	gr 64497
Germany, 1997 (Devon) spring wheat	WS WG	st [d] 0.050	 400	1 + 1	14	wheat grain[51] semolina bran flour bread	0.03 < 0.02 0.03 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	gr 65197
COTTON PROCESSING									
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.05	 190	1 + 2 14d	22	cotton seed hulls meal oil, refined	0.03 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 02-1R-038-97 [b]
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.15	 190	1 + 2 14d	22	cotton seed hulls meal oil, refined	0.05 0.01 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 02-1R-038-97 [b]
USA (CA) 1997 (Acala Maxxa)	FS + WG	3 g ai/kg seed 0.25	 190	1 + 2 14d	22	cotton seed hulls meal oil, refined	0.13 0.04 0.02 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 02-1R-038-97 [b]
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.05	 84	1 + 2 14d	21	cotton seed hulls meal oil, refined	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 0S-1R-308-97 [b]
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.15	 84	1 + 2 14d	21	cotton seed hulls meal oil, refined	< 0.01 < 0.01 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 0S-1R-308-97 [b]
USA (TX) 1997 (DPL-50)	FS + WG	3 g ai/kg seed 0.25	 84	1 + 2 14d	21	cotton seed hulls meal oil, refined	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	34-97 0S-1R-308-97 [b]
USA (CA) 1998 (Acala Maxxa)	WG	0.045	190	2 (5d)	21	cotton seed hulls meal refined oil	0.11 0.03 0.03 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	132-98 02-IR-022-98/CA [c]
USA (CA) 1998 (Acala Maxxa)	WG	0.225	190	2 (5d)	21	cotton seed hulls meal refined oil	0.53 0.18 0.26 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	132-98 02-IR-022-98/CA [c]
USA (TX) 1998 (DPL 5557)	WG	0.045	94	2 (5d)	21	cotton seed hulls meal refined oil	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	132-98 0S-IR-306-98/TX [c]
USA (TX) 1998 (DPL 5557)	WG	0.225	94	2 (5d)	21	cotton seed hulls meal refined oil	0.02 0.02 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	132-98 0S-IR-306-98/TX [c]

[51] Wheat grain and bran, gr 65197. Reported values have been adjusted for procedural recoveries, adjustment factor = 1.68 for thiamethoxam.

CROP	Application				PHI	Commodity	Residue, mg/kg		Ref
Country, year (variety)	Form	kg ai/ha	water (L/ha)	no. interval	days		thiamethoxam	CGA 322704	
Greece, 1997 (Eva)	WS WG	2.7 ST 0.050	790	1 + 3 14 d	28	dehulled seed cotton hulls cotton seed oil presscake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1096/97
Greece, 1997 (Eva)	WS WG	2.6 ST 0.050	700	1 + 14 d	28	dehulled seed cotton hulls cotton seed oil presscake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1097/97
Greece, 1998 (Korina)	WG	0.050	600	3 14 d	28	dehulled seed cotton hulls crude oil presscake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1065/98
Greece, 1998 (324 Stoneville)	WG	0.050	600	3 14 d	28	dehulled seed cotton hulls crude oil presscake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1066/98
Greece, 1999 (ETH.I.AG.E-1)	WS WG	1.9 ST 0.050	500	1 + 3 13, 14 d	0 0 28	dehulled seed cotton hulls dehulled seed cotton hulls crude oil flour/cake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1134/99
Greece, 1999 (ETH.I.AG.E-1)	WS WG	1.9 ST 0.050	500	1 + 3 13, 14 d	28	dehulled seed cotton hulls crude oil flour/cake	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	< 0.02 (2) < 0.05 (2) < 0.02 (2) < 0.02 (2)	1135/99
COFFEE PROCESSING									
Brazil (MG), 2008 (Mundo Novo)	WG WG	0.30 [e] +0.50	soil drench	2 90 d	100 100	coffee beans roasted coffee	0.07 < 0.01	0.03 < 0.01	M09200 trial JJB1
Brazil (MG), 2008 (Mundo Novo)	WG	0.30 [e]	soil drench	1	190 190	coffee beans roasted coffee	0.05 < 0.01	0.03 < 0.01	M09200 trial JJB1
Brazil (MG), 2008 (Mundo Novo)	WG	0.50	soil drench	1	100 100	coffee beans roasted coffee	0.04 < 0.01	0.02 < 0.01	M09200 trial JJB1
Brazil (MG), 2008 (Mundo Novo)			control plot		(100) (100)	coffee beans roasted coffee	c 0.03 c < 0.01	c 0.02 c < 0.01	M09200 trial JJB1
Brazil (MG), 2008 (Catuai)	WG WG	0.30 [e] +0.50	soil drench	2 90 d	100 100	coffee beans roasted coffee	0.07 < 0.01	0.03 < 0.01	M09200 trial JJB2
Brazil (MG), 2008 (Catuai)	WG	0.30 [e]	soil drench	1	190 190	coffee beans roasted coffee	0.05 < 0.01	0.03 < 0.01	M09200 trial JJB2
Brazil (MG), 2008 (Catuai)	WG	0.50	soil drench	1	100 100	coffee beans roasted coffee	0.05 < 0.01	0.02 < 0.01	M09200 trial JJB2
Brazil (MG), 2008 (Catuai)			control plot		(100) (100)	coffee beans roasted coffee	c 0.04 c < 0.01	c 0.02 c < 0.01	M09200 trial JJB2
Brazil (MG), 2008 (Catuai)	WG WG	0.30 [e] +0.50	soil drench	2 90 d	100 100	coffee beans roasted coffee	0.06 < 0.01	0.03 < 0.01	M09200 trial JJB4
Brazil (MG), 2008 (Catuai)	WG	0.30 [e]	soil drench	1	190 190	coffee beans roasted coffee	0.03 < 0.01	0.02 < 0.01	M09200 trial JJB4
Brazil (MG), 2008 (Catuai)	WG	0.50	soil drench	1	100 100	coffee beans roasted coffee	0.04 < 0.01	< 0.01 < 0.01	M09200 trial JJB4
Brazil (SP), 2008 (Mundo Novo)	WG WG	0.30 [e] +0.50	soil drench	2 90 d	100 100	coffee beans roasted coffee	0.03 < 0.01	0.02 < 0.01	M09200 trial LZF
Brazil (SP), 2008 (Mundo Novo)	WG	0.30 [e]	soil drench	1	190 190	coffee beans roasted coffee	0.04 < 0.01	0.02 < 0.01	M09200 trial LZF
Brazil (SP), 2008 (Mundo Novo)	WG	0.50	soil drench	1	100 100	coffee beans roasted coffee	0.02 < 0.01	< 0.01 < 0.01	M09200 trial LZF

[a] Applied as a tank-mix with pymetrozine

[b] The reported individual residue results had been adjusted for procedural recovery where it was less than 100 % for that set of analyses.

[c] Reported residues had been adjusted for procedural recoveries.

[d] st: seed treatment at 0.63 g ai/kg seed

[e] Trial results are suspect because of significant residues in samples from the control plot

Table 103 Summary of processing factors for thiamethoxam and CGA 322704 residues. The factors are calculated from the data recorded in tables in this section. 'Less than values' (<) occur when the residue in the processed commodity is reported as less than the LOQ

Raw agricultural commodity (RAC)	Processed commodity	Calculated processing factors.	Median or best estimate
THIAMETHOXAM			
Apple	apple juice	0.20, 0.27, 0.38, 0.92, 0.94, 1.00, < 1.00, 1.04	0.93
Apple	washed apples	0.53, 0.57, 0.65, 0.80, 0.83, 0.85	0.73
Apple	wet pomace	1.08, 1.38, 1.41, 1.50, 1.60, 1.67, 1.91, 2.00	1.55
Barley	barley bran	0.33	0.33
Barley	barley flour	0.08	0.08
Barley	beer	< 0.5	inadequate
Barley	malt	< 1	inadequate
Barley	pearled barley	0.25	0.25
Barley	wort	< 0.5	inadequate
Coffee beans	roasted coffee	< 0.14, < 0.14, < 0.17, < 0.20, < 0.20, < 0.20, < 0.25, < 0.25, < 0.25, < 0.33, < 0.33, < 0.50	< 0.14
Cotton seed	cotton seed meal	0.15, 0.20, 0.27, < 0.3, 0.49	0.27
Cotton seed	cotton seed oil refined	< 0.02, < 0.08, < 0.09, < 0.20, < 0.33	< 0.02
Grapes	dry pomace	3.4, 4.4	3.9
Grapes	must	0.70, 0.95, 0.97, 1.13, 1.17, 1.21, 1.40, 1.60	1.15
Grapes	wet pomace	1.3, 1.5, 4.3	1.5
Grapes	wine	0.70, 0.73, 0.79, 1.00 , 1.05, 1.33, 1.60, 1.60,	1.0
Orange	dried pulp	2.0, 3.25	2.6
Orange	orange juice	< 0.25, < 0.5	< 0.25
Orange	orange oil	< 0.25, < 0.5	< 0.25
Plum	dried prunes	0.60, 0.83, < 1.0	0.83
Tomato	tomato juice	0.67, < 1.0	0.67
Tomato	tomato paste	1.25, 2.00, 2.24, 2.40, 2.94, 2.94, 3.10, 3.86, 3.91, 4.21, 4.33, 6.00	3.0
Tomato	tomato pulp	1.0, 1.0	1.0
Tomato	tomato puree	0.40, 0.50, 0.64, 0.91, 1.06, 1.12, 1.13, 1.50, 1.87, 2.00, 2.21, 2.50	1.1
Tomato	washed tomatoes	0.18, 0.24, 0.37, 0.40, 0.50, 0.50, 0.52, 0.52, 0.57, 0.61, 0.75, < 0.33< 1.00,	0.50
Wheat	semolina	< 0.7	< 0.7
Wheat	wheat bran	1	1
Wheat	wheat bread	< 0.7	< 0.7
Wheat	wheat flour	< 0.7	< 0.7
CGA 322704			
Apple	apple juice	1.0, 1.0, 1.0-	1.0
Apple	washed apples	0.5, 0.6, 1.0	0.6
Apple	wet pomace	1.4, 1,5, 1.5	1.5
Coffee beans	roasted coffee	< 0.33, < 0.33, < 0.33, < 0.33, < 0.33, < 0.50, < 0.50, < 0.50, < 0.50, < 0.50	< 0.3
Plum	dried prunes	1.5, 2.0	1.75
Tomato	tomato paste	2.00, 2.38, 3.33, 3.75, 5.50, 5.78, 6.0, 6.0, 6.5, 6.5, 9.7, 11.3	5.9
Tomato	tomato puree	0.50, 0.67, 1.0, 1.19, 1.33, 1.75, 2.50, 2.75, 3.0, 3.44, 3.54, 6.0,	2.1
Tomato	washed tomatoes	0.39, 0.50, 0.50, 0.50, 0.56, 0.75, 0.75, 1.00, 1.08, 1.11, 1.43, 2.33,	0.75

RESIDUES IN ANIMAL COMMODITIES

Livestock feeding studies

The meeting received a lactating dairy cow feeding study, which provided information on likely residues resulting in animal tissues and milk from thiamethoxam residues in the animal diet.

Lactating dairy cows

Groups of three lactating Holstein dairy cows (animals weighing 500–538 kg and 492–558 kg on days 1 and 29 respectively) were dosed once daily via gelatin capsule with thiamethoxam at 2 ppm (1×), 6 pm (3×) and 20 ppm (10×) in the dry-weight diet, equivalent to doses of 0.079, 0.24 and 0.81 mg thiamethoxam per kg body weight, for 28–30 consecutive days (Campbell, 1998, ABR-98052). Milk was collected on seven occasions for analysis (days 0, 1, 3, 7, 14, 21 and 26), as a composite of AM and PM milking for the day for each animal. On days 29 and 30, the animals were slaughtered for tissue collection. Animals were slaughtered within 20–24 hours of the final dose. Tissues collected for analysis were liver, kidney, perirenal fat, omental fat, round muscle, and tenderloin muscle. Animals consumed approximately 20 kg dry feed each per day and produced approximately 17–33 kg milk per animal per day.

Parent thiamethoxam residues did not occur above LOQ in liver or fat tissues for the highest test dose (Table 104). Metabolite CGA 322704 did not occur above LOQ (0.01 mg/kg) in any of the tissues except liver.

Parent thiamethoxam residues were higher in muscle than in other tissues, but levels were below LOQ (0.01 mg/kg) at the 2 ppm dosing level.

Residue levels of parent thiamethoxam and metabolite CGA 322704 apparently reached plateau levels in milk about 3–5 days after the commencement of dosing.

Lin and Oakes (2002, ABR-98052-Am1) used a microwave extraction procedure on liver, which was found to release residues of metabolite CGA 322704. The microwave procedure is summarised in this evaluation under analytical methods (Lin, 2002, 206-97).

Table 104 Residues in milk and tissues of lactating Holstein dairy cows (3 per group) dosed once daily via gelatin capsule with thiamethoxam at the equivalent of 2 ppm (1×), 6 ppm (3×) and 20 ppm (10×) in the dry-weight diet, for 28–30 consecutive days (Campbell, 1998, ABR-98052)

Substrate	Residues, mg/kg—individual animals					
	Dosing, 2 ppm		Dosing, 6 ppm		Dosing, 20 ppm	
	thiamethoxam	CGA 322704	thiamethoxam	CGA 322704	thiamethoxam	CGA 322704
Tenderloin muscle	< 0.01 (3)	< 0.01 (3)	0.01 0.01 < 0.01	< 0.01 (3)	0.02 0.04 0.03	< 0.01 (3)
Round muscle	< 0.01 (3)	< 0.01 (3)	< 0.01 0.01 < 0.01	< 0.01 (3)	0.03 0.06 0.03	< 0.01 (3)
Liver	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)
Liver Note [a]	< 0.01 (3)	0.040 0.049 0.028	< 0.01 (3)	0.14 0.090 0.13	< 0.01 (3)	0.13 0.30 0.38
Kidney	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)	< 0.01 (3)	0.01 0.04 0.03	< 0.01 (3)
Omental fat					< 0.01 (3)	< 0.01 (3)
Perirenal fat					< 0.01 (3)	< 0.01 (3)
Milk, day 0	< 0.005 (3)	< 0.005 (3)	< 0.005 (3)	< 0.005 (3)	< 0.005 (3)	< 0.005 (3)
Milk, day 1	0.006 0.009 0.009	< 0.005 0.005 < 0.005	0.03 0.03 0.02	0.01 0.009 < 0.005	0.08 0.13 0.09	0.03 0.04 0.03
Milk, day 3	< 0.005 0.007 0.008	< 0.005 (3)	0.04 0.05 0.03	0.02 0.02 0.005	0.10 0.15 0.10	0.03 0.06 0.04
Milk, day 7	0.007 0.01 0.008	< 0.005 0.006 < 0.005	0.02 0.04 0.02	0.01 0.01 0.006	0.13 0.17 0.09	0.05 0.07 0.03
Milk, day 14	0.008 0.007 0.007	< 0.005 (3)	0.04 0.03 0.03	0.02 0.02 0.007	0.10 0.17 0.10	0.03 0.06 0.04
Milk, day 21	0.007 0.007 0.007	< 0.005 (3)	0.03 0.04 0.04	0.01 0.02 0.007	0.14 0.12 0.11	0.04 0.05 0.04

Substrate	Residues, mg/kg—individual animals					
	Dosing, 2 ppm		Dosing, 6 ppm		Dosing, 20 ppm	
	thiamethoxam	CGA 322704	thiamethoxam	CGA 322704	thiamethoxam	CGA 322704
Milk, day 26	0.007 0.008 0.007	< 0.005 (3)	0.04 0.05 0.04	0.02 0.02 0.009	0.07 0.12 0.19	0.02 0.05 0.03

[a] Residues in liver measured after microwave extraction (Lin and Oakes, 2002, ABR-98052-Am1).

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

No information was available.

NATIONAL RESIDUE DEFINITIONS

The following national residue definitions for thiamethoxam were available to the Meeting.

Australia

Commodities of plant origin: *thiamethoxam*.

Commodities of animal origin: Sum of thiamethoxam and N-(2-chloro-thiazol-5-ylmethyl)-N'-methyl-N'-nitro-guanidine, expressed as thiamethoxam. (FSANZ, 2010).

Canada

3-[(2-chloro-5-thiazolyl)methyl]tetrahydro-5-methyl-N-nitro-4H-1,3,5-oxadiazin-4-imine, including the metabolite (E)-N-[(2-chloro-5-thiazolyl)methyl]-N'-methyl-N''-nitroguanidine. (Canada, 2010).

Brazil

Thiamethoxam: sum of thiamethoxam and clothianidin expressed as *thiamethoxam*.

EU

Thiamethoxam (enforcement and risk assessment, plants and animals): sum of thiamethoxam and clothianidin expressed as *thiamethoxam*.

Japan

Thiamethoxam: (for crops for which both a pesticide containing thiamethoxam as active ingredient and the other containing clothianidin are registered for use, there is a specific residue definition established for clothianidin, taking into consideration these pesticides may be used on the crops in the same lot.

Clothianidin: sum of clothianidin arising from the use of pesticide(s) containing clothianidin and clothianidin arising from the use of pesticide(s) containing thiamethoxam).

New Zealand

Thiamethoxam

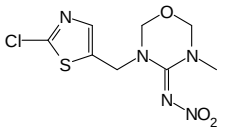
USA

Thiamethoxam: combined residues of thiamethoxam and its metabolite calculated as parent equivalents.

APPRAISAL

Residue and analytical aspects of thiamethoxam were considered for the first time by the present meeting.

Thiamethoxam (ISO common name), a nicotinoid compound, has broad spectrum activity against sucking and chewing insects in vegetables, ornamentals, field crops, deciduous fruits, citrus, cotton and rice. It possesses contact and stomach activity. Its activity against foliar feeding insects after seed treatment, after application to the soil, through irrigation systems, or when applied to the trunks of trees, results from its systemic properties. It is also registered for direct foliar application.



The IUPAC name for thiamethoxam is (EZ)-3-(2-chloro-1,3-thiazol-5-ylmethyl)-5-methyl-1,3,5-oxadiazinan-4-ylidene(nitro)amine and the CA name is 3-[(2-chloro-5-thiazolyl)methyl]tetrahydro-5-methyl-N-nitro-4*H*-1,3,5-oxadiazin-4-imine.

Thiamethoxam labelled either in the 2-position of the thiazole moiety or on the carbon of the guanidine moiety (4-oxadiazine label) was used in the metabolism and environmental fate studies.

Animal metabolism

Information was available on metabolism of thiamethoxam in laboratory animals, lactating goats and laying hens.

When rats were orally dosed with labelled thiamethoxam, 70–80% of the dose was eliminated in the urine as parent thiamethoxam. The main metabolite in urine was CGA 322704 (*N*-(2-chlorothiazol-5-ylmethyl)-*N*'-methyl-*N*''-nitroguanidine) accounting for approximately 10% of the dose. Numerous low-level metabolites were identified. Metabolism in laboratory animals was summarised and evaluated by the WHO panel of the JMPR in 2010.

When lactating goats were orally dosed with labelled thiamethoxam, approximately 1% of the dose appeared in the milk and 3–4% in the tissues.

Metabolite CGA 322704 was the major component (44% and 45%) of the residue in milk, while parent thiamethoxam was the major component in goat fat (36% and 52%), muscle (51% and 54%) and kidneys (21% and 22%).

Products of further metabolism occurred in the goat liver. NOA 421276 (N-(2-chlorothiazol-5-ylmethyl)-guanidine), NOA 421275 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-guanidine), L14 (2-oxopropionic acid [3-(2-chloro-thiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidene]-hydrazide) and NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) were metabolites found at levels exceeding 10% TRR in the liver. Parent thiamethoxam and CGA 322704 were present in liver tissue at approximately 1% and 6–7% of TRR respectively.

When laying hens were dosed with labelled thiamethoxam, most of the dose was excreted in the droppings. Eggs accounted for approximately 0.1% of the administered dose and tissues approximately 1–1.5%.

Parent thiamethoxam was not the major component of the residue in any hen tissue or eggs, but did constitute approximately 21% TRR in lean meat, 5–15% in fat + skin, 2–5% in egg white and 11% in egg yolks.

Metabolite CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) was the major residue component in the eggs, both whites (45% and 47%) and yolks (69% and 54%), and also in fat + skin (54% and 57%). Metabolite CGA 322704 was the major residue component in hen liver (34% and 39%) while metabolite MU3 (amino-([(2-chlorothiazol-5-ylmethyl)-amino]-methylene)-hydrazide) was the major component of the lean meat residue (39% and 28%).

Other metabolites present at more than 10% TRR were: NOA 421275 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-guanidine) in lean meat, MU3 in hen liver, CGA 322704 and NOA 404617 (1-(2-chloro-thiazol-5-ylmethyl)-3-nitrourea) in egg white and CGA 322704 in egg yolk.

Animal metabolism summary

When animals were orally dosed with labelled thiamethoxam, the ^{14}C was readily excreted in urine and faeces and an array of metabolites was produced.

In lactating goats, metabolite CGA 322704 was the major component of the residue in milk, while parent thiamethoxam was the major component in muscle, fat and kidney. Further degraded metabolites occurred in the liver. Metabolite NOA 421276 was the major identified component of the residue in goat liver.

In laying hens, parent thiamethoxam was not the major component of the residue in any tissue or eggs, but did constitute approximately 21% of the ^{14}C in lean meat. Metabolite CGA 265307 was the major residue component in the eggs and in fat + skin. Metabolite CGA 322704 was the major residue component in liver while metabolite MU3 was the major component of the lean meat residue.

Plant metabolism

Information was available on the metabolism of thiamethoxam in maize, rice, pears, cucumbers, lettuce and potatoes.

When maize seeds treated with [^{14}C-oxadiazin]thiamethoxam were sown and grown through to maturity, ^{14}C residues were detected in whole tops (day 33 after sowing), forage (day 124) and grain and fodder (maturity, day 166). The TRR level of 18 mg/kg in the whole tops with 40% TRR identified as thiamethoxam demonstrated that thiamethoxam is readily taken up and translocated. Parent thiamethoxam was the major identified component of the residues in whole tops and maize grain. Metabolite NOA 421275 (*N*-(2-chlorothiazol-5-ylmethyl)-*N'*-methyl-guanidine) was the major identified component of the forage and fodder. Metabolite CGA 322704 constituted approximately 10% TRR in forage and grain.

In the companion maize seed metabolism study, maize seeds treated with [^{14}C-thiazolyl]thiamethoxam were sown and grown through to maturity. ^{14}C residues were detected in tops (day 33 after sowing), forage (day 124) and grain and fodder (maturity, day 166). Parent thiamethoxam was the major component of residues in the tops (47% TRR). Metabolites appearing as 10% or more of TRR were: NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) in tops, CGA 322704 and NOA 421275 in forage and NOA 421275 in fodder. In the grain, 65% of TRR was unextracted; thiamethoxam and CGA 322704 were the only identified residue components.

In a soil treatment maize experiment, [^{14}C-oxadiazin]thiamethoxam was applied to the soil around maize plants at the 2 leaf stage. Parent thiamethoxam and CGA 322704 were the major identified components of the residues in 89 days forage and grain. Metabolite 1-methyl-3-nitroguanidine at approximately 10% TRR was the major identified component of the fodder.

The companion soil treatment study with [^{14}C-thiazolyl]thiamethoxam again found that thiamethoxam and CGA 322704 were the major identified components in the forage and grain. NOA 421275 at approximately 10% TRR was the major component of the fodder.

In a rice metabolism study, [^{14}C-oxadiazin]thiamethoxam was formulated as granules and applied to the seedling box 24 hours before planting out. A parallel experiment was run with [^{14}C-thiazolyl]thiamethoxam. Release of ^{14}C into the paddy water was rapid and the radiolabel was readily translocated to all parts of the plant. Thiamethoxam was the major component of the residues in the early stages. At maturity, parent thiamethoxam was not identified in the grain, when 88% TRR was unextracted. Metabolites CGA 322704 and *N*-methylurea were the major identified components of the rice grain residues but at only 1–2% TRR. Parent thiamethoxam and CGA 355190 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-one) were the main components of the straw residues while thiamethoxam and CGA 322704 were the main components in the husks.

In a separate rice metabolism study, [^{14}C-oxadiazin]thiamethoxam formulated as a WP was applied twice as foliar treatments at booting stage and 50 days later. A parallel experiment was run with [^{14}C-thiazolyl]thiamethoxam. Parent thiamethoxam was the major identified component in grain (13% and 4.5%), husks (65% and71%) and straw (53% and 14.5%) with CGA 322704 the second largest identified component. The non-extracted component in the grain accounted for 63% and 91% of the TRR.

The non-extracted ^{14}C in grains, husk and straw was found to be incorporated into starch, cellulose, hemicellulose or proteins.

Pears were subject to foliar sprays with [^{14}C-oxadiazin]thiamethoxam and [^{14}C-thiazolyl]thiamethoxam formulated as WPs—two cover sprays, 13 days apart with the final spray 15 days before harvest. For each treatment and application rate, thiamethoxam and CGA 322704 were the major identified components of the residues in fruit, together accounting for approximately 50% of the TRR. None of the other metabolites exceeded 10% TRR.

Cucumber plots were subject to foliar sprays with [^{14}C-oxadiazin]thiamethoxam and [^{14}C-thiazolyl]thiamethoxam formulated as WPs—first spray at full flowering and the second 10 days later, 14 days prior to mature harvest. NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) and thiamethoxam were the major identified components of the residues in cucumbers, together accounting for approximately 30–40% the TRR. CGA 322704 and other metabolites were minor components, each accounting for less than 1–2% TRR.

Field grown lettuce were subject to foliar sprays with [^{14}C-oxadiazin]thiamethoxam and [^{14}C-thiazolyl]thiamethoxam formulated as WGs—three times at weekly intervals. Parent thiamethoxam was the major component of the residues accounting for approximately 40% of the residues 14 days after the final treatment. Numerous metabolites were identified, but at day 14 none exceeded 8% of the TRR. The non-extracted residue fraction accounting for 13% and 19% of TRR was subjected to vigorous treatment and extraction, which released ^{14}C material of a very polar nature believed to be derived from natural plant components.

In a potato metabolism study, potato seed-pieces treated with [^{14}C-thiazol]thiamethoxam and [^{14}C-oxadiazin]thiamethoxam were sown and the potatoes were grown to new potato size (84 days after sowing) and maturity (106 days).

Parent thiamethoxam was the major identified residue in the harvested potatoes at 10–27% of TRR. Metabolite CGA 322704 was present at 6–13% of TRR. Metabolite CGA 282149 (3,6-dihydro-3-methyl-*N*-nitro-2H-1,3,5-oxadiazin-4-amine) constituted approximately 6–10% TRR while CGA 349208 (2-chloro-5-thiazolemethanol) and its conjugate also accounted for approximately 6–10% TRR. A number of other metabolites were identified, but none exceeded 10% TRR.

Plant metabolism summary

Thiamethoxam was readily taken up from treated seed, treated soil or sprayed foliage and translocated within the plant and it produced many metabolites. Parent thiamethoxam was usually an important component of the residues.

Metabolic degradation pathways were similar in the various plants tested: maize, rice, pears, cucumbers, lettuce and potatoes.

Parent thiamethoxam and metabolite CGA 322704 appeared in plant metabolism profiles above 10% TRR more often than other metabolites. Other metabolites to appear above 10% TRR at least once were: 1-methylguanidine, CGA 282149, CGA 355190, NOA 407475 and NOA 421275.

N-nitroguanidine was the only plant metabolite (identified in lettuce at 0.3–1.5% TRR) that did not also appear as an animal metabolite. *N*-nitroguanidine may occur from other sources—it is an industrial chemical with uses in the explosives industry and as a chemical intermediate in the manufacture of pharmaceuticals.

Environmental fate in soil

Information was available on aerobic soil metabolism for thiamethoxam, CGA 322704, CGA 355190 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-one) and NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine). Studies on rice paddy metabolism, soil surface photolysis and rotational crops were also provided.

Soil metabolism and photolysis

When labelled thiamethoxam was incubated in soils under aerobic conditions at 20 °C and 40% max water capacity, its half-life ranged from 80 to 300 days. Higher temperatures or higher moisture levels increased the rate of disappearance. CGA 322704 and CGA 355190 were usually the main identified soil metabolites. After 180 days, approximately 12–20% of the dose had been mineralized and 7–16% was unextracted.

When labelled CGA 322704 was incubated in soils under aerobic conditions at 20 °C and 40% max water capacity, its half-life was approximately 100–300 days. The half-life for labelled CGA 355190 under these same conditions was 15–30 days.

When [^{14}C-thiazol]thiamethoxam was exposed to a paddy soil system at 25 °C, thiamethoxam disappeared with a half-life of approximately 50–70 days. The main metabolite was NOA 407475, produced under the reducing conditions of the paddy soil.

NOA 407475 was quite persistent at 20 °C and 40% max water capacity in soils under aerobic conditions, with 77% and 86% of the dose remaining after a test of 180 days (estimated half-life exceeding 300 days).

In a 30 days study with the soil photolysis of labelled thiamethoxam at 25 °C and 75% field moisture capacity, the amount remaining after photolysis was 66% and 59% compared with the dark controls 83% and 83%. CGA 322704 and CGA 355190 were the main products identified.

Soil metabolism summary

When labelled thiamethoxam was incubated in soils under aerobic conditions at 20 °C, its half-life varied from 80 to 300 days. In 6 months of incubation, the percentage of dose mineralized was approximately 12 to 20% and the percentage that was unextracted was approximately 7 to 16%.

The main soil metabolites identified were: CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) and CGA 355190 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-one). Metabolite NOA 407475 (3-(2-chlorothiazol-5-ylmethyl)-5-methyl-[1,3,5]oxadiazinan-4-ylidineamine) was identified under rice paddy conditions. The disappearance of thiamethoxam under soil photolysis conditions was faster than in the dark controls but the main products were CGA 322704 and CGA 355190, the same as for soil metabolism.

Rotational crops

When lettuce, radish and wheat were grown in a rotational crop situation 29, 119 and 362 days after treatment of bare ground with labelled thiamethoxam at 0.2 kg ai/ha, TRR levels were generally low: 0.035 mg/kg and below for lettuce; 0.12 mg/kg and below for radish tops; 0.007 mg/kg and below for radish roots and 0.15 mg/kg and below for wheat grain. Higher TRR levels were found in wheat straw: 0.05–0.75 mg/kg.

Parent thiamethoxam was the most commonly detected component of the residue and was present at higher concentrations (up to 0.023 mg/kg) than other components in lettuce and radish. In wheat straw and grain, parent thiamethoxam (up to 0.038 mg/kg in straw and 0.0002 mg/kg in grain) and metabolite CGA 322704 (up to 0.044 mg/kg in straw and 0.001 mg/kg in grain) were the most commonly detected. However, in some cases other metabolites were present at higher levels: CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) in wheat grain and 1-methylguanidine (CGA 382191), NOA 405217 (N-nitro-N'-methylguanidine), NOA 421275 (N-(2-

chlorothiazol-5-ylmethyl)-N'-methyl-guanidine) and CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) in wheat straw.

Residues of parent thiamethoxam and some metabolites could occur in rotational crops, but generally at very low levels. Detections would be unlikely except for residues in commodities such as wheat straw, which will be covered by MRLs in any case because of approved direct uses. Additional information relevant to CGA 322704 fate and behaviour is available in the clothianidin rotational crop studies.

Methods of residue analysis

Analytical methods and validation data for residues of thiamethoxam and CGA 322704 in animal and plant matrices were made available to the Meeting. Methods had been subjected to independent laboratory validation. Analytical recovery data for thiamethoxam and CGA 322704 at residue concentrations on numerous substrates were available to the Meeting.

Residues of parent thiamethoxam and metabolite CGA 322704 in plant and animal matrices may be analysed by HPLC-MS or HPLC-UV with an LOQ of 0.01 mg/kg after a series of cleanup steps.

In method AG-675, which relies on acetonitrile-water for sample extraction, a microwave extraction procedure is necessary for good extraction of residues from some animal commodities, especially liver. Analysis of residues in liver was not possible with the HPLC-UV finish because of too many interfering peaks, but was successful with the LC-MS/MS finish.

Samples with incurred residues from the metabolism studies were analysed by method AG-675, but interpretation was difficult because of uncertainties in the data (some concentrations below 0.05 mg/kg). For pears and cucumbers, the analytical method concentration of thiamethoxam was approximately 40–90% of the metabolism value. For thiamethoxam in goat meat, the analytical method result was 56–79% of the metabolism result. The thiamethoxam concentration in goats' milk, measured by method AG-675 was only about 20% of the value from the metabolism study. In each of these tests, the results for CGA 322704 were similar to those for thiamethoxam. However, the data were from different laboratories on samples with different storage histories, making interpretation difficult.

Supporting information relevant to the efficient extraction of CGA 322704 from milk and other matrices by acetonitrile-water is provided in the clothianidin studies on samples with incurred residues from clothianidin metabolism studies. This information on efficient extraction of CGA 322704 residues would also support the efficient extraction of thiamethoxam residues, which had behaved similarly but erratically, in the thiamethoxam studies.

Method REM-179 versions were used for analysis of plant commodities. Samples are homogenized and extracted with water + methanol. Cleanup is affected by solvent partition and cartridge columns.

Pears from the metabolism study were extracted and analysed by method REM 179.3 for comparison with the ^{14}C measurements. Measured concentrations of thiamethoxam in the pear were 0.196, 0.143 and 0.130 mg/kg for the original metabolism study, by radiolabel analysis on the LC fraction and by HPLC-UV respectively. Similarly, measured concentrations of CGA 322704 (expressed as thiamethoxam) were 0.134, 0.0875 and 0.0775 mg/kg for the same three situations.

Thiamethoxam, CGA 322704 and CGA 265307 (N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine) were not suitable analytes for the multiresidue methods tested (DFG Method S 19 and FDA multiresidue methods). In the FDA methods, thiamethoxam was not recovered from the cleanup columns.

Stability of residues in stored analytical samples

The meeting received information on the freezer storage stability of thiamethoxam and metabolite CGA 322704 at residue concentrations in apples, tomatoes, potato tubers, rape seed, maize grain,

cranberries, hops, barley grain, barley hay, barley straw, pearled barley and barley flour. For the animal commodities, (beef, liver, milk and eggs), freezer storage stability data were available for thiamethoxam and two metabolites CGA 322704 and CGA 265307.

Thiamethoxam, CGA 322704 and CGA 265307 were apparently stable at residue concentrations in the various substrates tested at the freezer temperatures and test durations. The durations of test were mostly 1–2 years, but some were less. Test temperatures were mostly approximately –18 °C to –20 °C, but other storage temperatures were used in some storage stability tests, e.g., between –26 °C and –4 °C.

Residue definition

In animal commodities, parent thiamethoxam was a major component of the residues in goat muscle, fat and kidney, while CGA 322704 was the main component in milk, but thiamethoxam was also a substantial residue component in milk. In goat liver, thiamethoxam constituted only approximately 1% of the residues in goat liver with CGA 322704 about 6–7%. Some other metabolites were present at higher levels.

In laying hens, parent thiamethoxam was not the major component of the residues in any tissue or eggs, but did constitute approximately 21% TRR in lean meat, 5–15% in fat + skin and 11% in egg yolk. Thiamethoxam was a very minor part of the residues in poultry liver, whereas CGA 322704 constituted 34% and 39% of the liver TRR (8.2 and 9.2 mg/kg) in the poultry metabolism study with ^{14}C labels in the thiazol and oxadiazin positions, respectively. Metabolite CGA 265307 was the major residue component in the eggs, both whites (45% and 47%) and yolks (69% and 54%), and also in fat + skin (54% and 57%). Metabolite MU3 was the major residue component in lean hen meat.

The complexity of the metabolite mixture makes it difficult to select an ideal residue definition for risk assessment in poultry.

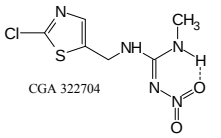
The Meeting decided to include CGA 265307 and MU3 with thiamethoxam in the intake assessment of residues in poultry. Metabolite CGA 322704 will be included in the clothianidin risk assessment.

Because the dietary burden was low and no feeding study was available for poultry, data from the poultry metabolism studies were used in the risk assessment.

For most purposes, thiamethoxam and CGA 322704 are adequate for monitoring residues in animal commodities.

In plant metabolism, parent thiamethoxam is usually an important component of the residues. Metabolite CGA 322704 occurs in plant metabolism profiles above 10% TRR more commonly than do other plant metabolites. For plant commodities thiamethoxam and CGA 322704 are the most important residues.

Thiamethoxam is described as an EZ mixture. It is generally believed that the activation energy for the E↔Z interconversion for the C = N bond is low and that an equilibrium mixture is rapidly established at ambient temperature. The situation is likely to be similar for metabolite CGA 322704. In this case the E form is likely to be favoured in the equilibrium mixture because of possible formation of a hydrogen bond from the secondary amine to the nitro group. The E form of CGA 322704 is equivalent to the compound clothianidin and with E↔Z interconversion, CGA 322704 will appear the same as clothianidin in the analytical methods.



CGA 322704

Clothianidin residues may arise from the use of clothianidin or from the use of thiamethoxam. Separate residue definitions are needed:

- for thiamethoxam
- for clothianidin (from uses of clothianidin) and CGA 322704 (from uses of thiamethoxam), appearing as clothianidin.

The Meeting recommended the following residue definition for thiamethoxam.

Definition of the residue for animal and plant commodities (for compliance with the MRL): *thiamethoxam*.

Definition of the residue f*or plants and animals (except poultry),* (for estimation of dietary intake): *thiamethoxam*

CGA 322704 (CGA 322704 to be included with clothianidin and considered separately from thiamethoxam). See also clothianidin.

Definition of the residue for poultry (for estimation of dietary intake): *sum of thiamethoxam, CGA 265307 and MU3, expressed as thiamethoxam*

CGA 322704 (CGA 322704 to be included with clothianidin and considered separately from thiamethoxam). See also clothianidin.

The residue is not fat soluble.

Note that thiamethoxam metabolite CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) will appear as clothianidin in the analytical method and residues of CGA 322704 occurring in food are included in the clothianidin MRLs.

Metabolite CGA 265307: N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine.

Metabolite MU3: amino-([(2-chlorothiazol-5-ylmethyl)-amino]-methylene)-hydrazide.

Residues resulting from supervised trials

The Meeting received supervised field trials data for thiamethoxam uses on citrus, pome fruits, plums, peaches, cherries, strawberries, cranberries, blueberries, caneberries, grapes, bananas, mangoes, papaya, pineapples, broccoli, cabbage, mustard greens, cucumbers, melons, cantaloupes, summer squash, sweet corn, tomatoes, bell peppers, chilli peppers, egg plants, sweet peppers, lettuce, spinach, snap beans, lima beans, succulent peas, dry beans, peas (green pods), peas (dry seed), soya beans, carrots, radishes, potatoes, sugar beets, artichokes, celery, maize, barley, wheat, rice, pecan, sunflower, cotton, oilseed rape, cacao beans, coffee, pea forage and fodder, maize forage and fodder, barley straw and fodder, wheat straw and fodder, rice straw, beet leaves and tops, oilseed rape fodder and forage, hops and tea.

For a specific crop, sets of trials were often available with different methods of application, e.g., foliar, soil treatment and seed treatment, and from different regions. The set of trials with an adequate number of trials and producing the highest residues was selected for maximum residue level estimation. The set of trials selected for thiamethoxam maximum residue level estimation was not necessarily the same set selected for metabolite CGA 322704.

The estimated maximum residue levels for CGA 322704 are transferred to the clothianidin report for integration with the estimates for clothianidin.

Citrus fruits

Supervised trials data for citrus were available from Spain, Indonesia and the USA.

Thiamethoxam may be used in Spain as a single foliar treatment of citrus with a WG formulation at a spray concentration of 0.0075 kg ai/hL and harvest of fruit 28 days later.

In seven thiamethoxam trials on oranges in Spain in accord with Spanish GAP, thiamethoxam residue concentrations in whole oranges in rank order were: < 0.02, 0.02, 0.03, 0.05, 0.05, 0.06 and 0.06 mg/kg. Thiamethoxam residues in orange flesh were: < 0.02 (6) and 0.02 mg/kg. In one Spanish orange trial residues were at measurable levels in both flesh (0.02 mg/kg) and fruit (0.05 mg/kg) providing a factor of 0.4 to estimate thiamethoxam residues in edible portion from residues in whole fruit from foliar treatment. In the same seven orange trials from Spain, residues of CGA 322704 in whole oranges as a metabolite of thiamethoxam were: < 0.02 (5), 0.02 and 0.03 mg/kg. CGA 322704 residues in orange flesh were: < 0.02 (7) mg/kg.

In six thiamethoxam trials on lemons in Spain in accord with Spanish GAP, thiamethoxam residue concentrations in whole lemons in rank order were: 0.02, 0.04, 0.07, 0.07, 0.08 and 0.08 mg/kg. Thiamethoxam residues in lemon flesh were: < 0.02 (5) and 0.02 mg/kg. In the same six lemon trials from Spain, residues of CGA 322704 in whole lemons were: < 0.02, 0.02, 0.02, 0.02, 0.03 and 0.04 mg/kg. CGA 322704 residues in lemon flesh were: < 0.02 (6) mg/kg.

In eight thiamethoxam trials on mandarins in Spain in accord with Spanish GAP, thiamethoxam residue concentrations in whole mandarins in rank order were: < 0.02 (2), 0.02, 0.02, 0.03, 0.04, 0.07 and 0.10 mg/kg. Thiamethoxam residues in mandarin flesh in nine trials were: < 0.02 (7), 0.02 and 0.02 mg/kg. In the same eight mandarin trials from Spain, residues of CGA 322704 in whole mandarins in rank order were: < 0.02 (3), 0.02, 0.02, 0.02, 0.03 and 0.05 mg/kg (NAFTA calculator: 0.057. OECD calculator Mean + 4SD: 0.068). CGA 322704 residues in mandarin flesh in nine trials were: < 0.02 (8) and 0.02 mg/kg. This CGA 322704 data set was selected for maximum residue level estimation.

In Indonesia, thiamethoxam may be applied twice as foliar sprays on citrus with a ZC formulation at 0.085 kg ai/ha and harvest 42 days after the final application. In three trials on oranges in Indonesia in accord with Indonesian GAP, residues of thiamethoxam were : < 0.01, 0.03 and 0.05 mg/kg. Residues of CGA 322704 were not detected.

Thiamethoxam may be used in the USA as a single soil treatment with SL formulations (chemigation in the root zone, drench around tree trunk and out to root zone or band each side of row) at 0.19 kg ai/ha. Thiamethoxam may also be used in two foliar applications with WG at 0.096 kg ai/ha during the production of citrus fruits. Fruit may be harvested on the same day as treatment.

In 12 orange trials in the USA matching the soil surface application GAP, residues of thiamethoxam were all < 0.01 mg/kg. In the same trials, residues of CGA 322704 in the oranges were also all < 0.01 mg/kg.

In six grapefruit trials in the USA matching the soil surface application GAP, residues of thiamethoxam were all < 0.01 mg/kg. In the same trials, residues of CGA 322704 in the grapefruits were also all < 0.01 mg/kg.

In five lemon trials in the USA matching the soil surface application GAP, residues of thiamethoxam were all < 0.01 mg/kg. In the same trials, residues of CGA 322704 in the lemons were also all < 0.01 mg/kg.

In 14 orange trials in the USA matching the US GAP for foliar application with a WG formulation, thiamethoxam residues, in rank order, were: 0.03, 0.04, 0.06, 0.06, 0.06, 0.07, 0.07, 0.08, 0.12, 0.13, 0.13, 0.19, 0.21 and 0.26 mg/kg (NAFTA calculator: 0.393. OECD calculator Mean + 4SD: 0.386). This data set was selected for maximum residue level estimation.

In the same 14 orange trials in the USA, residues of CGA 322704 in rank order were: < 0.01 (8), 0.01, 0.02, 0.02, 0.02, 0.02 and 0.03 mg/kg.

In eight grapefruit trials in the USA matching US GAP for foliar application with a WG formulation, thiamethoxam residues, in rank order, were: 0.02, 0.03, 0.04, 0.06, 0.06, 0.08, 0.10 and 0.17 mg/kg. In the same eight trials, residues of CGA 322704 in rank order were: < 0.01 (6), 0.03 and 0.03 mg/kg.

In six lemon trials in the USA matching US GAP for foliar application with a WG formulation, thiamethoxam residues, in rank order, were: 0.05, 0.06, 0.11, 0.12, 0.14 and 0.17 mg/kg. In the same six trials, residues of CGA 322704 in rank order were: < 0.01, 0.01, 0.01, 0.02, 0.02 and 0.02 mg/kg.

Summary—Citrus fruits

Residue data with suitable GAP were available for oranges, lemons, mandarins and grapefruit. The Meeting noted that thiamethoxam residues were highest in orange trials from the USA and that CGA 322704 residues were highest in mandarin trials from Spain and decided to estimate citrus group maximum residue levels based on these data sets.

On the basis of the foliar applications on oranges in the USA, the Meeting estimated a maximum residue level of 0.5 mg/kg for thiamethoxam on citrus fruits.

The STMR and HR for thiamethoxam in citrus were derived from the median and high residue of the US orange trials and a factor (residues in edible portion ÷ residues in whole fruit = 0.4) from the Spanish trials. The Meeting estimated STMR and HR values of 0.028 and 0.104 mg/kg respectively for thiamethoxam residues in citrus fruits.

On the basis of the CGA 322704 data on mandarins from eight trials with foliar application of thiamethoxam in Spain, the Meeting estimated a maximum residue level of 0.07 mg/kg for CGA 322704 on citrus fruits.

On the basis of the CGA 322704 data on mandarin flesh from nine trials in Spain, the Meeting estimated STMR and HR values of 0.02 and 0.02 mg/kg respectively for CGA 322704 residues in citrus fruits.

Pome fruits

Supervised trials data for pome fruits were available from the USA.

US GAP for pome fruit allows the use of thiamethoxam for foliar application at 0.096 kg ai/ha with a 35 days PHI and 0.048 kg ai/ha with a 14 days PHI.

In 15 apple trials in the USA matching GAP for foliar application and the final rate suitable for a 14 days PHI, thiamethoxam residues in rank order were: 0.03, 0.04, 0.04, 0.05, 0.06, 0.06, 0.06, 0.07, 0.08, 0.08, 0.09, 0.09, 0.10, 0.12 and 0.15 mg/kg (NAFTA calculator: 0.189. OECD calculator 3*Mean: 0.224). In the same 15 trials, residues of CGA 322704 in apples in rank order were: < 0.01 (13), 0.01 and 0.02 mg/kg.

In six pear trials in the USA matching GAP for foliar application and the final rate suitable for a 14 days PHI, thiamethoxam residues in rank order were: 0.03, 0.03, 0.04, 0.05, 0.05 and 0.08 mg/kg. In the same six trials, residues of CGA 322704 in pears in rank order were: 0.01, 0.02, 0.02, 0.03, 0.03 and 0.04 mg/kg (NAFTA calculator: 0.071. OECD calculator 3*Mean: 0.075).

Summary—Pome fruits

Residue data with suitable GAP were available for apples and pears from the USA. The Meeting noted that thiamethoxam residues were higher in the apple trials and that CGA 322704 residues were higher in pears. The Meeting decided to estimate pome fruit group maximum residue levels based on these data sets.

On the basis of the foliar applications on apples in the USA, the Meeting estimated a maximum residue level of 0.3 mg/kg for thiamethoxam on pome fruits. On the basis of the CGA 322704 data on pears from the US trials, the Meeting estimated a maximum residue level of 0.1 mg/kg for CGA 322704 on pome fruits.

The STMR and HR for thiamethoxam in pome fruits were derived from the median and high residues of the US apple trials. The Meeting estimated STMR and HR values of 0.07 and 0.15 mg/kg respectively for thiamethoxam residues in pome fruits. The STMR and HR for CGA 322704 in pome fruits were derived from the median and high residues of the US thiamethoxam pear trials. The Meeting estimated STMR and HR values of 0.025 and 0.04 mg/kg respectively for CGA 322704 residues in pome fruits.

Stone fruits

Supervised trials data were available for plums, peaches and cherries from the USA and cherries from France, Italy, Spain and Switzerland. No suitable GAP was available to evaluate the Swiss trials.

US GAP for stone fruits allows the use of thiamethoxam for foliar application at 0.096 kg ai/ha with a 14 days PHI.

In eight plum trials in the USA matching stone fruit GAP, thiamethoxam residues in plums in rank order were: < 0.01 (5), 0.01, 0.02 and 0.02 mg/kg. In the same eight trials, residues of CGA 322704 in plums in rank order were: < 0.01 (6), 0.01 and 0.02 mg/kg.

In 11 peach trials in the USA matching stone fruit GAP, thiamethoxam residues in peaches in rank order were: 0.01, 0.02, 0.02, 0.02, 0.03, 0.04, 0.04, 0.05, 0.05, 0.06 and 0.19 mg/kg.

In the same 11 peach trials, residues of CGA 322704 in peaches in rank order were: 0.01, 0.02, 0.02, 0.02, 0.02, 0.04, 0.04, 0.04, 0.04, 0.05 and 0.12 mg/kg (NAFTA calculator: 0.144. OECD calculator Mean + 4SD: 0.158). This data set was selected for maximum residue level estimation.

In 10 cherry trials in the USA matching stone fruit GAP, thiamethoxam residues in cherries in rank order were: 0.13, 0.17, 0.19, 0.19, 0.20, 0.21, 0.22, 0.22, 0.24 and 0.28 mg/kg. In the same 10 trials, residues of CGA 322704 in cherries in rank order were: < 0.01, < 0.01, 0.01, 0.01, 0.01, 0.02, 0.02, 0.03, 0.03 and 0.03 mg/kg.

Spanish GAP for cherries allows the use of thiamethoxam for two foliar applications with a spray concentration of 0.0075 kg ai/hL followed by a 7 days PHI.

In 12 cherry trials in France (seven), Italy (three) and Spain (two) matching the Spanish GAP, thiamethoxam residues in cherries in rank order were: 0.13, 0.15, 0.16, 0.16, 0.17, 0.19, 0.20, 0.26, 0.31, 0.49, 0.50 and 0.60 mg/kg (NAFTA calculator: 0.827. OECD calculator Mean + 4SD: 0.927). This data set was selected for maximum residue level estimation.

In the same 12 cherry trials, residues of CGA 322704 in cherries in rank order were: < 0.02 (7), 0.02, 0.02, 0.03, 0.04 and 0.06 mg/kg.

Summary—Stone fruits

Residue data with suitable GAP were available for plums, peaches and cherries. The Meeting noted that thiamethoxam residues were highest in cherry trials from Europe and that CGA 322704 residues were highest in peach trials from the USA and decided to estimate stone fruits group maximum residue levels based on these two data sets.

On the basis of the foliar applications on cherries in 12 trials in France, Italy and Spain, the Meeting estimated a maximum residue level of 1 mg/kg for thiamethoxam on stone fruits. The Meeting estimated STMR and HR values of 0.195 and 0.60 mg/kg respectively for thiamethoxam residues in stone fruits.

On the basis of the CGA 322704 data on peaches from 11 trials in the USA, the Meeting estimated a maximum residue level of 0.2 mg/kg for CGA 322704 on stone fruits. The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.04 and 0.12 mg/kg respectively for CGA 322704 residues in stone fruits.

Berries and other small fruits

Supervised trials data were available for strawberries, cranberries, blueberries, caneberries and grapes.

Cranberries

Supervised trials data were available for cranberries from the USA.

During the production of cranberries in the USA, thiamethoxam as a WG formulation may be used for foliar sprays at 0.070 kg ai/ha with observation of a 30 days PHI.

In six cranberry trials in the USA with a WG formulation and matching the conditions of the foliar treatment GAP, thiamethoxam residues in cranberries were all below LOQ (0.01 mg/kg). In the same six trials, residues of CGA 322704 in cranberries were also all below LOQ (0.01 mg/kg).

Blueberries

Supervised trials data were available for blueberries from the USA.

Thiamethoxam may be used as foliar applications (WG formulation) or a soil-applied surface band (SL formulation) during the production of blueberries in the USA. The application rate is 0.070 kg ai/ha in the foliar use (PHI 3 days) or, for bushberries (includes blueberries), 0.20 kg ai/ha for the band application followed by a PHI of 75 days.

In seven blueberry trials in the USA with an SL formulation and matching the conditions of the soil-applied surface band treatment GAP, thiamethoxam residues in blueberries were all below LOQ (0.01 mg/kg). In the same seven trials, residues of CGA 322704 in blueberries were also all below LOQ (0.01 mg/kg).

In nine blueberry trials in the USA with a WG formulation and matching the conditions of the foliar treatment GAP, thiamethoxam residues in blueberries in rank order were: < 0.01, 0.05, 0.06, 0.06, 0.07, 0.07, 0.07, 0.07 and 0.11 mg/kg. In the same nine trials, residues of CGA 322704 in blueberries in rank order were: < 0.01 (4), 0.01, 0.01, 0.02, 0.03 and 0.05 mg/kg. This CGA 322704 data set was used as part of the data for maximum residue level estimation for the berry fruits group.

Blackberries, raspberries and boysenberries

Supervised trials data were available from the USA for caneberries: raspberries (four trials), blackberries (one trial) and boysenberries (one trial).

Thiamethoxam may be used as foliar applications (WG formulation) during the production of caneberries in the USA. The application rate is 0.053 kg ai/ha and the crop may be harvested 3 days after an application.

In six caneberry trials in the USA matching the conditions of the foliar treatment GAP, thiamethoxam residues in blackberries, raspberries and boysenberries in rank order were: 0.01, 0.06, 0.10, 0.12, 0.19 and 0.20 mg/kg. In the same six trials, residues of CGA 322704 in blackberries, raspberries and boysenberries in rank order were: < 0.01 (2), 0.01, 0.02, 0.02 and 0.04 mg/kg. This CGA 322704 data set was used as part of the data for maximum residue level estimation for the berry fruits group.

For CGA 322704, the data from nine blueberry trials and six caneberry trials were combined to represent the group: < 0.01 (6), 0.01, 0.01, 0.01, 0.02, 0.02, 0.02, 0.03, 0.04 and 0.05 mg/kg (NAFTA calculator: 0.056. OECD calculator Mean + 4SD: 0.069).

Grapes

Supervised trials data were available for grapes from France, Italy, Spain and Switzerland.

In Spain and Italy, thiamethoxam formulated as WG is approved for foliar application to grapes at 0.050 kg ai/ha, with harvest permitted 21 days later. The trials from France, Italy and Spain were evaluated using the GAP from Spain and Italy. No suitable GAP was available for evaluation of the Swiss trials.

In 11 grape trials in Europe (seven French, one Italian and three Spanish) matching the conditions of the Spanish and Italian GAP, thiamethoxam residues in grapes in rank order were: < 0.02 (2), 0.02, 0.02, 0.02, 0.04, 0.04, 0.07, 0.13, 0.17 and 0.21 mg/kg (NAFTA calculator: 0.276. OECD calculator Mean + 4SD: 0.345). In the same 11 trials, residues of CGA 322704 in grapes were: < 0.02 (10) and 0.02 mg/kg.

On the basis of the foliar applications on grapes in 11 European trials, the Meeting estimated a maximum residue level of 0.4 mg/kg for thiamethoxam in grapes. On the basis of the CGA 322704 data on grapes from the same 11 trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for CGA 322704 on grapes. The residue levels of thiamethoxam and CGA 322704 occurring in grapes allow grapes to be included in the berry fruit group MRLs.

Strawberries

Supervised trials data were available for strawberries from the USA.

During the production of strawberries in the USA, thiamethoxam may be used as a single soil drench treatment (0.20 kg ai/ha) with an SL formulation at the base of the plants followed by harvest 65 days later. Alternatively, a WG formulation may be used for foliar sprays at 0.070 kg ai/ha with observation of a 3 days PHI.

In eight strawberry trials in the USA with an SL formulation and matching the conditions of the drench treatment GAP, but with some flexibility in the PHI, thiamethoxam residues in strawberries in rank order were: < 0.01, < 0.01, 0.01, 0.01, 0.02, 0.02, 0.03 and 0.03 mg/kg. In the same eight trials, residues of CGA 322704 in strawberries were all below LOQ (0.01 mg/kg).

In eight strawberry trials in the USA with a WG formulation and matching the conditions of the foliar treatment GAP, thiamethoxam residues in strawberries in rank order were: 0.02, 0.02, 0.05, 0.05, 0.06, 0.14, 0.22 and 0.26 mg/kg (NAFTA calculator: 0.378. OECD calculator Mean + 4SD: 0.476). This thiamethoxam data set was selected for maximum residue level estimation for the berry fruits group. In the same eight trials, residues of CGA 322704 in strawberries were all below LOQ (0.01 mg/kg).

Summary—Berries and other small fruits

Residue data with suitable GAP were available for strawberries, cranberries, blueberries, caneberries and grapes. The Meeting noted that thiamethoxam residues were highest in strawberries and that CGA 322704 residues were highest in blueberries and caneberries and decided to estimate berry fruit group maximum residue levels based on these two data sets.

Grapes are often evaluated separately because the crop is rarely included in a berries crop group GAP and specific grape data are needed for its important processed commodities. However, the estimated maximum residue level for grapes closely agrees with that estimated for the other berry fruits, so the Meeting agreed to include the grapes with the berry fruits proposals.

On the basis of the foliar applications on strawberries in eight US trials, the Meeting estimated a maximum residue level of 0.5 mg/kg for thiamethoxam in berries and other small fruits.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.055 and 0.26 mg/kg respectively for thiamethoxam residues in berries and other small fruits.

On the basis of the nine blueberry trials and six caneberry trials from the USA, the Meeting estimated a maximum residue level of 0.07 mg/kg for CGA 322704 in berries and other small fruits.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.01 and 0.05 mg/kg respectively for CGA 322704 residues in berries and other small fruits.

Assorted tropical and sub-tropical fruits—inedible peel

Supervised trials data were available for bananas, mangoes, papaya and pineapples.

Bananas

Supervised trials data were available for bananas from Cameroon.

In Cameroon, thiamethoxam WG is approved for use as a drench to the banana stem at a concentration of 0.20 kg ai/hL and application volume 100 ml per plant, equivalent to 0.2 g ai per plant, with harvest permitted on the same day.

In three banana trials with thiamethoxam in Cameroon at the approved application rate and one at double rate and with bananas harvested 7–60 days after treatment, thiamethoxam residues in bananas were all below LOQ (0.02 mg/kg). In a further trial at the label rate, banana pulp was analysed but again thiamethoxam residues were below LOQ (0.02 mg/kg). In all these samples, CGA 322704 residues also were all below LOQ (0.02 mg/kg).

The Meeting estimated a maximum residue level of 0.02* mg/kg for thiamethoxam in bananas. On the basis of the CGA 322704 data on bananas from the same 12 trials, the Meeting estimated a maximum residue level of 0.02* mg/kg for CGA 322704 on bananas.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.02 and 0.02 mg/kg for thiamethoxam residues in bananas. The Meeting also estimated STMR and HR values of 0.02 and 0.02 mg/kg for CGA 322704 residues in bananas.

Mangoes

Supervised trials data were available for mangoes from South Africa.

In South Africa, thiamethoxam is approved for application to mango trees as a drench around the trees or by drip irrigation at a dose of 1.4 g ai per tree. The timing of the application is set by a seasonal instruction: apply from last week in July to mid August. The harvesting season for mangoes would follow in early to mid-summer.

One of the trials was compromised of residues of thiamethoxam (0.02 mg/kg) and CGA 322704 (0.02 mg/kg) appearing in samples from the control plot at similar levels to those from treated plots.

Three of the mango trials followed the label rate for application: 1.4 g ai per tree, resulting in thiamethoxam residues in mangoes, 0.04, 0.10 and 0.11 mg/kg. The same three trials produced CGA 322704 residues in mangoes of < 0.02, 0.02 and 0.02 mg/kg.

Three trials for mangoes are insufficient to support a maximum residue level.

Papaya

Supervised trials data were available for papaya from Brazil and Côte d'Ivoire. No GAP was available to evaluate the Côte d'Ivoire trials.

In Brazil, thiamethoxam is approved as a soil drench application for papaya at a rate equivalent to 0.20 kg ai/ha. A PHI of 14 days is specified.

Four of the papaya trials in Brazil followed the label rate of application, 0.2 kg ai/ha with thiamethoxam residues in papaya fruits all below LOQ (0.01 mg/kg). The same four trials produced CGA 322704 residues in papaya fruits also all below LOQ (0.01 mg/kg).

Four of the papaya trials in Brazil followed a double rate of application, 0.4 kg ai/ha with the same results as the label rate, thiamethoxam residues in papaya fruits all below LOQ (0.01 mg/kg). The same four trials produced CGA 322704 residues in papaya fruits also all below LOQ (0.01 mg/kg).

The Meeting estimated a maximum residue level of 0.01* mg/kg for thiamethoxam in papaya. On the basis of the CGA 322704 data on papaya from the same trials, the Meeting estimated a maximum residue level of 0.01* mg/kg for CGA 322704 on papaya.

The Meeting estimated STMR and HR values of 0 and 0 mg/kg for thiamethoxam residues in papayas. The Meeting also estimated STMR and HR values of 0 and 0 mg/kg for CGA 322704 residues in papayas.

Pineapples

Supervised trials data were available for pineapples from Brazil.

In Brazil, thiamethoxam is approved for pineapples as a pre-seedling transplant immersion in a solution concentration 0.075 kg ai/hL, and as a soil drench at the plant base 45–60 days after transplant at an application rate of 0.20 kg ai/ha.

In the Brazilian trials, this seedling treatment and soil drench usage GAP was followed, but another thiamethoxam soil drench was added 0–60 days before harvest. In the four trials,

thiamethoxam residues in pineapples were all below LOQ (0.01 mg/kg). Residues of CGA 322704 were also all below LOQ (0.01 mg/kg).

The Meeting estimated a maximum residue level of 0.01* mg/kg for thiamethoxam in pineapples. On the basis of the CGA 322704 data on pineapples from the same trials, the Meeting estimated a maximum residue level of 0.01* mg/kg for CGA 322704 on pineapples.

The Meeting estimated STMR and HR values of 0 and 0 mg/kg for thiamethoxam residues in pineapples. The Meeting also estimated STMR and HR values of 0 and 0 mg/kg for CGA 322704 residues in pineapples.

Brassica vegetables

Supervised trials data were available for cabbages and broccoli.

Cabbages

Supervised trials data on cabbage were available from the USA.

In the USA, foliar applications of thiamethoxam may be made to head and stem Brassica vegetables (includes cabbage) at 0.096 kg ai/ha, with harvest on the same day.

Soil drench applications of thiamethoxam to Brassica vegetables at 0.19 kg ai/ha with a 30 days PHI are also registered. The soil drench rate in the cabbage trials was 0.14 kg ai/ha and the data were not evaluated.

In eight cabbage trials in the USA matching the foliar GAP conditions, thiamethoxam residues in cabbages (with wrapper leaves) in rank order were: 0.57, 0.59, 0.62, 0.69, 0.78, 0.91, 1.1 and 3.0 mg/kg. In the same eight trials, residues of CGA 322704 in cabbages (with wrapper leaves) in rank order were: 0.02, 0.02, 0.03, 0.03, 0.04, 0.05, 0.06 and 0.08 mg/kg.

In the same eight cabbage trials, residues were also measured on cabbage heads only, i.e., with wrapper leaves removed. Thiamethoxam residues in cabbage heads in rank order were: 0.01, 0.02, 0.03, 0.05, 0.05, 0.09, 0.11 and 0.14 mg/kg. In the same eight trials, residues of CGA 322704 in cabbage heads were: < 0.01 (7) and 0.01 mg/kg.

Two of the cabbage trials matching the foliar GAP conditions were side-by-side trials providing bridging data for the use of WG and SL formulations. Thiamethoxam residues in the head + wrapper leaves were 0.15 and 0.57 mg/kg for SL and 0.69 and 0.58 mg/kg for WG, and for head only the residues were < 0.01 and 0.01 mg/kg for SL and 0.05 and 0.02 mg/kg for WG. CGA 322704 residues in the head + wrapper leaves were < 0.01 and 0.04 mg/kg for SL and 0.04 and 0.05 mg/kg for WG. The results suggest equivalence, so only one of the bridging trials should be included in the dataset for STMR and maximum residue level estimation.

The cabbage datasets become:

- Thiamethoxam—head + wrapper leaves (n = 7): 0.59, 0.62, 0.69, 0.78, 0.91, 1.1 and 3.0 mg/kg. (NAFTA calculator: 3.67. OECD calculator Mean + 4SD:4.53)
- CGA 322704—head + wrapper leaves (n = 7): 0.02, 0.02, 0.03, 0.03, 0.05, 0.06 and 0.08 mg/kg. (NAFTA calculator: 0.129. OECD calculator Mean + 4SD: 0.132)
- thiamethoxam—head only (n = 7): 0.02, 0.03, 0.05, 0.05, 0.09, 0.11 and 0.14 mg/kg
- CGA 322704—head only (n = 7): < 0.01 (6) and 0.01 mg/kg.

Broccoli

Supervised trials data on broccoli were available from the USA.

In the USA, foliar applications of thiamethoxam may be made to head and stem Brassica vegetables (includes broccoli) at 0.096 kg ai/ha, with harvest on the same day.

In 10 broccoli trials in the USA matching the GAP conditions, thiamethoxam residues in broccoli in rank order were: 0.30, 0.30, 0.34, 0.37, 0.41, 0.49, 0.57, 0.66, 1.1 and 1.1 mg/kg. In the same 10 trials, residues of CGA 322704 in broccoli in rank order were: < 0.01 (4), 0.01, 0.02, 0.03, 0.04, 0.04 and 0.04 mg/kg.

Four of the broccoli trials matching the foliar GAP conditions were side-by-side trials providing bridging data for the use of WG and SL formulations. In one pair of trials, from California, thiamethoxam residues in the head + stem were 0.34 and 0.37 g/kg for SL and 0.49 and 0.44 mg/kg for WG. CGA 322704 residues were 0.01 and 0.01 mg/kg for SL and 0.02 and 0.02 mg/kg for WG. In the second pair of trials, from Texas, thiamethoxam residues in the head + stem were 0.38 and 0.41 g/kg for SL and 0.32 and 0.34 mg/kg for WG. CGA 322704 residues were 0.02 and 0.04 mg/kg for SL and 0.03 and 0.02 mg/kg for WG. The results suggest equivalence, so only one from each pair of the bridging trials should be included in the dataset for STMR and maximum residue level estimation.

The broccoli datasets (n = 8) become:

- thiamethoxam 0.30, 0.30, 0.41, 0.49, 0.57, 0.66, 1.1 and 1.1 mg/kg
- CGA 322704 < 0.01 (4), 0.02, 0.04, 0.04 and 0.04 mg/kg.

These data sets were selected for the STMR and HR estimation for the Brassica group.

Summary—Brassica vegetables group

Residue data with suitable GAP were available for broccoli and cabbages. The Meeting noted that residues in cabbage with wrapper leaves had higher residues than the broccoli and decided to use the cabbage data to support Brassica group MRLs.

On the basis of the foliar applications on cabbages in the US trials, the Meeting estimated a maximum residue level of 5 mg/kg for thiamethoxam on Brassica vegetables. On the basis of the CGA 322704 data on cabbages from the same trials, the Meeting estimated a maximum residue level of 0.2 mg/kg for CGA 322704 on Brassica vegetables.

The Meeting noted that residues in broccoli had higher residues than the cabbages (heads only) and decided to use the broccoli data to support Brassica group STMRs and HRs.

On the basis of the foliar applications on broccoli in the eight US trials, the Meeting estimated an STMR and an HR value of 0.53 and 1.1 mg/kg respectively for thiamethoxam on Brassica vegetables. On the basis of the CGA 322704 data on broccoli from the same trials, the Meeting estimated an STMR and an HR value of 0.015 and 0.04 mg/kg respectively for CGA 322704 on Brassica vegetables.

For livestock dietary burden, it is more appropriate to include the cabbage wrapper leaves in the STMR and high residue estimates. In this case the STMR and high residue values for thiamethoxam on cabbages are 0.78 and 3.0 mg/kg respectively. For CGA 322704, the STMR and high residue values on cabbage are 0.03 and 0.08 mg/kg respectively.

Fruiting vegetables, Cucurbits

Supervised trials data were available for cucumbers, melons and cantaloupes and summer squash.

Cucumbers

Supervised trials data on cucumbers were available from France, Netherlands, Spain and the USA.

In the USA, foliar applications of thiamethoxam may be made to cucurbit vegetables (includes cucumbers) at 0.096 kg ai/ha, with harvest on the same day.

In-furrow spray or soil surface band applications of thiamethoxam to cucurbit vegetables at 0.19 kg ai/ha with a 30 days PHI are also registered in the USA. The in-furrow and surface band treatment rate in the cucumber trials was 0.14 kg ai/ha and the data could not be evaluated.

In eight cucumber trials in the USA matching the foliar GAP conditions, thiamethoxam residues in cucumbers in rank order were: 0.02, 0.04, 0.05, 0.07, 0.07, 0.08, 0.09 and 0.11 mg/kg. In the same eight trials, residues of CGA 322704 in cucumbers were all below LOQ < 0.01 mg/kg).

In Italy, thiamethoxam may be applied to cucumbers by drip or drench at 0.2 kg ai/ha, with harvest permitted 3 days later. Drip refers to application to the base of each plant through the drip application system. Drench is application by watering soil around plants.

The protected cucumber trials in France, Netherlands and Spain relied on drip, drench and syringe applications. A syringe may be used in an experimental situation to simulate drip application. In six cucumber trials in France, Netherlands and Spain following Italian GAP, thiamethoxam residues in cucumbers in rank order were: 0.06, 0.06, 0.09, 0.12, 0.14 and 0.29 mg/kg (NAFTA calculator: 0.432. OECD calculator Mean + 4SD: 0.471). The Meeting noted that application at 0.1 kg ai/ha (½ label rate) produced residues of 0.17 and 0.12 mg/kg. In the same six trials, residues of CGA 322704 in cucumbers were all below LOQ < 0.02 mg/kg). These data sets for both thiamethoxam and CGA 322704 were selected for estimation of maximum residue levels for cucurbit fruiting vegetables.

Melons and cantaloupes

Supervised trials data on melons and cantaloupes were available from Italy, Spain and the USA.

Thiamethoxam is approved for use on melons in Spain as a drip irrigation method of application: 0.20 kg ai/ha for indoor production and 0.10 kg ai/ha for outdoor production. A PHI of 3 days is specified.

The two trials from Italy could not be evaluated because no suitable GAP was available.

In four melon trials in Spain matching the drip irrigation GAP conditions (but with allowances on the PHI), thiamethoxam residues in cucumbers in rank order were: < 0.02, 0.02, 0.02 and 0.03 mg/kg. In the same four trials, residues of CGA 322704 in melons were all below LOQ < 0.02 mg/kg).

In the USA, foliar applications of thiamethoxam may be made to cucurbit vegetables (includes cantaloupes) at 0.096 kg ai/ha, with harvest on the same day.

In-furrow spray applications of thiamethoxam to cucurbit vegetables at 0.19 kg ai/ha with a 30 days PHI are also registered in the USA. The in-furrow treatment rate in the cantaloupe trials was 0.14 kg ai/ha and the data could not be evaluated.

In six cantaloupe trials in the USA matching the foliar application GAP conditions, thiamethoxam residues in cantaloupes in rank order were: 0.03, 0.03, 0.04, 0.07, 0.13 and 0.16 mg/kg. In the same six trials, residues of CGA 322704 in cantaloupes were all below LOQ (0.01 mg/kg).

Summer squash

Supervised trials data for thiamethoxam use on summer squash were available from the USA.

In the USA, foliar applications of thiamethoxam as a WG may be made to cucurbit vegetables (includes summer squash) at 0.096 kg ai/ha, with harvest on the same day.

In five summer squash trials in the USA matching the foliar application GAP conditions, thiamethoxam residues in summer squash in rank order were: 0.02, 0.05, 0.06, 0.07 and 0.16 mg/kg. In the same five trials, residues of CGA 322704 in summer squash in rank order were all below LOQ (0.01 mg/kg).

Summary—Fruiting vegetables, Cucurbits

Residue data with suitable GAP were available for cucumbers, melons and cantaloupes and summer squash. The Meeting noted that thiamethoxam residues were highest in cucumbers and that CGA 322704 residues were below LOQ in cucurbit fruiting vegetables. The Meeting decided to estimate cucurbit fruiting vegetables group maximum residue levels based on the cucumber data sets.

On the basis of the drip, drench and syringe applications on cucumbers in six European trials, the Meeting estimated a maximum residue level of 0.5 mg/kg for thiamethoxam on cucurbit fruiting vegetables. On the basis of the CGA 322704 data on cucumbers from the same six trials, the Meeting estimated a maximum residue level of 0.02* mg/kg for CGA 322704 on cucurbit fruiting vegetables.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.105 and 0.29 mg/kg respectively for thiamethoxam residues in cucurbit fruiting vegetables. The Meeting estimated STMR and HR values of 0.02 and 0.02 mg/kg for CGA 322704 residues in cucurbit fruiting vegetables.

Fruiting vegetables, other than Cucurbits

Supervised trials data were available for sweet corn, tomatoes, peppers, egg plants and okra.

Egg plant

Supervised trials data for thiamethoxam use on egg plants were available from Switzerland and the UK.

Thiamethoxam is approved in Italy for foliar application on egg plants at 0.10 kg ai/ha, two applications at an interval of 7 days, with harvest 3 days after application.

In one greenhouse egg plant trial in the UK matching Italian GAP, thiamethoxam residues in egg plant were 0.12 mg/kg with CGA 322704 residues < 0.02 mg/kg.

Sweet corn

Supervised trials data for thiamethoxam use on sweet corn were available from the USA.

In the USA, thiamethoxam is formulated as an FS seed treatment that may be used on sweet corn at 1.25 mg ai per kernel. This is equivalent to approx 4.5 g ai/kg seed for a single kernel weight of 0.28 g.

In 12 sweet corn trials in the USA where the seed had been treated with thiamethoxam FS at 4.5 g ai/kg seed, thiamethoxam residues and CGA 322704 residues in the harvested sweet corn ears were all below LOQ (0.01 mg/kg).

The Meeting estimated a maximum residue level and STMR and HR values, all at 0.01 mg/kg for thiamethoxam in sweet corn (corn-on-the-cob).

The Meeting estimated a maximum residue level and STMR and HR values, all at 0.01 mg/kg for CGA 322704 in sweet corn (corn-on-the-cob).

Peppers

Supervised trials data for thiamethoxam use on bell peppers and chilli peppers were available from the USA and on sweet peppers from France, Italy, Spain, Switzerland and the UK. No suitable GAP was available to evaluate the data from Switzerland and the UK.

Thiamethoxam is approved in Italy for foliar application on peppers at 0.10 kg ai/ha, with harvest 3 days after application.

In eight sweet pepper field trials in Italy and Spain matching the Italian GAP conditions for peppers, thiamethoxam residues in sweet peppers in rank order were: 0.03, 0.03, 0.06, 0.08, 0.08, 0.09, 0.13 and 0.24 mg/kg. In the same eight trials, residues of CGA 322704 in sweet peppers were all below LOQ (0.02 mg/kg).

In 11 sweet pepper greenhouse trials in France, Italy, Spain, Switzerland and the UK matching the Italian GAP conditions for peppers, thiamethoxam residues in sweet peppers in rank order were: 0.07, 0.07, 0.08, 0.08, 0.08, 0.08, 0.10, 0.12, 0.16, 0.26 and 0.47 mg/kg (NAFTA calculator: 0.510. OECD calculator Mean + 4SD: 0.632). In the same 11 trials, residues of CGA 322704 in sweet

peppers were: < 0.02 (9), 0.02 and 0.03 mg/kg. These data sets were selected for maximum residue level estimations for the fruiting vegetables group, except sweet corn.

In the USA, foliar applications of thiamethoxam as a WG may be made to fruiting vegetables (includes peppers) at 0.096 kg ai/ha, with harvest on the same day.

In six bell pepper trials in the USA matching the foliar GAP conditions for fruiting vegetables, thiamethoxam residues in sweet peppers in rank order were: 0.03, 0.06, 0.08, 0.10, 0.13 and 0.18 mg/kg. In the same six trials, residues of CGA 322704 in sweet peppers were: < 0.01 (5) and 0.01 mg/kg.

In three chilli pepper trials in the USA matching the foliar GAP conditions for fruiting vegetables, thiamethoxam residues in chilli peppers in rank order were: 0.06, 0.11 and 0.22 mg/kg. In the same three trials, residues of CGA 322704 in chilli peppers were: < 0.01 (2) and 0.06 mg/kg.

Okra

Supervised trials data for thiamethoxam use on okra were available from Côte d'Ivoire.

In Kenya, foliar applications of thiamethoxam as a WG may be made to okra at 0.10 kg ai/ha, with harvest 3 days later. The Meeting agreed to evaluate the data from Côte d'Ivoire with the Kenyan GAP, allowing that the 2 days PHI in the trials was sufficiently close to the 3 days PHI specified in the Kenyan GAP.

In four okra trials in Côte d'Ivoire at an application rate of 0.10 kg ai/ha and a PHI of 3 days, reported thiamethoxam residues in okra in rank order were: 0.03, 0.07, 0.07 and 0.24 mg/kg. The analytical method used for thiamethoxam residue analysis was an imidacloprid residue analytical method, presumably adapted to thiamethoxam. No validation data were available, but procedural recoveries of 78% and 70% were recorded. Metabolite CGA 322704 residues were not included in the analyses and the reported residues of thiamethoxam include only parent thiamethoxam.

Tomatoes

Supervised trials data for thiamethoxam use on tomatoes were available from France, Italy, Spain, Switzerland and the USA. No suitable GAP was available to evaluate the Swiss trials.

Thiamethoxam is approved for foliar application on tomatoes in Italy at 0.10 kg ai/ha, with harvest 3 days after application.

In 17 tomato field trials in France, Italy and Spain in accord with the GAP conditions of Italy, thiamethoxam residues in tomatoes in rank order were: < 0.02 (7), 0.02, 0.02, 0.02, 0.02, 0.02, 0.03, 0.03, 0.03, 0.04 and 0.04 mg/kg. In the same 17 trials, residues of CGA 322704 in tomatoes were: < 0.02 (16) and 0.03 mg/kg.

In 10 tomato greenhouse trials in France, Italy, Spain and Switzerland in accord with the GAP conditions of Italy, thiamethoxam residues in tomatoes in rank order were: 0.02, 0.02, 0.02, 0.03, 0.03, 0.03, 0.03, 0.06, 0.07 and 0.12 mg/kg. In the same 10 trials, residues of CGA 322704 in tomatoes were all below LOQ (0.02 mg/kg).

In the USA, foliar applications of thiamethoxam as a WG may be made to fruiting vegetables (includes tomatoes) at 0.096 kg ai/ha, with harvest on the same day.

In 20 tomato trials in the USA matching the foliar GAP conditions, thiamethoxam residues in tomatoes in rank order were: 0.02, 0.03, 0.03, 0.04, 0.04, 0.05, 0.05, 0.06, 0.06, 0.06, 0.06, 0.07, 0.07, 0.07, 0.08, 0.10, 0.10, 0.12, 0.14 and 0.15 mg/kg. In the same 20 trials, residues of CGA 322704 in tomatoes in rank order were: < 0.01 (9), 0.01, 0.01, 0.01, 0.02, 0.02, 0.02, 0.02, 0.03, 0.03, 0.04 and 0.05 mg/kg.

Four of the tomato trials matching the foliar GAP conditions were side-by-side trials providing bridging data for the use of WG and SL formulations. In one pair of trials, from California, thiamethoxam residues in the tomatoes were 0.03 and 0.07 g/kg for SL and 0.06 and 0.02 mg/kg for WG. CGA 322704 residues were < 0.01 and 0.02 mg/kg for SL and < 0.01 and 0.01 mg/kg for WG. In

the second pair of trials, from Florida, thiamethoxam residues in the tomatoes were 0.10 and 0.08 g/kg for SL and 0.05 and 0.06 mg/kg for WG. CGA 322704 residues were < 0.01 (2)for both SL and WG. The results suggest equivalence, so only one from each pair of the bridging trials should be included in the dataset for STMR and maximum residue levels estimation.

The tomato datasets become (n = 18): thiamethoxam 0.02, 0.03, 0.03, 0.04, 0.04, 0.05, 0.05, 0.06, 0.06, 0.07, 0.07, 0.07, 0.08, 0.10, 0.10, 0.12, 0.14 and 0.15 mg/kg; CGA 322704 < 0.01 (8), 0.01, 0.01, 0.02, 0.02, 0.02, 0.02, 0.03, 0.03, 0.04 and 0.05 mg/kg.

Summary—Fruiting vegetables, other than Cucurbits

Residue data with suitable GAP were available for sweet corn, tomatoes, peppers, egg plants and okra. The Meeting noted that thiamethoxam residues and CGA 322704 were highest in peppers and decided to estimate fruiting vegetable group maximum residue levels based on the peppers data sets. Residues in sweet corn appeared inconsistent with residues from other members of the commodity group, so the Meeting agreed on separate MRLs for sweet corn. Mushrooms were also excluded from the group MRLs.

On the basis of the foliar applications on sweet peppers in 11 greenhouse trials in France, Italy, Spain, Switzerland and the UK the Meeting estimated a maximum residue level of 0.7 mg/kg for thiamethoxam in fruiting vegetables other than cucurbits, except sweet corn. On the basis of the CGA 322704 data on sweet peppers from the same 11 trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for CGA 322704 in fruiting vegetables other than cucurbits, except sweet corn and mushrooms.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.08 and 0.47 mg/kg respectively for thiamethoxam residues in fruiting vegetables other than cucurbits, except sweet corn and mushrooms. The Meeting estimated STMR and HR values of 0.02 and 0.03 mg/kg for CGA 322704 residues in fruiting vegetables other than cucurbits, except sweet corn and mushrooms.

The JMPR Manual (Section 6.9.2) explains that a generic factor may be used for conversion of residues from fresh peppers to dried chilli peppers. The factor is 10 for the estimation of residue levels of pesticides in dried chilli peppers from the HR values estimated for residues in or on sweet peppers.

The Meeting agreed to apply the default factor of 10 for dried chilli peppers to the STMR (0.08 mg/kg) and HR (0.47 mg/kg) values for thiamethoxam in fruiting vegetables other than cucurbits (based on sweet pepper data) and estimated a maximum residue level, an STMR and an HR for thiamethoxam in dried chilli peppers of 7, 0.8 and 4.7 mg/kg, respectively.

For CGA 322704, the Meeting also agreed to apply the default factor of 10 for dried chilli peppers to the STMR (0.02 mg/kg) and HR (0.03 mg/kg) values based on sweet peppers and estimated a maximum residue level, an STMR and an HR for CGA 322704 in dried chilli peppers of 0.5, 0.2 and 0.3 mg/kg, respectively.

Leafy vegetables

Supervised trials data were available for lettuce, spinach and mustard greens.

Lettuce

Supervised trials data for thiamethoxam use on lettuce were available from the USA.

In the USA, foliar applications of thiamethoxam as a WG may be made to leafy vegetables (includes lettuce) at 0.096 kg ai/ha, with harvest 7 days after treatment.

Thiamethoxam may also be used as a soil treatment at planting (in-furrow spray, surface band or drench) for leafy vegetables at 0.19 kg ai/ha with an expected time to harvest of 65 days. A shanked into root zone after transplanting application at 0.19 kg ai/ha, with a 35 days PHI is also available.

In eight head lettuce trials in the USA matching the foliar GAP conditions, thiamethoxam residues in head lettuces in rank order were: 0.02, 0.04, 0.11, 0.12, 0.20, 0.24, 0.25 and 0.45 mg/kg. In the same eight trials, residues of CGA 322704 in head lettuces in rank order were: < 0.01 (4), 0.01, 0.01, 0.01 and 0.03 mg/kg.

In 10 leaf lettuce trials in the USA matching the foliar GAP conditions, thiamethoxam residues in leaf lettuces in rank order were: 0.07, 0.13, 0.22, 0.25, 0.53, 0.55, 0.86, 0.88, 1.14 and 1.9 mg/kg (NAFTA calculator: 3.442. OECD calculator Mean + 4SD: 2.914). This data set was selected for a thiamethoxam maximum residue level estimation for the leafy vegetables commodity group.

In the same 10 trials, residues of CGA 322704 in leaf lettuces in rank order were: < 0.01, 0.01, 0.01, 0.01, 0.03, 0.03, 0.04, 0.04, 0.04 and 0.07 mg/kg.

In six leaf lettuce trials in the USA matching the soil treatment GAP conditions, thiamethoxam residues in leaf lettuces in rank order were: 0.03, 0.05, 0.12, 0.36, 0.55 and 0.85 mg/kg.

In the same six trials, residues of CGA 322704 in leaf lettuces in rank order were: < 0.01 (2), 0.03, 0.03, 0.05 and 0.14 mg/kg.

Spinach

Supervised trials data for thiamethoxam use on spinach were available from the USA.

In the USA, foliar applications of thiamethoxam as a WG may be made to leafy vegetables (includes spinach) at 0.096 kg ai/ha, with harvest 7 days after treatment.

In 10 spinach trials in the USA matching the foliar GAP conditions for leafy vegetables, thiamethoxam residues in spinach in rank order were: 0.02, 0.02, 0.05, 0.07, 0.22, 0.28, 0.28, 0.28, 0.62 and 0.66 mg/kg.

In the same 10 trials, residues of CGA 322704 in spinach in rank order were: 0.10, 0.13, 0.21, 0.39, 0.49, 0.54, 0.61, 0.62, 0.77 and 0.80 mg/kg (NAFTA calculator: 2.157. OECD calculator Mean + 4SD: 1.475). This data set was selected for a CGA 322704 maximum residue level estimation for the leafy vegetables commodity group.

Mustard greens

Supervised trials data on mustard greens were available from the USA.

In the USA, foliar applications of thiamethoxam may be made to leafy greens Brassica vegetables (includes mustard greens) at 0.096 kg ai/ha, with harvest 7 days after an application.

In-furrow spray or soil surface band applications of thiamethoxam to Brassica vegetables at 0.19 kg ai/ha with a 30 days PHI are also registered uses. The in-furrow and surface band treatments rate in the mustard greens trials was 0.14 kg ai/ha and the data could not be evaluated.

In six mustard greens trials in the USA matching the foliar GAP conditions, thiamethoxam residues in mustard greens in rank order were: 0.38, 0.42, 0.42, 0.66, 0.69 and 0.75 mg/kg. In the same six trials, residues of CGA 322704 in mustard greens in rank order were: 0.07, 0.08, 0.12, 0.16, 0.23 and 0.29 mg/kg.

Two of the mustard greens trials matching the foliar GAP conditions were side-by-side trials providing bridging data for the use of WG and SL formulations. Thiamethoxam residues in the leaves were 0.69 and 0.60 mg/kg for SL and 0.69 and 0.75 mg/kg for WG. CGA 322704 residues in the leaves were 0.12 and 0.11 mg/kg for SL and 0.18 and 0.23 mg/kg for WG. The results suggest equivalence, so only one of the bridging trials should be included in the dataset for STMR and maximum residue level estimation.

The mustard green datasets become (n = 5): thiamethoxam 038, 0.42, 0.42, 0.66, and 0.75 mg/kg; CGA 322704 0.07, 0.08, 0.16, 0.23 and 0.29 mg/kg.

Summary—Leafy vegetables

Residue data with suitable GAP were available for leaf lettuce, head lettuce, spinach and mustard greens. The Meeting noted that thiamethoxam residues were highest in leaf lettuce and that CGA 322704 residues were highest in spinach and decided to estimate leafy vegetables group maximum residue levels based on these two data sets.

On the basis of the foliar applications on leaf lettuces in 10 US trials, the Meeting estimated a maximum residue level of 3 mg/kg for thiamethoxam on leafy vegetables. The STMR and HR values were 0.54 and 1.9 mg/kg, respectively.

On the basis of the foliar applications on spinach in 10 US trials, the Meeting estimated a maximum residue level of 2 mg/kg for CGA 322704 on leafy vegetables. The STMR and HR values were 0.52 and 0.80 mg/kg, respectively.

Legume vegetables

Supervised trials data were available for beans and peas.

Beans

Supervised trials data for thiamethoxam seed treatment uses on beans were available from the USA.

In the USA, thiamethoxam is registered for use as an FS formulation on bean seed at 50 g ai per 100 kg seed, i.e., 0.5 g ai/kg seed.

In seven snap bean trials in the US with seeds treated at the label rate (0.5 g ai/kg seed) and in seven trials where seeds were treated at 3 × the label rate, residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested snap beans (include succulent seeds and pods).

In six lima bean trials in the US with seeds treated at the label rate (0.5 g ai/kg seed) and in six trials where seeds were treated at 3 × the label rate, residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested lima beans (include succulent seeds, pods are discarded).

Peas

Supervised trials data for thiamethoxam seed treatment uses on peas were available from the USA.

In the USA, thiamethoxam is registered for use as an FS formulation on pea seeds at 25 g ai per 100 kg seed, i.e., 0.25 g ai/kg seed.

In seven pea trials in the US with seeds treated at 2 × the label rate (0.5 g ai/kg seed) and in seven trials where seeds were treated at 6 × the label rate, residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested succulent shelled peas (include succulent seeds, pods are discarded), except for two trials at 6 × where a thiamethoxam residue of 0.01 mg/kg was recorded.

In three pea trials in the US with seeds treated at the 2 × the label rate (0.5 g ai/kg seed) and in three trials where seeds were treated at 6 × the label rate, residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested succulent edible pods (include succulent seeds and pods), except for one trial at 6 × where a thiamethoxam residue of 0.01 mg/kg was recorded.

Summary—Legume vegetables

Residue data with suitable GAP were available for snap beans, lima beans, succulent shelled peas and succulent seeds and pods. Residues were below LOQ. The Meeting decided to estimate legume vegetables group maximum residue levels.

On the basis of the seed treatment trials on peas and beans, the Meeting estimated a maximum residue level of 0.01* mg/kg for thiamethoxam on legume vegetables. On the basis of the

CGA 322704 data from the same trials, the Meeting also estimated a maximum residue level of 0.01* mg/kg for CGA 322704 on legume vegetables.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.01 and 0.01 mg/kg for thiamethoxam residues in legume vegetables. The Meeting also estimated STMR and HR values of 0.01 and 0.01 mg/kg for CGA 322704 residues in legume vegetables.

Pulses

Supervised trials data were available for beans, peas and soya beans.

Beans, dry

Supervised trials data for thiamethoxam seed treatment uses on beans were available from the USA.

In the USA, thiamethoxam is registered for use as an FS formulation on bean seed at 50 g ai per 100 kg seed, i.e., 0.5 g ai/kg seed.

In nine bean trials in the US with seeds treated at the label rate (0.5 g ai/kg seed) and in nine trials where seeds were treated at 3 × the label rate, residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested dry beans.

Peas, dry

Supervised trials data for thiamethoxam seed treatment uses on peas producing dry peas were available from the USA, Denmark, France and Germany.

In the USA, thiamethoxam is registered for use as an FS formulation on pea seed at 25 g ai per 100 kg seed, i.e., 0.25 g ai/kg seed.

In five pea trials in the US with seeds treated at 2 × the label rate (0.5 g ai/kg seed), residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested dry peas. In five pea trials in the US with seeds treated at 6 × the label rate (1.4 g ai/kg seed), residues of thiamethoxam did not exceed the LOQ (0.01 mg/kg) in the harvested dry peas. CGA 322704 residues were: < 0.01 (3), 0.02 and 0.02 mg/kg.

In the Czech Republic, thiamethoxam is registered for use as an FS formulation on pea seed at 53 g ai per 100 kg seed (0.53 g ai/kg seed).

In 20 pea trials in Europe (Denmark—two, France—14 and Germany—four) with seeds treated with thiamethoxam at 0.5 g ai/kg seed (Czech Republic GAP), residues of thiamethoxam in the harvested dry peas at maturity were: < 0.02 (18), 0.02 and < 0.05 mg/kg. In the same 20 trials, residues of CGA 322704 were all below LOQ (0.02 (19) and < 0.05 mg/kg).

The Meeting recognized that residues of thiamethoxam and metabolite CGA 322704 from seed treatment uses were mostly below LOQ, but could sometimes occur in the dry peas.

Soya beans

Supervised trials data for thiamethoxam seed treatment uses on soya beans were available from the USA.

In the USA, thiamethoxam is registered for use as an FS formulation on soya bean seeds at 50 g ai per 100 kg seed, i.e., 0.5 g ai/kg seed.

In 15 soya bean trials in the US with seeds treated at the label rate (0.5 g ai/kg seed), residues of thiamethoxam and CGA 322704 did not exceed the LOQ (0.01 mg/kg) in the harvested soya bean dry seed.

Summary—Pulses

Residue data with suitable GAP were available for dry beans, dry peas and soya beans. Residues were almost all below LOQ. The Meeting decided to estimate pulse group maximum residue levels.

On the basis of the 20 seed treatment trials on peas in Europe, the Meeting estimated a maximum residue level of 0.04 mg/kg for thiamethoxam on pulses. On the basis of the CGA 322704 data from the same trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for CGA 322704 on pulses.

The same data were used for STMR estimates. The Meeting estimated an STMR value of 0.02 mg/kg for thiamethoxam residues in pulses. The Meeting also estimated an STMR value of 0.02 mg/kg for CGA 322704 residues in pulses.

Root and tuber vegetables

Supervised trials data were available for carrots, potatoes, radishes and sugar beets.

Carrots

Supervised trials data for thiamethoxam uses on carrots were available from the USA.

In the USA, thiamethoxam may be used in foliar applications to root vegetables (includes carrot) at 0.070 kg ai/ha, with harvest permitted 7 days after an application. Thiamethoxam may also be used as a soil surface band with incorporation after sowing or in-furrow spray treatments with an application rate of 0.21 kg ai/ha for root vegetables.

In eight carrot trials in the USA matching the foliar GAP conditions, thiamethoxam residues in carrots did not exceed the LOQ (0.01 mg/kg). In the same eight trials, residues of CGA 322704 in carrots also in did not exceed the LOQ (0.01 mg/kg).

In six carrot trials in the USA matching the soil surface band GAP conditions, thiamethoxam residues in carrots in rank order were: < 0.01 (2), 0.01, 0.02, 0.02 and 0.04 mg/kg. In the same six trials, residues of CGA 322704 in carrots did not exceed the LOQ (0.01 mg/kg).

Potatoes

Supervised trials data for thiamethoxam uses on potatoes were available from France, Germany, Spain, Switzerland, the UK and the USA.

In Spain, foliar applications of thiamethoxam may be made to potatoes at 0.025 kg ai/ha, with harvest 7 days after an application. In Hungary, foliar applications of thiamethoxam may be made to potatoes at 0.020 kg ai/ha, with harvest 7 days after an application. These two use patterns are very similar and were used to evaluate the trials from France, Germany, Spain, Switzerland and the UK.

In 13 potato trials in Europe (France—four, Germany—two, Spain—four, Switzerland—two and the UK—one) with foliar application of thiamethoxam at 0.025 kg ai/ha and harvest of tubers 7 days later, residues of thiamethoxam and CGA 322704 did not exceed the LOQs (< 0.02 mg/kg) in any tuber sample.

In the USA, thiamethoxam is registered for foliar application to tuberous and corm vegetables (includes potato) at 0.053 kg ai/ha, with harvest permitted 14 days after an application. Also, potato seed pieces may be treated with thiamethoxam FS at 4.3–6.2 g ai per 100 kg seed.

In 14 potato trials in the USA with foliar application of thiamethoxam at approx 2 × the label rate (0.099 kg ai/ha) and harvest of tubers 14 days later, residues of thiamethoxam and CGA 322704 did not exceed the LOQs (< 0.01 mg/kg) in any tuber sample.

In 16 potato trials in the USA with potato seed pieces treated with thiamethoxam FS and DS at 8 g ai per 100 kg seed pieces, the residues of thiamethoxam in harvested mature tubers were: < 0.01 (11), 0.02, 0.05, 0.14, 0.18 and 0.20 mg/kg (NAFTA calculator: 0.242. OECD calculator Mean + 4SD: 0.308). In the same 16 trials, residues of CGA 322704 in the harvested tubers were: < 0.01 (12), 0.04,

0.04, 0.06 and 0.15 mg/kg (NAFTA calculator: 0.135. OECD calculator Mean+4SD: 0.172). Note that the nominal 8 g ai per 100 kg seed pieces in these trials is 30% higher than the label maximum rate 6.2 g ai per 100 kg seed. These data sets were selected for maximum residue level estimations on the root and tuber vegetables group.

Radishes

Supervised trials data for thiamethoxam uses on radishes were available from the USA.

In the USA, thiamethoxam may be used in a single foliar application to radishes at 0.070 kg ai/ha, with harvest permitted 7 days after the application. Thiamethoxam may also be used as a soil surface band with incorporation after sowing with an application rate of 0.11 kg ai/ha for radishes.

In six radish trials in the USA matching the foliar GAP conditions, thiamethoxam residues in radish roots in rank order were: < 0.01 (4), 0.01 and 0.01 mg/kg. In the same six trials, residues of CGA 322704 in radish roots did not exceed the LOQ (0.01 mg/kg).

In six radish trials in the USA matching the foliar GAP conditions, thiamethoxam residues in radish tops in rank order were: 0.07, 0.10, 0.17, 0.18, 0.30 and 0.64 mg/kg. In the same six trials, residues of CGA 322704 in radish tops in rank order were: 0.02, 0.02, 0.03, 0.04, 0.05 and 0.13 mg/kg. The Meeting noted that both the thiamethoxam and CGA 322704 residue concentrations in radish tops fell within the maximum residue levels estimated for the leafy vegetables group.

In four radish trials in the USA matching the soil surface band application GAP conditions, thiamethoxam residues in radish roots in rank order were: < 0.01 (3) and 0.02 mg/kg. In the same four trials, residues of CGA 322704 in radish roots did not exceed the LOQ (0.01 mg/kg).

In four radish trials in the USA matching the soil surface band application GAP conditions, thiamethoxam residues in radish tops in rank order were: < 0.01, 0.09, 0.09 and 0.38 mg/kg. In the same four trials, residues of CGA 322704 in radish tops in rank order were: < 0.01 (2), 0.03 and 0.10 mg/kg.

Sugar beet

Supervised trials data for thiamethoxam uses on sugar beets were available from France, Germany, Italy, Netherlands, Spain, Switzerland and the UK. No suitable GAP information was available to evaluate the trials from Italy, Spain and Switzerland.

In the UK, thiamethoxam is registered for use as an FS formulation on sugar beet seeds at 60 g ai per 100,000 seeds.

In nine sugar beet trials in Europe (France—three, Germany—three, Netherlands—one, Sweden—one and the UK—one) matching UK seed treatment GAP conditions, thiamethoxam residues in harvested sugar beets did not exceed LOQ (0.02 mg/kg). In the same nine trials, residues of CGA 322704 in sugar beets also did not exceed LOQ (0.02 mg/kg).

Summary—Root and tuber vegetables

Residue data with suitable GAP were available for carrots, radishes, potatoes and sugar beets. Residues were highest in potatoes and the Meeting decided to estimate root and tuber vegetables group maximum residue levels based on the potatoes data.

On the basis of the potato seed piece treatment with thiamethoxam FS and DS in 16 US trials, the Meeting estimated a maximum residue level of 0.3 mg/kg for thiamethoxam on root and tuber vegetables. On the basis of the CGA 322704 data on potatoes from the same 16 trials, the Meeting estimated a maximum residue level of 0.2 mg/kg for CGA 322704 on root and tuber vegetables.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.01 and 0.20 mg/kg respectively for thiamethoxam residues in root and tuber vegetables.

The Meeting estimated STMR and HR values of 0.01 and 0.15 mg/kg respectively for CGA 322704 residues in root and tuber vegetables.

Stalk and stem vegetables

Supervised trials data were available for artichokes and celery.

Artichoke, Globe

Supervised trials data for thiamethoxam uses on globe artichokes were available from the USA.

In the USA, thiamethoxam WG may be used in foliar applications to globe artichokes at 0.053 kg ai/ha, with harvest permitted 4 days after an application.

In three globe artichoke trials in the USA matching foliar GAP conditions, thiamethoxam residues in globe artichokes in rank order were: 0.17, 0.23 and 0.24 mg/kg. In the same three trials, residues of CGA 322704 in globe artichokes in rank order were: 0.023, 0.024 and 0.029 mg/kg.

Globe artichoke is a minor crop and the Meeting agreed to evaluate the data. The Meeting estimated a maximum residue level of 0.5 mg/kg for thiamethoxam on globe artichokes. On the basis of the CGA 322704 data on globe artichokes from the same three trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for CGA 322704 on globe artichokes.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.23 and 0.24 mg/kg respectively for thiamethoxam residues in globe artichokes. The Meeting estimated STMR and HR values of 0.024 and 0.029 mg/kg respectively for CGA 322704 residues in globe artichokes.

Celery

Supervised trials data for thiamethoxam uses on celery were available from the USA.

In the USA, thiamethoxam WG may be used in foliar applications on leafy vegetables (includes celery) at 0.096 kg ai/ha, with harvest permitted 7 days after an application. Thiamethoxam may also be used as a soil drench treatment at sowing or planting of leafy vegetables at 0.19 kg ai/ha. Trials with the drench treatment could not be evaluated because the trial rate did not match the GAP rate.

In six celery trials in the USA matching the foliar GAP conditions, thiamethoxam residues in celery in rank order were: 0.09, 0.10, 0.16, 0.25, 0.38 and 0.43 mg/kg (NAFTA calculator: 0.927. OECD calculator Mean + 4SD: 0.812). In the same six trials, residues of CGA 322704 in celery in rank order were: < 0.01 (4), 0.01 and 0.02 mg/kg.

On the basis of the foliar applications on celery in six US trials, the Meeting estimated a maximum residue level of 1 mg/kg for thiamethoxam on celery. On the basis of the CGA 322704 data on celery from the same six trials, the Meeting estimated a maximum residue level of 0.04 mg/kg for CGA 322704 on celery.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.21 and 0.43 mg/kg respectively for thiamethoxam residues in celery. The Meeting estimated STMR and HR values of 0.01 and 0.02 mg/kg respectively for CGA 322704 residues in celery.

Cereal grains

Supervised trials data were available for barley, maize, popcorn, rice and wheat.

Barley

Supervised trials data were available for barley from France, Germany, the UK and the USA.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on barley at 53 g ai per 100 kg seed, i.e., 0.53 g ai/kg seed.

In 24 barley seed-treatment trials in Europe (France—19, Germany—two and the UK—three) with conditions (application rates 0.53–0.78 g ai/kg seed) approximately aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in barley grain from 23 trials did not exceed LOQ (0.02 mg/kg), while 0.02 mg/kg was recorded in grain from one trial. In the same 24 trials, residues of CGA 322704 in barley grain also did not exceed LOQ (0.02 mg/kg).

US GAP for barley allows the use of thiamethoxam WG for foliar applications at 0.070 kg ai/ha with a 21 days PHI.

In nine barley trials in the USA matching the foliar GAP conditions, thiamethoxam residues in barley in rank order were: < 0.01 (3), 0.01, 0.12, 0.14, 0.14, 0.15 and 0.21 mg/kg (NAFTA calculator: .0.325. OECD calculator Mean + 4SD: 0.403). In the same nine trials, residues of CGA 322704 in barley in rank order were: < 0.01 (7), 0.01 and 0.02 mg/kg. These data sets were selected for maximum residue level estimations.

On the basis of the foliar applications on barley in nine US trials, the Meeting estimated a maximum residue level of 0.4 mg/kg for thiamethoxam on barley. On the basis of the CGA 322704 data on barley from the same nine trials, the Meeting estimated a maximum residue level of 0.04 mg/kg for CGA 322704 on barley.

The same data were used for STMR estimates. The Meeting estimated an STMR value of 0.12 mg/kg for thiamethoxam residues in barley. The Meeting estimated an STMR value of 0.01 mg/kg for CGA 322704 residues in barley.

Maize

Supervised trials data for thiamethoxam seed treatment uses on maize were available from France, Germany, Spain and the USA.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on maize at 315 g ai per 100 kg seed, i.e., 3.15 g ai/kg seed.

The European supervised trials on maize were evaluated with the seed treatment GAP of the Czech Republic and Romania.

In 24 maize seed-treatment trials in Europe (France–15, Germany–six, and Spain–three) with conditions aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in maize grain from 23 trials did not exceed LOQ (0.02 mg/kg), while 0.04 mg/kg was recorded in grain from one trial. In the same 24 trials, residues of CGA 322704 in maize grain also did not exceed LOQ (0.02 mg/kg).

In the USA, thiamethoxam is formulated as an FS seed treatment that may be used on maize at 1.25 mg ai per kernel. This is equivalent to approx 4.5 g ai/kg seed for a single kernel weight of 0.28 g.

In 21 maize trials in the USA matching the US seed treatment GAP conditions, thiamethoxam residues in maize grain did not exceed LOQ (0.01 mg/kg). In the same 21 trials, residues of CGA 322704 in maize grain also did not exceed LOQ (0.01 mg/kg). In two trials with a seed treatment rate of 13.5 g ai/kg seed (3 × the label rate), residues of thiamethoxam and CGA 322704 also did not exceed LOQ (0.01 mg/kg).

The maize metabolism studies showed that very low concentrations of thiamethoxam and metabolite CGA 322704 could occur in the maize grain from a seed treatment.

On the basis of the seed treatment uses on maize in 24 European trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for thiamethoxam on maize. On the basis of the CGA 322704 data on maize from the same 24 trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for CGA 322704 on maize.

The same data were used for STMR estimates. The Meeting estimated an STMR value of 0.02 mg/kg for thiamethoxam residues in maize. The Meeting also estimated an STMR value of 0.02 mg/kg for CGA 322704 residues in maize.

Popcorn

Supervised trials data for thiamethoxam use on popcorn were available from the USA.

In the USA, thiamethoxam is formulated as an FS seed treatment that may be used on popcorn at 1.25 mg ai per kernel. This is equivalent to approx 4.5 g ai/kg seed for a single kernel weight of 0.28 g.

In three popcorn trials in the USA where the seed had been treated with thiamethoxam FS at 4.5 g ai/kg seed, thiamethoxam residues and CGA 322704 residues in the harvested grain were all below LOQ (0.01 mg/kg).

The Meeting estimated a maximum residue level and an STMR value, both at 0.01 mg/kg for thiamethoxam in popcorn.

The Meeting estimated a maximum residue level and an STMR value, both at 0.01 mg/kg for CGA 322704 in popcorn.

Rice

Supervised trials data were available for rice from Brazil and Japan.

In Japan, thiamethoxam formulated as an SC may be applied to rice as foliar sprays at a concentration of 0.0065 kg ai/hL. A 14 days PHI is observed. Thiamethoxam GR may also be used as a seed-box treatment at 0.8 g ai per litre of soil.

In two reverse-decline rice trials in Japan with seed-box treatment and foliar application aligned with GAP, residues of thiamethoxam in hulled rice grain were: 0.064 and 0.092 mg/kg. It should be noted that higher residues occurred at 28 days PHI than at shorter intervals. In the same two trials, CGA 322704 residues in the hulled rice grain were: 0.068 and 0.088 mg/kg.

Brazil has a registered seed treatment use for thiamethoxam FS on rice at 100 g ai per 100 kg seed, i.e., 1 g ai/kg seed. Thiamethoxam as a WG formulation may also be used in foliar applications on rice at 0.0375 kg ai/ha with observation of a 21 days PHI.

In three rice trials in Brazil with application conditions, seed treatment 1.4 g ai/kg seed, and foliar application at 0.05 kg ai/ha (33% higher than label), thiamethoxam residues in rice grain were: < 0.02, < 0.02 and 0.03 mg/kg. In three other trials with application conditions, seed treatment 1.4 g ai/kg seed, and foliar application at 0.028 kg ai/ha (25% lower than label), thiamethoxam residues in rice grain were: 0.27, 0.22 and 0.32 mg/kg. The data are apparently inconsistent with residues from the 0.028 kg ai/ha application rate approximately 10 times as high as residues from the 0.05 kg ai/ha application rate.

Residues of CGA 322704 in the six trials (approximately label rate) from Brazil were < 0.02, < 0.02, < 0.02, 0.02, 0.07 and 0.08 mg/kg.

Six trials for rice is very minimal for a major crop and the Meeting decided not to estimate a maximum residue level.

Wheat

Supervised trials data were available for wheat from France, Germany, Switzerland and the UK.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on wheat at 53 g ai per 100 kg seed, i.e., 0.53 g ai/kg seed.

In 34 wheat seed-treatment trials in Europe (France—31, Germany—two and the UK—one) with conditions (application rates 0.56–0.64 g ai/kg seed) approximately aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in wheat grain from 34 trials did not exceed

LOQ (0.02 mg/kg). In the same 34 trials, residues of CGA 322704 in wheat grain also did not exceed LOQ (0.02 mg/kg).

Hungarian GAP for wheat allows the use of thiamethoxam WG for foliar applications at 0.040 kg ai/ha with a 14 days PHI.

In 22 wheat trials in Europe (France—13, Germany—four, Switzerland—two and the UK—three) with conditions aligned with the GAP of Hungary (but application rate 0.050 kg ai/ha instead of 0.040 kg ai/ha and eight trials also included seed treatments), thiamethoxam residues in wheat grain from 22 trials were: < 0.02 (16), 0.02, 0.02, 0.02, 0.03, 0.03 and 0.04 mg/kg (NAFTA calculator: 0.037. OECD calculator Mean + 4SD: 0.042). In the same 22 trials, residues of CGA 322704 in wheat grain did not exceed LOQ (0.02 mg/kg). These data sets were selected for maximum residue level estimations.

On the basis of the foliar applications on wheat in 22 European trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for thiamethoxam on wheat. On the basis of the CGA 322704 data on wheat from the same 22 trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for CGA 322704 on wheat.

The same data were used for STMR estimates. The Meeting estimated STMR values of 0.02 and 0.02 mg/kg respectively for thiamethoxam residues and CGA 322704 residues in wheat.

Tree nuts

Pecans

Supervised trials data were available for pecans from the USA.

In the USA, a ZC (mixed formulation of CS capsule suspension and SC suspension concentrate) is registered for foliar application to pecans at 0.054 kg ai/ha. A 14 days PHI is to be observed.

Eight pecan trials were carried out at five sites in the USA. At three of the sites, application was made with a low-volume concentrated spray to simulate aerial application in one trial and as a high-volume dilute spray in the parallel trial. The remaining two sites had one trial each, one at high volume and the other at low volume. The trials included a second active ingredient, pymetrozine, as a tank mix.

In eight pecan trials at five sites in the USA with foliar application of a thiamethoxam WG formulation at 0.074 kg ai/ha and pecan harvest at 12 or 14 days after the second application, residues of thiamethoxam in pecan kernels did not exceed the LOQ (0.01 mg/kg). In the same eight trials, residues of CGA 322704 in pecan kernels also did not exceed the LOQ (0.01 mg/kg).

On the basis of the foliar applications on pecans in eight US trials, the Meeting estimated a maximum residue level of 0.01 mg/kg for thiamethoxam on pecans. On the basis of the CGA 322704 data on pecans from the same eight trials, the Meeting estimated a maximum residue level of 0.01 mg/kg for CGA 322704 on pecans.

The same data were used for STMR and HR estimates. The Meeting estimated STMR and HR values of 0.01 and 0.01 mg/kg for thiamethoxam residues in pecans. The Meeting also estimated STMR and HR values of 0.01 and 0.01 mg/kg for CGA 322704 residues in pecans.

Oilseed

Supervised trials data were available for cotton seed, oilseed rape and sunflower.

Cotton

Supervised trials data were available for cotton from Greece, Spain and the USA.

In the USA, a thiamethoxam FS formulation is registered for seed-treatment of cotton seed at 0.30–0.34 mg ai per seed. For a 100 mg cotton seed this would translate to 3.0–3.4 g ai/kg seed.

Thiamethoxam is also registered for foliar use on cotton at 0.070 kg ai/ha, with observation of a 21 days PHI.

In the cotton trials from the US, the seed treatment rate was in accord with US GAP, but foliar application rates in the trials (0.032, 0.045, 0.05, 0.15 and 0.25 kg ai/ha) were not in accord with the GAP rate, 0.070 kg ai/ha, so it was not possible to evaluate the cotton trials data.

In Spain, a thiamethoxam WG formulation is registered for foliar applications to cotton at 0.050 kg ai/ha with a PHI of 28 days.

In 13 cotton trials in Europe (Greece–eight and Spain–five) matching the foliar GAP conditions of Spain, thiamethoxam residues in cotton seed did not exceed the LOQ (0.02 mg/kg). In the same 13 trials, residues of CGA 322704 in cotton seed also did not exceed the LOQ (0.02 mg/kg). Some of the trials had also included a thiamethoxam seed treatment at 1.9–2.7 g ai/kg seed, but it is expected that the foliar treatment would produce the higher residues; in this case residue levels did not exceed the LOQ from the combined uses. The residue data were reported for dehulled seed and cotton hulls separately. Residues of thiamethoxam and CGA 322704 in cotton hulls were also below LOQ (0.05 mg/kg) in all samples.

Oilseed rape

Supervised trials data were available for seed treatment uses on oilseed rape from France, Germany, Sweden and the UK.

In Germany and the UK, thiamethoxam FS formulations are registered for use as seed treatments on rapeseed at 420 g ai per 100 kg seed.

In 14 trials in France, nine in Germany, one in Sweden and five in the UK where rapeseed was treated with thiamethoxam in WS or FS formulations, then sown and the crop grown to maturity, residues of thiamethoxam in rapeseed were all below LOQ (0.02 mg/kg). Residues of metabolite CGA 322704 in rapeseed were also all below LOQ (0.02 mg/kg) in the same trials.

Sunflowers

Supervised trials data were available for sunflowers from the USA.

In the USA, a thiamethoxam FS formulation is registered for seed-treatment of sunflower seeds at 0.25 mg ai per seed. For a 60–70 mg sunflower seed this would translate to 3.6–4.2 g ai/kg seed.

In eight sunflower trials in the USA matching the GAP conditions, thiamethoxam residues in sunflower seeds did not exceed the LOQ (0.01 mg/kg). In the same eight trials, residues of CGA 322704 in sunflower seeds also did not exceed the LOQ (0.01 mg/kg).

Residues of thiamethoxam and CGA 322704 also did not exceed LOQ (0.01 mg/kg) in two trials where seed treatment rates were 12.2 and 11.3 g ai/kg seed (3 × the label rate), suggesting a nil residue situation.

Summary—Oilseeds

Residue data with suitable GAP were available for sunflowers, cotton and oilseed rape. The Meeting noted that thiamethoxam and CGA 322704 residues were mostly below LOQ, but were highest in cotton seed and decided to estimate oilseed group maximum residue levels based on the cotton seed data set.

On the basis of the foliar applications on cotton in 13 European trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for thiamethoxam on oilseed. On the basis of the CGA 322704 data on cotton seed from the same 13 trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for CGA 322704 on oilseed.

The same data were used for STMR estimates. The Meeting estimated STMR values of 0.02 and 0.02 mg/kg respectively for thiamethoxam residues and CGA 322704 residues in oilseed.

Seed for beverages and sweets

Cacao

Supervised trials data were available for foliar application of thiamethoxam in the production of cacao beans in Côte d'Ivoire.

In Cameroon, thiamethoxam WG is registered for foliar application to cacao at 0.025 kg ai/ha. A PHI of 30 days is to be observed.

In four cacao trials in Côte d'Ivoire matching the GAP conditions of Cameroon, thiamethoxam residues in fermented dried cacao beans did not exceed the LOQ (0.02 mg/kg). In the same four trials, residues of CGA 322704 in dried cacao beans also did not exceed the LOQ (0.02 mg/kg).

On the basis of the foliar applications on cacao in four Côte d'Ivoire trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for thiamethoxam on dried cacao beans. On the basis of the CGA 322704 data from the same four trials, the Meeting estimated a maximum residue level of 0.02 mg/kg for CGA 322704 on dried cacao beans.

The same data were used for STMR estimates. The Meeting estimated STMR values of 0.02 and 0.02 mg/kg respectively for thiamethoxam residues and CGA 322704 residues in dried cacao beans.

Coffee

Supervised trials data were available for thiamethoxam uses in the production of coffee beans in Brazil.

In Brazil, thiamethoxam may be used in soil treatments in the production of coffee—GR granules applied to the soil at 0.30 kg ai/ha, max annual dose 0.60 kg ai/ha; PHI 90days;WG drench on soil under coffee tree at 0.50 kg ai/ha, PHI 90 days.

In six coffee trials in Brazil matching the GAP conditions of GR treatment of the soil, thiamethoxam residues in coffee beans in rank order were: 0.02, 0.02, 0.02, 0.02, 0.03 and 0.04 mg/kg. In the same six trials, residues of CGA 322704 in coffee beans in rank order were: < 0.01 (4), 0.02 and 0.02 mg/kg.

In six coffee trials in Brazil matching the GAP conditions of WG drench treatment of the soil, thiamethoxam residues in coffee beans in rank order were: 0.02, 0.03, 0.03, 0.04, 0.04 and 0.06 mg/kg (NAFTA calculator: 0.082. OECD calculator 3*Mean: 0.110). In the same six trials, residues of CGA 322704 in coffee beans in rank order were: < 0.01 (3), 0.02, 0.02 and 0.03 mg/kg (NAFTA calculator: 0.046. OECD calculator Mean + 4SD: 0.049). These data sets were selected for maximum residue level estimations.

The Meeting noted that the trials with granular soil treatments produced residues of the same order as those from the drench treatment and provided support for the six soil drench trials.

On the basis of the six Brazilian trials with soil drench treatments, the Meeting estimated a maximum residue level of 0.2 mg/kg for thiamethoxam on coffee beans. On the basis of the CGA 322704 data on coffee beans from the same six trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for CGA 322704 on coffee beans.

The same data were used for STMR estimates. The Meeting estimated STMR values of 0.035 and 0.015 mg/kg respectively for thiamethoxam residues and CGA 322704 residues in coffee beans.

Legume animal feeds

Pea fodder

Supervised trials data for thiamethoxam seed treatment uses on peas producing dry peas were available from the USA, Denmark, France and Germany. Residue data on pea vines and fodder were also provided.

In the Czech Republic, thiamethoxam is registered for use as an FS formulation for pea seed treatment at 53 g ai per 100 kg seed (0.53 g ai/kg seed).

In 12 pea trials in Europe (Denmark—two, France—six and Germany—four) with seeds treated with thiamethoxam at 0.5 g ai/kg seed (Czech Republic GAP), residues of thiamethoxam in the harvested haulm at maturity, i.e., the pea fodder, in rank order were: 0.02 < 0.04, < 0.05 (6), 0.06, 0.11, 0.18 and 0.21 mg/kg. In the same 12 trials, residues of CGA 322704 in the pea fodder were: 0.02, < 0.04 (2), < 0.05 (6), < 0.1 (2) and 0.09 mg/kg.

On a dry-weight basis (DM = 88%), thiamethoxam residues in pea fodder were (n = 12): 0.02, < 0.04, < 0.05 (6), 0.07, 0.13, 0.20 and 0.24 mg/kg (NAFTA calculator: 0.291. OECD calculator Mean + 4SD: 0.361). Residues of CGA 322704 in the pea fodder, dry weight, were (n = 12): 0.02, < 0.04 (2), < 0.05 (6), < 0.1 (2) and 0.10 mg/kg (NAFTA calculator: 0.139).

The Meeting estimated a maximum residue level of 0.3 mg/kg for thiamethoxam on pea fodder. On the basis of the CGA 322704 data from the same 12 trials, the Meeting estimated a maximum residue level of 0.2 mg/kg for CGA 322704 on pea fodder.

The same data were used for STMR and highest residue estimates. The Meeting estimated STMR and highest residue values of 0.05 and 0.24 mg/kg respectively for thiamethoxam residues in pea fodder. The Meeting estimated STMR and highest residue values of 0.05 and 0.10 mg/kg respectively for CGA 322704 residues in pea fodder.

In 11 of the same pea trials in Europe, residue data were available on whole plant (pea vines) sampled approximately 50–70 days after sowing. Residues of thiamethoxam in the pea whole plant, in rank order were: < 0.05(4), 0.02, 0.04, 0.05, 0.05, 0.07, 0.07 and 0.10 mg/kg. In the same 11 trials, residues of CGA 322704 in the pea whole plant were: < 0.04 (4) and < 0.05 (7) mg/kg.

The Meeting estimated STMR and highest residue values of 0.04 and 0.10 mg/kg respectively for thiamethoxam residues in pea vines. The Meeting estimated STMR and highest residue values of 0.05 and 0.05 mg/kg respectively for CGA 322704 residues in pea vines.

Straw, fodder and forage of cereal grains

Maize forage and fodder

Supervised trials data for thiamethoxam seed treatment uses on maize were available from France, Germany, Spain and the USA.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on maize at 315 g ai per 100 kg seed, i.e., 3.15 g ai/kg seed. The supervised trials on maize from Europe were evaluated with the seed treatment GAP of the Czech Republic and Romania.

In 22 maize seed-treatment trials in Europe (France—15, Germany—six and Spain—one) with conditions aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in maize fodder from all trials did not exceed LOQ (0.02 (7), 0.04 (8) and 0.05 mg/kg (7)). In the same 22 trials, residues of CGA 322704 in maize fodder also did not exceed LOQ (same LOQs).

In 10 of these trials (France—five and Germany—five), residues were measured on the whole plant at an earlier stage, i.e., maize forage. Thiamethoxam residues in maize forage in these 10 trials did not exceed LOQ (0.02 (5), 0.04 (2) and 0.05 mg/kg (3)). In the same 10 trials, residues of CGA 322704 in maize forage also did not exceed LOQ (same LOQs).

In the USA, thiamethoxam is formulated as an FS seed treatment that may be used on maize or sweet corn at 1.25 mg ai per kernel. This is equivalent to approx 4.5 g ai/kg seed for a single kernel weight of 0.28 g.

In 35 maize and sweet corn trials in the USA matching the US seed treatment GAP conditions, thiamethoxam residues in maize stover (maize fodder) were: < 0.01 (31), 0.01, 0.01, 0.02 and 0.03 mg/kg. In the same 35 trials, residues of CGA 322704 in maize fodder did not exceed LOQ (0.01 mg/kg). On a dry-weight basis (DM = 83%), thiamethoxam residues in maize fodder were (n = 35): < 0.01 (31), 0.01, 0.01, 0.02 and 0.04 mg/kg. These data sets were selected for maximum residue level estimations.

In 33 maize and sweet corn trials in the USA matching the US seed treatment GAP conditions, thiamethoxam residues in maize forage were: < 0.01 (17), 0.01, 0.01, 0.01, 0.01, 0.01, 0.02, 0.02, 0.02, 0.02, 0.02, 0.04, 0.04, 0.04, 0.04, 0.04 and 0.05 mg/kg. In the same 33 trials, residues of CGA 322704 in maize forage were: < 0.01 (30), 0.01, 0.01 and 0.02 mg/kg. The Meeting estimated STMR and highest residue values of 0.01 and 0.05 mg/kg for thiamethoxam in maize forage. The Meeting also estimated STMR and highest residue values of 0.01 and 0.02 respectively for CGA 322704 in maize forage.

On the basis of the seed treatment uses on maize and sweet corn in 35 US trials, the Meeting estimated a maximum residue level of 0.05 mg/kg for thiamethoxam on maize fodder. On the basis of the CGA 322704 data on maize fodder from the same 35 trials, the Meeting estimated a maximum residue level of 0.01 mg/kg for CGA 322704 on maize fodder.

The same data were used for STMR and highest residue estimates. The Meeting estimated STMR and highest residue values of 0.01 and 0.04 mg/kg respectively for thiamethoxam residues in maize fodder. The Meeting estimated STMR and highest residue values of 0.01 and 0.01 mg/kg for CGA 322704 residues in maize fodder.

Barley straw and fodder

Supervised trials data were available for barley from France, Germany, the UK and the USA.

US GAP for barley allows the use of thiamethoxam WG for foliar applications at 0.070 kg ai/ha with a 21 days PHI.

In eight barley trials in the USA matching the foliar GAP conditions, thiamethoxam residues in barley straw in rank order were: < 0.01 (2), 0.03, 0.03, 0.19, 0.26, 0.27 and 0.33 mg/kg. In the same eight trials, residues of CGA 322704 in barley straw in rank order were: < 0.01 (3), 0.01, 0.02, 0.03, 0.03 and 0.03 mg/kg.

In the same eight barley trials in the USA matching the foliar GAP conditions, thiamethoxam residues in barley hay in rank order were: < 0.01 (2), 0.02, 0.02, 0.20, 0.21, 0.25 and 0.27 mg/kg. In the same eight trials, residues of CGA 322704 in barley hay in rank order were: < 0.01 (3), 0.01, 0.02, 0.02, 0.02 and 0.03 mg/kg.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on barley at 53 g ai per 100 kg seed, i.e., 0.53 g ai/kg seed.

In 24 barley seed treatment trials in Europe (France—19, Germany—two and the UK—three) with conditions (application rates 0.53–0.78 g ai/kg seed) approximately aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in barley straw from the 24 trials did not exceed LOQ (0.02–0.05 mg/kg). In the same 24 trials, residues of CGA 322704 in barley straw also did not exceed LOQ (0.02–0.05 mg/kg) in 23 of the trials with a CGA 322704 residue of 0.04 mg/kg recorded in one barley straw.

In 10 of the same barley seed-treatment trials in Europe (France—nine and Germany—one), residues were measured on barley whole plant. Thiamethoxam residues in barley whole plant were: < 0.02, < 0.04 (5), < 0.05, 0.05, 0.05 and 0.11 mg/kg. In the same 10 trials, residues of CGA 322704 in barley whole plant did not exceed LOQ (0.02–0.05 mg/kg).

The Meeting estimated STMR and highest residue values of 0.04 and 0.11 mg/kg respectively for thiamethoxam residues in barley whole plant. The Meeting estimated STMR and highest residue values of 0.04 and 0.05 mg/kg respectively for CGA 322704 residues in barley whole plant.

Wheat straw and fodder

Supervised trials data, including data on wheat straw and fodder, were available for wheat from France, Germany, Switzerland and the UK.

In the Czech Republic and Romania, thiamethoxam is formulated as an FS seed treatment that may be used on wheat at 53 g ai per 100 kg seed, i.e., 0.53 g ai/kg seed.

In 34 wheat seed-treatment trials in Europe (France—31, Germany—two and the UK—one) with conditions (application rates 0.56–0.64 g ai/kg seed) approximately aligned with the GAP of the Czech Republic and Romania, thiamethoxam residues in wheat straw from 34 trials did not exceed LOQ (0.04–0.05 mg/kg). In the same 34 trials, residues of CGA 322704 in wheat straw also did not exceed LOQ (0.04–0.05 mg/kg), except for one trial: CGA 322704 residue = 0.05 mg/kg.

In 12 of the same wheat seed-treatment trials in Europe (France—11 and Germany—one), residues were measured on wheat whole plant. Thiamethoxam residues in wheat whole plant were: < 0.02 (4), < 0.04 (5), 0.02, 0.02 and 0.05 mg/kg. In the same 10 trials, residues of CGA 322704 in wheat were: < 0.02 (3), < 0.04 (5), < 0.05, 0.02, 0.02 and 0.02 mg/kg.

Hungarian GAP for wheat allows the use of thiamethoxam WG for foliar applications at 0.040 kg ai/ha with a 14 days PHI.

In 21 wheat trials in Europe (France—14, Germany—two, Switzerland—two and the UK—three) with conditions aligned with the GAP of Hungary (but application rate 0.050 kg ai/ha instead of 0.040 kg ai/ha and six trials also included a seed treatment), thiamethoxam residues in wheat straw from 21 trials were: < 0.04, 0.05, 0.14, 0.15, 0.17, 0.22, 0.25, 0.28, 0.32, 0.33, 0.34, 0.35, 0.37, 0.42, 0.44, 0.51, 0.51, 0.65, 0.80, 1.4 and 1.5 mg/kg. In the same 21 trials, residues of CGA 322704 in wheat straw were: < 0.04 (8), < 0.05 (5), 0.03, 0.04, 0.06, 0.07, 0.08, 0.10, 0.10 and 0.12 mg/kg.

On a dry-weight basis (DM = 88%), thiamethoxam residues in wheat straw were (n = 21): < 0.04, 0.06, 0.16, 0.17, 0.19, 0.25, 0.28, 0.32, 0.36, 0.38, 0.39, 0.40, 0.42, 0.48, 0.50, 0.58, 0.58, 0.74, 0.91, 1.6 and 1.7 mg/kg. On a dry-weight basis (DM=88%), CGA 322704 residues in wheat straw were (n = 21): < 0.04 (8), < 0.05 (5), 0.03, 0.05, 0.07, 0.08, 0.09, 0.11, 0.11 and 0.14 mg/kg. These datasets were used for MRL estimation.

In 12 of these same wheat trials in Europe (France—10 and Germany—two) with conditions aligned with the GAP of Hungary (but application rate 0.050 kg ai/ha instead of 0.040 kg ai/ha and six trials also included a seed treatment), thiamethoxam residues were measured on wheat whole plants or equivalent: < 0.04, 0.28, 0.38, 0.41, 0.50, 0.51, 0.55, 0.58, 0.61, 0.63, 0.66 and 0.73 mg/kg. In the same 12 trials, residues of CGA 322704 in wheat whole plants were: < 0.04 (5), < 0.05 (3), 0.04, 0.05, 0.05 and 0.06 mg/kg.

The Meeting estimated STMR and highest residue values of 0.53 and 0.73 mg/kg respectively for thiamethoxam residues in wheat whole plants. The Meeting estimated STMR and highest residue values of 0.05 and 0.06 mg/kg respectively for CGA 322704 residues in wheat whole plant.

Rice straw

Data were available for rice straw from two supervised trials, but this was insufficient for an evaluation.

Summary of 'Barley straw and fodder' and 'Wheat straw and fodder'

Barley straw and fodder, and wheat straw and fodder, as commodities of trade, may not always be readily distinguishable from each other. It is therefore preferable for the two commodities to have the same MRLs.

Thiamethoxam residues in wheat straw from 21 trials were: < 0.04, 0.05, 0.14, 0.15, 0.17, 0.22, 0.25, 0.28, 0.32, 0.33, 0.34, 0.35, 0.37, 0.42, 0.44, 0.51, 0.51, 0.65, 0.80, 1.4 and 1.5 mg/kg. Thiamethoxam residues in barley straw from eight trials were: < 0.01 (2), 0.03, 0.03, 0.19, 0.26, 0.27 and 0.33 mg/kg.

Residues of CGA 322704 in wheat straw were: < 0.04 (8), < 0.05 (5), 0.03, 0.04, 0.06, 0.07, 0.08, 0.10, 0.10 and 0.12 mg/kg. Residues of CGA 322704 in barley straw were: < 0.01 (3), 0.01, 0.02, 0.03, 0.03 and 0.03 mg/kg.

In this case, residues in wheat straw were higher than in the barley straw. The Meeting agreed to use the wheat straw data for both the barley straw and fodder MRL, and the wheat straw and fodder MRL.

On a dry-weight basis (DM = 88%), thiamethoxam residues in wheat straw were (n = 21): < 0.04, 0.06, 0.16, 0.17, 0.19, 0.25, 0.28, 0.32, 0.36, 0.38, 0.39, 0.40, 0.42, 0.48, 0.50, 0.58, 0.58, 0.74, 0.91, 1.6 and 1.7 mg/kg (NAFTA calculator: 2.974. OECD calculator Mean + 4SD: 2.246). On a dry-weight basis (DM = 88%), CGA 322704 residues in wheat straw were (n = 21): < 0.04 (8), < 0.05 (5), 0.03, 0.05, 0.07, 0.08, 0.09, 0.11, 0.11 and 0.14 mg/kg (NAFTA calculator: 0.149. OECD calculator Mean + 4SD: 0.178).

On the basis of the foliar applications on wheat in 21 European trials, the Meeting estimated a maximum residue level of 2 mg/kg for thiamethoxam on wheat straw and fodder, dry. On the basis of the CGA 322704 data on wheat straw from the same 21 trials, the Meeting estimated a maximum residue level of 0.2 mg/kg for CGA 322704 on wheat straw and fodder, dry.

The same data were used for STMR and highest residue estimates. The Meeting estimated STMR and highest residue values of 0.39 and 1.7 mg/kg respectively for thiamethoxam residues in wheat straw and fodder, dry. The Meeting estimated STMR and highest residue values of 0.05 and 0.14 mg/kg respectively for CGA 322704 residues in wheat straw and fodder, dry.

On the basis of these same wheat data, the Meeting estimated a maximum residue level of 2 mg/kg for thiamethoxam on barley straw and fodder, dry, and a maximum residue level of 0.2 mg/kg for CGA 322704 on barley straw and fodder, dry. The Meeting also estimated STMR and highest residue values of 0.39 and 1.7 mg/kg respectively for thiamethoxam residues in barley straw and fodder, dry, and STMR and highest residue values of 0.05 and 0.14 mg/kg respectively for CGA 322704 residues in barley straw and fodder, dry.

Miscellaneous fodder and forage crops

Sugar beet leaves and tops

Supervised trials data for thiamethoxam uses on sugar beets, including data on leaves and tops, were available from France, Germany, Netherlands, Spain, Switzerland and the UK. No suitable GAP information was available to evaluate the trials from Italy, Spain and Switzerland.

In the UK, thiamethoxam is registered for use as an FS formulation on sugar beet seeds at 60 g ai per 100,000 seeds.

In 10 sugar beet trials in Europe (France—three, Germany—three, Netherlands—one, Spain—one, Sweden—one and the UK—one) matching UK seed treatment GAP conditions (application rate 60 ± 15 g ai per 100,000 seeds), thiamethoxam residues in sugar beet tops or leaves did not exceed LOQ (0.02 mg/kg). CGA 322704 residues in sugar beet tops or leaves also did not exceed LOQ (0.02 mg/kg).

The data were used for STMR and highest residue estimates. The Meeting estimated STMR and highest residue values of 0.02 and 0.02 mg/kg for thiamethoxam residues in sugar beet tops or leaves. The Meeting estimated STMR and highest residue values of 0.02 and 0.02 mg/kg also for CGA 322704 residues in sugar beet tops or leaves.

Rape seed forage and fodder

Supervised trials data were available for seed treatment uses on oilseed rape from France, Germany, Sweden and the UK.

In Germany and the UK, thiamethoxam FS formulations are registered for use as seed treatments on rapeseed at 420 g ai per 100 kg seed.

In four trials in France, seven in Germany, one in Sweden and two in the UK where rapeseed was treated with thiamethoxam at the GAP rate, then sown and the forage sampled 1–7 months later, residues of thiamethoxam in rapeseed plant were all below LOQ (0.05 mg/kg). Residues of metabolite CGA 322704 in rapeseed plant were also all below LOQ (0.05 mg/kg) in the same trials.

In seven trials in Germany and one in Sweden where rapeseed was treated with thiamethoxam at the GAP rate, then sown and the crop grown to maturity, residues of thiamethoxam in rapeseed straw were all below LOQ (0.05 mg/kg). Residues of metabolite CGA 322704 in rapeseed straw were also all below LOQ (0.05 mg/kg) in the same trials.

The data were used for STMR and highest residue estimates. The Meeting estimated STMR and highest residue values of 0.05 and 0.05 mg/kg for thiamethoxam residues in rapeseed forage. The Meeting estimated STMR and highest residue values of 0.05 and 0.05 mg/kg also for CGA 322704 residues in rapeseed forage.

Cotton gin by-products

Supervised trials data were available for seed treatment and foliar uses on cotton from the USA.

In the USA, a thiamethoxam FS formulation is registered for seed-treatment of cotton seed at 0.30–0.34 mg ai per seed. For a 100 mg cotton seed this would translate to 3.0–3.4 g ai/kg seed. Thiamethoxam is also registered for foliar use on cotton at 0.070 kg ai/ha, with observation of a 21 days PHI.

In the cotton trials from the US, the seed treatment rate was in accord with US GAP, but foliar application rates in the trials (0.032, 0.045, 0.05, 0.15 and 0.25 kg ai/ha) were not in accord with the GAP rate, 0.070 kg ai/ha, so it was not possible to evaluate the cotton trials residue data on gin trash.

Dried herbs

Hops

Supervised trials data for thiamethoxam use on hops were available from the USA.

Thiamethoxam may be used in the USA as a soil surface band application with incorporation during the production of hops. The application rate is 0.14 kg ai/ha and the PHI is 65 days.

In three hops trials in the USA matching the GAP conditions, thiamethoxam residues in hops dry cones in rank order were: < 0.025, 0.027 and 0.055 mg/kg. In the same three trials, residues of CGA 322704 in hops dry cones in rank order were: < 0.025, 0.025 and 0.028 mg/kg.

The Meeting agreed that three trials are insufficient for maximum residue level estimation on hops.

Teas

Supervised trials data for thiamethoxam use on tea were available from Japan.

In Japan, thiamethoxam SG (soluble granule) formulation is registered for foliar application during the production of tea. The spray concentration is 0.005 kg ai/hL and the PHI is 7 days.

Immediately after harvest in the tea trials in Japan, the leaves were processed with an in-house tea processing machine and then enclosed in aluminium bags for delivery to the laboratory. The processing consisted of drying, breaking the leaves to expose enzymes and tissues to oxidation and allowing a period of oxidation by exposure in the air.

In six tea trials in Japan matching the GAP conditions, thiamethoxam residues in crude processed tea leaves in rank order were: 2.1, 2.3, 2.7, 5.5, 7.1 and 8.6 mg/kg (NAFTA calculator: 16.92. OECD calculator Mean + 4SD: 15.76). In the same six trials, residues of CGA 322704 in crude processed tea leaves in rank order were: 0.06, 0.08, 0.08, 0.16, 0.25 and 0.28 mg/kg (NAFTA calculator: 0.581. OECD calculator Mean + 4SD: 0.531).

The Meeting estimated a maximum residue level of 20 mg/kg for thiamethoxam on tea, green and black. On the basis of the CGA 322704 data on tea from the same six trials, the Meeting estimated a maximum residue level of 0.7 mg/kg for CGA 322704 on tea, green and black.

The same data were used for STMR estimates. The Meeting estimated an STMR value of 4.1 mg/kg for thiamethoxam residues in tea. The Meeting estimated an STMR value of 0.12 mg/kg for CGA 322704 residues in tea.

Fate of residues during food processing

The Meeting received information on the fate of thiamethoxam residues during the processing of apples to juice and pomace; barley to pearled barley, barley bran, barley flour, beer, wort and malt; coffee beans to roasted coffee; cotton seed to meal and refined oil; grapes to juice, pomace and wine; maize to grits, flour, oil and starch; oranges to pulp, juice and oil; plums to dried prunes; potato to wet peelings, flakes and chips; tomatoes to juice, pulp, puree and paste; and wheat to semolina, bran, flour and bread.

Also information was provided on hydrolysis studies of thiamethoxam to assist with identification of the nature of the residue during processing.

Thiamethoxam was essentially stable during the hydrolysis conditions simulating food processing conditions.

Processing factors have been calculated for thiamethoxam residues during the following processes: apples processing to juice and wet pomace; barley processing to pearled barley, bran, flour, and beer; coffee beans to roasted coffee; cotton seed to meal and oil; grapes to pomace and wine; oranges to pulp and juice; plums to dried prunes; tomatoes to juice, paste and puree; and wheat to semolina, wheat bran, wheat bread and wheat flour. Processing factors were also calculated for CGA 322704 residues in the following processes: apples to apple juice and wet pomace; coffee beans to roasted coffee; plums to dried prunes; and tomatoes to paste and puree.

Calculated processing factors are summarised in the following table. Factors are indicated with a '<' (less-than) sign when the residue in the processed commodity is below the LOQ of the analytical method. The calculation is then made on the LOQ of the analytical method and the residue concentration of the RAC (raw agricultural commodity). The medians of the observed values or the best estimates of the processing factors are summarised in the final column of the table.

Only those processes are included in the table that lead to STMR-P or HR-P values useful for dietary intake estimations or for livestock dietary burden calculations.

Raw agricultural commodity (RAC)	Processed commodity	Calculated processing factors.	Median or best estimate
THIAMETHOXAM			
Apple	apple juice	0.20, 0.27, 0.38, 0.92, 0.94, 1.00, < 1.00, 1.04	0.93
Apple	wet pomace	1.08, 1.38, 1.41, 1.50, 1.60, 1.67, 1.91, 2.00	1.55
Barley	barley flour	0.08	0.08
Barley	pearled barley	0.25	0.25
Coffee beans	roasted coffee	< 0.14, < 0.14, < 0.17, < 0.20, < 0.20, < 0.20, < 0.25, < 0.25, < 0.25, < 0.33, < 0.33, < 0.50	< 0.14
Cotton seed	cotton seed meal	0.15, 0.20, 0.27, < 0.3, 0.49	0.27
Cotton seed	cotton seed oil refined	< 0.02, < 0.08, < 0.09, < 0.20, < 0.33	< 0.02
Grapes	dry pomace	3.4, 4.4	3.9
Grapes	wet pomace	1.3, 1.5, 4.3	1.5

Raw agricultural commodity (RAC)	Processed commodity	Calculated processing factors.	Median or best estimate
Grapes	wine	0.70, 0.73, 0.79, 1.00 , 1.05, 1.33, 1.60, 1.60,	1.0
Orange	dried pulp	2.0, 3.25	2.6
Orange	orange juice	< 0.25, < 0.5	< 0.25
Plum	dried prunes	0.60, 0.83, < 1.0	0.83
Tomato	tomato juice	0.67, 1.0	0.67
Tomato	tomato paste	1.25, 2.00, 2.24, 2.40, 2.94, 2.94, 3.10, 3.86, 3.91, 4.21, 4.33, 6.00	3.0
Tomato	tomato pulp	1.0, 1.0	1.0
Tomato	tomato puree	0.40, 0.50, 0.64, 0.91, 1.06, 1.12, 1.13, 1.50, 1.87, 2.00, 2.21, 2.50	1.1
Wheat	semolina	< 0.7	< 0.7
Wheat	wheat bran	1	1
Wheat	wheat bread	< 0.7	< 0.7
Wheat	wheat flour	< 0.7	< 0.7
CGA 322704			
Apple	apple juice	1.0, 1.0, 1.0	1.0
Apple	wet pomace	1.4, 1,5, 1.5	1.5
Coffee beans	roasted coffee	< 0.33, < 0.33, < 0.33, < 0.33, < 0.33, < 0.50, < 0.50, < 0.50, < 0.50, < 0.50	< 0.3
Plum	dried prunes	1.5, 2.0	1.75
Tomato	tomato paste	2.00, 2.38, 3.33, 3.75, 5.50, 5.78, 6.0, 6.0, 6.5, 6.5, 9.7, 11.3	5.9
Tomato	tomato puree	0.50, 0.67, 1.0, 1.19, 1.33, 1.75, 2.50, 2.75, 3.0, 3.44, 3.54, 6.0,	2.1

Thiamethoxam residues in tea were investigated for percentage infusion and, by inference, percentage consumption.

Tea infusions were prepared by adding boiling water to dried and processed tea leaves from a thiamethoxam supervised residue trial and allowing to stand for 5 minutes. The infusion was filtered and analysed and the % infusion (% of residue extracted into the boiling water) was calculated. For thiamethoxam, the average % infusion was 97%, range 68–130%, n = 12. For CGA 322704, average % infusion was 94%, range 80–100%, n = 10.

The processing factors for thiamethoxam residues for oranges → orange juice (1.1) and oranges → orange dry pulp (2.6) were applied to the citrus fruits STMR, 0.028 mg/kg, to produce an orange juice STMR-P of 0.031 mg/kg and an orange dry pulp STMR-P of 0.073 mg/kg.

The processing factors for thiamethoxam residues for apples → apple juice (0.93) and apples → apple pomace (1.55) were applied to the pome fruit STMR, 0.07 mg/kg, to produce an apple juice STMR-P of 0.065 mg/kg and an apple wet pomace STMR-P of 0.11 mg/kg.

The processing factor for thiamethoxam residues for plums → dried prunes (0.83) was applied to the stone fruits STMR and HR, 0.195 and 0.6 mg/kg, to produce a dried prunes STMR-P of 0.16 mg/kg and an HR-P of 0.50 mg/kg.

The processing factors for thiamethoxam residues for grapes → wine (1) and grapes → dry grape pomace (3.9) were applied to the berry fruits STMR, 0.055 mg/kg, to produce a wine STMR-P of 0.055 mg/kg and a dry grape pomace STMR-P of 0.21 mg/kg.

The processing factors for thiamethoxam residues for tomato → tomato juice (0.67), tomato → tomato paste (3), tomato → tomato pulp (1) and tomato → tomato puree (1.1) were applied to the fruiting vegetables STMR, 0.08 mg/kg, to produce a tomato juice STMR-P of 0.054 mg/kg, a tomato paste STMR-P of 0.24 mg/kg, a tomato pulp STMR-P of 0.08 mg/kg and a tomato puree STMR-P of 0.088 mg/kg.

The processing factors for thiamethoxam residues for barley → barley flour (0.08) and barley → pearled barley (0.25) were applied to the barley STMR, 0.12 mg/kg, to produce a barley flour STMR-P of 0.010 mg/kg and a pearled barley STMR-P of 0.030 mg/kg.

The processing factors for thiamethoxam residues for wheat → semolina (0.7), wheat → wheat bran (1), wheat → wheat bread (0.7) and wheat → wheat flour (0.7) were applied to the wheat STMR, 0.02 mg/kg, to produce a semolina STMR-P of 0.014 mg/kg, a wheat bran STMR-P of 0.020 mg/kg, a wheat bread STMR-P of 0.014 mg/kg and a wheat flour STMR-P of 0.014 mg/kg.

The processing factors for thiamethoxam residues for cotton seed → cotton seed meal (0.27) and cotton seed → refined cotton seed oil (0.02) were applied to the oilseed STMR, 0.02 mg/kg, to produce a cotton seed meal STMR-P of 0.0054 mg/kg and a refined cotton seed oil STMR-P of 0.0004 mg/kg.

The processing factor for thiamethoxam residues for coffee beans → roasted coffee (0.14) was applied to the coffee beans STMR, 0.035 mg/kg, to produce a roasted coffee STMR-P of 0.0049 mg/kg.

The fate of CGA 322704 residues during food processing is dealt with in the clothianidin evaluation.

Residues in animal commodities

The Meeting received a lactating dairy cow feeding study, which provided information on likely residues resulting in animal tissues and milk from thiamethoxam residues in the animal diet.

Lactating Holstein dairy cows were dosed for 29 days once daily via gelatin capsule with thiamethoxam at the equivalent of 2, 6 and 20 ppm in the dry-weight diet.

Parent thiamethoxam did not occur above LOQ (0.01 mg/kg) in liver or fat tissues at the highest test dose. Parent thiamethoxam residues were higher in muscle than in other tissues, but residues did not exceed the LOQ at the 2 ppm dosing level.

Metabolite CGA 322704 did not occur above LOQ (0.01 mg/kg) in any of the tissues except liver.

At 2 ppm dosing, the only residues above LOQ in tissues were: CGA 322704 in liver at 0.028–0.049 mg/kg.

At 6 ppm dosing, residues above LOQ in tissues were: thiamethoxam in muscle at 0.01 mg/kg; CGA 322704 in liver at 0.09–0.14 mg/kg.

Residue levels of parent thiamethoxam and metabolite CGA 322704 reached plateau levels in milk approximately 3–5 days after the commencement of dosing. At 2 and 6 ppm dosing, the approximate plateau levels for thiamethoxam in milk were 0.007–0.008 mg/kg and 0.03–0.05 mg/kg, respectively. For CGA 322704, the plateau levels in milk at 6 ppm dosing were approximately 0.01–0.02 mg/kg.

Livestock dietary burden

The Meeting estimated the dietary burden of thiamethoxam in livestock on the basis of the diets listed in OECD Feed Table 2009 (available from the FAO website: *http://www.fao.org/agriculture/crops/core-themes/theme/pests/pm/jmpr/jmpr-docs/en/)*.

Calculation from highest residue, STMR (some bulk commodities) and STMR-P values provides the levels in feed suitable for estimating MRLs, while calculation from STMR and STMR-P values for feed is suitable for estimating STMR values for animal commodities.

Some processed and forage commodities do not appear in the *Recommendations Table* (because no maximum residue level is needed) but they are used in estimating livestock dietary burdens. Those commodities are listed here. Also, the terminology for commodities in the OECD feed tables is not always identical to descriptions in the original studies or Codex descriptions and some clarification is needed.

Commodity	Thiamethoxam STMR or STMR-P, mg/kg	High residue, mg/kg
Apple wet pomace	0.11	
Barley whole plant = Barley forage	0.04	0.11
Beans (dry) = Bean seed	See Recommendations Table, pulses	
Cabbages (including wrapper leaves)	0.78	3.0
Cotton seed meal = Cotton meal	0.0054	
Dry grape pomace	0.21	
Maize = Field corn grain	See Recommendations Table	
Maize fodder = Field corn, stover	See Recommendations Table	
Maize forage = Field corn, forage/silage	0.01	0.05
Orange dry pulp = Citrus dried pulp	0.073	
Pea hay or Pea fodder (dry) = Pea hay	See Recommendations Table	
Pea vines	0.04	0.10
Peas (dry) = Pea seed	See Recommendations Table, pulses	
Rapeseed forage	0.05	0.05
Soya bean (dry) = Soya bean seed	See Recommendations Table, pulses	
Sugar beet tops or leaves = Beet, sugar tops	0.02	0.02
Wheat whole plant = Wheat forage	0.53	0.73

The data on CGA 322704 residues in feed materials will be needed for dietary burden calculations for clothianidin.

Commodity	CGA 322704 STMR or STMR-P, mg/kg	High residue, mg/kg
Barley whole plant	0.04	0.05
Beans (dry) = Bean seed	See Recommendations Table	
Cabbages (including wrapper leaves)	0.03	0.08
Maize = Field corn grain	See Recommendations Table	
Maize fodder = Field corn, stover	See Recommendations Table	
Maize forage = Field corn, forage/silage	0.01	0.02
Pea hay or Pea fodder (dry) = Pea hay	See Recommendations Table	
Pea vines	0.05	0.05
Peas (dry) = Pea seed	See Recommendations Table	
Rapeseed forage	0.05	0.05
Soya bean (dry) = Soya bean seed	See Recommendations Table	
Sugar beet tops or leaves = Beet, sugar tops	0.02	0.02
Wheat whole plant = Wheat forage	0.05	0.06

Estimated maximum and mean dietary burdens of livestock

Dietary burden calculations for beef cattle, dairy cattle, broilers and laying poultry are provided in Annex 6 of the 2010 Report of the JMPR. The calculations were made according to the livestock diets from US-Canada, EU, Australia and Japan in the OECD Feed Table 2009.

		Livestock dietary burden, thiamethoxam, ppm of dry matter diet			
		US-Canada	EU	Australia	Japan
Max	beef cattle	0.55	5.21	2.92	0.10
	dairy cattle	0.89	5.23[a,c]	2.01	0.12
	Poultry—broiler	0.11	0.27	0.04	0.03
	Poultry—layer	0.11	1.59[e]	0.04	0.02
Mean	beef cattle	0.13	1.60	2.12[b]	0.10
	dairy cattle	0.56	1.59[d]	1.35	0.07
	Poultry—broiler	0.11	0.11	0.04	0.03
	Poultry—layer	0.11	0.59[f]	0.04	0.02

[a] Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian meat.

[b] Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian meat.

[c] Highest maximum dairy cattle dietary burden suitable for MRL estimates for milk.

[d] Highest mean dairy cattle dietary burden suitable for STMR estimates for milk.

[e] Highest maximum poultry dietary burden suitable for MRL estimates for poultry meat and eggs.

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry meat and eggs.

Animal commodities maximum residue level estimation

Cattle

For MRL estimation, the high residues in the tissues were calculated by interpolating the maximum dietary burden (5.23 ppm) between the relevant feeding levels (2 and 6 ppm) from the dairy cow feeding study and using the highest tissue concentrations from individual animals within those feeding groups.

The STMR values for the tissues were calculated by interpolating the STMR dietary burden (2.12 ppm) between the relevant feeding levels (2 and 6 ppm) from the dairy cow feeding study and using the mean tissue concentrations from those feeding groups.

For milk MRL estimation, the high residues in the milk were calculated by interpolating the maximum dietary burden (5.23 ppm) between the relevant feeding levels (2 and 6 ppm) from the dairy cow feeding study and using the mean milk concentrations from those feeding groups.

The STMR value for milk was calculated by interpolating the STMR dietary burden (1.59 ppm) between the relevant feeding levels (0 and 2 ppm) from the dairy cow feeding study and using the mean milk concentrations from those feeding groups.

In the table, dietary burdens are shown in round brackets (), feeding levels and residue concentrations from the feeding study are shown in square brackets [] and estimated concentrations related to the dietary burdens are shown without brackets.

Dietary burden (ppm)	Thiamethoxam residues				
Feeding level [ppm]	Milk	Muscle	Liver	Kidney	Fat
MRL					
	mean	highest	highest	highest	highest
MRL beef cattle (5.23) [2, 6]		0.01 [< 0.01, 0.01]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01]
MRL dairy cattle (5.23) [2, 6]	0.028 [0.007, 0.033]				
STMR					
	mean	mean	mean	mean	mean
STMR beef cattle (2.12) [2, 6]		0.01 [< 0.01, 0.01]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01]
STMR dairy cattle (1.59) [0, 2]	0.006 [0, 0.007]				

The data from the cattle feeding studies were used to support the estimation of maximum residue levels for mammalian meat and milk.

Residues in milk were estimated as 0.028 and 0.006 mg/kg resulting from the maximum (5.23 ppm) and STMR (1.59 ppm) dietary burdens respectively.

The Meeting estimated a maximum residue level for thiamethoxam in milks of 0.05 mg/kg. The Meeting also estimated an STMR for milk of 0.006 mg/kg.

The Meeting estimated a maximum residue level for thiamethoxam in edible offal of 0.01* mg/kg. The estimation is based on the liver and kidney data. The Meeting estimated an STMR value and an HR value of 0.01 and 0.01 mg/kg for edible offal.

For muscle, the residue arising from a dietary burden of 5.23 ppm was calculated as 0.01 mg/kg. The Meeting estimated a maximum residue level for meat as 0.02 mg/kg. STMR and HR values for muscle and fat were all estimated as 0.01 mg/kg.

Cattle—CGA 322704 residues

The residues of CGA 322704 were evaluated in the same way as described above for thiamethoxam.

In the table, dietary burdens are shown in round brackets (), feeding levels and residue concentrations from the feeding study are shown in square brackets [] and estimated concentrations related to the dietary burdens are shown without brackets.

Dietary burden, thiamethoxam (ppm) Feeding level [ppm]	CGA 322704 residues Milk	Muscle	Liver	Kidney	Fat
MRL					
	mean	highest	highest	highest	highest
MRL beef cattle (5.23) [2, 6]		< 0.01 [< 0.01, < 0.01]	0.12[a] [0.049, 0.14]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01 (20 ppm)]
MRL dairy cattle (5.23) [2, 6]	0.011 0.005, 0.013]				
STMR					
	mean	mean	mean	mean	mean
STMR beef cattle (2.12) [2, 6]		< 0.01 [< 0.01, < 0.01]	0.041[b] [0.039, 0.12]	< 0.01 [< 0.01, < 0.01]	< 0.01 [< 0.01, < 0.01 (20 ppm)]
STMR dairy cattle (1.59) [0, 2]	0.004 [0, 0.005]				

[a] Residue 0.12 mg/kg expressed as thiamethoxam is equivalent to 0.10 mg/kg expressed as CGA 322704.

[b] Residue 0.041 mg/kg expressed as thiamethoxam is equivalent to 0.0.035 mg/kg expressed as CGA 322704.

The CGA 322704 data from the thiamethoxam cattle feeding studies were used to support the estimation of maximum residue levels for mammalian meat and milk.

CGA 322704 residues in milk were estimated as 0.011 and 0.004 mg/kg resulting from the maximum (5.23 ppm) and STMR (1.59 ppm) dietary burdens respectively.

The Meeting estimated a maximum residue level for CGA 322704 in milks of 0.02 mg/kg. The Meeting also estimated a CGA 322704 STMR for milk of 0.004 mg/kg.

For liver, the CGA 322704 residues arising from dietary burdens of 5.23 ppm and 1.59 ppm were 0.10 and 0.035 mg/kg, respectively. The Meeting estimated a maximum residue level for CGA 322704 in liver of 0.2 mg/kg. The Meeting estimated an STMR value and an HR value of 0.035 and 0.10 mg/kg, respectively, for CGA 322704 residues in liver.

For kidney, the CGA 322704 residue arising from a dietary burden of 5.23 ppm was calculated as < 0.01 mg/kg. The Meeting agreed to use the kidney data to estimate a maximum residue level for edible offal except liver. The Meeting estimated a maximum residue level for edible offal except liver as 0.01* mg/kg. CGA 322704 STMR and HR values for edible offal except liver were estimated as 0.01 mg/kg.

For muscle, the CGA 322704 residue arising from a dietary burden of 5.23 ppm was calculated as < 0.01 mg/kg. The Meeting estimated a maximum residue level for meat as 0.01* mg/kg. STMR and HR values for muscle and fat were all estimated as 0.01 mg/kg.

Poultry

The thiamethoxam maximum dietary burden for poultry is 1.59 ppm and the mean dietary burden is 0.59 ppm.

No poultry feeding study is available for thiamethoxam, but the metabolism studies suggest that parent thiamethoxam would be unlikely to be present at measurable concentrations in poultry tissues or eggs from a dietary burden of 1.59 ppm.

When laying hens in the metabolism studies were dosed with thiamethoxam at the equivalent of 112 and 98 ppm (^{14}C-thiazolyl and ^{14}C-oxadiazin, respectively) in the feed, parent thiamethoxam was found in lean meat and eggs at concentrations of 0.14–0.19 mg/kg and 0.03 mg/kg respectively. It may be reasonably anticipated that the levels of thiamethoxam in tissues and eggs resulting from a dietary burden of 1.59 mg/kg would be well below the LOQ of the analytical method (0.01 mg/kg).

Thiamethoxam was a very minor part of the residue in poultry liver, whereas CGA 322704 constituted 34% and 39% of the liver TRR (8.2 and 9.2 mg/kg) in the poultry metabolism study with ^{14}C labels in the thiazol and oxadiazin positions, respectively. Metabolite CGA 265307 was the major residue component in the eggs, both whites (45% and 47%) and yolks (69% and 54%), and also in fat + skin (54% and 57%). The complexity of the metabolite mixture makes it difficult to select an ideal residue definition for risk assessment.

In the two poultry metabolism studies, the lower dosing (equivalent to 98 ppm in diet) produced slightly higher TRR values for tissues and eggs, so was selected for the purpose of exposure assessment.

	Concentrations, mg/kg, expressed as thiamethoxam				
	Lean meat	Fat + skin	Liver	Egg white	Egg yolk
TRR, mg/kg at dose equiv to 98 ppm in metabolism study	0.93	0.42	9.2	0.30	0.30
For max residue level estimation					
Calculated TRR, mg/kg for dietary burden 1.59 ppm = TRR × (1.59/98)	0.015	0.0068	0.149	0.0049	0.0049
Calculated thiamethoxam, mg/kg, for dietary burden 1.59 ppm = TRR × (1.59/98) × (%TRR/100)	0.0032 (21% TRR)	0.0003 (5% TRR)	0.0003 (0.2% TRR)	0.0001 (1.9% TRR)	0.0005 (11.1% TRR)
Calculated CGA 322704, mg/kg for dietary burden 1.59 ppm = TRR × (1.59/98) × (%TRR/100)	0.0002 (1.5% TRR)	0.0005 (7.7% TRR)	0.058 Note[a] (39% TRR)	0.001 (20% TRR)	0.001 (20% TRR)
For STMR estimation					
Calculated TRR, mg/kg for dietary burden 0.59 ppm = TRR × (0.59/98)	0.0056	0.0025	0.055	0.0018	0.0018
Calculated thiamethoxam, mg/kg, for dietary burden 0.59 ppm = TRR × (0.59/98) × (%TRR/100)	0.0012 (21% TRR)	0.0001 (5% TRR)	0.0001 (0.2% TRR)	0.00003 (1.9% TRR)	0.0002 (11.1% TRR)
Calculated CGA 265307, mg/kg for dietary burden 0.59 ppm = TRR × (0.59/98) × (%TRR/100)	0.0005 (8.4% TRR)	0.0014 (57% TRR)	0.0088 (16% TRR)	0.0008 (47% TRR)	0.00097 (54% TRR)
Calculated MU3, mg/kg for dietary burden 0.59 ppm = TRR × (0.59/98) × (%TRR/100)	0.0016 (28% TRR)	0.0001 (3.6% TRR)	0.0066 (12% TRR)		
Total of thiamethoxam + CGA 265307 + MU3 (expressed as thiamethoxam) for dietary burden 0.59 ppm	0.0032 (57.4% TRR)	0.0016 (65.6%)	0.016 (28.2%)	0.001 (48.9%)	0.0012 (65.1%)
Calculated CGA 322704, mg/kg for dietary burden 0.59 ppm = TRR × (0.59/98) × (%TRR/100)	0.0001 (1.5% TRR)	0.0002 (7.7% TRR)	0.021 Note[b] (39% TRR)	0.0004 (20% TRR)	0.0004 (20% TRR)

[a] Residue 0.058 mg/kg expressed as thiamethoxam is equivalent to 0.050 mg/kg expressed as CGA 322704.

[b] Residue 0.021 mg/kg expressed as thiamethoxam is equivalent to 0.018 mg/kg expressed as CGA 322704.

On the basis of the calculated thiamethoxam residues in tissues and eggs (0.0001–0.0032 mg/kg) for a dietary burden of 1.59 ppm, the Meeting estimated maximum residue levels of 0.01* mg/kg for thiamethoxam in poultry meat, offal and eggs.

On the basis of the calculated thiamethoxam + CGA 265307 + MU3 residues (expressed as thiamethoxam) residues in lean meat (0.0032 mg/kg), liver (0.016 mg/kg) and eggs (0.001 mg/kg) for a dietary burden of 0.59 ppm, the Meeting estimated STMR values of 0.01 mg/kg for thiamethoxam in poultry meat and eggs and 0.016 mg/kg for poultry edible offal.

Similar calculations were made for a dietary burden of 1.59 ppm. On the basis of the calculated thiamethoxam + CGA 265307 + MU3 residues (expressed as thiamethoxam) residues in lean meat (0.0088 mg/kg), liver (0.042 mg/kg) and eggs (0.003 mg/kg) for a dietary burden of 1.59 ppm, the Meeting estimated HR values of 0.01 mg/kg for thiamethoxam in poultry meat and eggs and 0.042 mg/kg for poultry edible offal.

On the basis of the calculated CGA 322704 residues in lean meat (0.0002 mg/kg), liver (0.050 mg/kg) and eggs (0.0001 mg/kg) for a thiamethoxam dietary burden of 1.59 ppm, the Meeting estimated maximum residue levels of 0.01* mg/kg for CGA 322704 in poultry meat, 0.1 mg/kg for poultry offal and 0.01* mg/kg for eggs.

On the basis of the calculated CGA 322704 residues in lean meat (0.0001 mg/kg), liver (0.018 mg/kg) and eggs (0.0004 mg/kg) for a thiamethoxam dietary burden of 0.59 ppm, the Meeting estimated STMR values of 0.01 mg/kg for CGA 322704 in poultry meat and eggs and 0.018 mg/kg for poultry edible offal.

On the basis of the calculated CGA 322704 residues in lean meat (0.0002 mg/kg), liver (0.050 mg/kg) and eggs (0.0001 mg/kg) for a thiamethoxam dietary burden of 1.59 ppm, the Meeting estimated HR values of 0.01 mg/kg for CGA 322704 in poultry meat and eggs and 0.050 mg/kg for poultry edible offal.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI and IESTI assessment. The Meeting recommended the following residue definition for thiamethoxam.

Definition of the residue for animal and plant commodities (for compliance with the MRL): *thiamethoxam*.

Definition of the residue for plants and animals (except poultry), (for estimation of dietary intake): *thiamethoxam;* and

CGA 322704 (CGA 322704 to be included with clothianidin and considered separately from thiamethoxam). See also clothianidin.

Definition of the residue for poultry (for estimation of dietary intake): *sum of thiamethoxam, CGA 265307 and MU3, expressed as thiamethoxam;* and

CGA 322704 (CGA 322704 to be included with clothianidin and considered separately from thiamethoxam). See also clothianidin.

The residue is not fat-soluble.

Note that thiamethoxam metabolite CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N'-methyl-N''-nitroguanidine) will appear as clothianidin in the analytical method and residues of CGA 322704 occurring in food are included in the clothianidin MRLs.

Metabolite CGA 265307: N-(2-chlorothiazol-5-ylmethyl)-N'-nitroguanidine.

Metabolite MU3: amino-([(2-chlorothiazol-5-ylmethyl)-amino]-methylene)-hydrazide.

	Commodity	THIAMETHOXAM Maximum residue level recommendations,	STMR or STMR-P	HR or HR-P
CCN	Name	mg/kg	mg/kg	mg/kg
VS 0620	Artichoke, Globe	0.5	0.23	0.24
FI 0327	Banana	0.02*	0.02	0.02
GC 0640	Barley	0.4	0.12	
AS 0640	Barley straw and fodder, dry	2	0.39	1.7
FB 0018	Berries and other small fruits	0.5	0.055	0.26
VB 0040	Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead Brassicas	5	0.53	1.1
SB 0715	Cacao beans	0.02*	0.02	
VS 0624	Celery	1	0.21	0.43
FC 0001	Citrus fruits	0.5	0.028	0.104
SB 0716	Coffee beans	0.2	0.035	
MO 0105	Edible offal (Mammalian)	0.01*	0.01	0.01
PE 0112	Eggs	0.01*	0.01	0.01
VC 0045	Fruiting vegetables, Cucurbits	0.5	0.105	0.29
VO 0050	Fruiting vegetables, other than Cucurbits (except sweet corn)	0.7	0.08	0.47
VL 0053	Leafy vegetables	3	0.54	1.9
VP 0060	Legume vegetables	0.01*	0.01	0.01
GC 0645	Maize	0.05	0.02	
AS 0645	Maize fodder	0.05	0.01	0.04
MM 0095	Meat (from mammals other than marine mammals)	0.02	0.01 muscle 0.01 fat	0.01 muscle 0.01 fat
ML 0106	Milks	0.05	0.006	
SO 0088	Oilseed	0.02*	0.02	
FI 0350	Papaya	0.01*	0	0
AL 0072	Pea hay or Pea fodder (dry)	0.3	0.05	0.24
TN 0672	Pecan	0.01*	0.01	0.01
HS 0444	Peppers Chilli, dried	7	0.8	4.7
FI 0353	Pineapple	0.01*	0	0
FP 0009	Pome fruits	0.3	0.07	0.15
GC 0656	Popcorn	0.01*	0.01	
PM 0110	Poultry meat	0.01*	0.01	0.01
PO 0111	Poultry, Edible offal of	0.01*	0.016	0.042
VD 0070	Pulses	0.04	0.02	
VR 0075	Root and tuber vegetables	0.3	0.01	0.20
FS 0012	Stone fruits	1	0.195	0.60
VO 0447	Sweet corn (corn-on-the-cob)	0.01*	0.01	0.01
DT 1114	Tea, Green, Black (black, fermented and dried)	20	4.1	
GC 0654	Wheat	0.05	0.02	
AS 0654	Wheat straw and fodder, dry	2	0.39	1.7
	Apple juice		0.065	
	Barley flour		0.010	
	Barley, pearled		0.030	
	Coffee, roasted		0.0049	
	Cotton seed oil, Refined		0.0004	
	Orange juice		0.031	
	Prunes, dried		0.16	0.50
	Semolina		0.014	
JF 0048	Tomato juice		0.054	
VW 0448	Tomato paste		0.24	
	Tomato pulp		0.08	
	Wheat bran		0.020	
	Wheat bread		0.014	

	Commodity	THIAMETHOXAM Maximum residue level recommendations,	STMR or STMR-P	HR or HR-P
CCN	Name	mg/kg	mg/kg	mg/kg
	Wheat flour		0.014	
	Wine		0.055	

* At or about the limit of quantification.

For plants and animals

Definition of the residue (for compliance with the MRL and for estimation of dietary intake): *CGA 322704 (N-(2-chlorothiazol-5-ylmethyl)-N′-methyl-N″-nitroguanidine)*.

The residue is not fat soluble.

	Commodity	CGA 322704 Maximum residue level recommendations,	STMR or STMR-P	HR or HR-P
CCN	Name	mg/kg	mg/kg	mg/kg
VS 0620	Artichoke, Globe	0.05	0.024	0.029
FI 0327	Banana	0.02*	0.02	0.02
GC 0640	Barley	0.04	0.01	
AS 0640	Barley straw and fodder, dry	0.2	0.05	0.14
FB 0018	Berries and other small fruits	0.07	0.01	0.05
VB 0040	Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead Brassicas	0.2	0.015	0.04
SB 0715	Cacao beans	0.02*	0.02	
VS 0624	Celery	0.04	0.01	0.02
FC 0001	Citrus fruits	0.07	0.02	0.02
SB 0716	Coffee beans	0.05	0.015	
MO 0105	Edible offal (Mammalian), except liver	0.01*	0.01	0.01
PE 0112	Eggs	0.01*	0.01	
AV 1051	Fodder beet leaves or tops	0.02	0.02	0.02
VC 0045	Fruiting vegetables, Cucurbits	0.02*	0.02	0.02
VO 0050	Fruiting vegetables, other than Cucurbits (except sweet corn and mushrooms)	0.05	0.02	0.03
VL 0053	Leafy vegetables	2	0.52	0.80
VP 0060	Legume vegetables	0.01*	0.01	0.01
MO 0099	Liver of cattle, goats, pigs and sheep	0.2	0.035	0.10
GC 0645	Maize	0.02	0.02	
AS 0645	Maize fodder	0.01	0.01	0.01
MM 0095	Meat (from mammals other than marine mammals)	0.01*	0.01	0.01
ML 0106	Milks	0.02	0.004	
SO 0088	Oilseed	0.02	0.02	
FI 0350	Papaya	0.01*	0	0
AL 0072	Pea hay or Pea fodder (dry)	0.2	0.05	0.10
TN 0672	Pecan	0.01	0.01	0.01
HS 0444	Peppers Chilli, dried	0.5	0.2	0.3
FI 0353	Pineapple	0.01*	0	0
FP 0009	Pome fruits	0.1	0.025	0.04
GC 0656	Popcorn	0.01	0.01	
PM 0110	Poultry meat	0.01*	0.01	0.01
PO 0111	Poultry, Edible offal of	0.1	0.018	0.050
VD 0070	Pulses	0.02	0.02	
VR 0075	Root and tuber vegetables	0.2	0.01	0.15
FS 0012	Stone fruits	0.2	0.04	0.12
VO 0447	Sweet corn (corn-on-the-cob)	0.01	0.01	0.01

	Commodity	CGA 322704 Maximum residue level recommendations,	STMR or STMR-P	HR or HR-P
CCN	Name	mg/kg	mg/kg	mg/kg
DT 1114	Tea, Green, Black (black, fermented and dried)	0.7	0.12	
GC 0654	Wheat	0.02	0.02	
AS 0654	Wheat straw and fodder, dry	0.2	0.05	0.14

* At or about the limit of quantification.

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Daily Intakes of thiamethoxam, based on the STMRs estimated for 66 commodities, for the GEMS/Food regional diets were in the range of 1 to 4% of the maximum ADI (0.08 mg/kg bw) (Annex 3 of the 2010 JMPR Report). The Meeting concluded that the long-term intake of residues of thiamethoxam resulting from its uses that have been considered by JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short Term Intake (IESTI) for thiamethoxam was calculated for food commodities and their processed fractions for which maximum residue levels were estimated and for which consumption data were available. The results are shown in Annex 4 of the 2010 JMPR Report.

The IESTI for the general population represented 0–4% of the ARfD (1 mg/kg bw) and the IESTI for children represented 0–10% of the ARfD. The Meeting concluded that the short-term intake of residues of thiamethoxam, when used in ways that have been considered by the JMPR, is unlikely to present a public health concern.

REFERENCES

Author	Year	Title, Institute, Report references	Code
Adam, D	1996	Degradation of ^{14}C-thiazol ring labelled CGA 293343 in various soils under laboratory conditions. Ciba-Geigy, Switzerland. Study 95DA03. GLP. Unpublished.	95DA03
Adam, D	1998	Paddy soil metabolism of ^{14}C-thiazolring labeled CGA 293343 under laboratory conditions. Novartis Crop Protection, Switzerland. Study 95DA04, Amendment 1. GLP. Unpublished.	95DA04 Amendment 1
Adam, D	1997	Paddy soil metabolism of ^{14}C-thiazolring labeled CGA 293343 under laboratory conditions. Novartis Crop Protection, Switzerland. Study 95DA04. GLP. Unpublished.	96DA04
Adam, D	1999	Degradation of ^{14}C-thiazole labelled CGA 293343 and its major metabolite CGA 322704 (^{14}C-thiazole labelled) in Borstel soil under aerobic conditions at 20°C. Novartis Crop Protection AG, Switzerland. Study 99DA01. GLP. Unpublished.	99DA01
Adam, D	1999	Degradation of ^{14}C-thiazole labelled CGA 322704 in Schwaderloch soil under aerobic conditions at 20°C. Novartis Crop Protection AG, Switzerland. Study 99DA06. GLP. Unpublished.	99DA06
Adams, S	1998	Report on residue study IR0196 (UK). Spring barley: generation of crop samples for subsequent residue analysis following seed treatment with CGA293343 (A9567B) in the UK. Novartis Crop Protection, UK. Study IR0196. GLP. Unpublished.	IR0196
Adams, S	1998	Report on residue study IR0296 (UK). Spring barley: generation of crop samples for subsequent residue analysis following seed treatment with CGA293343 (A9567B) in the UK. Novartis Crop Protection, UK. Study IR0296. GLP. Unpublished.	IR0296

Author	Year	Title, Institute, Report references	Code
Adams, S	1998	Report on residue study IR0396. Spring oil seed rape: generation of grain samples for subsequent residue analysis following seed treatment with CGA 293343 (A-9567B) in the UK. Novartis Crop Protection, UK. Study IR0396. GLP. Unpublished.	IR0396
Barney, W	2004	Thiamethoxam: magnitude of the residue on carrot. Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07468. GLP. Unpublished.	7468
Barney, W	2004	Thiamethoxam: magnitude of the residue on radish. Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07677. GLP. Unpublished.	7677
Barney, WP	2003	Thiamethoxam: magnitude of the residue on blueberry. IR-4 Project 07051. Center for Minor Crop Pest Management, NJ, USA. Field trials: 01-ME05, 01-NJ28, 01-NJ29, 01-NC22, 01-NC23, 01-MI34, 01-MI35, 01-MI36, 01-OR20. GLP. Unpublished.	7051
Bell, A	2005	Independent laboratory validation of a method (AG-675) for the determination of residues of thiamethoxam (CGA 293343) and CGA 322704 in eggs. Syngenta Crop Protection, Switzerland. CEMAS, UK. Study CEMS 2635. Report CEMR-2635. GLP. Unpublished.	CEMR-2635
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in France. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1033. GLP. Unpublished.	02-1033
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1037. GLP. Unpublished.	02-1037
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1038. GLP. Unpublished.	02-1038
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on mandarins in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1044. GLP. Unpublished.	02-1044
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on mandarins in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1045. GLP. Unpublished.	02-1045
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on mandarins in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1046. GLP. Unpublished.	02-1046
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on mandarins in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1047. GLP. Unpublished.	02-1047
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1048. GLP. Unpublished.	02-1048
Benazeraf, L	2004	Residue study withthiamethoxam (CGA 293343) in or on oranges in Spain. Syngenta, UK. ADME Bioanalyses, France. Study 02-1049. GLP. Unpublished.	02-1049
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1050. GLP. Unpublished.	02-1050
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1051. GLP. Unpublished.	02-1051
Benazeraf, L	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (south). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1066. GLP. Unpublished.	02-1066
Boscolo P, Capellari Neto, A and Góis Marconi, FEZ	2005	Cruiser 350 FS and Engeo Maxx—magnitude of the residues of thiamethoxam, CGA322704 and lambda-cyhalothrin in rice grains - Brazil, 2003-04. Syngenta Proteção de Cultivos Ltda, Brazil. Study M03025. GLP. Unpublished.	M03025
Boxwell, C	2004	Thiamethoxam (CGA 293343) - validation of a residue analytical method (REM 179_03) for the determination of residues in crops (wheat grain, tomatoes, oranges and oil seed rape seed). Syngenta, United Kingdom. Report RJ3509B. GLP. Unpublished.	RJ3509B
Boxwell, C	2004	Validation of a residue analytical method (AG-675) for the determination of residues in animal products (milk, eggs, meat, kidney and liver). Syngenta, United Kingdom. Report RJ3513B. GLP. Unpublished.	RJ3513B
Boyette, SE	2000	Magnitude of the residues in or on Crop Group 1C: tuberous and corm vegetables. Novartis Crop Protection, USA. Study 159-98. GLP. Unpublished.	159-98

Author	Year	Title, Institute, Report references	Code
Buckel, T	2001	Degradation of [oxadiazin-4- ^{14}C]-labelled NOA 407475 in soil Gartenacker under aerobic conditions at 20 °C. Syngenta Crop Protection, Switzerland. Study 01MO01. GLP. Unpublished.	01MO01
Campbel,l DD	1998	CGA 293343 and CGA 215944 magnitude of the residues in or on crop 5: Brassica (cole) leafy vegetables. Novartis Crop Protection, USA. Project ABR-98050. GLP. Unpublished.	ABR-98050
Campbel,l DD	1998	CGA 293343 - Magnitude of the residues in meat and milk resulting from the feeding of three levels to dairy cattle. Novartis Crop Protection, USA. Project ABR-98052. Nexus project 46-97. GLP. Unpublished.	ABR-98052
Campbell, D and Oakes, T	2000	CGA 293343 + difenoconazole—magnitude of the residues in or on corn. Novartis Crop Protection, USA. Study 158-98. GLP. Unpublished.	158-98
Campbell, D and Pyles, S	2001	CGA-293343—magnitude of the residues in or on sunflowers. Syngenta Crop Protection, USA. Study 100-99. GLP. Unpublished.	100-99
Campbell, D and Pyles, S	2001	CGA-293343—Magnitude of the residues in or on leaf lettuce. Syngenta Crop Protection, USA. Study 905-99. GLP. Unpublished.	905-99
Campbell, DD	1998	Analytical method for the determination of residues of CGA 293343 and the metabolite CGA 322704 in animal and crop substrates by high performance liquid chromatography with detection by UV and mass spectrometry, including validation data. Novartis Crop Protection, USA. Analytical method AG-675. Project 346001. GLP. Unpublished.	346001
Campbell, DD	1998	CGA 293343 - magnitude of the residues in or on cotton.Novartis Crop Protection Inc, USA. Study 34-97. GLP. Unpublished.	34-97
Campbell, DD	1998	CGA-293343 and CGA-219544. Magnitude of the residues in or on crop 4: leafy vegetables. Novartis Crop Protection, USA. Project ABR-98051. GLP. Unpublished.	ABR-98051
Campbell, DD	1998	CGA 293343 and CGA 215944 - magnitude of the residues on crop group 11: pome fruits. Novartis Crop Protection, USA. Project ABR-98096. Novartis project 44-96. GLP. Unpublished.	ABR-98096
Canada	2010	Residue definitions for chemicals with maximum residue limits regulated under the Pest Control Products Act. Document: chemicals-residue-chimique-eng.pdf. Residue definitions as of 3 June 2010.	
Capps, TM	1999	[Thiazol-2-^{14}C] and [oxadiazin-4-^{14}C] CGA 293343: nature of the residue in potatoes after seed treatment. Novartis Crop Protection, USA. Study 601-99. GLP. Unpublished.	601-99
Capps, TM	1998	^{14}C-CGA-293343: Nature of the residue in pears. Project ABR-98041. Novartis Number 198-96. Novartis Crop Protection, USA. GLP. Unpublished.	ABR-98041
Capps, TM	1999	Amendment 1 to final report: ^{14}C-CGA-293343: nature of the residue in field grown cucurbits. Study ABR-98048. Novartis Crop Protection, USA. Unpublished.	ABR-98048 amendment 1
Capps, TM and Brown, K	2000	[Thiazol-2-^{14}C] and [oxadiazin-4-^{14}C] CGA 293343: nature of the residue in potatoes after seed treatment. Novartis Crop Protection, USA. Study 601-99, amendment 1. GLP. Unpublished.	601-99 amendment 1
Carlin, TJ	1998	14C-CGA-293343: nature of the residue in field grown cucurbits. Study ABR-98048. Novartis Crop Protection, USA. GLP. Unpublished.	ABR-98048
Chemwatch	2004	Nitroguanidine. Australian MSDS. Material Safety Data Sheet. Chemwatch 0282. Version 2.0	
Clark, A	1998	Hydrolysis of 2-^{14}C-thiazolyl CGA 293343 under laboratory conditions. Novartis Crop Protection, USA. Report ABR-96106. Study 214-95. GLP. Unpublished.	ABR-96106
Corley, J	2006	Thiamethoxam - magnitude of the residue on barley. IR-4 Project, North Brunswick, USA, Project 07746. GLP. Unpublished.	7746
Crawford, CJ	1998	Independent laboratory validation of method AG-675, for the determination of residues of CGA-293343 and the metabolite CGA-322704 in animal and crop substrates. Novartis Crop Protection, Switzerland. Ricerca, USA. Study 7693-98-0174-CR-001. Project 490-98. GLP. Unpublished.	490-98
Crook, SJ	2004	Residue method for the determination of residues of thiamethoxam (CGA 293343) and CGA 322704 in lettuce, tomato, grape and tobacco samples. Final Determination by LC-MS/MS. Syngenta, UK. Method REM 179.06. GLP. Unpublished.	REM 179.06
Cruz, SM	1998	Metabolism of ^{14}C-guanidine CGA 293343 in viable and sterile clay loam soil under aerobic conditions. Novartis Crop Protection, USA. Report ABR-98046. Study 148-97. GLP. Unpublished.	ABR-98046
Das, R	1995	Report on melting point / melting range. Ciba-Geigy, Switzerland. Project 35441. GLP. Unpublished.	35441
Das, R	1995	Report on general physico-chemical properties. Ciba-Geigy, Switzerland. Project 35446. Unpublished.	35446
Das,R	1998	Report on general physico-chemical properties. Novartis Crop Protection, Switzerland. Study 58210. GLP. Unpublished.	58210

Author	Year	Title, Institute, Report references	Code
de Villiers, WG	2004	Thiamethoxam: residue study with thiamethoxam (A9795B) in mangoes in South Africa during 2003/2004. Syngenta South Africa. Study I 110 2004 ZA. Field phase report. Relates to 04/339. Unpublished.	I 110 2004 ZA
de Villiers, WG	2004	Thiamethoxam: residue study with thiamethoxam (A9795B) in mangoes in South Africa during 2003/2004. Syngenta South Africa. Study I 111 2004 ZA. Field phase report. Relates to 04/338. Unpublished.	I 111 2004 ZA
Delhove, G and Gerard, M	2005	Report on residues trials in Côte d'Ivoire on papaya. COLEACP. CIV/CNRA/PA/2004. Unpublished.	CIV/CNRA/PA/2004
Dixon, B	1998	Aerobic soil metabolism of [^{14}C-thiazole] CGA 293343. Novartis Crop Protection, USA. Study 505-95. Report ABR-96059. GLP. Unpublished.	ABR-96059
Doumbia, M and Yoboue, Kouassi	2005	Report on residue trials in Côte d'Ivoire on okra. CUECDA, Côte d'Ivoire. Unpublished.	CI/AIPR/2004/03
Ediger, K	2003	CGA-293343—Magnitude of the residues in or on strawberry. Syngenta study 140-00. Field trials FL-IR-401-00, 0W-IR-601-00. Syngenta Crop Protection, USA. GLP. Unpublished.	140-00
Ediger, K	2003	CGA-293343 - magnitude of the residues in or on soya bean resulting from seed treatment. Syngenta Crop Protection, USA. Study 26-02. GLP. Unpublished.	26-Feb
Ediger, K	2007	Thiamethoxam—magnitude of the residues in or on fruit, citrus, group 10. Syngenta Crop Protection, USA. Report T018964-04. GLP. Unpublished.	T018964-04
Ellgehausen, H	1998	Calculation of the degradation kinetics of metabolite CGA 322704 in sandy soil Collombey. Novartis Crop Protection, Switzerland. Study 98EH05. Unpublished.	98EH05
Ely, SV and Clark,e DM	2004	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Syngenta, UK. Study 03-1004. GLP. Unpublished.	03-1004
Ely, SV and Clarke, DM	2004	Residue study with thiamethoxam, CGA 293343) in or on mandarins in Spain. Syngenta, UK. Study 03-1000. GLP. Unpublished.	03-1000
Ely, SV and Clarke, DM	2004	Residue study with thiamethoxam, CGA 293343) in or on mandarins in Spain. Syngenta, UK. Study 03-1001. GLP. Unpublished.	03-1001
Ely, SV and Clarke, DM	2004	Residue study with thiamethoxam, CGA 293343) in or on mandarins in Spain. Syngenta, UK. Study 03-1002. GLP. Unpublished.	03-1002
Ely, SV and Clarke, DM	2004	Residue study with thiamethoxam, (CGA 293343) in or on mandarins in Spain. Syngenta, UK. Study 03-1003. GLP. Unpublished.	03-1003
Eudy, LW	1998	CGA 293343 - magnitude of the residues in or on crop group 9: cucurbit vegetables. Report ABR-98085. Project 346001, Study 42-96. Novartis Crop Protection Inc, USA. GLP. Unpublished.	ABR-98085
Eudy, LW	1998	CGA 293343 - magnitude of the residues in or on Crop Group 8: fruiting vegetables. Novartis Crop Protection, USA. Project 346004. Study 45-96. Report ABR-98105. GLP. Unpublished.	ABR-98105
Eudy, LW, Cobin, J and Campbell, D	1999	CGA-293342 + emamectin—magnitude of the residues in or on cotton. Novartis Crop Protection, USA. Unpublished.	132-98
Franceschi, G	2003	Field report. Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Biological part. Syngenta study 02-1168. Syngenta Agro, Switzerland. Unpublished.	02-1168
Franceschi, G	2003	Field report. Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Biological part. Syngenta study 02-1169. Syngenta Agro, Switzerland. Unpublished.	02-1169
Franceschi, G	2003	Field report. Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Biological part. Syngenta study 03-1031. Syngenta Agro, Switzerland. Unpublished.	03-1031
Franceschi, G	2003	Field report. Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Biological part. Syngenta study 03-1032. Syngenta Agro, Switzerland. Unpublished.	03-1032
Francisco, E, Góis Marconi, FEZ and Nascimento, F	2002	Cruiser 350 FS + Actara 250 WG, magnitude of the residues of thiamethoxam and CGA 322704 in rice, Brazil. Syngenta Proteção de Cultivos Ltda, Brazil. Study M00049. GLP. Unpublished.	M00049
FSANZ	2010	Standard 1.4.2Maximum Residue Limits. Food Standards Australia New Zealand. http://www.foodstandards.gov.au/	
Geoffroy, A.	1995	Report on vapour pressure curve. Ciba-Geigy, Switzerland. Test PP-95-53P-VPC. Project 35445. GLP. Unpublished.	35445
Giannone, C	1998	Summary of results of fortified specimens of representative plant materials and soil analysed according to REM 179.03. Novartis Crop Protection, Switzerland. Report 503/98. Unpublished.	503/98

Author	Year	Title, Institute, Report references	Code
Góis Marconi, FEZ and Casallanovo, F	2009	Verdadero 600 WG and Actara 250 WG—residues of thiamethoxam, CGA322704 and cyproconazole in coffee—Brazil, 2008-09. Syngenta Proteção de Cultivos Ltda, Brazil. Study M09200. GLP. Unpublished.	M09200
Góis Marconi, FEZ and Casallanovo, F	2009	Verdadero 20 GR and Actara 10 GR—residues of thiamethoxam, CGA322704 and cyproconazole in coffee—Brazil, 2008-09. Syngenta Proteção de Cultivos Ltda, Brazil. Study M09201. GLP. Unpublished.	M09201
Grunenwald, M and Eudy, L	2000	Stability of CGA 293343, CGA 322704 and CGA 265307 in meat, milk and eggs under freezer storage conditions. Novartis Crop Protection, USA. Study 284-98. GLP. Unpublished.	284-98
Hein, W and Dorn, R	2001	Rate of degradation of [thiazol-2- 14C]-CGA 322704 in Birkenheide soil. Syngenta Crop Protection, Switzerland. SLFA, Germany. Study NOV17. GLP. Unpublished.	Nov-17
Higuchi, S and Matsuzawa, K	2009	Pyroquilon and thiamethoxam (SYJ-198), azoxystrobin and thiamethoxam (YIF-6601SC) (CG-216). Crop residue analysis report, rice. Syngenta Japan. 26-Jun-2009. Unpublished.	26-Jun-09
Hohl, J	1999	Stability of residues of CGA 322704 in plant material and soil stored under deep freezer conditions. Novartis Crop Protection, Switzerland. Study 127/97. GLP. Unpublished.	127/97
Indergand, P and Nicollie,r G	2004	Rate of degradation of [oxadiazin-4-^{14}C] NOA407475 (metabolite of thiamethoxam) in various soils under aerobic laboratory conditions at 20 ºC. Syngenta Crop Protection, Switzerland. Study T002207-04. GLP. Unpublished.	T002207-04
Indergand, P and Nicollier, G	2004	Rate of degradation of [thiazol-2-^{14}C] CGA 355190 (metabolite of thiamethoxam) in various soils under aerobic laboratory conditions at 20 ºC. Syngenta Crop Protection, Switzerland. Study T002208-04. GLP. Unpublished.	T002208-04
Joseph, TA	1999	CGA 215944 and CGA 293343—magnitude of the residues in or on pecans. Novartis Crop Protection, USA. Study 134-98. GLP. Unpublished.	134-98
Kang, J	2005	Thiamethoxam (CGA 293343): residue study in or on protected cucumber in the Netherlands. Syngenta Crop Protectio, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2316. Study CEMS-2316. GLP. Unpublished.	CEMS-2316
Kang, J	2005	Thiamethoxam (CGA 293343): residue study in or on cherries in Spain. Syngenta Crop Protection, Switzerland. CEMAS, UK. Report CEMR-2330. Study CEMS-2330. GLP. Unpublished.	CEMS-2330
Kang, J	2005	Thiamethoxam (CGA 293343): residue study in or on cherry in northern France. Syngenta Crop Protection, Switzerland. CEMAS, UK. Report CEMR-2331. Study CEMS-2331. GLP. Unpublished.	CEMS-2331
Kang, J	2005	Thiamethoxam (CGA 293343): residue study in or on cherry in Italy. Syngenta Crop Protection, Switzerland. CEMAS, UK. Report CEMR-2444. Study CEMS-2444. GLP. Unpublished.	CEMS-2444
Kato, T	2002	SYJ-101 (thiamethoxam and lufenuron). Crop residue analysis report, tea. Syngenta Japan. 30-Jul-2002. Unpublished.	30-Jul-02
Kato, Y and Odanaka, Y	1998	Thiamethoxam (CG-216). Crop residue analysis report, tea. Novartis Agro. 30-Nov-1998. Unpublished.	30-Nov-98
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in Spain. Novartis Crop Protection, Switzerland. Study 1026/97. GLP. Unpublished.	1026/97
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in Spain. Novartis Crop Protection, Switzerland. Study 1028/97. GLP. Unpublished.	1028/97
Kissling, M	1998	Residue study with CGA 293343 in or on apples in Italy. Novartis Crop Protection, Switzerland. Study 1068/97. GLP. Unpublished.	1068/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Italy. Novartis Crop Protection, Switzerland. Study 1078/97. GLP. Unpublished.	1078/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Italy. Novartis Crop Protection, Switzerland. Study 1079/97. GLP. Unpublished.	1079/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Italy. Novartis Crop Protection, Switzerland. Study 1080/97. GLP. Unpublished.	1080/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Italy. Novartis Crop Protection, Switzerland. Study 1081/97. GLP. Unpublished.	1081/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Switzerland. Novartis Crop Protection, Switzerland. Study 1121/97. GLP. Unpublished.	1121/97
Kissling, M	1998	Residue study with CGA 293343 in or on tomatoes in Switzerland. Novartis Crop Protection, Switzerland. Study 1122/97. GLP. Unpublished.	1122/97
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in Switzerland. Novartis Crop Protection, Switzerland. Study 1126/97. GLP. Unpublished.	1126/97
Kissling, M	2001	Residue study with thiamethoxam (CGA 293343) in or on cocoa in Ivory Coast. Farm: Bambaké Camara. Syngenta Crop Protection, Switzerland. Study 1128/00. Unpublished.	1128/00

Author	Year	Title, Institute, Report references	Code
Kissling, M	2001	Residue study with thiamethoxam (CGA 293343) in or on cocoa in Ivory Coast. Farm: Bazié Bazona. Syngenta Crop Protection, Switzerland. Study 1129/00. Unpublished.	1129/00
Kissling, M	2001	Residue study with thiamethoxam (CGA 293343) in or on cocoa in Ivory Coast. Farm: Sanfo Yamba. Syngenta Crop Protection, Switzerland. Study 1130/00. Unpublished.	1130/00
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in Switzerland. Novartis Crop Protection, Switzerland. Study 1130/97. GLP. Unpublished.	1130/97
Kissling, M	2001	Residue study with thiamethoxam (CGA 293343) in or on cocoa in Ivory Coast. Farm: Outtara Mamadou. Syngenta Crop Protection, Switzerland. Study 1131/00. Unpublished.	1131/00
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in France (south). Novartis Crop Protection, Switzerland. Study 1131/97. GLP. Unpublished.	1131/97
Kissling, M	1998	Residue study with CGA 293343 in or on potatoes in France (south). Novartis Crop Protection, Switzerland. Study 1132/97. GLP. Unpublished.	1132/97
Kissling,M	1998	Residue study with CGA 293343 in or on potatoes in Spain. Novartis Crop Protection, Switzerland. Study 1027/97. GLP. Unpublished.	1027/97
Kissling,M	1998	Residue study with CGA 293343 in or on apples in Italy. Novartis Crop Protection, Switzerland. Study 1067/97. GLP. Unpublished.	1067/97
Krainz, A	2003	Residue study with thiamethoxam (CGA 293343) in or on papaya in Brazil. Syngenta, UK. RCC Ltd., Itingen, Switzerland. Syngenta study 02-1061. RCC study 848011. GLP. Unpublished.	02-1061
Krainz, A	2003	Residue study with thiamethoxam (CGA 293343) in or on papaya in Brazil. Syngenta, UK. RCC Ltd., Itingen, Switzerland. Syngenta study 02-1062. RCC study 848012. GLP. Unpublished.	02-1062
Krainz, A	2004	Residue study with thiamethoxam (CGA 293343) in or on papaya in Brazil. Syngenta, Switzerland. RCC Ltd., Itingen, Switzerland. Syngenta study 02-1063. RCC study 848013. GLP. Unpublished.	02-1063
Krainz, A	2004	Residue study with thiamethoxam (CGA 293343) in or on papaya in Brazil. Syngenta, Switzerland. RCC Ltd., Itingen, Switzerland. Syngenta study 02-1064. RCC study 848014. GLP. Unpublished.	02-1064
Krauss, J	1997	Behaviour and metabolism of CGA 293343 in greenhouse grown paddy rice after granular application of [thiazol-2-^{14}C]-labelled material. Project 95JK15. Report 95JK15PR1. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 5/97. GLP. Unpublished.	95JK15PR1
Krauss, J	1997	Metabolism of CGA 293343 in greenhouse grown paddy rice after foliar application of [thiazol-2-^{14}C]-labelled material. Project 95KJK16. Report 95JK16PR1. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 11/97. GLP. Unpublished.	95JK16PR
Krauss, J	1997	Behaviour and metabolism of CGA 293343 in greenhouse grown paddy rice after granular application of [oxadiazin-4-^{14}C]-labelled material. Project 95JK17. Report 95JK17PR1. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 21/97. GLP. Unpublished.	95JK17PR1
Krauss, J	1997	Metabolism of CGA 293343 in greenhouse grown paddy rice after foliar application of [oxadiadin-4-^{14}C]-labelled material. Project 95KJK18. Report 95JK18PR1. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 14/97. GLP. Unpublished.	95JK18PR1
Kravets, RR and Amos, F	2000	Report of sample processing for "Thiamethoxam—magnitude of the residue on plum." Novartis study 562-00. Novartis trial 07674.00-CA96. Project MG6178. National Food Laboratory, USA. Unpublished.	562-00 MG6178
Labuschagne, CL	2004	Thiamethoxam: residue levels in or on mangoes from a trial conducted in South Africa during 2003/2004. Syngenta South Africa. Study I 108 2004 ZA. Field phase report. Relates to 04/430. Unpublished.	I 108 2004 ZA
Labuschagne, CL	2004	Thiamethoxam: residue levels in or on mangoes from a trial conducted in South Africa during 2003/2004. Syngenta South Africa. Study I 109 2004 ZA. Field phase report. Relates to 04/341. Unpublished.	I 109 2004 ZA
Lin K and Oakes, TL	2002	CGA 293343 - Magnitude of the residues in meat and milk resulting from the feeding of three levels to dairy cattle. Amendment 1. MRID 44703534. Syngenta Crop Protection, USA. Study ABR-98052. Nexus project 46-97. GLP. Unpublished.	ABR-98052-Am1
Lin, K	2002	Analytical method (AG675) for the determination of residues of CGA-293343 and the metabolite CGA-322704 in animal and crop substrates by high performance liquid chromatography with detection by UV and mass spectrometry, including validation data, amendment 1. Syngenta Crop Protection, USA. Method AG-675. Study 206-97. GLP. Unpublished.	206-97

Author	Year	Title, Institute, Report references	Code
Lin, K	2002	Thiamethoxam—validation of analytical method AG-675 for the analysis of liver. Syngenta Crop Protection, USA. Study 858-00. GLP. Unpublished.	858-00
Lin, K	1998	Determination of CGA 293343 by U.S. Food and Drug Administration multiresidue method testing. Novartis Crop Protection, USA. Report 363-96. Project ABR-98054. GLP. Unpublished.	ABR-98054
Lin, K and Oakes, TL	2002	Stability of CGA 293343, CGA 322704 and CGA 265307 in meat, milk and eggs under freezer storage conditions. Amendment 1. Syngenta Crop Protection, USA. Study ABR-98102. Syngenta 284-98. GLP. Unpublished.	ABR-98102
Lowery, E	1997	Hydrolysis of ^{14}C-guanidine-CGA 293343 under laboratory conditions. Novartis Crop Protection, USA. Report ABR-97013. Study 339-96. GLP. Unpublished.	ABR-97013
Lutringer, C	1998	Metabolism of [oxadiazin-4-^{14}C] CGA 293343 after multiple oral administrations to lactating goats. Novartis Crop Protection, Switzerland. Study 027AM05. GLP. Unpublished.	027AM05
Lutringer, C	1998	Metabolism of [oxadiazin-4-^{14}C] CGA 293343 after multiple oral administrations to laying hens. Novartis Crop Protection, Switzerland. Study 027AM06. GLP. Unpublished.	027AM06
Mair, P	1997	Report on residue study 1001/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WS 70 (A-9567 B) in maize. Novartis Crop Protection, Switzerland. Study 1001/96. GLP. Unpublished.	1001/96
Mair, P	1997	Report on residue study 1002/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WS 70 (A-9567 B) in maize. Novartis Crop Protection, Switzerland. Study 1002/96. GLP. Unpublished.	1002/96
Mair, P	1997	Report on residue study 1005/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WS 70 (A-9567 C) in sugarbeets. Novartis Crop Protection, Switzerland. Study 1005/96. GLP. Unpublished.	1005/96
Mair, P	1998	Residue study with thiamethoxam (CGA 293343) in or on sugarbeets in the United Kingdom. Novartis Crop Protection, Switzerland. Study 1006/98. GLP. Unpublished.	1006/98
Mair, P	1998	Residue study with CGA 293343 in or on oranges in Spain. Novartis Crop Protection, Switzerland. Study 1007/97. GLP. Unpublished.	1007/97
Mair, P	1997	Report on residue study 1008/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1008/96. GLP. Unpublished.	1008/96
Mair, P	1998	Residue study with CGA 293343 in or on oranges in Spain. Novartis Crop Protection, Switzerland. Study 1008/97. GLP. Unpublished.	1008/97
Mair, P	1997	Report on residue study 1009/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1009/96. GLP. Unpublished.	1009/96
Mair, P	1998	Residue study with CGA 293343 in or on oranges in Spain. Novartis Crop Protection, Switzerland. Study 1009/97. GLP. Unpublished.	1009/97
Mair, P	1997	Report on residue study 1011/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation 25 WG (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1011/96. GLP. Unpublished.	1011/96
Mair, P	1997	Report on residue study 1012/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation 25 WG (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1012/96. GLP. Unpublished.	1012/96
Mair, P	1997	Report on residue study 1017/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation 25 WG in lemon. Ciba-Geigy Ltd, Switzerland. Study 1017/96. GLP. Unpublished.	1017/96
Mair, P	1997	Report on residue study 1018/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation 25 WG in lemon. Ciba-Geigy Ltd, Switzerland. Study 1018/96. GLP. Unpublished.	1018/96
Mair, P	1997	Report on residue study 1019/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in cotton. Novartis Crop Protection, Switzerland. Study 1019/96. GLP. Unpublished.	1019/96
Mair, P	1997	Report on residue study 1020/96 (Spain). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in cotton. Novartis Crop Protection, Switzerland. Study 1020/96. GLP. Unpublished.	1020/96
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Novartis Crop Protection, Switzerland. Study 1020/99. GLP. Unpublished.	1020/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on oranges in Spain. Novartis Crop Protection, Switzerland. Study 1021/99. GLP. Unpublished.	1021/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on mandarins in Spain. Novartis Crop Protection, Switzerland. Study 1022/99. GLP. Unpublished.	1022/99

Author	Year	Title, Institute, Report references	Code
Mair, P	1999	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 329351) in or on rape in United Kingdom. Novartis Crop Protection, Switzerland. Study 1025/98. GLP. Unpublished.	1025/98
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on tomatoes in Spain. Novartis Crop Protection, Switzerland. Study 1025/99. GLP. Unpublished.	1025/99
Mair, P	1999	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 329351) in or on rape in United Kingdom. Novartis Crop Protection, Switzerland. Study 1026/98. GLP. Unpublished.	1026/98
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on tomatoes in Spain. Novartis Crop Protection, Switzerland. Study 1026/99. GLP. Unpublished.	1026/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on tomatoes in France (south). Novartis Crop Protection, Switzerland. Study 1027/99. GLP. Unpublished.	1027/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on tomatoes in France (south). Novartis Crop Protection, Switzerland. Study 1028/99. GLP. Unpublished.	1028/99
Mair, P	1997	Report on residue study 1036/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584C) in potatoes. Novartis Crop Protection, Switzerland. Study 1036/96. GLP. Unpublished.	1036/96
Mair, P	1997	Report on residue study 1037/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584C) in potatoes. Novartis Crop Protection, Switzerland. Study 1037/96. GLP. Unpublished.	1037/96
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Spain. Novartis Crop Protection, Switzerland. Study 1039/97. GLP. Unpublished.	1039/97
Mair, P	1997	Report on residue study 1040/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584C) in wheat. Novartis Crop Protection, Switzerland. Study 1040/96. GLP. Unpublished.	1040/96
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Spain. Novartis Crop Protection, Switzerland. Study 1040/97. GLP. Unpublished.	1040/97
Mair, P	1998	Residue study with CGA 293343 as formulation WG 25 (A-9584 C) in or on tomatoes in Spain. Novartis Crop Protection, Switzerland. GLP study 1041/97. Unpublished.	1041/97
Mair, P	1998	Residue study with CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes in Spain. Novartis Crop Protection, Switzerland. GLP study 1042/97. Unpublished.	1042/97
Mair, P	1997	Report on residue study 1043/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1043/96. GLP. Unpublished.	1043/96
Mair, P	1998	Residue study with CGA 293343 in or on cotton seed in Spain. Novartis Crop Protection, Switzerland. Study 1043/97. GLP. Unpublished.	1043/97
Mair, P	1997	Report on residue study 1044/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1044/96. GLP. Unpublished.	1044/96
Mair, P	1998	Residue study with CGA 293343 in or on cotton seed in Spain. Novartis Crop Protection, Switzerland. Study 1044/97. GLP. Unpublished.	1044/97
Mair, P	1997	Report on residue study 1045/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1045/96. GLP. Unpublished.	1045/96
Mair, P	1998	Residue study with CGA 293343 in or on cotton seed in Spain. Novartis Crop Protection, Switzerland. Study 1045/97. GLP. Unpublished.	1045/97
Mair, P	1997	Report on residue study 1046/96 (Switzerland). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1046/96. GLP. Unpublished.	1046/96
Mair, P	1998	Residue study with thiamethoxam (CGA 293343) in or on sugarbeets in the Netherlands. Novartis Crop Protection, Switzerland. Study 1046/98. GLP. Unpublished.	1046/98
Mair, P	1998	Residue study with CGA 293343 in or on sugarbeets in Spain. Novartis Crop Protection, Switzerland. Study 1048/97. GLP. Unpublished.	1048/97
Mair, P	1998	Residue study with CGA 293343 in or on maize in Spain. Novartis Crop Protection, Switzerland. Study 1049/97. GLP. Unpublished.	1049/97
Mair, P	1996	Determination of residues of CGA 293343 in sugarbeets- field trial. Ciba-Geigy Ltd, Switzerland. Study 1051/95. GLP. Unpublished.	1051/95
Mair, P	1999	Residue study with thiamethoxam (CGA 293343) in or on cotton in Greece. Novartis Crop Protection, Switzerland. Study 1065/98. GLP. Unpublished.	1065/98
Mair, P	1999	Residue study with thiamethoxam (CGA 293343) in or on cotton in Greece. Novartis Crop Protection, Switzerland. Study 1066/98. GLP. Unpublished.	1066/98
Mair, P	1997	Report on residue study 1072/96 (Greece). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in cotton. Novartis Crop Protection, Switzerland. Study 1072/96. GLP. Unpublished.	1072/96

Author	Year	Title, Institute, Report references	Code
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Italy. Novartis Crop Protection, Switzerland. Study 1082/97. GLP. Unpublished.	1082/97
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Italy. Novartis Crop Protection, Switzerland. Study 1083/97. GLP. Unpublished.	1083/97
Mair, P	1997	Report on residue study 1085/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WS 70 (A-9567 C) in sugarbeets. Novartis Crop Protection, Switzerland. Study 1085/96. GLP. Unpublished.	1085/96
Mair, P	1997	Report on residue study 1086/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WS 70 (A-9567 C) in sugarbeets. Novartis Crop Protection, Switzerland. Study 1086/96. GLP. Unpublished.	1086/96
Mair, P	1998	Residue study with CGA 293343 in or on sugarbeets in Italy. Novartis Crop Protection, Switzerland. Study 1091/97. GLP. Unpublished.	1091/97
Mair, P	1998	Residue study with CGA 293343 in or on sugarbeets in Italy. Novartis Crop Protection, Switzerland. Study 1092/97. GLP. Unpublished.	1092/97
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on sweet peppers in France (south). Novartis Crop Protection, Switzerland. Study 1092/99. GLP. Unpublished.	1092/99
Mair, P	1997	Report on residue study 1093/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation 25 WG (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1093/96. GLP. Unpublished.	1093/96
Mair, P	1997	Report on residue study 1094/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation 25 WG (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1094/96. GLP. Unpublished.	1094/96
Mair, P	1997	Report on residue study 1095/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1095/96. GLP. Unpublished.	1095/96
Mair, P	1997	Report on residue study 1096/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1096/96. GLP. Unpublished.	1096/96
Mair, P	1998	Residue study with CGA 293343 in or on cotton seed in Greece. Novartis Crop Protection, Switzerland. Study 1096/97. GLP. Unpublished.	1096/97
Mair, P	1997	Report on residue study 1097/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1098/96. GLP. Unpublished.	1097/96
Mair, P	1998	Residue study with CGA 293343 in or on cotton seed in Greece. Novartis Crop Protection, Switzerland. Study 1097/97. GLP. Unpublished.	1097/97
Mair, P	1997	Report on residue study 1098/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in tomatoes. Novartis Crop Protection, Switzerland. Study 1098/96. GLP. Unpublished.	1098/96
Mair, P	1997	Report on residue study 1099/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1099/96. GLP. Unpublished.	1099/96
Mair, P	1997	Report on residue study 1100/96 (Italy). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in sweet peppers. Novartis Crop Protection, Switzerland. Study 1100/96. GLP. Unpublished.	1100/96
Mair, P	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 329351) in or on rape in France (south). Novartis Crop Protection, Switzerland. Study 1110/98. GLP. Unpublished.	1110/98
Mair, P	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 329351) in or on rape in France (south). Novartis Crop Protection, Switzerland. Study 1112/98. GLP. Unpublished.	1112/98
Mair, P	1998	Residue study with CGA 293343 in or on eggplant in Switzerland. Novartis Crop Protection, Switzerland. Study 1113/97. GLP. Unpublished.	1113/97
Mair, P	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 329351) in or on rape in France (south). Novartis Crop Protection, Switzerland. Study 1113/98. GLP. Unpublished.	1113/98
Mair, P	1998	Residue study with CGA 293343 in or on eggplant in Switzerland. Novartis Crop Protection, Switzerland. Study 1114/97. GLP. Unpublished.	1114/97
Mair, P	1998	Residue study with CGA 293343 in or on eggplant in Switzerland. Novartis Crop Protection, Switzerland. Study 1115/97. GLP. Unpublished.	1115/97
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Switzerland. Novartis Crop Protection, Switzerland. Study 1116/97. GLP. Unpublished.	1116/97
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Switzerland. Novartis Crop Protection, Switzerland. Study 1117/97. GLP. Unpublished.	1117/97
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1117/99. GLP. Unpublished.	1117/99

Author	Year	Title, Institute, Report references	Code
Mair, P	1998	Residue study with CGA 293343 in or on sweet peppers in Switzerland. Novartis Crop Protection, Switzerland. Study 1118/97. GLP. Unpublished.	1118/97
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1118/99. GLP. Unpublished.	1118/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1119/99. GLP. Unpublished.	1119/99
Mair, P	1998	Stability of residues of CGA 293343 in plant material under deep freezer conditions. Novartis Crop Protection, Switzerland. Study 112/96. GLP. Unpublished.	112/96
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1120/99. GLP. Unpublished.	1120/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on potatoes in Spain. Novartis Crop Protection, Switzerland. Study 1125/99. GLP. Unpublished.	1125/99
Mair, P	1998	Residue study with CGA 293343 in or on wheat in Switzerland. Novartis Crop Protection, Switzerland. Study 1127/97. GLP. Unpublished.	1127/97
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on cotton in Greece. Novartis Crop Protection, Switzerland. Study 1134/99. GLP. Unpublished.	1134/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on cotton in Greece. Novartis Crop Protection, Switzerland. Study 1135/99. GLP. Unpublished.	1135/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1136/99. GLP. Unpublished.	1136/99
Mair, P	1996	Report on residue study 1137/95. CGA 293343, oranges, Spain. Determination of residues of CGA 293343 in oranges (whole fruit, pulp, peel)—field trial. Ciba-Geigy Ltd, Switzerland. Study 1137/95. GLP. Unpublished.	1137/95
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on lemons in Spain. Novartis Crop Protection, Switzerland. Study 1137/99. GLP. Unpublished.	1137/99
Mair, P	1996	Report on residue study 1138/95. CGA 293343, oranges, Spain. Determination of residues of CGA 293343 in oranges (whole fruit, pulp, peel)—field trial. Ciba-Geigy Ltd, Switzerland. Study 1138/95. GLP. Unpublished.	1138/95
Mair, P	1996	Report on residue study 1139/95. CGA 293343, oranges, Spain. Determination of residues of CGA 293343 in oranges (whole fruit, pulp, peel, juice)—field trial. Ciba-Geigy Ltd, Switzerland. Study 1139/95. GLP. Unpublished.	1139/95
Mair, P	1996	Report on residue study 1140/95. CGA 293343, oranges, Spain. Determination of residues of CGA 293343 in oranges (whole fruit, pulp, peel, juice)—field trial. Ciba-Geigy Ltd, Switzerland. Study 1140/95. GLP. Unpublished.	1140/95
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on sweet peppers in Spain. Novartis Crop Protection, Switzerland. Study 1142/99. GLP. Unpublished.	1142/99
Mair, P	2000	Residue study with thiamethoxam (CGA 293343) in or on sweet peppers in Spain. Novartis Crop Protection, Switzerland. Study 1143/99. GLP. Unpublished.	1143/99
Mair, P	1998	Residue study with CGA 293343 in or on tomatoes in Spain. Novartis Crop Protection, Switzerland. Study 1169/97. GLP. Unpublished.	1169/97
Mair, P	1999	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 319351) in or on rape in France (north). Novartis Crop Protection, Switzerland. Study 1176/97. GLP. Unpublished.	1176/97
Mair, P	1999	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 319351) in or on rape in France (north). Novartis Crop Protection, Switzerland. Study 1177/97. GLP. Unpublished.	1177/97
Mair, P	1999	Residue Study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 319351) in or on rape in France (south). Novartis Crop Protection, Switzerland. Study 1178/97. GLP. Unpublished.	1178/97
Mair, P	1999	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343) and metalaxyl-M (CGA 319351) in or on rape in France (south). Novartis Crop Protection, Switzerland. Study 1179/97. GLP. Unpublished.	1179/97
Mair, P	1998	Analysis on CGA 293343 in potatoes. Novartis Crop Protection, Switzerland. Study gr 62297. Analytical report 1180/97. GLP. Unpublished.	1180/97
Mair, P	1998	Analysis on CGA 293343 in potatoes. Novartis Crop Protection, Switzerland. Study gr 63497. Analytical report 1181/97. GLP. Unpublished.	1181/97
Mair, P	1995	Determination of CGA 293343 by HPLC, plant material. Ciba-Geigy Ltd., Switzerland. Method REM 179.01. Unpublished.	REM 179.01
Mair, P	1998	Determination of CGA 293343 and CGA 322704 by HPLC. Novartis Crop Protection, Switzerland. Method REM 179.03. Unpublished.	REM 179.03
Mair,P	1997	Report on residue study 1071/96 (Greece). Magnitude of residues after application of CGA 293343 as formulation WG 25 (A-9584 C) in cotton. Novartis Crop Protection, Switzerland. Study 1071/96. GLP. Unpublished.	1071/96
Moore, M and Ediger, K	2001	Thiamethoxam: magnitude of the residues on plum. IR-4 project 07674. Syngenta studyr 562-00. Syngenta Crop Protection, USA. GLP. Unpublished.	7674

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Moore, ME and Ediger, K	2001	Thiamethoxam: magnitude of the residues on peach. Syngenta study 559-00. IR-4 project 07052. Syngenta Crop Protection, USA. GLP. Unpublished.	7052 559-00
Moore, ME and Ediger, K	2001	Thiamethoxam: magnitude of the residues on cherry. Syngenta study 36-00. IR-4 project 07673.Syngenta Crop Protection, USA. GLP. Unpublished.	7673 36-00
Morris, I	2005	The determination of imidacloprid in fruit and vegetables by LC-MS. Standard Operating Procedure. PRES/064. Unpublished.	PRES/064
Müller, T and Stampf, P	1996	Absorption, distribution, and excretion of [thiazol-2-^{14}C] and [oxadiazin-4-^{14}C] CGA 293343 in the rat. Ciba-Geigy Ltd, Switzerland. Report 11/96. Project 027AM01. GLP. Unpublished.	027AM01
Nakanishi, J and Iwatani, M	1998	Thiamethoxam (CG-216). Crop residue analysis report, tea. Novartis Agro. 07-Jul-1998. Unpublished.	7-Jul-98
Noegrohati, Sri	2009	Estimation of national MRL for thiamethoxam in oranges (Citrus nobilis). Trial 82/SPKS/PPK-PPI/V/2009. Center of Permit and Investment. Department of Agriculture, Jakarta, Indonesia and Gadjah Mada University, Jogyakarta, Indonesia. Unpublished.	82/SPKS/PPK-PPI/V/2009
Oakes, T, Eudy, L and Vincent, T	2002	CGA-293343—magnitude of the residues in or on Crop Group 8: fruiting vegetables—amendment. Syngenta Crop Protection, USA. Study 9-00. GLP. Unpublished.	9-00
Oakes, TL and Ediger, K	2001	CGA 293343 - Magnitude of the residues in or on crop group 11: pome fruits. Syngenta Crop Protection, USA. Study 5-00. GLP. Unpublished.	5-00
Oakes, TL and Eudy, LW	2001	CGA 293343—magnitude of the residues in or on crop group 5: Brassica (cole) leafy vegetables. Syngenta study 121-00. Syngenta Crop Protection, USA. GLP. Unpublished.	121-00
Oakes, TL and Eudy, LW	2001	CGA-293343—magnitude of the residues in or on Crop Group 4: leafy vegetables. Syngenta Crop Protection, USA. Study 122-00. GLP. Unpublished.	122-00
Odanaka, Y and Wakasone, Y	2002	Lufenuron and thiamethoxam (SYJ-101). Crop residue analysis report, tea. Syngenta Japan. 26-Dec-2002. Unpublished.	26-Dec-02
Oliver-Kang, J	2006	Thiamethoxam (CGA 293343): residue study in or on protected cucumber in Spain. Syngenta Crop Protection, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2317. Study CEMS-2317. GLP. Unpublished.	CEMS-2317
Oliver-Kang, J	2007	Thiamethoxam (CGA 293343):residue study in or on cherries in Switzerland. Syngenta Crop Protection, Switzerland. CEMAS, UK. Report CEMR-2329. Study CEMS-2329. GLP. Unpublished.	CEMS-2329
Osborne, V	2002	Residue Study with thiamethoxam (CGA 293343) in or on grapes in Italy. Syngenta, UK. Study 1114/01. GLP. Unpublished.	1114/01
Osborne, V	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in Spain. Syngenta, UK. Study 1165/01. GLP. Unpublished.	1165/01
Pelz, S and Steinhauer, S	2001	Validation of the DFG Method S19 (extended revision) for the determination of residues of thiamethoxam (CGA 293343) in/on rape (seed). Syngenta Crop Protection, Switzerland. Dr. Specht & Partner, Germany. Report SYN-0107V. GLP. Unpublished.	SYN-0107V
Phaff, R	1997	Rate of degradation of CGA 293343 in soil under various conditions. Novartis Crop Protection, Switzerland. Study 95RP03. GLP. Unpublished.	95RP03
Pointurier ,R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on winter wheat in north of France. ADME Bioanalyses, France. Study 9840301. GLP. Unpublished.	9840301
Pointurier ,R	1999	Residue study with CGA 293343 in or on maize in south of France. ADME Bioanalyses, France. Study 9841402. GLP. Unpublished.	9841402
Pointurier, R	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (north). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 0131401. GLP. Unpublished.	131401
Pointurier, R	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (south). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 0131402. GLP. Unpublished.	131402
Pointurier, R	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (south). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 0131502. GLP. Unpublished.	131502
Pointurier, R	1998	Report on residue study: 9730501, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in apples and processed food after application of formulation A9584C WG 25. Novartis Agro, France. Study 9730501. GLP. Unpublished.	9730501
Pointurier, R	1998	Report on residue study: 9730701, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Novartis Agro, France. Study 9730701. GLP. Unpublished.	9730701

Author	Year	Title, Institute, Report references	Code
Pointurier, R	1998	Report on residue study: 9730702, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Novartis Agro, France. Study 9730702. GLP. Unpublished.	9730702
Pointurier, R	1998	Report on residue study: 9730703, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Novartis Agro, France. Study 9730703. GLP. Unpublished.	9730703
Pointurier, R	1998	Report on residue study 9730801, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Dissipation study. Novartis Crop Protection, France. Study 9730801. GLP. Unpublished.	9730801
Pointurier, R	1998	Report on residue study: 9730802, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Dissipation study. Novartis Agro, France. Study 9730802. GLP. Unpublished.	9730802
Pointurier, R	1998	Report on residue study: 9730803, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C WG 25. Dissipation study. Novartis Agro, France. Study 9730803. GLP. Unpublished.	9730803
Pointurier, R	1998	Report on residue study: 9730804, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C WG 25. Dissipation study. Novartis Agro, France. Study 9730804. GLP. Unpublished.	9730804
Pointurier, R	1998	Residue study with CGA 293343 in or on spring wheat in north of France. ADME Bioanalyses, France. Study 9730901. GLP. Unpublished.	9730901
Pointurier, R	1998	Residue study with CGA 293343 in or on spring wheat in north of France. ADME Bioanalyses, France. Study 9730902. GLP. Unpublished.	9730902
Pointurier, R	1998	Residue study with CGA 293343 in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9730903. GLP. Unpublished.	9730903
Pointurier, R	1998	Residue study with CGA 293343 in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9730904. GLP. Unpublished.	9730904
Pointurier, R	1998	Residue study with CGA 293343 in or on potatoes in south of France. ADME Bioanalyses, France. Study 9731501. GLP. Unpublished.	9731501
Pointurier, R	1998	Residue study with CGA 293343 in or on potatoes in south of France. ADME Bioanalyses, France. Study 9731502. GLP. Unpublished.	9731502
Pointurier, R	1998	Residue study with CGA 293343 in or on potatoes in south of France. ADME Bioanalyses, France. Study 9731503. GLP. Unpublished.	9731503
Pointurier, R	1998	Report on residue study: 9740501, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in peas dry (whole plant, dry seeds and haulm) after application of formulation A9567B WS 70 on peas seeds. Novartis Agro, France. Study 9740501. GLP. Unpublished.	9740501
Pointurier, R	1998	Report on residue study: 9740504, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in peas dry (whole plant, dry seeds and haulm) after application of formulation A9567B WS 70 on peas seeds. Novartis Agro, France. Study 9740504. GLP. Unpublished.	9740504
Pointurier, R	1998	Report on residue study: 9740505, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in peas dry (whole plant, dry seeds and haulm) after application of formulation A9567B WS 70 on peas seeds. Novartis Agro, France. Study 9740505. GLP. Unpublished.	9740505
Pointurier, R	1998	Report on residue study: 9740506, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in peas dry (whole plant, dry seeds and haulm) after application of formulation A9567B WS 70 on peas seeds. Novartis Agro, France. Study 9740506. GLP. Unpublished.	9740506
Pointurier, R	1997	Report on residue study: 974061 France, north. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B WS 70: seed treatment. Novartis Agro S.A., France. Study 9740601. GLP. Unpublished.	9740601
Pointurier, R	1998	Report on residue study: 974062 France, north. Magnitude of residues of CGA 293343 and CGA 322704 in sugarbeet after application of formulation A9567B WS 70: seed treatment. Novartis Agro S.A., France. Study 9740602. GLP. Unpublished.	9740602
Pointurier, R	1997	Report on residue study: 9740603 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in sugar beet after application of formulation A9567B WS 70: seed treatment. Novartis Agro S.A., France. Study 9740603. GLP. Unpublished.	9740603
Pointurier, R	1998	Report on residue study: 9741001 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in spring wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study 9741001. GLP. Unpublished.	9741001

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Pointurier, R	1998	Report on residue study: 9741002 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in spring wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study 9741002. GLP. Unpublished.	9741002
Pointurier, R	1998	Report on residue study: 9741003 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in spring wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study 9741003. GLP. Unpublished.	9741003
Pointurier, R	1998	Report on residue study: 9741101, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B WS 70 on maize seeds. ADME Bioanalyses, France. Study 9741101. GLP. Unpublished.	9741101
Pointurier, R	1998	Report on residue study: 9741102, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B WS 70 on maize seeds. ADME Bioanalyses, France. Study 9741102. GLP. Unpublished.	9741102
Pointurier, R	1998	Report on residue study: 9741201, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study 9741201. GLP. Unpublished.	9741201
Pointurier, R	1998	Report on residue study: 9741301 France, north. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study 9741301. GLP. Unpublished.	9741301
Pointurier, R	1998	Report on residue study: 9741401 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in spring barley after application of formulation A9567B WS 70 on barley seeds. ADME Bioanalyses, France. Study 9741401. GLP. Unpublished.	9741401
Pointurier, R	1998	Report on residue study: 9741402 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in spring barley after application of formulation A9567B WS 70 on barley seeds. ADME Bioanalyses, France. Study 9741402. GLP. Unpublished.	9741402
Pointurier, R	1998	Report on residue study: 9741601, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B WS 70 on maize seeds. ADME Bioanalyses, France. Study 9741601. GLP. Unpublished.	9741601
Pointurier, R	1998	Report on residue study: 9741602, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B WS 70 on maize seeds. ADME Bioanalyses, France. Study 9741602. GLP. Unpublished.	9741602
Pointurier, R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on winter wheat in north of France. ADME Bioanalyses, France. Study 9840302. GLP. Unpublished.	9840302
Pointurier, R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on winter wheat in north of France. ADME Bioanalyses, France. Study 9840401. GLP. Unpublished.	9840401
Pointurier, R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on winter wheat in north of France. ADME Bioanalyses, France. Study 9840402. GLP. Unpublished.	9840402
Pointurier, R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on winter wheat in south of France. ADME Bioanalyses, France. Study 9840403. GLP. Unpublished.	9840403
Pointurier, R	1999	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on winter wheat in south of France. ADME Bioanalyses, France. Study 9840404. GLP. Unpublished.	9840404
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on spring wheat in north of France. ADME – Bioanalyses, France. Study 9840501. GLP. Unpublished.	9840501
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on spring wheat in north of France. ADME Bioanalyses, France. Study 9840502. GLP. Unpublished.	9840502
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9840503. GLP. Unpublished.	9840503
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 + tefluthrin in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9840504. GLP. Unpublished.	9840504
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on spring wheat in north of France. ADME Bioanalyses, France. Study 9840601. GLP. Unpublished.	9840601

Author	Year	Title, Institute, Report references	Code
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on spring wheat in north of France. ADME Bioanalyses, France Study 9840602. GLP. Unpublished.	9840602
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9840603. GLP. Unpublished.	9840603
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 169374 in or on spring wheat in south of France. ADME Bioanalyses, France. Study 9840604. GLP. Unpublished.	9840604
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 219417 + flutriafol in or on spring barley in north of France. ADME Bioanalyses, France. Study 9840701. GLP. Unpublished.	9840701
Pointurier, R	2000	Residue Study with CGA 293343 + CGA 173506 + CGA 219417 + flutriafol in or on spring barley in south of France. ADME Bioanalyses, France. Study 9840702. GLP. Unpublished.	9840702
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 219417 + flutriafol in or on spring barley in north of France. ADME Bioanalyses, France. Study 9840801. GLP. Unpublished.	9840801
Pointurier, R	2000	Residue study with CGA 293343 + CGA 173506 + CGA 219417 + flutriafol in or on spring barley in south of France. ADME Bioanalyses, France. Study 9840802. GLP. Unpublished.	9840802
Pointurier, R	1999	Residue study with CGA 293343 in or on peas in north of France. ADME Bioanalyses, France. Study 9840901. GLP. Unpublished.	9840901
Pointurier, R	1999	Residue study with CGA 293343 in or on peas in south of France. ADME Bioanalyses, France. Study 9840902. GLP. Unpublished.	9840902
Pointurier, R	1999	Residue study with CGA 293343 in or on peas in north of France. ADME Bioanalyses, France. Study 9841001. GLP. Unpublished.	9841001
Pointurier, R	1999	Residue study with CGA 293343 in or on maize in north of France. Novartis Crop Protection, Switzerland. ADME Bioanalyses, France. Study 9841401. GLP. Unpublished.	9841401
Pointurier, R	1999	Residue study with CGA 293343 in or on maize in south of France. ADME Bioanalyses, France. Study 9841501. GLP. Unpublished.	9841501
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil in or on wheat in north of France. ADME Bioanalyses, France. Study 9940201. GLP. Unpublished.	9940201
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil in or on wheat in south of France. ADME Bioanalyses, France. Study 9940202. GLP. Unpublished.	9940202
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole + tefluthrine in or on wheat in north of France. ADME Bioanalyses, France. Study 9940301. GLP. Unpublished.	9940301
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole + teflutrine in or on wheat in north of France. ADME Bioanalyses, France. Study 9940302. GLP. Unpublished.	9940302
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole + teflutrine in or on wheat in south of France. ADME Bioanalyses, France. Study 9940303. GLP. Unpublished.	9940303
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole + teflutrine in or on wheat in south of France. ADME Bioanalyses, France. Study 9940304. GLP. Unpublished.	9940304
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole in or on wheat in south of France. ADME Bioanalyses, France. Study 9940401. GLP. Unpublished.	9940401
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + difenoconazole in or on wheat in south of France. ADME Bioanalyses, France. Study 9940402. GLP. Unpublished.	9940402
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + cyprodinil + flutriafol in or on winter barley in north of France. ADME Bioanalyses, France. Study 9940501. GLP. Unpublished.	9940501
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + cyprodinil + flutriafol in or on winter barley in south of France. ADME Bioanalyses, France. Study 9940601. GLP. Unpublished.	9940601
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + cyprodinil + flutriafol in or on winter barley in south of France. ADME Bioanalyses, France. Study 9940602. GLP. Unpublished.	9940602
Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + cyprodinil + flutriafol in or on winter barley in south of France. ADME Bioanalyses, France. Study 9940603. GLP. Unpublished.	9940603

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Pointurier, R	2000	Residue study with CGA 293343 + fludioxonil + cyprodinil + flutriafol in or on winter barley in south of France. ADME Bioanalyses, France. Study 9940604. GLP. Unpublished.	9940604
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), cyprodinil (CGA 219417), thiamethoxam (CGA 293343) and flutriafol (ASF 356) in or on spring barley in France (north). ADME Bioanalyses, France. Study 9940801. GLP. Unpublished.	9940801
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), cyprodinil (CGA 219417), thiamethoxam (CGA 293343) and flutriafol (ASF 356) in or on spring barley in France (north). ADME Bioanalyses, France. Study 9940802. GLP. Unpublished.	9940802
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343), and metalxyl-M (CGA 329351) in or on maize in France (north). ADME Bioanalyses, France. Study 9941101. GLP. Unpublished.	9941101
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343), and metalaxyl-M (CGA 329351) in or on maize in France (south). ADME Bioanalyses, France. Study 9941102. GLP. Unpublished.	9941102
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343), and metalxyl-M (CGA 329351) in or on maize in France (north). ADME Bioanalyses, France. Study 9941201. GLP. Unpublished.	9941201
Pointurier, R	2000	Residue study with fludioxonil (CGA 173506), thiamethoxam (CGA 293343), and metalxyl-M (CGA 329351) in or on maize in France (south). ADME Bioanalyses, France. Study 9941202. GLP. Unpublished.	9941202
Pointurier, R	1997	Report on residue study OI96303, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Novartis Agro, France. Study OI96303. GLP. Unpublished.	OI96303
Pointurier, R	1997	Report on residue study OI96304 trial AC21, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Dissipation study. Novartis Agro, France. Study OI96304/AC21. GLP. Unpublished.	OI96304/AC21
Pointurier, R	1997	Report on residue study: OI96304, trial KJ76, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9584C. Dissipation study. Novartis Agro, France. Study OI96304/KJ76. GLP. Unpublished.	OI96304/KJ76
Pointurier, R	1997	Report on residue study: OS96401, trial AC02, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/AC02. GLP. Unpublished.	OS96401/AC02
Pointurier, R	1997	Report on residue study: OS96401, trial AC32, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/AC32. GLP. Unpublished.	OS96401/AC32
Pointurier, R	1997	Report on residue study: OS96401, trial FP01, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/FP01. GLP. Unpublished.	OS96401/FP01
Pointurier, R	1997	Report on residue study: OS96401, trial KJ95, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/KJ95. GLP. Unpublished.	OS96401/KJ95
Pointurier, R	1997	Report on residue study: OS96401, trial LD99, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/LD99. GLP. Unpublished.	OS96401/LD99
Pointurier, R	1997	Report on residue study: OS96401, trial SJ05, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in protein peas after application of formulation A9567B on protein pea seeds. Novartis Agro, France. Study OS96401/SJ05. GLP. Unpublished.	OS96401/SJ05
Pointurier, R	1997	Report on residue study: OS96402 trial AC03 France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on barley seeds. Novartis Agro, France. Study OS96402/AC03. GLP. Unpublished.	OS96402/AC03
Pointurier, R	1997	Report on residue study: OS96402 trial LD98 France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on barley seeds. Novartis Agro, France. Study OS96402/LD98. GLP. Unpublished.	OS96402/LD98
Pointurier, R	1998	Report on residue study: OS96402 trial SJ06 France, north. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on barley seeds. Novartis Agro, France. Study OS96402/SJ06. GLP. Unpublished.	OS96402/SJ06

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Pointurier, R	1997	Report on residue study: OS96403 trial AC06 France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on wheat seeds. Novartis Agro S.A., France. Study OS96403/AC06. GLP. Unpublished.	OS96403/AC06
Pointurier, R	1997	Report on residue study: OS96403 trial SJ07 France, north. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on wheat seeds. Novartis Agro S.A., France. Study OS96403/SJ07. GLP. Unpublished.	OS96403/SJ07
Pointurier, R	1997	Report on residue study: OS96405 trial AC04, France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on rape seeds. Novartis Agro, France. Study OS96405/AC04. GLP. Unpublished.	OS96405/AC04
Pointurier, R	1997	Report on residue study: OS96405 trial AC05, France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on rape seeds. Novartis Agro, France. Study OS96405/AC05. GLP. Unpublished.	OS96405/AC05
Pointurier, R	1997	Report on residue study: OS96405 trial FP02, France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on rape seeds. Novartis Agro, France. Study OS96405/FP02. GLP. Unpublished.	OS96405/FP02
Pointurier, R	1997	Report on residue study: OS96405 trial KJ94, France north. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on rape seeds. Novartis Agro, France. Study OS96405/KJ94. GLP. Unpublished.	OS96405/KJ94
Pointurier, R	1997	Report on residue study: OS96406, trial AC08, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B on maize seeds. Novartis Agro, France. Study OS96406/ AC08. GLP. Unpublished.	OS96406/AC08
Pointurier, R	1997	Report on residue study: OS96406, trial KJ92, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B on maize seeds. Novartis Agro, France. Study OS96406/KJ92. GLP. Unpublished.	OS96406/KJ92
Pointurier, R	1997	Report on residue study: OS96406, trial LD95, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B on maize seeds. Novartis Agro, France. Study OS96406/LD95. GLP. Unpublished.	OS96406/LD95
Pointurier, R	1997	Report on residue study: OS96406, trial SJ09, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in maize after application of formulation A9567B on maize seeds. Novartis Agro, France. Study OS96406/SJ09. GLP. Unpublished.	OS96406/SJ09
Pointurier, R	1997	Report on residue study: OS96407 trial AC10 France, south. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on beet seeds. Novartis Agro S.A., France. Study OS96407. GLP. Unpublished.	OS96407 AC10
Pointurier, R	1997	Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on beet seeds. Novartis Agro S.A., France. Study OS96407/DE02. GLP. Unpublished.	OS96407/DE02
Pointurier, R	1997	Report on residue study: OS96407 trial KJ90 France, north. Magnitude of residues of CGA 293343 and CGA 322704 after application of formulation A9567B on beet seeds. Novartis Agro S.A., France. Study OS96407/KJ90. GLP. Unpublished.	OS96407/KJ90
Pointurier, R	1998	Report on residue study: OS97402 trial AC98 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study OS97402/AC98. GLP. Unpublished.	OS97402/AC98
Pointurier, R	1998	Report on residue study: OS97402 trial KJ02 France, north. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study OS97402/KJ02. GLP. Unpublished.	OS97402/KJ02
Pointurier, R	1998	Report on residue study: OS97402 trial LD01 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in wheat after application of formulation A9567B WS 70 on wheat seeds. Novartis Agro S.A., France. Study OS97402/LD01. GLP. Unpublished.	OS97402/LD01
Pointurier, R	1998	Report on residue study: OS97403 trial AC97 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in barley after application of formulation A9567B WS 70 on barley seeds. Novartis Agro, France. Study OS97403/AC97. GLP. Unpublished.	OS97403/AC97

Author	Year	Title, Institute, Report references	Code
Pointurier, R	1998	Report on residue study: OS97403 trial KJ03 France, north. Magnitude of residues of CGA 293343 and CGA 322704 in barley after application of formulation A9567B WS 70 on barley seeds. Novartis Agro, France. Study OS97403/KJ03. GLP. Unpublished.	OS97403/KJ03
Pointurier, R	1998	Report on residue study: OS97403 trial LD02 France, south. Magnitude of residues of CGA 293343 and CGA 322704 in barley after application of formulation A9567B WS 70 on barley seeds. Novartis Agro, France. Study OS97403/LD02. GLP. Unpublished.	OS97403/LD02
Pointurier, R	1998	Report on residue study: OS97404 trial AC95, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study OS97404/AC95. GLP. Unpublished.	OS97404/AC95
Pointurier, R	1998	Report on residue study: OS97404 trial AC96, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study OS97404/AC96. GLP. Unpublished.	OS97404/AC96
Pointurier, R	1998	Report on residue study: OS97404, trial KJ04, France, north. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study OS97404/KJ04. GLP. Unpublished.	OS97404/KJ04
Pointurier, R	1998	Report on residue study: OS97404 trial LD03, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study OS97404/LD03. GLP. Unpublished.	OS97404/LD03
Pointurier, R	1998	Report on residue study: OS97404 trial LD04, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in rape grains after application of formulation A9567B WS 70 (seed treatment). Novartis Agro, France. Study OS97404/LD04. GLP. Unpublished.	OS97404/LD04
Pointurier,R	1998	Report on residue study: 9740503, France, south. Magnitude of residues of CGA 293343 and CGA 322704 in peas dry (whole plant, dry seeds and haulm) after application of formulation A9567B WS 70 on peas seeds. Novartis Agro, France. Study 9740503. GLP. Unpublished.	9740503
Rawle, N	2004	Residue study with thiamethoxam (CGA 293343) in or on protected cucumbers in Spain. Syngenta Crop Protection, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2203 Version 2. Study 03-1021. GLP. Unpublished.	03-1021
Rawle, N	2004	Residue study with thiamethoxam (CGA 293343) in or on protected cucumbers in Spain. Syngenta Crop Protection, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2204. Study 03-1022. GLP. Unpublished.	03-1022
Rawle, N	2005	Residue study with thiamethoxam (CGA 293343) in or on protected melons in Spain. Syngenta Crop Protection, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2205 Study 03-1023. GLP. Unpublished.	03-1023
Rawle, N	2005	Residue study with thiamethoxam (CGA 293343) in or on protected melons in Spain. Syngenta Crop Protection, Switzerland. CEMAS, North Ascot, UK. Report CEMR-2206 Study 03-1024. GLP. Unpublished.	03-1024
Rawle, N	2004	Independent laboratory validation of a method (REM 179.03) for the determination of residues of thiamethoxam (CGA 293343) and CGA 322704 in tomatoes and cereal grain. Study CEMS-2237. Report CEMR-2237. CEMAS, UK. GLP. Unpublished.	CEMR-2237
Rawle, N	2004	Independent laboratory validation of a method (AG 675) for the determination of residues of thiamethoxam (CGA 293343) and CGA 322704 in milk, meat and liver. Syngenta Crop Protection, Switzerland. CEMAS, UK. Study CEMS2238. Report CEMR-2238. GLP. Unpublished.	CEMR-2238
Roncato, C	2007	Actara 250 WG—residues of thiamethoxan and CGA 322704 in pinapple after complete treatment on thiamethoxam basis - Brazil, 2005-06. Syngenta Proteção de Cultivos Ltd.a, São Paulo, Brazil. Study M04037. GLP. Unpublished.	M04037
Rümbeli, R	1998	Metabolism of [thiazol-2-^{14}C] CGA 293343 after multiple oral administrations to lactating goats. Novartis Crop Protection, Switzerland Study 027AM03. GLP. Unpublished.	027AM03
Rümbeli, R	1998	Metabolism of [thiazol-2-^{14}C] CGA 293343 after multiple oral administrations to laying hens. Novartis Crop Protection, Switzerland. Study 027AM04. GLP. Unpublished.	027AM04
Sandmeier, P	1996	Uptake, distribution and degradation of CGA 293343 in field grown corn after seed treatment with [oxadiazin-4-^{14}C] labelled material. Project 95PSA40. Report 95PSA40PR1. Ciba-Geigy, Switzerland. Plant metabolism report PMR 7/96. GLP. Unpublished.	95PSA40PR1

Author	Year	Title, Institute, Report references	Code
Sandmeier, P	1997	Metabolism of [oxadiazin-4-^{14}C]CGA 293343 in corn. Project 95PSA40. Report 95PSA40PR2. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 10/97. GLP. Unpublished.	95PSA40PR2
Sandmeier, P	1996	Uptake, distribution and degradation of CGA 293343 in field grown corn after seed treatment with [thiazol-2-^{14}C] labelled material. Project 95PSA41. Report 95PSA41PR1. Ciba-Geigy, Switzerland. Plant metabolism report PMR 6/96. GLP. Unpublished.	95PSA41PR1
Sandmeier, P	1997	Metabolism of [thiazol-2-^{14}C]CGA 293343 in corn. Project 95PSA41. Report 95PSA41PR2. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 19/97. GLP. Unpublished.	95PSA41PR2
Sandmeier, P	1997	Outdoor confined accumulation study on rotational crops after bareground application of [oxadiazin-4-^{14}C]CGA 293343. Novartis Crop Protection AG, Switzerland. Crop metabolism report CMR 20/97. Project report 95PSA42PR1. GLP. Unpublished.	95PSA42PR1
Sandmeier, P	1997	Outdoor confined accumulation study on rotational crops after bareground application of [thiazol-2-^{14}C]CGA 293343. Novartis Crop Protection, Switzerland. Crop metabolism report CMR 16/97. Project report 95PSA43PR1. GLP. Unpublished.	95PSA43PR1
Sandmeier, P	1999	Metabolism of [thiazol-2-^{14}C] and [oxadiazin-4-^{14}C] CGA 293343 in field grown lettuce. Novartis Crop Protection, Switzerland. Study 99PSA52. GLP. Unpublished.	99PSA52
Satter, P	2003	Residue study with thiamethoxam (CGA 293343) in or on cucumbers in Spain. Syngenta Crop Protection, Switzerland. Study 02-1017. GLP. Unpublished.	02-1017
Satter, P	2003	Residue study with thiamethoxam (CGA 293343) in or on tomatoes in Spain. Syngenta Crop Protection, Switzerland. Study 02-1120. GLP. Unpublished.	02-1120
Satter, P	2002	Residue study with thiamethoxam (CGA 293343) in or on bananas in Cameroon. Report on analytical part for non-GLP Study 02-1168. Syngenta Crop Protection AG, Switzerland. Not GLP. Unpublished.	02-1168
Satter, P	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in Switzerland. Syngenta Crop Protection, Switzerland. Study 1003/01. GLP. Unpublished.	1003/01
Satter, P	2002	Residue study with thiamethoxam (CGA 293343) in or on grapes in Switzerland. Syngenta Crop Protection, Switzerland Study 1004/01. GLP. Unpublished.	1004/01
Satter,P	2003	Residue study with thiamethoxam (CGA 293343) in or on sweet peppers in Spain. Syngenta Crop Protection, Switzerland. Study 02-1020. GLP. Unpublished.	02-1020
Schwartz, B	1998	Final report: aerobic soil metabolism of [^{14}C-guanidine] CGA 293343. Novartis Crop Protection, USA. Study 504-95. Report ABR-96084. GLP. Unpublished.	ABR-96084
Schwartz, B	1998	Photodegradation of ^{14}C-thiazolyl-CGA 293343 in pH 5 buffered solution under artificial light. Novartis Crop Protection, USA. Report ABR-98091. Study 87-96. GLP. Unpublished.	ABR-98091
Smith ,JA	1998	Determination of residues of CGA293343 and the metabolite CGA322704 in spring wheat. Novartis Agro, Germany. Report gr 68197. GLP. Unpublished.	gr 68197
Smith, JA	2000	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in winter oilseed rape. Novartis Agro, Germany. Study gr 61299. GLP. Unpublished.	gr 61299
Smith, JA	1997	Residues of CGA293343 in spring wheat. Novartis Agro, Germany. Study gr 61496. GLP. Unpublished.	gr 61496
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in potatoes. Novartis Agro, Germany. Report gr 62297. GLP. Unpublished.	gr 62297
Smith, JA	2000	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in winter oilseed rape. Novartis Agro, Germany. Study gr 62499. GLP. Unpublished.	gr 62499
Smith, JA	1997	Residues of CGA293343 in spring barley. Novartis Agro, Germany. Study gr 62596. GLP. Unpublished.	gr 62596
Smith, JA	1997	Residues of CGA 293343 in maize (test product: CGD 30060I - A9567B). Novartis Agro, Germany. Study gr 63296. GLP. Unpublished.	gr 63296
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in potatoes. Novartis Agro, Germany. Report gr 63497. GLP. Unpublished.	gr 63497
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in spring wheat, soil and processing products (semolina, bran, flour and bread). Novartis Agro GmbH, Germany. Study gr 64497. GLP. Unpublished.	gr 64497
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in spring wheat, soil and processing products (semolina, bran, flour and bread). Novartis Agro GmbH, Germany. Study gr 65197. GLP. Unpublished.	gr 65197
Smith, JA	1997	Residues of CGA 293343 in spring oilseed rape (test product: CGD 30060 I - A9567B). Novartis Agro, Germany. Study gr 65496. GLP. Unpublished.	gr 65496

Author	Year	Title, Institute, Report references	Code
Smith, JA	1999	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in spring oilseed rape. Novartis Agro, Germany. Study gr 65498. GLP. Unpublished.	gr 65498
Smith, JA	1999	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in spring oilseed rape. Novartis Agro, Germany. Study gr 66298. GLP. Unpublished.	gr 66298
Smith, JA	1997	Residues of CGA 293343 in spring oilseed rape (test product: CGD 30060 I - A9567B). Novartis Agro, Germany. Study gr 66596. GLP. Unpublished.	gr 66596
Smith, JA	1999	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in spring oilseed rape. Novartis Agro, Germany. Study gr 68098. GLP. Unpublished.	gr 68098
Smith, JA	2000	Determination of residues of CGA 293343 and the metabolite CGA 322704, CGA 329351 and CGA 173506 in spring oilseed rape. Novartis Agro, Germany. Study gr 71199. GLP. Unpublished.	gr 71199
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in peas. Novartis Agro, Germany. Study gr 74197. GLP. Unpublished.	gr 74197
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in peas. Novartis Agro, Germany. Study gr 75297. GLP. Unpublished.	gr 75297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in peas. Novartis Agro, Germany. Study gr 76197. GLP. Unpublished.	gr 76197
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in peas. Novartis Agro, Germany. Study gr 77297. GLP. Unpublished.	gr 77297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in maize. Novartis Agro, Germany. Study gr 80197. GLP. Unpublished.	gr 80197
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in maize. Novartis Agro, Germany. Study gr 81297. GLP. Unpublished.	gr 81297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in maize. Novartis Agro, Germany. Study gr 82497. GLP. Unpublished.	gr 82497
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in maize. Novartis Agro, Germany. Study gr 83197. GLP. Unpublished.	gr 83197
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in maize. Novartis Agro, Germany. Study gr 84297. GLP. Unpublished.	gr 84297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in sugar beet. Novartis Agro GmbH, Germany. Report gr 67298. GLP. Unpublished.	gr 67298
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in sugar beet. Novartis Agro GmbH, Germany. Report gr 69098. GLP. Unpublished.	gr 69098
Smith, JA	1998	Determination of residues of CGA293343 and the metabolite CGA293343 in spring barley. Novartis Agro, Germany. Study gr 69497. GLP. Unpublished.	gr 69497
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in spring oilseed rape. Novartis Agro, Germany. Study gr 72197. GLP. Unpublished.	gr 72197
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in spring oilseed rape. Novartis Agro, Germany. Study gr 73297. GLP. Unpublished.	gr 73297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in sugar beet. Novartis Agro GmbH, Germany. Report gr 78297. GLP. Unpublished.	gr 78297
Smith, JA	1998	Determination of residues of CGA 293343 and the metabolite CGA 322704 in sugar beet. Novartis Agro GmbH, Germany. Report gr 79497. GLP. Unpublished.	gr 79497
Solé ,C	2004	Residue study with thiamethoxam (CGA 293343) in or on melons in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1040. GLP. Unpublished.	02-1040
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in Switzerland. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1006. GLP. Unpublished.	02-1006
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in Switzerland. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1007. GLP. Unpublished.	02-1007
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on cucumbers in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1018. GLP. Unpublished.	02-1018
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on melons in Spain. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1039. GLP. Unpublished.	02-1039
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on melons in Italy. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1101. GLP. Unpublished.	02-1101

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Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on cucumbers in France (north). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-11107. GLP. Unpublished.	02-1107
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (north). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1110. GLP. Unpublished.	02-1110
Solé, C	2004	Residue study with thiamethoxam (CGA 293343) in or on grapes in France (north). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1111. GLP. Unpublished.	02-1111
Solé, C	2003	Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Syngenta Crop Protection AG, Switzerland. ADME Bioanalyses, France. Study 02-1169. Not GLP. Unpublished.	02-1169
Solé, C	2003	Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Syngenta Crop Protection AG, Switzerland. ADME Bioanalyses, France. Study 03-1031. Not GLP. Unpublished.	03-1031
Solé, C	2003	Residues of thiamethoxam (CGA 293343) and its metabolite (CGA 322704) in bananas from Cameroon. Syngenta Crop Protection AG, Switzerland. ADME Bioanalyses, France. Study 03-1032. Not GLP. Unpublished.	03-1032
Solé, C	2006	Thiamethoxam (CGA 293343) - residue study on cherries in Switzerland. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 05-0406. GLP. Unpublished.	05-0406
Solé, C	2007	Thiamethoxam (CGA 293343) - residue study on cherries in France (north). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 05-0416. GLP. Unpublished.	05-0416
Solé, C	2007	Thiamethoxam (CGA 293343) - Residue study on cherries in Spain and France (south). Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 05-0417. GLP. Unpublished.	05-0417
Solé, C	2006	Thiamethoxam (CGA 293343) - Residue study on cherries in Italy. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 05-0506. GLP. Unpublished.	05-0506
Solé, C	2007	Thiamethoxam (CGA 293343)—Residue study on cherries in northern France in 2006. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Report T000641-06-REG. GLP. Unpublished.	T000641-06-REG
Solé, C	2007	Thiamethoxam (CGA 293343)—Residue study on cherries in Southern France in 2006. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Report T000642-06-REG. GLP. Unpublished.	T000642-06-REG
Solé, C	2007	Thiamethoxam (CGA2933043)—residue study on grapes and processed products in Switzerland and northern France in 2006. ADME – Bioanalyses, France. Study T000797-06. Report SYN/RES/07-0216. GLP. Unpublished.	T000797-06
Solé, C	2007	Thiamethoxam (CGA2933043)—residue study on grapes and processed products in southern France in 2006. ADME – Bioanalyses, France. Study T000798-06. Report SYN/RES/07-0217. GLP. Unpublished.	T000798-06
Solé, C	2007	Thiamethoxam (CGA 293343): residue study on field tomato in Spain and Italy in 2006. Syngenta, UK. ADME Bioanalyses, France, Study T000803-06. Report SYN/RES/06-0607. GLP. Unpublished.	T000803-06
Solé,C	2004	Residue study with thiamethoxam (CGA 293343) in or on melons in Italy. Syngenta Crop Protection, Switzerland. ADME Bioanalyses, France. Study 02-1106. GLP. Unpublished.	02-1106
Sparrow, K	1997	Photodegradation of ^{14}C-[thiazolyl]-CGA 293343 on soil under artificial light. Novartis Crop Protection, USA. Report ABR-97011. Study 372-96. GLP. Unpublished.	ABR-97011
Sparrow, K	1997	Photodegradation of ^{14}C-[guanidine]-CGA 293343 on soil under artificial light. Novartis Crop Protection, USA. Report ABR-97012. Study 336-96. GLP. Unpublished.	ABR-97012
Sparrow, K	1997	Photodegradation of ^{14}C-guanidine-CGA 293343 in pH 5 buffered solution under artificial light. Novartis Crop Protection, USA. Report ABR-97023. Study 509-95. GLP. Unpublished.	ABR-97023
Starner ,VR	2003	Thiamethoxam: magnitude of the residue on cranberry. IR-4 Project 07754. Center for Minor Crop Pest Management, NJ, USA. Field trials: 00-MA01, 00-NJ14, 00-WI18, 00-WI19, 00-OR19, 00-OR20. GLP. Unpublished.	7754
Starner, V	2006	Thiamethoxam: magnitude of the residue on artichoke. IR-4 project 08282. North Brunswick, USA. GLP. Unpublished.	8282
Starner, V	2006	Thiamethoxam - magnitude of the residue on hops. IR-4 Project, North Brunswick, USA. Project 08451. GLP. Unpublished.	8451
Starner, VR	2002	Thiamethoxam: magnitude of the residue on bean (succulent). Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07589. GLP. Unpublished.	7589

Author	Year	Title, Institute, Report references	Code
Starner, VR	2003	Thiamethoxam: magnitude of the residue on pea (dry). Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07590. GLP. Unpublished.	7590
Starner, VR	2003	Thiamethoxam: magnitude of the residue on bean (dry). Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07675. GLP. Unpublished.	7675
Starner, VR	2003	Thiamethoxam: magnitude of the residue on pea (succulent). Syngenta. IR-4 Project, North Brunswick, USA. IR-4 study 07676. GLP. Unpublished.	7676
Starner, VR	2006	Thiamethoxam - magnitude of the residue on caneberry. IR-4 Project 08039. Center for Minor Crop Pest Management, NJ, USA. Field trials: 02-NJ10, 02-OR08, 02-OR09, 02-WA11, 02-CA36, 02-MI27. GLP. Unpublished.	8039
Stulz, J	1995	Report on water solubility. Ciba-Geigy, Switzerland. Project 35444. GLP. Unpublished.	35444
Stulz, J	1995	Report on octanol/water partition coefficient. Ciba-Geigy, Switzerland. Project 36610. GLP. Unpublished.	36610
Stulz, J	1995	Report on dissociation constant in water. Ciba-Geigy, Switzerland. Project 38123. GLP. Unpublished.	38123
Stulz, J	1998	Report on solubility in organic solvents. Novartis Crop Protection, Switzerland. Study 58212. GLP. Unpublished.	58212
Tack, T	1998	Report on residue study IR1396. Determination of residues in potatoes after application of CGA 293343, formulated as A-9584 C, as a foliar treatment. Novartis Crop Protection, UK. Study IR1396. GLP. Unpublished.	IR1396
Tack, T	1998	Report on residue study IR1496. Determination of residues in potatoes after application of CGA 293343, formulated as A-9584 C, as a foliar treatment. Novartis Crop Protection, UK. Study IR1496. GLP. Unpublished.	IR1496
Tack, TJ	1998	Report on residue study IR 0996. (UK Study) Peas: generation of crop samples for subsequent residue analysis following seed treatment with A-9567B. Novartis Crop Protection, UK. Study IR0996. GLP. Unpublished.	IR0996
Tauber, R and McLean, N	1999	Independent laboratory validation of Novartis Method AG-675: Analytical method for the determination of residues CGA 293343 and the metabolite CGA 322704 in animal and crop substrates by high performance liquid chromatography. Novartis Crop Protection, USA. Study 615-99. GLP. Unpublished.	615-99
Thanei, P	1998	The metabolism of [thiazol-2-^{14}C] and [oxadiazin-4-^{14}C] CGA 293343 in the rat. Novartis Crop Protection, Switzerland. Study 027AM02. GLP. Unpublished.	027AM02
Tribolet, R	1998	Validation of analytical method REM 179.03 for the determination of CGA 293343 and CGA 322704 in crops by HPLC using field grown pears after treatment with ^{14}C-labelled CGA 293343. Novartis Crop Protection, Switzerland. Report 103/98. GLP. Unpublished.	103/98
Ulbrich, R	1999	Hydrolysis of ^{14}C-labelled CGA 322704 under laboratory conditions. Novartis Crop Protection, Switzerland. Study 98UL03. GLP. Unpublished.	98UL03
Ulbrich, R	1998	Hydrolysis of ^{14}C-labelled CGA 293343 under processing conditions. Novartis Crop Protection, Switzerland. Study 98UL05. GLP. Unpublished.	98UL05
van Zyl, PFC	2005	Determination of thiamethoxam residues in mangoes. SABS, Pretoria, South Africa, Syngenta SA, Johannesburg, South Africa. Study 04/338. Report 7214/2372801/Y338. GLP. Unpublished.	04/338
van Zyl, PFC	2005	Determination of thiamethoxam residues in mangoes. SABS, Pretoria, South Africa, Syngenta SA, Johannesburg, South Africa, Study 04/339. Report 7214/2372810/Y339. GLP. Unpublished.	04/339
van Zyl, PFC	2005	Determination of thiamethoxam residues in mangoes. SABS, Pretoria, South Africa, Syngenta SA, Johannesburg, South Africa. Study 04/341. Report 7214/2372836/Y341. GLP. Unpublished.	04/341
van Zyl, PFC	2005	Determination of thiamethoxam residues in mangoes. SABS, Pretoria, South Africa, Syngenta SA, Johannesburg, South Africa. Study 04/430. Report 7214/2372828/Y340. GLP. Unpublished.	04/430
Walser, M	1997	Applicability of multiresidue method DFG S 19 for determination of parent compound CGA 293343 and metabolite CGA 322704 in potatoes, wheat grains and rape seeds. Novartis Crop Protection, Switzerland. Study 175/97. Unpublished.	175/97
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in winter oil seed rape after application of CGA 293343 as formulation A-9567B in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR0197. Dr. Specht & Partner, Germany. Project NOV-9819. GLP. Unpublished.	Nov-19
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in spring oil seed rape after application of CGA 293343 as formulation A-9567B in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR2797. Dr. Specht & Partner, Germany. Project NOV-9820. GLP. Unpublished.	Nov-20

Author	Year	Title, Institute, Report references	Code
Weber, H	1998	Residue study of CGA293343 and CGA322704 in winter wheat after an application of CGA293343 as formulation A9567B in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR0397. Dr. Specht & Partner, Germany. Project NOV-9821. GLP. Unpublished.	Nov-21
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in winter wheat after an application of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR1197. Dr. Specht & Partner, Germany. Project NOV-9822. GLP. Unpublished.	Nov-22
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in winter wheat after an application of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR1297. Dr. Specht & Partner, Germany. Project NOV-9823. GLP. Unpublished.	Nov-23
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in winter wheat after an application of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR1397. Dr. Specht & Partner, Germany. Project NOV-9824. GLP. Unpublished.	Nov-24
Weber, H	1998	Residue study of CGA293343 and CGA322704 in winter barley after an application of CGA293343 as formulation A9567B in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR0497. Dr. Specht & Partner, Germany. Project NOV-9825. GLP. Unpublished.	Nov-25
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in potatoes and processed products after four applications of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR1097. Dr. Specht & Partner, Germany. Project NOV-9831. GLP. Unpublished.	Nov-31
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in egg plants grown in greenhouses after two applications of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR2097. Dr. Specht & Partner, Germany. Project NOV-9836. GLP. Unpublished.	Nov-36
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in sweet peppers grown in greenhouses after two applications of CGA 293343 as formulation A-9584C in Great Britain, 1997. Novartis Crop Protection, Switzerland. Study IR2197. Dr. Specht & Partner, Germany. Project NOV-9837. GLP. Unpublished.	Nov-37
Weber, H	1998	Residue study of CGA 293343 and CGA 322704 in vining pea after an application of CGA 293343 as formulation A-9567B in Denmark, 1996. Novartis Crop Protection, Switzerland. Study IR1096. Dr. Specht & Partner, Germany. Project NOV-9838. GLP. Unpublished.	Nov-38
Whetton, M	no date	Direct Laboratories: final analytical report for the analysis of pesticide residues in samples of okra. COLE/ACP Ref: (PIP No. 0106/22/Direct-Lab/03) and (PIP No. 0106/22/Direct-Lab/05). Field trials and pesticides residue monitoring on Okra in Ivory Coast. Unpublished.	0106/22
Wood A	2010	Compendium of Pesticide Common Names. http://www.alanwood.net/pesticides/index_cn_frame.html	