THIACLOPRID (223)

The first draft was prepared by Mr. Christian Sieke, Federal Institute for Risk Assessment, Germany

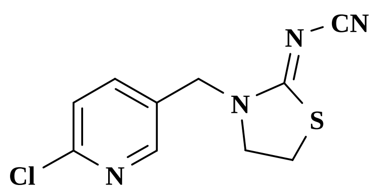
EXPLANATION

Residue and analytical aspects of thiacloprid were considered for the first time by the present meeting. The manufacturer submitted studies on metabolism, analytical methods, supervised field trials, processing, freezer storage stability, environmental fate in soil and rotational crop residues.

IDENTITY

Common name:	Thiacloprid
Chemical name:	
IUPAC:	N-{3-[(6-Chloro-3-pyridinyl)methyl]-1,3-thiazolan-2-yliden}cyanamide
CA (index):	Cyanamide, [3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolidinylidene]-
Manufacturer's code number:	YRC 2894
CAS number:	111988-49-9
CIPAC number:	not allocated
Molecular formula:	$C_{10}H_9ClN_4S$

Structural formula:



Molecular mass: 252.73 g/mol

Formulations:

Formulation	Content of active ingredients	Trade names
SC 480	480 g/L Thiacloprid	Calypso
SC 240	240 g/L Thiacloprid	Calypso
OD 240	240 g/L Thiacloprid	Biscaya

PHYSICAL AND CHEMICAL PROPERTIES

A detailed chemical and physical characterisation of the active ingredient is given in Table 1.

References to test materials used:

1 Thiacloprid (batch 941013ELB01, purity 99.3%)
2 Thiacloprid (batch 950614ELB02, purity 99.7%)
3 Thiacloprid (batch 940629ELB04, purity 98.6%)
4 [methylene-^{14}C] thiacloprid, radiochemical purity > 98%, specific radioactivity 3.43 MBq/mg

Table 1. Physical and chemical data of thiacloprid.

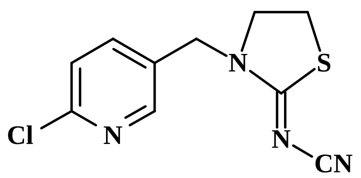
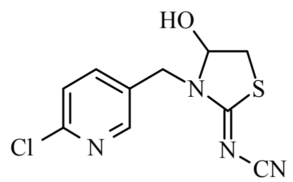
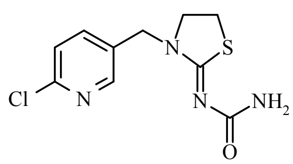
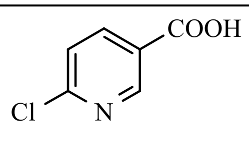
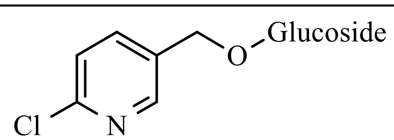
Property	Results	Test Material, Method	Reference
Physical state, colour	Active substance, pure: yellowish powder of crystals Active substance as manufactured: yellowish crystalline powder	Material 1 Technical ai	Krohn, J. 1996
Odour	Active substance, pure: no characteristic odour Active substance as manufactured: weak characteristic odour	Material 1 Technical ai	Krohn, J. 1996
Melting point	136 °C A second modification has a melting point of 128°C.	Material 1 EU A.1.	Krohn, J. 1996 Goehrt, A. 1995
Density	1.46 g/cm³ at 20°C	Material 1, OECD 109	Krohn, J. 1996
Vapour pressure	$1.61 \cdot 10^{-8}$ to $4.50 \cdot 10^{-8}$ Pa at 50°C $1.21 \cdot 10^{-7}$ to $1.61 \cdot 10^{-7}$ Pa at 60°C $1.68 \cdot 10^{-7}$ to $6.31 \cdot 10^{-7}$ Pa at 70 °C $3 \cdot 10^{-10}$ Pa at 20 °C (extrapolated) $8 \cdot 10^{-10}$ Pa at 25 °C (extrapolated)	Material 2, OECD 104 ≅ EU A.4	Krohn, J. 1996
Volatility	Henry's law constant at 20°C (calculated): 5×10^{-10} Pa × m³ ×·mol⁻¹		Krohn, J. 1996
Solubility in water	0.185 g/L at 20°C The solubility is not influenced by the pH in the range between pH 4 and pH 9.	Material 1, OECD 105 ≅ EU A.6.	Krohn, J. 1996
Solubility in organic solvents (at 20 °C, in g/L)	n-heptane < 0.1 g/L at 20°C xylene 0.30 g/L at 20°C 1-octanol 1.4 g/L at 20°C 2-propanol 3.0 g/L at 20°C ethyl acetate 9.4 g/L at 20°C polyethylen glycol (PEG) 42 g/L at 20°C acetonitrile 52 g/L at 20°C acetone 64 g/L at 20°C dichloromethane 160 g/L at 20°C dimethylsulfoxide 150 g/L at 20°C	Material 3, CIPAC MT 157, part 2	Krohn, J. 1996
Dissociation constant	Thiacloprid has no acidic or basic properties in aqueous solutions. It is not possible to specify dissociation constants of the active substance in water.	Material 1, OECD 112	Krohn, J. 1996
Partition coefficient n-octanol/ water	$P_{OW} = 18$ $\log P_{OW} = 1.26$ at 20°C The effect of pH (4-9) was not investigated because there is no influence of pH on the water solubility.	Material 1, OECD 107 ≅ EU A.8	Krohn, J. 1996
Hydrolysis rate	Thiacloprid is stable at pH 5, 7 and 9. Under the experimental conditions the test substance was recovered from solution at content levels throughout the experiment (95-98% of applied). In the pH range tested formation of hydrolysis products was only observed at pH 9 at amounts less than 2% of the applied radioactivity. Considering the hydrolytic stability determined under environmental pH and temperature conditions it is not expected that hydrolytic processes will contribute to the degradation of thiacloprid in the environment.	Material 4, EPA 161-1	Brumhard, B. 1998

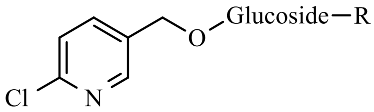
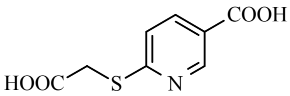
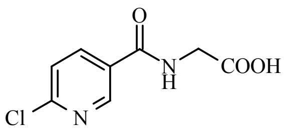
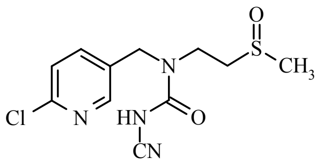
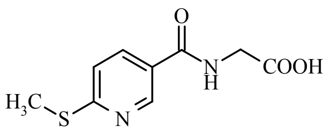
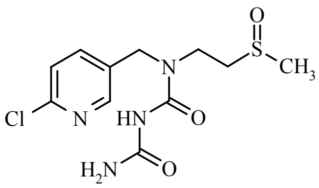
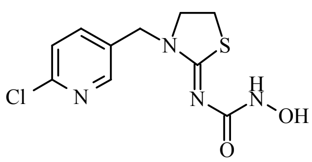
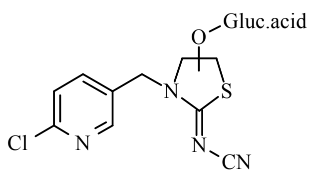
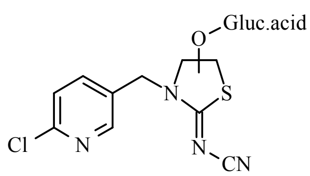
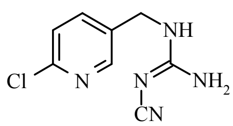
Property	Results	Test Material, Method	Reference
Photochemical degradation	Under the experimental conditions used thiacloprid degraded very slowly with an experimental half life of 79.7 days. Recovery ranged from 100.8 to 107.4% of the applied radioactivity. One main photoproduct (WAK 7259 A) was observed during the course of the experiment and accounted for a maximum of about 5% of the applied radioactivity. There was no degradation observed in the dark control samples. Considering the slow photolytic breakdown determined under environmental pH and temperature conditions it is expected that photolytic processes in aqueous solutions will contribute to the degradation of thiacloprid in the environment only to a very limited extent.	Material 4, EPA 161-2	Henneböle + Bornatsch, 1998

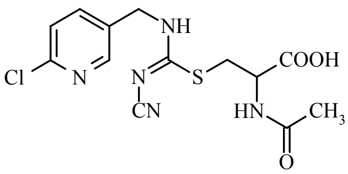
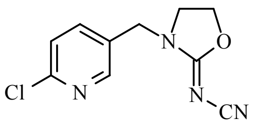
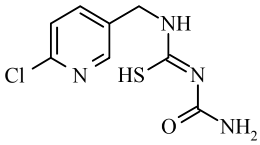
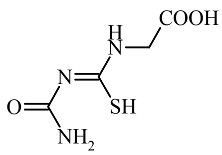
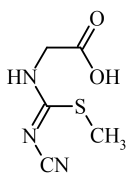
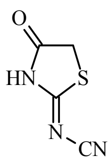
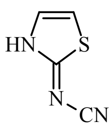
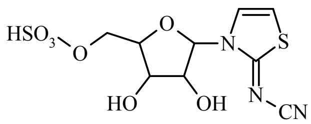
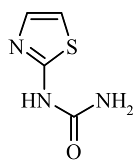
METABOLISM AND ENVIRONMENTAL FATE

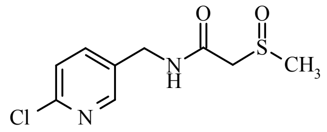
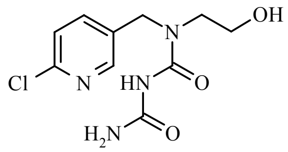
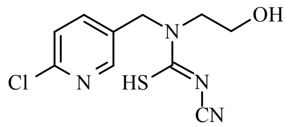
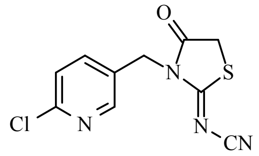
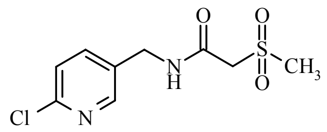
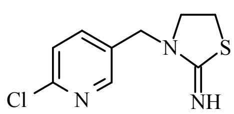
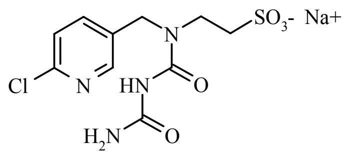
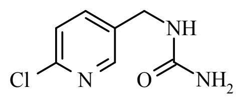
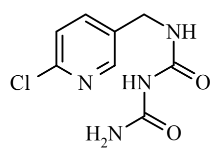
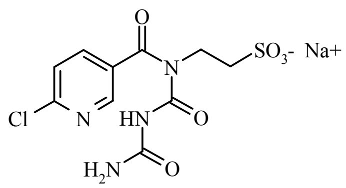
Chemical names, structures and code names of metabolites and degradation products of thiacloprid are shown below.

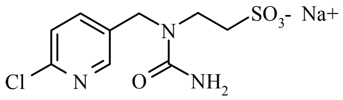
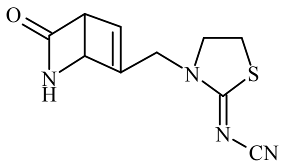
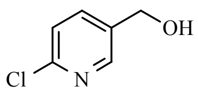
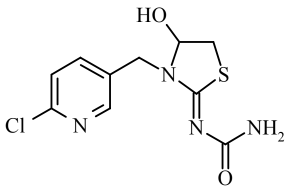
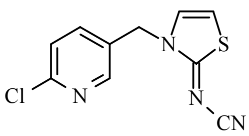
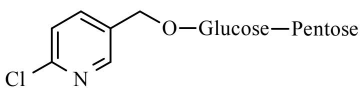
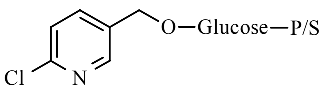
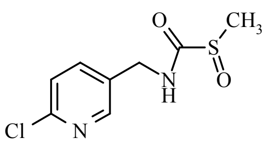
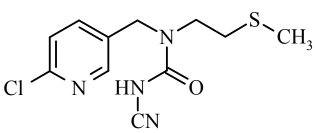
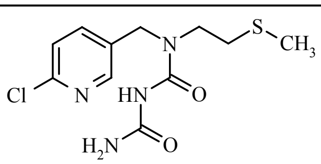
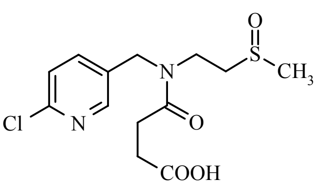
List of Metabolites – sorted by chemical structures

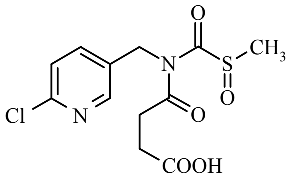
Structure	Name	Occurrence
	AS, Thiacloprid YRC 2894, PIZ 1264, ECW 10874, THS 4432, Ja752-J *{3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolidinylidene}cyanamide*	Apple, tomato, cotton Goat, hen, rat Soil
	M01 4-hydroxy-thiacloprid, WAK 6856, PIZ 1265, KNO 1863, FHW 0106E, G1 *{3-[(6-chloro-3-pyridinyl)methyl]-4-hydroxy-2-thiazolidinylidene}cyanamide*	Apple, tomato, cotton Goat, hen, rat
	M02 thiacloprid-amide, KKO 2254, Ja752-A, FHW 0104D *{3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolidinylidene}urea*	Apple, cotton Soil Rotational crops Soil (by photolysis)
	M03 6-CNA, BNF5518A, Ja752-K, G6 *6-chloro-3-pyridinecarboxylic acid*	Tomato, cotton Goat, hen, rat Soil Rotational crops
	M04 6-CPA-glucoside, G4 *Glucoside of 6-chloro-3-pyridine-methanol*	Tomato, cotton

Structure	Name	Occurrence
	M05 6-CPA-complex glucoside *Complex glucoside of 6-chloro-3-pyridi-ne-methanol*	Tomato
	M06 6-CMT-nicotinic acid *6-[(carboxymethyl)thio]-3-pyridine-carboxylic acid*	Rat
	M07 6-CN-glycine, WAK 3583 *N-[(6-chloro-3-pyridinyl)-carbonyl]glycine*	Goat, hen, rat
	M08 6-CP-urea sulfoxide, KNO 2672 *N-[(6-chloro-3-pyridinyl)methyl]-N'-cyano-N-[2-(methylsulfinyl)ethyl]urea*	Goat, hen, rat
	M09 KNO 1889 *N-{[6-(methylthio)-3-pyridinyl]-carbonyl}glycine*	Hen, rat
	M10 6-CP-biuret sulfoxide, KNO 1891, KNO 1873B N-[(6-chloro-3-pyridinyl)methyl]-N-N-[2-(methylsulfinyl)ethyl]iminodi carbonic diamide	Goat, hen, rat
	M11 thiacloprid-hydroxylamide, KNO 1893 N-{3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolidinylidene}-N'-hydroxyurea	Goat, hen, rat
	M12 KNO 2621, PIZ 1270 Glucuronic acid conjugate of {3-[(6-chloro-3-pyridinyl)methyl]-4(or 5)-hydroxy-2-thiazolidinylidene}= cyanamide	Goat, rat
	M13 KNO 2665, PIZ 1271 *Glucuronic acid conjugate of {3-[(6-chloro-3-pyridinyl)methyl]-5(or 4)-hydroxy-2-thiazolidinylidene}= cyanamide*	Goat, rat
	M14 6-CP-cyanoguanidine, KNO 1872 N-[(6-chloro-3-pyridinyl)methyl]-N'-cyanoguanidine	Hen, rat

Structure	Name	Occurrence
	<u>M15</u> S-(6-CP-cyanoamidino)-acetylcystein, KNO 2684 N-acetyl-3-{[N-[(6-chloro-3-pyridinyl) methyl]-N'-cyano]amidinothio}alanine	Goat, hen, rat
	<u>M16</u> thiacloprid O-analogue, NTN 35078, PIZ 1266, KNO 1859 {3-[(6-chloro-3-pyridinyl)methyl]-2- oxazolidinylidene}cyanamid	Goat, hen, rat
	<u>M17</u> 6-CP-thiobiuret, KNO 1864 1-[(6-chloro-3-pyridinyl)methyl]-2-thiobiuret	Goat rat
	<u>M18</u> 1-CM-2-thiobiuret, PIZ 1241C N-{[(aminocarbonyl)amino]= thioxomethyl}glycine	Rat
	<u>M19</u> PIZ 1252, PIZ 1250 N-[cyanimino(methylthio)methyl]= glycine	Rat
	<u>M20</u> PIZ 1297B (4-oxo-2-thiazolidinylidene)= cyanamide	Rat
	<u>M21</u> PIZ 1245 2-thiazolylcyanamide	Rat
	<u>M22</u> PIZ 1243, PIZ 1244 [3-(5-O-sulfono-furanosyl)-2- thiazolyl]cyanamide	Rat
	<u>M23</u> PIZ 1249 2-thiazolylurea	Rat

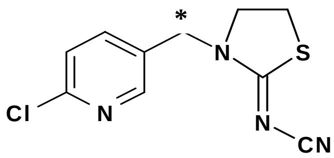
Structure	Name	Occurrence
	M24 PIZ 1297E N-[(6-chloro-3-pyridinyl)methyl]-2-(methylsulfinyl)acetamide	Rat
	M25 WAK 6935, PIZ 1297F N-[(6-chloro-3-pyridinyl)methyl]-N-(2-hydroxyethyl)imidodicarbonic diamide	Rat
	M26 PIZ 1253 N-[(6-chloro-3-pyridinyl)methyl]-N'-cyano-N-(2-hydroxyethyl)thiourea	Rat
	M27 PIZ 1297D {3-[(6-chloro-3-pyridinyl)methyl]-4-oxo-2-thiazolidinylidene}cyanamide	Rat
	M28 PIZ 1269X N-[(6-chloro-3-pyridinyl)methyl]-2-(methylsulfonyl)acetamide	Rat
	M29 thiacloprid thiazolidinimine, KTU 3072, LZR 7497, Ja752-C, NTN 36232, WAK 7376 3-[(6-Chloro-3-pyridinyl)methyl]-2-thiazolidinimine	Soil Rotational crops
	M30 thiacloprid sulfonic acid, sodium salt, thiacloprid sodium sulfonate, WAK 6999, Ja752-D, G9 Sodium 2-[[[(aminocarbonyl)amino]-carbonyl][(6-chloro-3-pyridinyl)-methyl]amino]ethanesulfonate	Soil Rotational crops
	M31 thiacloprid urea, DIJ 10739, Ja752-H [(6-chloro-3-pyridinyl)methyl]urea	Soil Rotational crops
	M32 thiacloprid diamide, WAK 7747, Ja752-I, De23, Z8 N-[(6-chloro-3-pyridinyl)methyl]-imidodicarbonic diamide	Soil
	M33 thiacloprid oxo-sodium sulfonate, Ja752-B Sodium 2-[[[(aminocarbonyl)amino]-carbonyl][(6-chloro-3-pyridinyl)-carbonyl]amino]ethanesulfonate	Soil

Structure	Name	Occurrence
	M34 YRC sulfonic acid amide, SAA, De24, Z1 Sodium 2-[(aminocarbonyl)[(6-chloro-3-pyridinyl)methyl]amino]ethane-sulfonate	Soil Rotational crops
	M35 thiacloprid dewar pyridone, WAK 7259A [3-[(3-oxo-2-azabicyclo[2.2.0]hex-5-en-6-yl)methyl]-2-thiazolidinylidene]-cyanamide	Water
	M36 6-CPA, G2 6-chloro-3-pyridinemethanol	Cotton Rotational crops
	M37 4-hydroxy-KKO 2254, FHW 0104B {3-[(6-chloro-3-pyridinyl)methyl]-4-hydroxy-2-thiazolidinylidene}urea	Cotton Rotational crops
	M38 thiacloprid-olefin, NTN 35099 {3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolylidene}cyanamide	Cotton
	M39 6-CPA-glucosylpentoside, G7 Glucosylpentoside of 6-chloro-3-pyridine-methanol	Cotton
	M40 6-CPA-glucosylphosphate/sulfate, G10 Glucosylphosphate/sulfate of 6-chloro-3-pyridinemethanol	Cotton
	M41 KNO 2673 N-[(6-chloro-3-pyridinyl)methyl]-(methylsulfinyl)carboxamide	Goat, hen
	M42 ANC 1502 N-[(6-chloro-3-pyridinyl)methyl]-N'-cyano-N-[2-(methylthio)ethyl]urea	Goat
	M43 ANC 1503 N-[(6-chloro-3-pyridinyl)methyl]-N-[2-(methylthio)ethyl]imidodi-carbonic diamide	Goat
	M44 ANC 1508A 4-{[(6-chloro-3-pyridinyl)methyl] [2-(methylthio)ethyl]amino}-4-oxo-butanoic acid	Goat

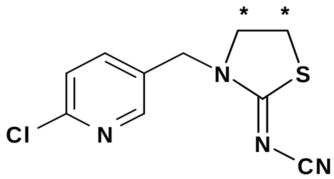
Structure	Name	Occurrence
	M45 ANC 1508B 4-{[(6-chloro-3-pyridinyl)methyl] [(methylsulfinyl)carbonyl]amino}-4-oxo-butanoic acid	Goat

Studies of metabolism and degradation were carried out with [^{14}C]-thiacloprid labelled in the methylene-position and in the thiazolidine-position as shown below.

[Methylene-^{14}C]-thiacloprid



[Thiazolidine-^{14}C]-thiacloprid



★ = position of label

Animal metabolism

The metabolism of thiacloprid has been studied in laboratory rats, goats and hens, in compliance with GLP. Rat metabolism studies were evaluated by the WHO Core Assessment Group of the 2006 JMPR. A short summary of the rat metabolism in comparison with the goat and hen metabolism is given on the end of this section.

Lactating goat

The kinetic behaviour and the metabolism of [methylene-^{14}C]-thiacloprid were investigated in a lactating goat (Anderson, C.; Weber, H. and Bornatsch, W. 1998). A target dose of 10 mg/kg body weight was administered orally as a suspension in tragacanth to one lactating goat (34 kg bw at first dosing) on three consecutive days in time intervals of 24 hours.

Radioactivity was measured in the excreta, plasma and milk at different sampling intervals. The goat was sacrificed 6 hours after the final dosage, after which the edible tissues kidney, liver, muscle and fat were radio-assayed. Metabolites were extracted from milk and edible tissues and purified by applying chromatographic techniques (TLC and HPLC). Metabolite identification was based on co-chromatography with authentic references in two different chromatographic systems or on spectroscopic evidence (mass- and NMR-spectroscopy as well as hyphenated techniques). The quantification of the metabolites was conducted by integrating the ^{14}C-signals in the chromatograms of the tissue extracts.

The radioactivity concentrations in the plasma were followed after the first administration. A broad maximum 2 hours after dosage with a peak level of 4.17 µg/mL, corresponding to about 42% of the equidistribution concentration of 10 µg/mL could be observed. The radioactivity was eliminated from the plasma in two phases. The initial phase was described by a half-life of about 5 hours. Thereafter, the elimination process slowed down and was governed by a half-life of about 32 hours. At this time, the concentration in plasma had decreased to 1.47 µg/mL.

The recovery of radioactivity and the excretion behaviour of the lactating goat are presented in Table 2. The excretion amounted to about 53.7% of the total administered radioactivity until sacrifice. A portion of about 48.3% was eliminated with urine and 4.5% with faeces.

A small amount, 0.93% of the total dose, was secreted in milk. Milk was collected twice daily, just before application and again in the evening. An equivalent concentration of 2.43 µg/mL was measured in the milk 8 hours after the first dosage. The maximum concentration of 4.70 µg/mL was obtained at 32 hours.

Table 2. Percentages of the total radioactivity excreted/secreted with urine, faeces and milk.

Sample	Time after 1st dose (h)	Dose No.	% of the total dose
Urine (incl. urine funnel rinse)	0 24 48 54	1 2 3 (sacrifice)	-- 17.95 30.12 0.18
Subtotal			48.25
Faeces	0 24 48 54	1 2 3 (sacrifice)	-- 0.21 2.90 1.36
Subtotal			4.47
Milk	0 8 24 32 48 54	1 2 3 (sacrifice)	-- 0.14 0.17 0.27 0.14 0.21
Subtotal			0.93
Total excreted			53.65
Calculated/estimated residue in edible tissues			5.61
Recovery			59.25

Due to the short survival period after the last dosage, 40% of the dose was not recovered in the excreta.

At sacrifice 6 hours after the last administration, the highest equivalent concentration was measured in the kidney (24.78 mg/kg fresh weight), followed by that obtained for the liver (17.4 mg/kg). These concentrations corresponded to 0.21% and 1.25% of the total dose in the kidneys and liver, respectively. The residue concentrations of the other edible tissues are at least fourfold lower. The detailed data are shown in Table 3.

Table 3. Residue levels of thiacloprid equivalents in the edible tissues and organs of the lactating goat.

Organ	Residue levels (mg/kg)
Kidney	24.78
Liver	17.40
Muscle (flank)	4.18
Muscle (loin)	3.92
Muscle (round)	3.81
Fat (omental)	1.56
Fat (perirenal)	1.59
Fat (subcutaneous)	4.86
Milk (at sacrifice)	4.10

The radioactive residues were extracted from milk and edible tissues with high recoveries of 92 up to 99% using acetonitrile and mixtures of acetonitrile with 0.5% aqueous NaCl. In order to optimise the clean-up procedure and to provide sufficient sample material for metabolite identification, several series of extractions were conducted. After sample clean-up the extracts were analysed by HPLC for the quantitative determination of thiacloprid and its metabolites. The radioactive components were identified by co-chromatography with authentic reference compounds and by spectroscopic investigations.

More than about 96% of the TRR in fat and muscle was recovered by extraction. After sample clean-up, 94% of the TRR or more was subjected to quantitative analysis by HPLC. Unchanged thiacloprid was the pre-dominant component of the TRR accounting for at least 87% of the TRR in fat and about 90% in muscle. The corresponding concentrations were 1.6 mg/kg in fat and 3.5 mg/kg in muscle. Several metabolites were detected at levels near the LOQ. The total rate of identification was about 95% of the TRR in fat and at least 93% of that in muscle (Table 4).

In kidney about 90% or more of the TRR was recovered by extraction. Eighty nine percent of the TRR was subjected to quantitative analysis by HPLC after sample clean-up. Unchanged thiacloprid was the main component of the TRR accounting for at least 28.3% of the TRR in kidney, which corresponded to 7.0 mg/kg. The main metabolites in kidney were the glucuronides M12 and M13 as well as M08 with up to 10.7, 7.1 and 12.3% of the TRR each. A series of metabolites such as M01, M07, M10, M11, M16, M41 and M44/M45 accounted for about 2 to 5% of the TRR individually. The metabolite M15 and two peaks of unknown identity were near or below the LOQ of the TRR in kidney. The portion identified was about 81% of the TRR in kidney (Table 4).

About 94% or more of the TRR in liver was recovered by extraction. After sample clean-up at least 90% of the TRR was subjected to quantitative analysis by HPLC. Unchanged thiacloprid was the predominant component of the TRR accounting for at least 83% of the TRR in liver, corresponding to 14.4 mg/kg. Several metabolites were detected at levels near the LOQ. The total rate of identification was 88 to 92% of the TRR in liver (Table 4).

More than 92% of the TRR in milk was recovered by. For quantitative analysis by HPLC samples containing at least 87% of the TRR following sample clean-up were chosen. Unchanged thiacloprid was also the major radioactive component in milk accounting for at least 58% of the TRR, corresponding to 1.4 mg/kg. The main metabolite in milk was M08 at a level of up to 8.7%. Several metabolites such as M07, M16, M17, M42, M43 and M44/M45, were detected at levels below 5% of the TRR. The metabolite M43 could not be quantified due to interference of other minor unknown metabolites and the lack of an authentic reference compound. A few other metabolites were near the LOQ of 0.9% of the TRR. The portion identified was about 83% of the TRR in milk (Table 4).

Table 4. Quantitative distribution of metabolites in the edible tissues and in milk after administration of [methylene-^{14}C]thiacloprid to a lactating goat based on the first series of extractions.

Metabolite	Fat		Kidney		Liver		Muscle		Milk	
	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
M01	1.3	0.024	2.6	0.636	0.9	0.149	< 0.8	0.015	< 0.9	0.011
M07[1]			4.4	1.090					3.5	0.087
M08			12.3	3.055	0.9	0.151			8.7	0.213
M10	< 0.8	0.007	3.3	0.812	< 0.8	0.104	< 0.8	0.017	1.4	0.035
M11	< 0.8	0.013	4.4	1.088	< 0.8	0.105	1.0	0.036	< 0.9	0.009
M12	< 0.8	0.013	10.1	2.500	< 0.8	0.049				
M13	< 0.8	0.012	7.1	1.769	< 0.8	0.060				
M15	1.1	0.020	0.8	0.200	0.8	0.148	0.9	0.035	< 0.9	0.019
M16	< 0.8	0.012	4.2	1.039	< 0.8	0.060			1.7	0.042
M17									1.6	0.039
M41			1.1	0.277					< 0.9	0.006
M42									2.3	0.057
M44/M45			2.1	0.513					1.0	0.026
thiacloprid	89.8	1.607	28.3	7.012	83.1	14.45	92.0	3.535	61.0	1.494
Unknown			10.0	1.931	2.4	0.411	2.9	0.112	3.6	0.048
Losses	4.6		9.3		9.8		2.3		13.2	
Extraction yield	97.1		95.3		93.8		98.5		91.9	
Identification	95.4	1.71	80.7	19.99	87.8	15.28	94.7	3.64	83.1	2.04

1) Metabolites not containing the thiazolidine heterocycle

Laying hens

The kinetic behaviour and the metabolism of [methylene-^{14}C]-thiacloprid were studied in laying hens (Weber, H.; Printz, H. and Klempner, A. 1998). The test compound was administered to six hens in tragacanth suspension in three oral doses of 10 mg/kg bw (corresponding to 124 ppm in feed on dry weight basis), one dose per day, on three consecutive days.

Radioactivity was measured in the excreta, plasma and eggs at different intervals. The animals were sacrificed 6 hours after the final dose, after which the edible tissues kidney, liver, skin, muscle and fat were radioassayed. Metabolite analyses were performed with the eggs and the edible tissues except kidney. Metabolites were extracted from eggs and edible tissues with acetonitrile and mixtures of acetonitrile and methanol with a saline solution. This extraction procedure was followed by a microwave extraction step. Purification was conducted by chromatographic techniques (TLC and HPLC). Metabolite identification was based on co-chromatography with authentic references in two different chromatographic systems or on spectroscopic evidence (mass- and NMR-spectroscopy as well as hyphenated techniques). The quantification of the metabolites was conducted by integrating the ^{14}C-signals in the chromatograms of the tissue extracts.

The absorption was fast so that the concentration-time-course of radioactivity in the plasma did not allow a determination of the absorption rate. A concentration of 1.54 µg/mL was obtained at the first sampling point (0.25 hours after dosing). The mean plasma concentration peaked at 3 hours with a mean value of approx. 1.6 µg/mL. Related to the dose of 10 mg/kg body weight, this value corresponded only to 16% of the so-called equidistribution concentration. The radioactivity was monophasically eliminated from the plasma with a half-life of 6.8 hours. Twenty-four hours after a single dose, the mean plasma concentration had declined to 0.19 µg/mL.

Until sacrifice the excretion amounted on average to 75.4% of the radioactivity totally administered. About 29.4% and 29.6% of the radioactivity totally eliminated during the whole test period was excreted within 24 hours after the first and the second administration, respectively. Another portion of 16.4% was excreted after the last dose until sacrifice. On average, only 0.06% of the total dose was determined in the eggs. The recovery of radioactivity and the excretion behaviour of the laying hens, after administration of a daily dose of 10 mg per kg body weight on three consecutive days, are presented in Table 5.

Table 5. Percentages of the total radioactivity excreted/secreted with urine, faeces and eggs.

Sample	Time after 1st dose (h)	% of the total dose	
		Mean	CV (%)[1]
Excreta	24 48 54	29.37 29.62 16.36	11.31 9.64 32.52
Subtotal		75.35	10.22
Eggs; 0 - 54 h		0.06	53.18
Totally excreted		75.41	10.22
Estimated residue in tissues prepared		0.71	14.79
Recovery		76.12	10.16

1) CV: coefficient of variance

The highest equivalent concentrations were determined in the liver (3.061 mg/kg) and kidneys (2.404 mg/kg), respectively. The residue concentrations of the other edible tissues were at least fourfold lower. The average data are shown in Table 6.

Table 6. Residue levels of thiacloprid equivalents in the edible tissues and organs of laying hens.

Organ	Residue levels (mg/kg)
Liver	3.061
Kidney	2.404
Muscle (leg)	0.152
Muscle (breast)	0.128
Skin (without fat)	0.295
Fat (subcutaneous)	0.083
Eggs (prior to sacrifice)	0.424
Eggs (from oviduct)	0.652

The radioactivity was extracted with solvent followed by microwave extraction with recoveries above 93%. After purification the extracts were co-chromatographed in two different HPLC-systems with authentic ^{14}C-labelled reference compounds, which were previously isolated during the rat- and goat metabolism studies. All reference compounds were spectroscopically identified.

The unchanged parent compound was the major component in all extracts of edible tissues and eggs. Its concentration was higher in the more lipophilic matrices as compared to muscle or liver. Correspondingly, polar metabolites occurred at higher quantities in muscle and liver. In egg and fat extracts thiacloprid was found in quantities ranging from 48.2% to 71.8% of the TRR. In addition, up to four further polar metabolites, ranging from 1.3% to 8.9% of TRR were identified.

In muscle and liver extracts thiacloprid was found at quantities ranging from 17.3% to 19.4% of the TRR, while up to eight further polar metabolites, ranging from 1.1% to 5.1% of the TRR were identified. Table 7 gives a quantitative overview of the extraction yields and the amounts of identified compounds in the extracts of edible tissues and eggs.

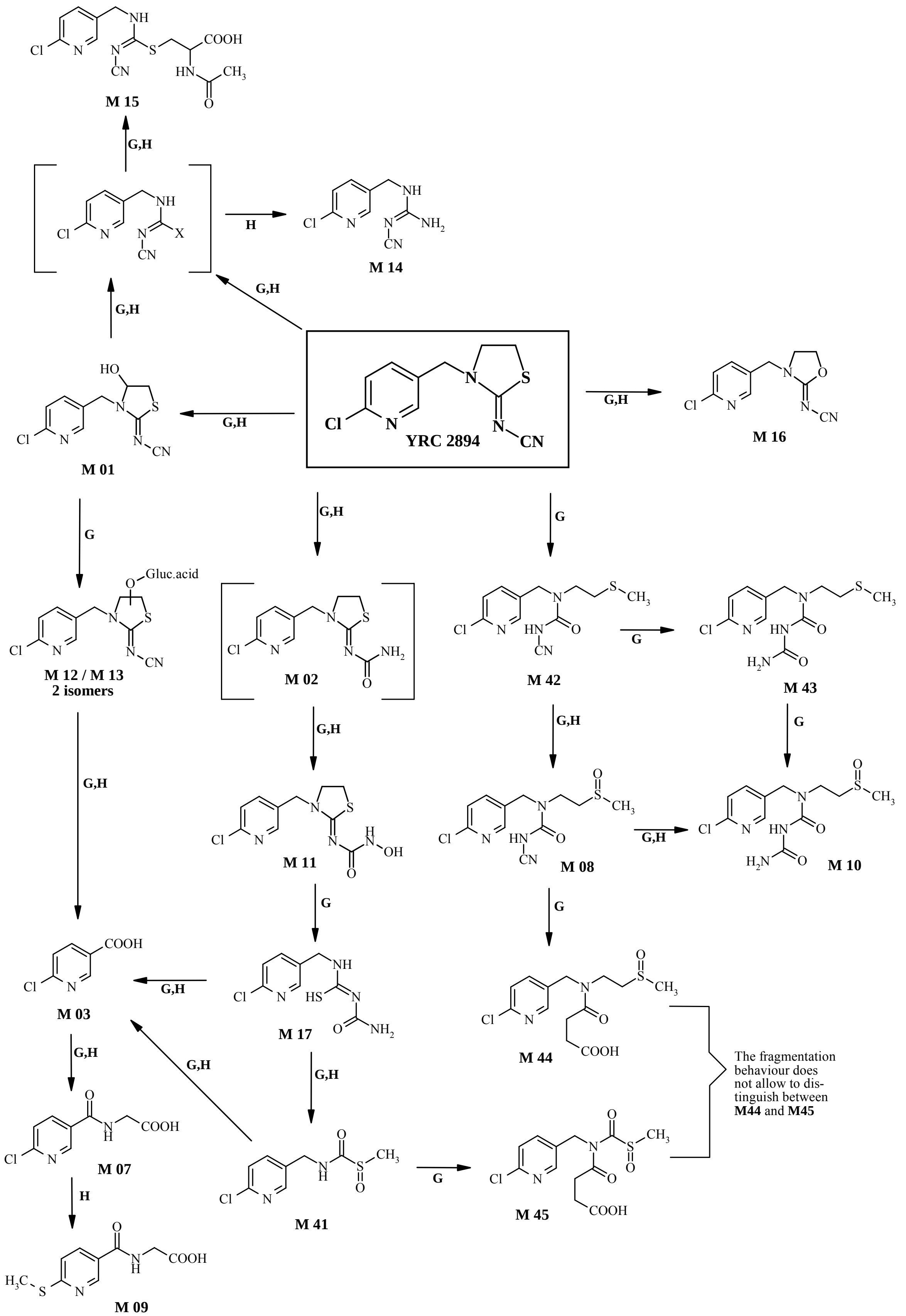
Table 7. Quantitative distribution of metabolites in the edible tissues and in eggs after administration of [methylene-^{14}C]thiacloprid to laying hens.

Metabolite	Eggs		Liver		Muscle		Fat	
	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
M01	4.6	0.006	1.7	0.054	3.8	0.006		
M03[1]	1.9	0.002			3.3	0.005		
M07[1]	6.4	0.008	1.1	0.034	1.5	0.002		
M08			4.1	0.128			8.9	0.010
M09[1]					1.4	0.002		
M10					5.1	0.007		
M11	1.3	0.002	4.6	0.144	10.9	0.016		
M14			4.6	0.142				
M15			1.5	0.047				
M16			2.8	0.088				
M41			2.4	0.076	4.8	0.007		
thiacloprid	48.2	0.059	17.3	0.537	19.4	0.028	71.8	0.077
Extraction yield	97.5		96.9		96.6		93.2	
Sum identified	62.5	0.077	40.2	1.250	50.2	0.073	80.8	0.087

1) Metabolites not containing the thiazolidine heterocycle ring

The metabolites found in the edible tissues and eggs of the laying hen were almost completely identical with those found in the edible tissues and milk of the lactating goat as well as those found in the rat metabolism study. Therefore, the proposed biotransformation pathway of thiacloprid shows the degradation in poultry and ruminants (Figure 1).

Based on the results of the livestock metabolism studies, the parent compound only is considered as relevant residue of concern for food commodities of animal origin.



G: Goat; H: Hen

Figure 1. Metabolic pathways of thiacloprid in goats and hens.

Plant metabolism

The metabolism of thiacloprid has been studied after spray application in apples, tomatoes, cotton and wheat in compliance with the GLP.

Apples

Apples of the variety James Grieve were treated twice with [methylene-^{14}C]-thiacloprid at an interval of 14 days (Clark, T. and Bornatsch, W. 1997). The last application was made 14 days prior to harvest. An aqueous suspension of the formulated product was applied uniformly to each of the apples using an Eppendorf syringe fitted with a tuft of hair at the tip. The following amounts were applied to each apple at both application dates: 104.8 µg 600 SC (50.6% ai), 53.0 µg ai, 0.22 MBq. The application rate was slightly exaggerated when compared to the annual recommended field rate of 300 g/ha thiacloprid. The apples were sampled 14 days after the second application (day 0).

In the scope of this study also a translocation experiment was conducted, in which [methylene-^{14}C]-thiacloprid was applied on the same days as for the metabolism experiment. The tests were conducted each with one apple and the adjacent leaves above and below. The same solutions and method of application was used as for the metabolism experiment, i.e., the leaves received the same total amount of radioactivity as each apple in the metabolism experiment.

The apples were extracted with methanol/water (1:1) and methanol. The radioactivity in the extract was measured by liquid scintillation. The solids were air dried and aliquots taken and combusted. The identification was achieved by co-chromatography (TLC and HPLC) with the authentic reference compounds as well as by ^{1}H-NMR and mass-spectroscopic methods.

The total radioactive residue (TRR) in apples amounted to 0.74 mg/kg parent compound equivalents. The vast majority of the TRR was removed by surface washing with dichloromethane (84.4% or 0.62 mg/kg), 12.9% (0.10 mg/kg) was detected in the extract and only 2.7% (0.02 mg/kg) remained unextracted in the solids, which were not investigated further.

Of the radioactivity present in the surface wash solution, extract and solids 90.8% (0.67 mg/kg) was identified as unchanged parent compound. Only two other metabolites were detected in any significant quantities and these were identified as the 4-hydroxy derivative of the parent compound (M01; 2.2%, 0.02 mg/kg) and the amide (M02; 1.3%, 0.01 mg/kg). A summary of the distribution of metabolites in the different fractions of apples is presented in Table 8.

The results of the translocation experiments showed that some of the applied radioactivity (ca. 25% on average) was lost, probably due to volatilisation. Virtually all the recovered radioactivity was found in the treated leaves while only traces of parent compound and metabolites (0.05% on average) were translocated from the leaves to the apples above and below the treated leaves.

Table 8. Distribution of metabolites in the different fractions of apples.

Compound/Metabolite	% TRR	mg/kg parent equivalents
Surface wash solution	84.4	0.62
Thiacloprid	82.4	0.61
M01	1.4	0.01
M02	0.6	< 0.01
Extract	12.9	0.1
Thiacloprid	8.4	0.06
M01	0.8	0.01
M02	0.7	0.01
Polar radioactivity	3.0	0.02
Solids	2.7	0.02
Total	100	0.74

Tomatoes - metabolism

In a greenhouse 10 bunches of tomatoes (82 tomatoes) were sprayed twice with [methylene-^{14}C]-thiacloprid at an interval of 14 days (Babczinski, P. 1997). The last application was made 14 days prior to the final harvest. An aqueous suspension of the formulated product was applied uniformly to each of the plants using a metre jet spray gun fitted with a flat-fan nozzle. Each bunch of tomatoes including the surrounding leaves and stalks was sprayed separately. In each application a total of 30 mL of formulation was applied which is equivalent to 7.9 mg ai or to 32.6 MBq of total radioactivity, respectively. This corresponded to an application rate of approximately 2 × 0.375 kg ai/ha.

The tomatoes were harvested as follows: Immediately after the second application (day 0) five tomatoes were harvested. Three of these were used to calculate the TRR and to analyse the quantitative distribution of metabolites. The remaining two tomatoes were used to determine the efficiency of surface washing with methanol.

At day 3, after the second application, 29 tomatoes were collected while the final harvest of 38 tomatoes was performed at day 14. Eight tomatoes were also harvested at this time and stored at -20°C without surface wash as a reserve sample for the validation of the residue method.

The tomatoes were surface washed and extracted with methanol. The radioactivity in the extract was measured by liquid scintillation. The solids were air dried and aliquots taken and combusted. The identification was achieved by co-chromatography (TLC and HPLC) with the authentic reference compounds as well as by ^{1}H-NMR and mass-spectroscopic methods.

The TRR in tomatoes at day 0 amounted to 0.76 mg/kg parent compound equivalents. The vast majority of the TRR was removed by surface washing with methanol (95.8% or 0.72 mg/kg), 4.0% (0.03 mg/kg) was detected in the extract and only 0.2% (< 0.01 mg/kg) remained unextracted in the solids.

Tomatoes harvested at day 3 and 14 yielded TRR values of 0.77 and 0.94 mg/kg, respectively. Again, the biggest part could be removed by surface washing and amounted to 87.8% (0.68 mg/kg) on day 3 and 84.3% (0.79 mg/kg) on day 14. The respective amounts in the methanol extract were 11.2% (0.09 mg/kg) on day 3 and 14.1% (0.13 mg/kg) on day 14 indicating a slight increase of the uptake of radioactivity during this time. Also the level of radioactivity in the solids increased slightly from day 0 to day 3 (1.0%, < 0.01 mg/kg) and further to day 14 (1.6%, 0.02 mg/kg). The solids were not investigated further.

Of the radioactivity present in the surface wash solution and the extract 94.4% (0.88 mg/kg) was identified as unchanged parent compound. Six further metabolites were detected in low quantities ranging from < 0.01 to 0.03 mg/kg. The main metabolite was identified as a complex 6-chloropicolyl alcohol glucoside (M05; 2.8%, 0.03 mg/kg). Three further glucosides were detected (together 0.6%, < 0.01 mg/kg), one of which was the 6-chloropicolyl alcohol glucoside (M04, 0.3%, < 0.01 mg/kg). The other two remained unidentified. Two more metabolites were identified as the 4-hydroxy derivative of the parent compound (M01; 0.4%, < 0.01 mg/kg) and 6-chloronicotinic acid (M03; 0.2%, < 0.01 mg/kg). A total of 98.1% (0.92 mg/kg) of the TRR in tomatoes was identified. The results are summarised in Table 9.

Table 9. Distribution of metabolites in different fractions of tomatoes (day 14).

Compound/Metabolite	% TRR	Mg/kg parent equivalents
Surface wash solution	84.3	0.79
Identified	84.3	0.79
Thiacloprid	84.3	0.79
Methanol extract	14.1	0.13
Identified	13.8	0.09
Thiacloprid	10.1	< 0.01
M01	0.4	< 0.01
M03	0.2	< 0.01
M04	0.3	0.03
M05	2.8	< 0.01

Compound/Metabolite	% TRR	Mg/kg parent equivalents
Characterised as glucose conjugates of M04	0.3	< 0.01
Non extractable residues	1.6	0.02
Subtotal identified	98.1	0.92
Subtotal identified/characterised	98.4	0.92
Total residue	100	0.94

Tomatoes – translocation

In a supplementary study to the above described metabolism study, the translocation in tomatoes was also investigated (Koester, J. 1997). [Methylene-^{14}C-methyl]-thiacloprid, formulated as a 600 SC, was sprayed twice to the soil surface of four container grown plants. The application was based on the assumption that under GAP conditions a certain fraction of the application solution would reach the soil during and after spraying. The application rate was 0.55 mg active substance at the first and 0.58 mg active substance at the second application. The total application rate was equivalent to 89.7 g ai/ha. The time interval between the applications was 14 days. The tomatoes of the first two plants were harvested 3 days after treatment and those of the remaining two plants 14 days after the second application as a mixture of green, reddish, and red fruits.

The TRR in the tomatoes was determined by adding the radioactivity in the extracts and the air-dried solids after extraction. In all cases, less than 0.1% of the radioactivity applied to the soil surfaces was detected in the tomato fruits. From the total amount recovered, an average of 94.1% was found in the extracts, the remainder was measured in the unextracted solids. The transformation of the total residue concentrations to parent compound equivalents yielded in all cases concentrations below 0.001 mg/kg. As a result, further analyses on the extracts were not conducted.

Cotton

[Methylene-^{14}C-methyl]thiacloprid was applied to cotton in three spray applications (Babczinski, P. 1998). The cumulative application rate was 375 g ai/ha. The time interval between each of the treatments was seven days. 120 days after the last application the cotton plants were harvested, i.e., at the time of natural maturity.

Leaves, petals, gin trash, lint, and seeds were collected and homogenised. The homogenised samples were extracted with acetonitrile and acetonitrile/water (1:1). The residue remained in the extracted gin trash was further extracted using acetone/water (1:1) in a microwave at 120°C, and the aqueous remainder partitioned against n-hexane and dichloromethane. The residues in extracted seeds were further extracted with n-hexane, dichloromethane and acetone followed by an extraction of the resulting residue using acetic acid and acetone/water (1:1). The latter extraction step was repeated in a micro-wave. The combined aqueous phases were subsequently partitioned against dichloromethane and ethyl acetate. Radioactivity was determined in the extracts and the extracted solids.

Metabolites were purified from the extracts by solid phase extraction methods and identified by comparative thin-layer chromatography and HPLC with authentic reference compounds using different chromatographic methods. Mass- and NMR-spectroscopy were also employed for structure elucidation.

The total radioactive residue (TRR) in cotton gin trash at harvest amounted to 3.21 mg/kg (ai equivalents), i.e., 97.2% was extracted. The main component was the parent compound (73.5%, 2.36 mg/kg). Fourteen metabolites were detected, twelve of these amounted to 14.8% (0.48 mg/kg) of the gin trash residue. These were: 6-chloronicotinic acid (M03) as the main gin trash metabolite (3.3%, 0.11 mg/kg), 4-hydroxy thiacloprid (M01; 2.7%, 0.08 mg/kg), 6-chloro-picolyl alcohol (M36; 1.5%, 0.05 mg/kg) and its glucoside (M04; 1.2%, 0.04 mg/kg), two complex 6-CPA glucosides (glucosyl-pentoside [M39] and glucosylphosphate or -sulfate [M40]; each 1.1%, 0.04 mg/kg), the sulfonic acid derivative (M30; 0.9%, 0.03 mg/kg) and as a minor component monohydroxylated thiacloprid amide (M37; 0.4%, 0.01 mg/kg). Two further metabolites were identified as thiacloprid amide (M02; 1.9%, 0.06 mg/kg) and the olefin derivative of the parent compound (M38; not quantified). In total, 85.7% (2.76 mg/kg) of the TRR in cotton gin trash was identified.

The total radioactive residue in cotton leaves (including petals) amounted to 30.35 mg/kg ai equivalent. In total, 98.1% (29.77 mg/kg) was extracted; the non-extractable residue amounted to 1.9% (0.58 mg/kg). As in gin trash, the main component was thiacloprid (83.9%, 25.46 mg/kg). Thirteen metabolites were detected, amounting to 12.3% (3.73 mg/kg) of the leaves residue. Nine of these were identified, eight of them were also found in gin trash. These were: Two complex 6-CPA glucosides (M39; glucosyl-pentoside as the main leaf metabolite: 2.7%, 0.82 mg/kg; M40; glucosyl-phosphate or -sulphate: 1.4%, 0.43 mg/kg), 6-chloropicolyl alcohol (M36; 0.5%, 0.15 mg/kg) and its glucoside (M04; 1.2%, 0.37 mg/kg), 6-chloronicotinic acid (M03; 1.1%, 0.33 mg/kg), 4-hydroxylated thiacloprid (M01; 0.8%, 0.24 mg/kg), 4-hydroxylated thiacloprid amide (M37; 1.2%, 0.36 mg/kg) and as a minor component the sulfonic acid derivative (M30; 0.3%, 0.09 mg/kg). A further metabolite was characterised as a complex conjugate of 6-chloronicotinic acid with glucose and a plant constituent (possibly protocatechuic acid). This metabolite is probably similar to one of the complex 6-chloronicotinic acid conjugates described for cotton seed. The four unidentified metabolites were polar in nature and each amounted to ≤ 1.2% (≤ 0.37 mg/kg). In total, 93.1% (28.25 mg/kg) of the TRR in cotton leaves was identified.

The TRR in cotton seed at harvest amounted to 1.12 mg/kg ai equivalents, 99.8% thereof was extracted. The main metabolite was free 6-chloronicotinic acid (M03) which accounted for 45.8% (0.51 mg/kg) of the TRR. Unchanged thiacloprid was only a minor component (0.6%, 0.01 mg/kg). Up to twenty further metabolites were detected totally accounting for 42.7% (0.48 mg/kg) of the TRR. That part of the seed residue which was neither free 6-chloronicotinic acid (M03) nor thiacloprid, 41.3% (0.46 mg/kg) was characterised after oxidation to comprise the 6-chloronicotinic acid-moiety by using permanganate oxidation as developed in total residue method for imidacloprid, a structurally related chloronicotinyl insecticide. Therefore, the total residue based on or identical with 6-chloronicotinic acid (including the parent compound) equalled 87.7% (0.98 mg/kg).

The distribution of metabolites in cotton is summarised in Table 10.

Table 10. Distribution of metabolites in different fractions of tomatoes (day 14).

Crop	Cotton leaves	Cotton seed
TRR = mg/kg	30.35	1.12
thiacloprid	83.9	0.6
M01	0.8	-
M03[1]	1.1	45.8
M04[1]	1.2	-
M30	0.3	-
M36[1]	0.5	-
M37	1.2	-
M39[1]	2.7	-
M40[1]	1.4	-
Complex glucosides of M36	-	0.3
Complex glucosides of M03	-	29.7
Unknown (%)	5.0	23.4
Not extracted (%)	1.9	0.2
Total (%)	100	100

1) Metabolites not containing the thiazolidine heterocycle

Wheat

The metabolism of thiacloprid was investigated in spring wheat following two applications with a spray interval of 14 days and a pre-harvest interval of 21days (Bongartz, R. and Neumann, B. 2001). The actual application conditions simulated normal practice: Radiolabelled [methylene-^{14}C]-thiacloprid was formulated as a 112.5 SE containing 100 g/L thiacloprid and 12.5 g/L of a mixing partner, which was replaced by water in the study. A computer controlled track sprayer with a flat-fan nozzle was used for the two applications. In the first spray application 49.9 g ai/ha was applied to wheat at growth stage 75 of the BBCH code (medium milk stage). The second application of 44.8 g ai/ha followed 14 days later at growth stage 77 of the BBCH code (late milk stage). This resulted in a total application rate of 94.7 g ai/ha. Wheat hay was sampled seven days after the first application. Wheat straw and grain were harvested at maturity 21 days after the second application.

Hay, straw, and grain were homogenised and extracted with acetonitrile/water (1:1) and acetonitrile. The combined extracts for each sample material were partitioned with dichloromethane. All phases were chromatographed and quantitated by HPLC with radioactivity detection. The solid remained after the first extraction was extracted with acetonitrile/water (1:1) at 120°C using a microwave. After this, the residues remaining in straw were hydrolysed with dioxane/2N HCl (9:1). Metabolites were isolated by HPLC and identified by co-chromatography with authentic reference compounds or by mass spectroscopy.

The total radioactive residue (TRR) in hay, which received only one application, amounted to 2.04 mg/kg (parent compound equivalents), 94.6% was extracted by liquid-solid and additional 3% by microwave extraction. The main component was the parent compound (81.4%, 1.66 mg/kg). Many minor metabolites were detected, all amounting to ≤ 0.03 mg/kg each. Ten metabolites were identified: a conjugate of 6-chloronicotinic acid (1.7%, 0.03 mg/kg) and 6-chloronicotinic acid (M03, 1.2%, 0.03 mg/kg), 4-hydroxy-thiacloprid (M01, 1.6%, 0.03 mg/kg), the sulfonic acid derivative (M30, 1.2%, 0.03 mg/kg) and a conjugate thereof (0.4%, 0.01 mg/kg), thiacloprid diamide (M32, 0.5%, 0.01 mg/kg), 6-chloropicolyl alcohol (M36, 0.4%, 0.01 mg/kg), thiacloprid-olefin (M38, 0.4%, 0.01 mg/kg), thiacloprid-amide (M02, 0.2%, < 0.01 mg/kg) and 3-aminocarbonyl-1-(6-chloro-pyridin-3-ylmethyl)-1-(2-hydroxy-ethyl)-urea (M25, 0.1%, < 0.01 mg/kg). In total, 89.3% (1.82 mg/kg) of the TRR in hay was identified.

In straw the TRR amounted to 12.36 mg/kg (parent compound equivalents), 95.0% was extracted by liquid-solid and additional 3.1% by microwave extraction. The extraction residue was further treated with dioxane/HCl, which again released 1.2% of the TRR. The main component in straw was the parent compound (83.4%, 10.30 mg/kg). Ten metabolites were identified: 6-chloronicotinic acid (M03, 2.2%, 0.27 mg/kg) and a conjugate thereof (1.1%, 0.13 mg/kg), 4-hydroxy-thiacloprid (M01, 1.9%, 0.23 mg/kg), the sulfonic acid derivative (M30, 1.0%, 0.13 mg/kg) and a conjugate thereof (0.3%, 0.03 mg/kg), thiacloprid diamide (M32, 0.4%, 0.05 mg/kg), 6-chloropicolyl alcohol (M36, 0.3%, 0.04 mg/kg), thiacloprid-olefin (M38, 0.3%, 0.04 mg/kg), thiacloprid-amide (M02, 0.3%, 0.04 mg/kg) and 3-aminocarbonyl-1-(6-chloro-pyridin-3-ylmethyl)-1-(2-hydroxy-ethyl)-urea (M25, 0.1%, 0.01 mg/kg). In total, 91.3% (11.28 mg/kg) of the TRR in straw was identified.

The total radioactive residue (TRR) in grain amounted to 0.21 mg/kg (parent compound equivalents), 89.6% was extracted by liquid-solid and additional 4.8% by microwave extraction. The main component in grain was the parent compound (80.9%, 0.17 mg/kg). Only few minor metabolites were detected, all of them << 0.01 mg/kg. Two metabolites were assigned to the conjugate of 6-chloronicotinic acid (1.7%, < 0.01 mg/kg) and 4-hydroxy-thiacloprid (M01, 0.7%, < 0.01 mg/kg). In total, 83.3% (0.17 mg/kg) of the TRR in grain was identified. The distribution of metabolites in wheat is summarised in Table 11.

Table 11. Distribution of metabolites in different fractions of wheat.

Crop crop part	Wheat hay	Wheat straw	Wheat grain
TRR = mg/kg	2.04	12.36	0.21
thiacloprid	81.4	83.4	80.9
M01	1.6	1.9	0.7
M02	0.2	0.3	-
M03[1]	1.2	2.2	-
M25	0.1	0.1	-
M30	1.2	1.0	-
M32	0.5	0.4	-

Crop crop part	Wheat hay	Wheat straw	Wheat grain
M36[1]	0.4	0.3	-
M38	0.4	0.3	-
Conjugate of M03	1.7	1.1	1.7
Conjugate of M30	0.4	0.3	-
Unknown (%)	8.3	8.0	11.1
Not extracted (%)	2.4	0.7	5.6
Total (%)	100	100	100

1 Metabolites not containing the thiazolidine heterocycle

Environmental fate in soil

Hydrolysis

The test was performed to determine the rate of hydrolysis of thiacloprid in sterile aqueous solution at various pH values at 25°C and to obtain information on the identity and pattern of hydrolysis products (Brumhard, B. 1998). The hydrolysis of [methylene-^{14}C]-thiacloprid was investigated in the dark at pH values of 5, 7 and 9 at a concentration of 0.35 mg ai/L. Test duration was 30 days with sampling intervals of 0, 2, 7, 13, 20 and 27 days. After the 30 days storage period thiacloprid recoveries were 95–98% of the applied radioactivity in all samples. In the pH range tested formation of hydrolysis products was only observed at pH 9 at amounts less than 2% of the applied radioactivity.

Photolysis on soil surfaces

The photo-transformation of [methylene-^{14}C]-thiacloprid was studied (Brumhard, B. 1998) on thin layers of the sandy loam soil "Howe" (IN/USA; 65.5% sand; 26.3% silt; 8.2% clay; 1.09% org. C; pH in CaCl2: 7.1) which was also used in the aerobic soil metabolism study. The dose rate was 2.34 mg/kg soil (dry substance) corresponding to about 350 g ai/ha (calculated for a soil density of 1.5 g/cm^3 and 1 cm depth). The water content of the samples was adjusted to 75% of the 1/3 bar moisture of the soil. The soil thin layers were continuously irradiated with a Xenon lamp simulating natural sunlight. The spectrum was cut off at wavelengths below 290 nm and the light intensity was 9.3 mW/cm^2. The temperature of the testing system was maintained at 25 ± 1°C. Duplicate samples were taken for analysis 0, 4, 7, 13 and 18 days post-treatment. 'Dark' samples were taken 7 and 19 days post-treatment. Volatile radioactivity was trapped using soda lime and released for measurement by adding HCl.

Soils were exhaustively extracted by shaking with methanol immediately after sampling. Additionally, the soil was subjected to further extraction with methanol/water (50/50) at about 180°C using a Soxtec® high temperature extraction unit. The radioactivity was determined in all samples and the extracts analysed by AMD (automated multiple development)-TLC and HPLC-methods. Metabolites were identified by NMR- and mass-spectroscopy and by comparison with authentic reference compounds.

Under the experimental conditions thiacloprid degraded with an experimental half-life (DT_{50}) of 18.8 days in the irradiated samples. This corresponds to a calculated environmental half-life of 74 days during midday and midsummer at 40° of latitude (Phoenix, AZ, USA). It is expected that the half-life at sites with less radiation intensity or in spring, fall or winter would be longer. The amount of unextracted residues was below 10% of the applied radioactivity. Besides the parent compound, one main degradate (M02) was observed in the extracts of irradiated and dark soil samples. At any time of the study all other products, individually made up less than 5% of the applied radioactivity. One of these metabolites was identified as the so-called "Dewar-pyridone" (M35). The results of the distribution of thiacloprid and its degradation products are summarised in Figure 2. Metabolic pathways of thiacloprid in plants

Table 12.

The degradation observed in the dark samples (DT_{50} = 6.3 days) was about threefold faster as compared to the irradiated samples. It is therefore concluded from this study that under environmental conditions the solar reaction will contribute only to a very limited extent to the overall degradation of thiacloprid on soil surfaces.

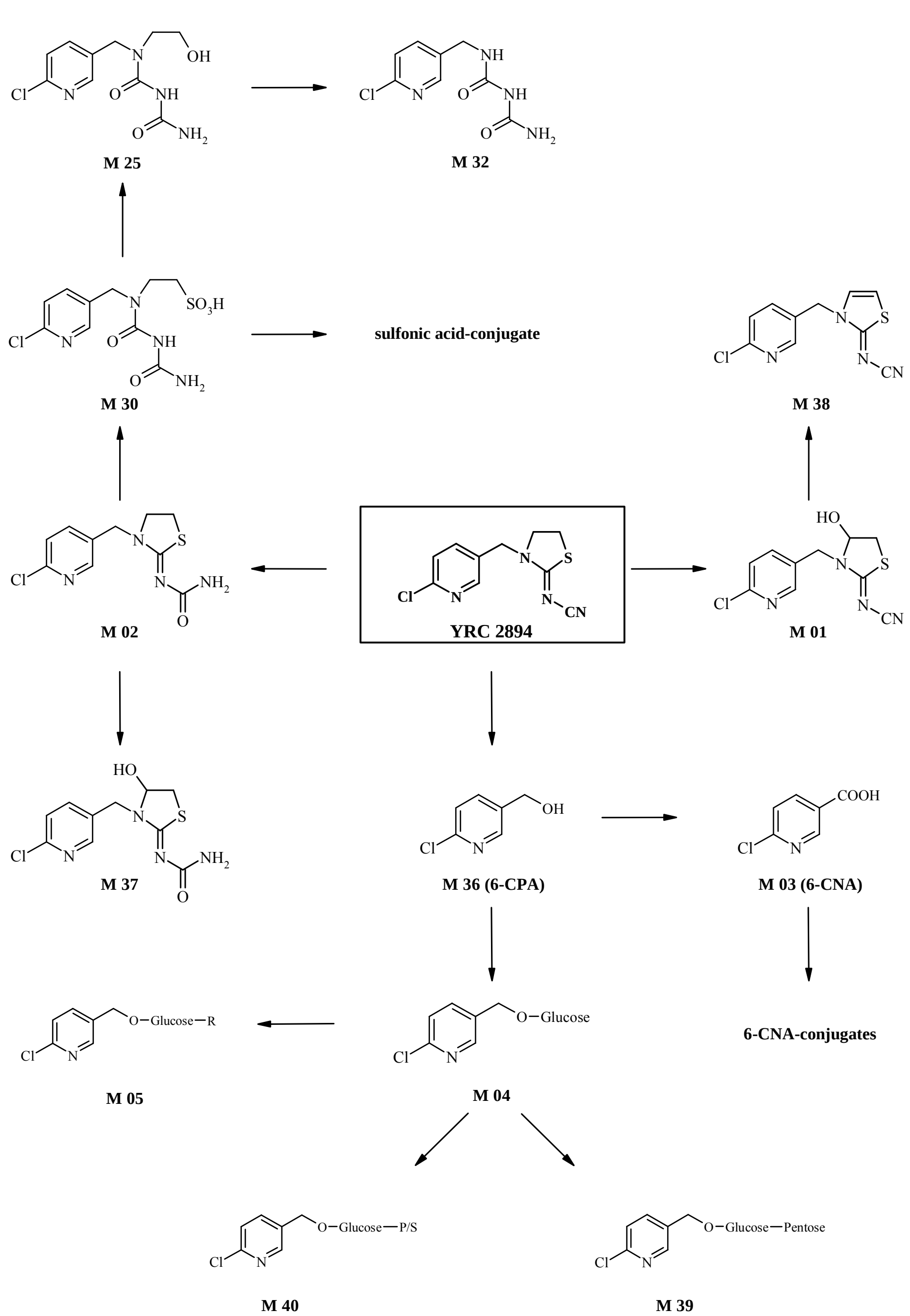


Figure 2. Metabolic pathways of thiacloprid in plants

Table 12. Recovery of radioactivity and distribution of the active substance and metabolites after application of [methylene-^{14}C]-thiacloprid to thin soil layers of sandy loam under artificial light conditions and in the dark (in % of the applied radioactivity) [mean of two values].

Study	Conditions	Exposure time (days)	A.S. %	M02 %	M35 %	CO_2 %	Unknown %	Extracted %	Not extracted %	Total %
		0	94.1	0.6		< 0.1	1.4	96.1	4.6	100.7

Study	Conditions	Exposure time (days)	A.S. %	M02 %	M35 %	CO_2 %	Unknown %	Extracted %	Not extracted %	Total %
		4	81.6	5.6		0.1	7.1	94.3	7.0	101.4
Photolysis	Irradiated	7	78.8	7.9		< 0.1	7.2	94.4	7.4	101.9
on soil		13	61.8	13.9	3.0	0.2	12.2	92.3	6.8	99.3
surfaces		18	47.5	23.8	3.8	0.2	14.2	89.6	9.5	99.3
	Dark	0	94.1	0.6		< 0.1	1.4	96.1	4.6	100.7
	control	7	35.5	49.6	0.6	0.1	7.5	93.2	7.2	100.4
		19	11.1	69.8	0.7	0.3	10.9	92.3	7.7	100.3

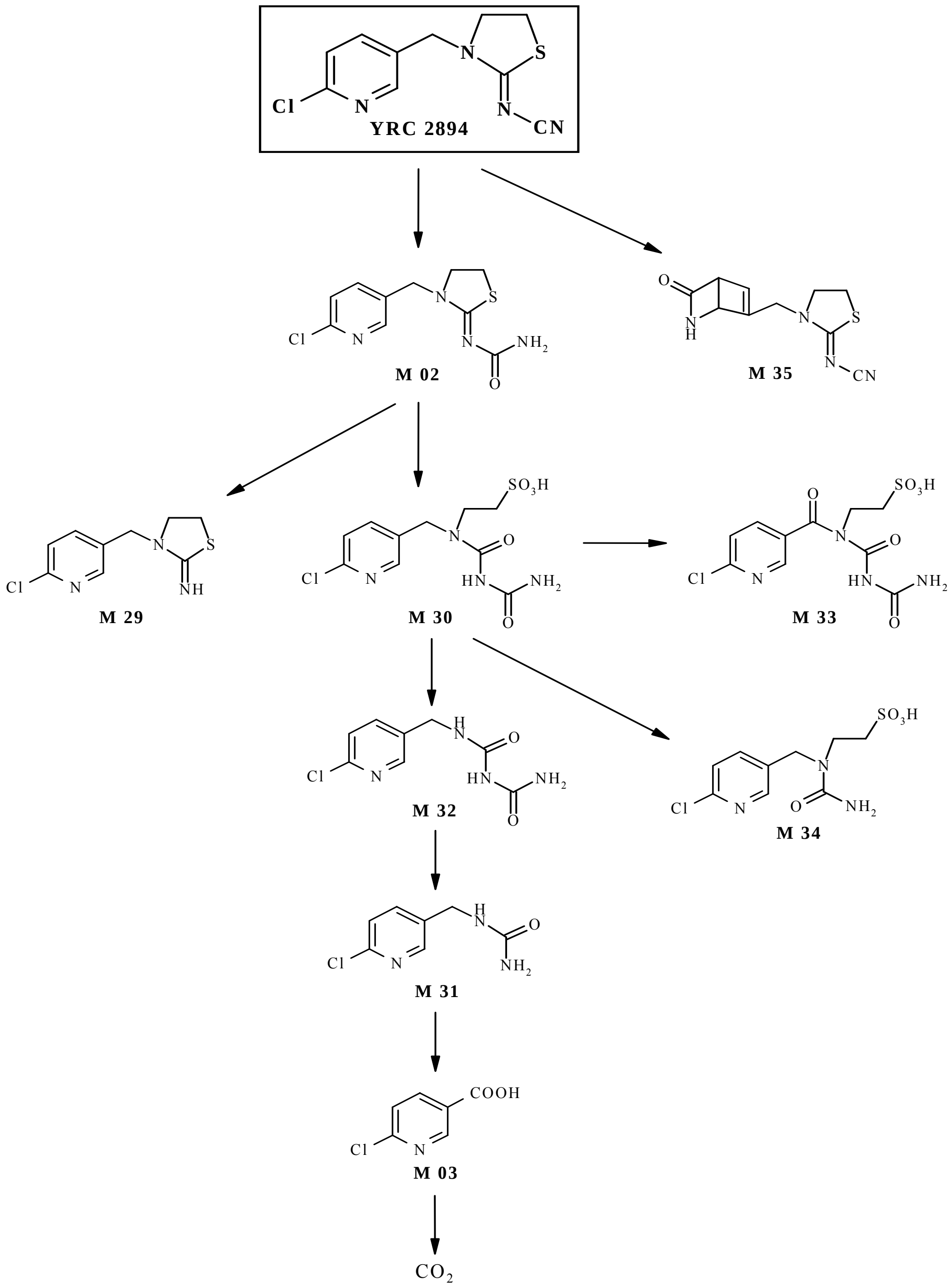


Figure 3. Proposed degradation pathway of thiacloprid in the soil, considering outdoor and photolysis on soil surfaces studies.

Residues in rotational crops

The metabolism of thiacloprid, formulated as a SC 480, was investigated (Clark, T. and Babczinski, P., 1998) in the following rotational crops spring wheat, lettuce and turnips planted into containers of soil treated with of [pyridinyl-^{14}C-methyl]-thiacloprid. The rate applied was approximately 10% above the highest rate used in the first season of residue trials (375 g ai/ha). This was to allow for any losses during application. The soil was aged for 30 days and tilled to a depth of 15 cm prior to planting the first set of rotational crops. Lettuce was transplanted in one quarter of the soil area, turnips were sown in a second quarter and spring wheat was sown in the remaining half. Lettuce was harvested on day 63 (i.e., 63 days after application) and turnips on day 105. Wheat was sampled at three different intervals, immature (day 70), hay (day 128) and maturity (day 170). The roots of lettuce and wheat were not harvested and remained in the soil for all rotations. Following the harvest of wheat, the soil was tilled (as for the first interval) and a second set of rotational crops were sown/transplanted as described above on day 170. In the second cycle the crops were sown/transplanted into different sectors of the container. The harvest days were as follows, lettuce day 220, turnips day 259, immature wheat day 212, wheat hay 232 and wheat grain and straw day 261. The above was repeated for the third rotation at the one year plant back interval (day 354). The harvest days were as follows, lettuce day 387, turnips day 441, immature wheat day 395, wheat hay 455 and wheat grain and straw day 526.

At maturity the wheat was separated into grain and straw. The glumes and the remainder of the ears were added to the straw fraction. Mature turnips were separated into bulbs and tops. The following seven plant fractions were obtained at each of the three intervals: Lettuce, turnip tops, turnip bulbs, immature wheat, wheat hay, wheat straw, and wheat grain. The individual plant fractions were macerated and extracted with methanol/water (1:1). Exhaustive extraction was achieved by microwave extraction using mixtures of acetonitrile/water. The radioactive content was measured by LSC in all extracts and the extraction residues after combustion. The extracts were cleaned by solid phase extraction, where necessary, and analysed by TLC and HPLC. Metabolites were identified by co-chromatography with authentic reference compounds and by spectroscopic methods.

A significant decrease in the TRR was observed over the whole period of the study although in some cases an increase was seen between the 30 and 170 day rotational crops. The TRR ranged from 0.005 mg/kg in turnip bulbs from the 354 day rotation to 2.6 mg/kg in wheat straw from the 170 day rotation. Overall, good extractability was achieved by conventional means, generally over 80%, after which microwave extraction was performed on the solids of the 2nd rotation to extract further radioactivity. A maximum of 9.5% of the TRR (turnip bulbs) was additionally extracted from any of the crops. In all cases, except wheat hay and straw, the amounts additionally extracted by microwave were all below 0.001 mg/kg. Only in wheat straw was the residue of any significance (0.15 mg/kg). Furthermore, radio-TLC showed that the radioactivity extracted by microwave was distributed over many components and therefore no further work was carried out on these samples. Due to the fact that the residues were generally very low and distributed over a number of components, the individual components were not quantified and were thus not accounted for in the distribution of metabolites. The total radioactive residue (TRR) based on fresh weight for each crop in each rotation is given in Table 13.

Table 13. Total radioactive residue (TRR) in rotational crops based on fresh weight.

	Thiacloprid Equivalents (mg/kg)		
	30 day Replant	170 day Replant	354 day Replant
Turnip, tops	0.174	0.088	0.032
Turnip, bulbs	0.014	0.016	0.005
Lettuce	0.111	0.081	0.023
Wheat, immature	0.203	0.128	0.122
Wheat, hay	0.283	0.558	0.135
Wheat, grain	0.101	0.145	0.019
Wheat, straw	1.655	2.595	0.322

In general, all crops had a similar metabolic profile. Metabolites detected in the crops were the thiacloprid amide (M02), 4-OH-thiacloprid amide (M37), 6-chloronicotinic acid (M03), 6-chloropicolyl alcohol (M36), 6-chloropico-lyl urea (M31), the sulfonic acid (M30), the imine (M29) and the sulfonic acid amide (M34), the latter most likely being an artefact formed from the sulfonic acid in the presence of methanol/water. The quantitative distribution of the metabolites is summarised in Table 14.

Table 14. Quantitative distribution of metabolites in rotational crops (values are given in % of the total radioactivity at harvest).

	Replant (days)	M36	M37	M02	M31	M03	M30	M34	M29	Unknown	Sum of metab. not containing thiazolidine	Extracted
Lettuce	30		39.1							52.7		91.9
	170	10.3	23.4	6.1		6.9	6.5		5.4	25.9	17.2	90.5
	354		14.5				17.4		8.6	43.0		83.5
Turnip	30	8.8	20.5	31.5			12.6			5.6	8.8	79.0
bulbs	170	5.0	7.4	17.5		9.8	16.1	7.5	4.8		14.8	82.2
	354											82.0
Turnip	30	12.1	20.4	42.3			6.1			9.9	12.1	90.8
tops	170	11.5	23.2	18.1	6.9		6.5		4.9	16.1	11.5	91.2
	354		45.8	23.3						18.3		87.4
Wheat	30		19.7	31.3			31.4	8.0				90.4
forage	170		11.6	28.2			39.7	14.0				94.8
	354		10.7	13.4			41.7	20.1		7.5		93.4
Wheat	30		13.4	25.1			39.3	8.8				86.6
hay	170		18.0	25.6			23.6	11.9		7.9		91.4
	354		12.7	15.1			34.4	17.3		7.6		87.1
Wheat	30		8.1					31.2		40.3		79.6
grain	170		14.8					27.4		40.7		88.1
	354											49.9
Wheat	30		11.2	13.9			31.2	9.0		17.2		82.5
straw	170		15.6	18.2			32.7	19.1				91.3
	354		15.9	10.5			24.5	17.9		14.1		83.0

Since most of the metabolites detected in the plants were either soil metabolites or their derivatives, it was concluded that the residues in the rotational crops resulted from uptake of soil metabolites which remained stable in the plants or to some degree were further metabolised by the plant. This is summarised in the proposed degradation scheme shown in Figure 4.

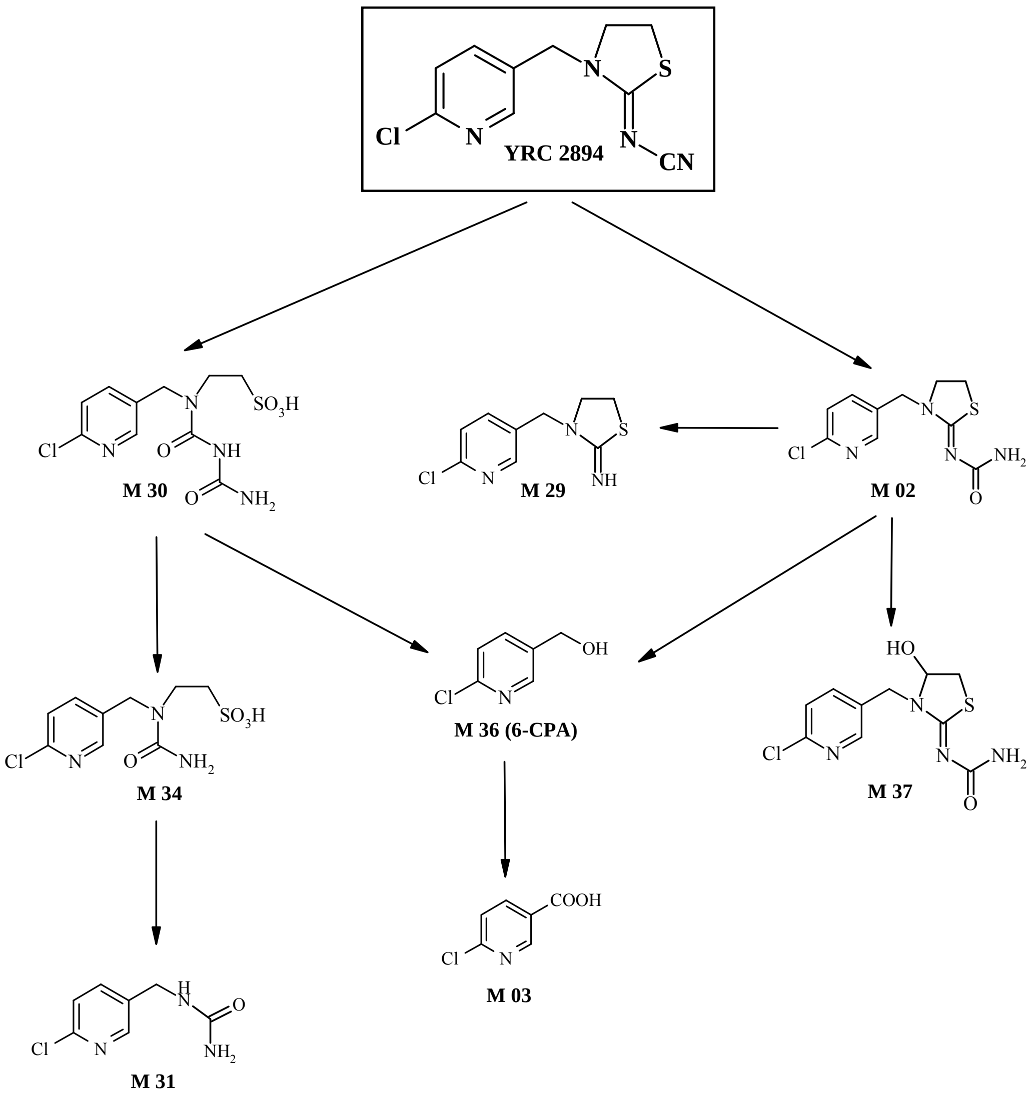


Figure 4. Metabolic pathway of thiacloprid in rotational crops

METHODS OF RESIDUE ANALYSIS

Analytical methods

Plant matrices-enforcement method

An analytical method for plant matrices based on HPLC-UV was reported (Report No.: MR-295/96 (Placke, F. J., 1996) and Report No.: 5438/1494225/T423 (Zyl, P. F. C. van, 2000)). Thiacloprid was extracted from 25 g of plant material with acetone/water (3:1; v:v). After vacuum filtration, an aliquot of the raw extract corresponding to a 5 g sample is concentrated and evaporated to the aqueous remainder. The residues are dissolved in water and partitioned against cyclohexane/ethyl acetate using a ChemElut column. Further clean-up is performed by column chromatography on Florisil and elution with acetonitrile. The residues of thiacloprid parent compound are quantified by reversed phase HPLC with UV detection at 242 nm.

Modifications for citrus: after elution, a partition clean-up step was included using a mixture of hexane and hexane-saturated acetonitrile. Florisil clean-up was not conducted.

The original method was validated by conducting recovery experiments with apple, cucumber, melon, red pepper, peach and tomato. Further recovery experiments were done using citrus matrices. Results obtained were within guideline requirements (recoveries: 70–110%; relative standard deviation (RSD) below 20%).

Control samples were spiked with thiacloprid at fortification levels of 0.02 and 0.2 mg/kg. Recoveries of thiacloprid ranged from 72 to 105% (overall mean: 95%, RSD: 5.8, n=97). Recoveries of thiacloprid for citrus matrices ranged from 77 to 101% (overall mean: 88%, RSD: 11%, n=6). The recoveries were not corrected for interferences. The results are summarised in Table 15 and Table 16.

Table 15. Recovery results from method 00419 for the determination of thiacloprid in plant matrices.

Matrix	Fortification level (mg/kg)	Recovery rate (%) mean	range	RSD (%)	Number of tests
Apple (fruit)	0.02*	101	98-103	1.9	5
	0.2	95	90-99	3.6	5
Apple (dried)	0.02*	82	72-88	10.6	3
	0.2	90	86-93	4.0	3
Apple (juice)	0.02*	98	94-100	3.3	3
Apple (pomace, dry)	0.02*	91	84-98	7.7	3
	0.2	86	97-97	0.0	3
Apple (sauce)	0.02*	98	95-100	2.6	3
	0.2	94	92-98	3.4	3
Cucumber (fruit)	0.02*	92	89-94	3.1	3
	0.2	90	83-96	7.4	3
Melon (peel)	0.02*	90	84-97	6.2	5
	0.2	98	92-101	3.5	5
Melon (pulp)	0.02*	95	92-97	2.7	3
	0.2	96	91-100	4.7	3
Red pepper (fruit)	0.02*	98	97-99	1.2	3
	0.2	95	92-99	3.7	3
Peach (fruit)	0.02*	98	91-103	6.4	3
	0.2	99	96-102	3.1	3
Peach (preserve)	0.02*	99	97-100	1.5	3
	0.2	95	93-96	1.6	3
Tomato (fruit)	0.02*	99	100-105	4.9	3
	0.2	100	97-104	3.6	3
Tomato (paste)	0.02*	98	97-99	1.0	3
	0.2	96	95-97	1.2	3
Tomato (juice)	0.02*	93	89-97	4.3	3
Tomato (preserve)	0.02*	94	90-98	4.3	3
	0.2	91	90-94	2.5	3

*: Limit of quantitation (LOQ), defined by the lowest validated fortification level

Table 16. Recovery results from report no. 5438/1494225/T423 for the determination of thiacloprid in plant matrices.

Matrix	Fortification level (mg/kg)	Recovery rate (%) mean	range	Number of tests
Citrus (peel)	0.04	--	101	1
Citrus (flesh)	0.04	--	98	1
	0.08	--	87	1
	0.16	--	82	1
Citrus (whole fruit)	0.08	--	82	1
	0.20	--	77	1

The chromatographic separation in combination with the preceding clean-up steps allows quantitation of the parent compound without significant matrix interferences. Blank values from control samples were well below 30% of the LOQ.

The limit of quantification (LOQ), defined as the lowest concentration at which an acceptable recovery is obtained, was 0.02 mg/kg of thiacloprid for all crop matrices mentioned above. Matrix interference was minimal as illustrated in the control sample chromatograms (< 10% LOQ).

Amendment E001 to method 00419 (Placke, F. J., 1998) was conducted to validate additional plant matrices for cotton, potato, pear, aubergine (eggplant), zucchini (courgette) and cherry. The principle of the method corresponds to the original method no. 00419 (Placke, F. J., 1996).

The method was validated by conducting recovery experiments with the additional commodities cotton, potato, pear, aubergine, zucchini and cherry. Results obtained were within guideline requirements (recoveries: 70−110%; RSD below 20%). Control samples were spiked with thiacloprid at fortification levels of 0.02 and 0.2 mg/kg. Individual recoveries of thiacloprid ranged from 85 to 103% (mean per crop matrix 90−97%, RSDs 1.5−4.4%, n=3−10). The recoveries were not corrected for interferences. The results obtained are summarised in Table 17.

Table 17. Recovery results for method 00419/E001 for the determination of thiacloprid in plant matrices.

Matrix	Fortification level (mg/kg)	Recovery rate (%) Mean	range	RSD (%)	Number of tests
Cotton (seed)	0.02*	93	92-96	1.7	5
	0.2	96	93-97	1.5	5
Potato (tuber)	0.02*	91	85-93	3.6	5
	0.2	93	91-95	1.6	5
Potato (French fries)	0.02*	94	92-96	1.9	3
	0.2	96	94-99	2.2	3
Cherry (juice)	0.02*	99	97-103	2.6	3
Pear (fruit)	0.02*	96	95-98	1.4	3
	0.2	98	97-99	0.8	3
Aubergine (fruit)	0.02*	89	86-91	2.2	5
	0.2	91	87-93	2.4	5
Zucchini (fruit)	0.02*	95	91-97	3.6	3
	0.2	99	97-100	1.3	3
Cherry (fruit)	0.02*	97	94-100	2.6	3
	0.2	93	91-94	1.6	3

*: LOQ, defined by the lowest validated fortification level

An independent laboratory validation of methods 00419 and 00419/E001 was conducted with the representative matrices apple fruit (high acid content), potato tuber (high water content) and cotton seed (high fat content) (Weber, H., 1998). Minor modifications included using chemicals (acetonitrile, cyclohexane and pure water) from a different manufacturer.

Control samples were spiked with thiacloprid at fortification levels of 0.02 and 0.2 mg/kg. Results obtained were within guideline requirements (recoveries: 70−110%; RSD below 20%, n=5). Individual recoveries of thiacloprid ranged from 79 to 110%. Mean recoveries for each crop ranged from 84 to 101%, with RSDs ranging from 3.2 to 8.8%. Blank values were not used for correcting recoveries. The results obtained are summarised in Table 18.

Table 18. Recovery results from the independent laboratory validation of method 00419 for the determination of thiacloprid in plant matrices (Weber, H., 1998)

Matrix	Fortification level (mg/kg)	Recovery rate (%) mean	range	RSD (%)	Number of tests
Apple (fruit)	0.02*	92	88-95	3.2	5
	0.20	92	83-97	6.1	5
Potato (tuber)	0.02*	84	79-88	4.0	5
	0.20	88	83-94	4.9	5
Cotton (seed)	0.02*	92	84-98	6.4	5
	0.20	94	85-102	7.3	5

*: LOQ, defined by the lowest validated fortification level

The enforcement method 00419 is suitable for the determination of residues of thiacloprid parent compound. The LOQ was 0.02 mg/kg in all analysed crop matrices.

Animal matrices-enforcement methods

Residue analysis of thiacloprid parent compound in animal matrices can be done by HPLC-UV according to Placke, F. J., 1998a (method 00519). The method is suitable as an enforcement method.

Thiacloprid is extracted from animal matrices (tissues, eggs and milk) using a mixture of acetonitrile/water or methanol. For milk samples, partitioning of the extracts against n-hexane is performed to remove fat. The extracts are evaporated to the aqueous remainder. For egg samples, clean-up with a polystyrene column (Chromabond HR-P) is performed. The aqueous remainder is partitioned against cyclohexane/ethyl acetate using a ChemElut column. Further clean-up is performed by column chromatography on Florisil and elution with acetonitrile.

The residues are quantified by reversed phase HPLC with UV-detection at 242 nm. The method was validated by conducting recovery tests with muscle, milk and eggs.

Five control samples were spiked with thiacloprid at fortification levels of 0.02 and 0.2 mg/kg for eggs and muscle, and 0.01 and 0.1 mg/kg for milk, respectively. Recoveries of thiacloprid ranged from 82 to 101% (mean: 93%, relative standard deviation (RSD): 5.0%, n=30). The recoveries were not corrected for interference. Blank values were not used for correcting recoveries. The results obtained are summarised in Table 19.

Table 19. Recovery results for method 00519 for the determination of thiacloprid in animal matrices.

Reference	Matrix	Fortification level (mg/kg)	Recovery rate (%) mean	range	RSD (%)	n
Placke, 1998 HPLC/UV, thiacloprid parent	Milk	0.01*	88	80-91	5.4	5
		0.1	95	90-100	4.2	5
	Muscle	0.02*	90	82-95	5.8	5
		0.2	94	92-101	4.1	5
	Egg	0.02	92	88-96	3.2	5
		0.2	94	93-96	1.2	5
HPLC/UV [confirmatory], thiacloprid parent	Milk	0.01*	87	78-95	8.6	5
		0.1	98	91-104	5.9	5
	Muscle	0.02*	90	80-94	6.2	5
		0.2	93	77-78	1.2	5
	Egg	0.02*	93	88-100	5.2	5
		0.2	94	93-95	0.8	5

*: LOQ, defined by the lowest validated fortification level

An independent laboratory validation of method 00519 was conducted with the representative animal materials milk, egg and meat (Weber, H., 1998a). Duplicates of control- and fortified samples (five each at 0.02 and 0.2 mg/kg, except for milk with five each at 0.01 and 0.1 mg/kg) were extracted and analysed. Minor modifications included the use of chemicals of a different specification.

The method was validated for both, the higher and the lower fortification level. Recoveries at the lower level were in the range of 76 to 89% (mean: 82%; RSD: 6.0%) for egg, 75 to 87% (mean: 80%; RSD: 6.3%) for meat, and 85 to 95% (mean: 90%; RSD: 4.5%) for milk. Recoveries at the higher level were in the range of 76 to 102% (mean: 84%; RSD: 12.0%) for egg, 84 to 90% (mean: 86%; RSD: 2.8%) for meat and 93 to 102% (mean: 98%; RSD: 3.4%) for milk. The overall recoveries were 83% (RSD: 9.2%, n=10) for egg, 83% (RSD: 5.9%, n=10) for meat and 94% (RSD: 5.6%, n=10) for milk. Blank values were not used for correcting recoveries. The results obtained are summarised in Table 20.

Table 20. Recovery results from the independent method validation of method 00519 for the determination of thiacloprid in animal matrices.

Reference	Matrix	Fortification level (mg/kg)	Recovery rate (%) mean	range	RSD (%)	n
Weber, 1998 HPLC/UV - ILV	Milk	0.01*	90	85-95	4.6	5
		0.1	98	93-102	3.5	5
	Muscle	0.02*	80	75-87	6.3	5
		0.2	86	84-90	2.8	5
	Egg	0.02*	82	76-89	6.0	5
		0.2	84	76-102	12	5

*: LOQ, defined by the lowest validated fortification level

Enforcement method 00519 for the determination of residues of thiacloprid parent compound by HPLC-UV in a number of animal matrices was successfully validated by an independent laboratory. The LOQ is 0.01 mg/kg in milk and 0.02 mg/kg in muscle and egg.

Specialised methods- thiacloprid only

For thiacloprid additional specialised methods were presented. A summary of the validation data is given in Table 21.

Schoening (1998, 2001, 2002, 2005, 2005a), Billian, P. and Schoening (2003) and Sur, R. (2000) developed a HPLC-MS/MS method (method 00548) for the analysis of thiacloprid parent compound in various plant matrices. The plant material was extracted with a mixture of acetonitrile/water (1/1, v/v). The residues of thiacloprid parent compound are determined by reversed-phase HPLC on a C18-column using a triple-stage mass spectrometer (HPLC-MS/MS) with an electrospray interface (ESI: TurboIonSpray) operated in the positive ion mode under multiple-reaction monitoring (MRM) conditions.

Ballesteros, C. and Meilland - Berthier, I. (2004, 2005) modified method 00548. Modifications involve a change in the composition of the extraction solvent, and filtration and evaporation steps were replaced by centrifugation.

The original method 00548 was adapted by Clay, S. (2003) to produce a new method for the analysis of thiacloprid parent compound be HPLC-MS(SIM) in a number of plant matrices. The residues of thiacloprid were determined by reversed-phase HPLC on a C18-column using the positive SIM-mode after atmospheric pressure chemical ionisation (APCI). As quantification ion m/z = 253 and as qualifier ion m/z = 255 was used. Quantification was performed using matrix matched standards because signal suppression was observed in matrix standards versus solvent standards.

HPLC/UV based method was presented by Fukuda, T. (1998) for green tea. A comparable method for rice matrices relies on HPLC/UV also (Anon. 2002).

For walnuts Baravelli, P. L. (2003) used a method where the residues of thiacloprid parent compound are determined by reversed-phase HPLC using a triple-stage mass spectrometer (HPLC-MS/MS) with an electrospray interface (ESI: TurboIonSpray) operated in the positive ion mode under multiple-reaction monitoring (MRM) conditions for detection. For quantification the following parent and daughter ion were used: m/z = 230 and m/z = 126, respectively. The daughter ion is used for quantification. Quantitation was done using external standards.

A method for animal matrices was developed by Schoening, R. (1998a). Thiacloprid is extracted from animal tissues using a mixture of acetonitrile/water, and from milk samples with methanol and diluted sulphuric acid. The residues are quantified by reversed phase HPLC with electrospray MS/MS-detection using deuterated thiacloprid as internal standard.

Table 21. Validation data for special analytical methods for the determination of parent thiacloprid residues in food of plant and animal origin.

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
Schoening, R., 1998	Apple (fruit)	0.02* 0.2	95 91	4.4 1.7	3 3
	Aubergine (fruit)	0.02* 0.2	86 93	3.3 1.6	3 3
	Cherry (fruit)	0.02* 0.2	88 82	4.7 3.2	3 3
	Cherry (juice)	0.02* 0.2	84 87	2.6 3.8	5 5
	Cotton (seed)	0.02* 0.2	79 81	5.7 9.5	5 5
	Cucumber (fruit)	0.02* 0.2	88 84	1.3 5.5	3 3
	Peach (fruit)	0.02* 0.2	86 89	6.5 3.9	3 3
	Pepper (fruit)	0.02* 0.2	88 85	4.6 5.3	3 3
	Potato (tuber)	0.02* 0.2	92 97	2.5 3.0	5 5
	Potato (green matter)	0.02* 0.2	88 98	2.4 8.5	3 3
	Potato (French fries)	0.02* 0.2	95 93	5.4 4.0	5 5
	Strawberry (fruit)	0.02* 0.2	87 90	3.0 3.2	5 5
	Strawberry (marmalade)	0.02* 0.2	86 90	1.5 2.5	5 5
	Tomato (fruit)	0.02* 0.2	99 95	4.2 4.8	3 3
	Tomato (juice)	0.02* 0.2	89 90	0.9 3.0	5 5
	Tomato (puree)	0.02* 0.2	93 92	1.6 2.6	5 5
	Tomato (paste)	0.02* 0.2	91 88	5.6 1.5	3 3
Schoening, R., 2001	Melon (pulp)	0.02* 0.2	98 94	2.6 1.1	3 3
	Melon (peel)	0.02* 0.2	90 93	12.5 4.1	3 3
	Currant (fruit)	0.02* 0.2	95 94	2.2 5.9	3 3
	Plum (fruit)	0.02* 0.2	96 95	5.1 3.0	3 3
	Sugar beet (leaves)	0.02* 0.2	90 93	13.3 0.6	3 3
	Sugar beet (body)	0.02* 0.2	96 93	2.2 3.3	3 3
	Wheat (grain)	0.02* 0.2	100 99	4.4 1.2	3 3
	Wheat (rest of plant)	0.02* 0.2	98 93	3.6 4.7	3 3

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
	Wheat (straw)	0.02* 0.2	94 98	6.9 1.2	3 3
	Barley (grain)	0.02* 0.2	97 95	1.6 1.1	3 3
	Barley (rest of plant)	0.02* 0.2	98 95	2.6 3.7	3 3
	Barley (straw)	0.02* 0.2	96 92	1.2 4.5	3 3
	Pea with pod	0.02* 0.2	100 98	0.0 4.8	3 3
	Pea without pod	0.02* 0.2	97 97	3.3 1.8	3 3
	Pea (pod empty)	0.02* 0.2	101 96	2.1 2.2	3 3
Schoening, R., 2002	Rape (rest of plant, green material)	0.02* 0.2	92 91	3.1 0.6	3 3
	Rape (pod)	0.02* 0.2	96 94	1.2 2.8	3 3
	Rape (seed)	0.02* 0.2	96 92	1.0 0.6	3 3
	Rape (straw)	0.02* 0.2	87 84	4.1 2.5	3 3
	Raspberry (fruit)	0.02* 0.2	96 93	1.6 0.6	3 3
Schoening, R., 2005	Onion (whole plant)	0.01* 0.1	90 97	5.9 1.0	5 3
Schoening, R., 2005a	Leek (whole plant)	0.01* 0.1	94 93	2.7 2.3	3 4
	Zucchini (fruit)	0.02* 0.2	90 88	1.3 2.0	3 3
Sur, R., 2000	Strawberry (fruit)	0.02* 0.2	87 90	3.0 3.2	5 5
	Strawberry (marmalade)	0.02* 0.2	86 90	1.5 2.5	5 5
	Tomato (juice)	0.02* 0.2	89 90	0.9 3.0	5 5
	Tomato (puree)	0.02* 0.2	93 92	1.6 2.6	5 5
	Tomato (paste)	0.02* 0.2	91 88	5.6 1.5	5 5
Billian, P. and Schoening, R., 2003	Bean (bean with pod)	0.01* 0.02 0.20	98 97 98	5.8 1.6 2.9	3 3 3
	Olive (fruit)	0.01* 0.02 0.20	99 89 89	1.5 0.0 1.3	3 3 3
	Olive (pomace wet)	0.01* 0.02 0.20	101 88 87	2.0 0.7 0.7	3 3 3
	Olive (oil)	0.01* 0.20	104 98	1.4 3.4	5 5
	Broccoli (curd)	0.01* 0.02 0.20	97 97 97	2.2 2.0 2.4	5 5 5
	Cauliflower (curd)	0.01* 0.02 0.20	97 97 96	4.3 3.3 0.6	3 3 3
	Head Cabbage (head)	0.01* 0.02 0.20	96 90 96	1.2 1.3 0.6	3 3 3
	Brussels Sprouts	0.01* 0.02 0.20	100 95 94	0.6 0.6 1.1	3 3 3

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
	Kohlrabi (leaf)	0.01* 0.20	102 94	2.8 0.6	3 3
	Kohlrabi (corm)	0.01* 0.20	99 94	1.0 1.1	3 3
	Corn (whole plant)	0.01* 0.20	98 98	1.0 2.6	3 3
	Corn (kernel)	0.01* 0.20	99 96	1.7 0.5	5 5
	Corn (cob without husks)	0.01* 0.20	99 97	3.0 0.0	3 3
	Artichoke (head)	0.01* 0.20	100 103	3.0 0.0	3 3
	Lettuce (head)	0.01* 0.20	97 96	1.6 2.6	3 3
	Hazelnut (nut)	0.01* 0.02 0.20	98 95 96	0.6 0.6 1.2	3 3 3
Ballesteros, C. and Meilland - Berthier, I., 2004	Zucchini (fruit)	0.01* 0.10	91 93	1.5 1.1	5 5
	Pepper (fruit)	0.01* 0.10	96 96	3.3 3.8	3 3
Ballesteros, C. and Meilland - Berthier, I., 2005	Sugar beet (body)	0.01* 0.1	99 103	1.5 1.5	3 3
	Sugar beet (leaves with root collar)	0.01* 0.1	93 88	1.6 2.4	3 3
	Tomato (fruit)	0.01* 0.1	104 97	3.6 1.6	3 3
	Field pea	0.01* 0.1	90 90	4.0 1.3	3 3
	Corn (kernel)	0.01* 0.1	84 84	4.1 4.8	3 3
	Corn (whole plant without roots)	0.05* 0.5	76 75	6.8 0.0	3 3
	Artichoke (head)	0.01* 0.1	83 88	1.2 1.3	3 3
	Watermelon (fruit)	0.01* 0.1	115 109	2.2 3.2	3 3
	Lettuce (head)	0.01* 0.1	98 100	4.3 2.6	3 3
	Wheat (grain)	0.01* 0.1	92 88	2.9 1.1	3 3
	Wheat (straw)	0.05* 0.5	89 86	6.9 3.7	3 3
	Barley (grain)	0.01* 0.1	93 93	4.4 3.8	3 3
	Barley (straw)	0.05* 0.5	100 93	2.0 4.4	3 3
Clay, S. 2003	Kiwi whole fruit	0.02* 0.20	87 91	8 8	7 7
	Peach fruit	0.02* 0.02* 0.20 0.20	84 81 93 90	9.0 7.9 5.3 3.6	8 5 8 5
	Sweetcorn	0.02* 0.20	74 82	5.8 4.6	4 5
	Lemon pulp	0.02* 0.20	78 83	6.8 5.7	5 5
	Nectarine fruit	0.02* 0.20	103 101	9 7	5 5

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
Fukuda, T. 1998	Green tea (leaf)	0.4* 0.4	87 84	0 0	2 2
Anon., 2002	Rice grain	5.0 1.0 0.5*	90 86 88	1.5 3.2 4.0	3 3 3
	Rice husk	5.0 1.0 0.5*	88 84 88	2.0 2.0 3.1	3 3 3
	Rice straw	5.0 1.0 0.5*	91 84 88	2.6 4.9 2.0	3 3 3
Baravelli, P. L., 2003	Walnut	0.005* 0.010 0.050 0.100 0.500 1.000 5.000	101.0 86.5 98.6 97.8 83.1 88.0 89.7	- - - - - - -	1 1 1 1 1 1 1
Schoening, R., 1998a	Milk	0.01* 0.1	95 94	1.2 3.2	5 5
	Muscle	0.02* 0.2	98 95	2.0 3.7	5 5
	Liver	0.02* 0.2	95 90	2.1 2.9	3 3
	Kidney	0.02* 0.2	90 93	2.3 2.8	3 3
	Fat	0.02* 0.2	98 95	2.7 2.4	3 3

*: LOQ, defined by the lowest validated fortification level

Specialised methods- thiacloprid total residue

For thiacloprid additional methods for the determination of the total residue containing the 6-chloropicolyl moiety were presented. A summary of the validation data is given in Table 21.

Schoening, R. (1999) and Babczinski, P. (1997a) developed a method, where thiacloprid and its metabolites were extracted from plant matrices with an acidic methanol / water mixture. After the clean-up thiacloprid and all metabolites containing the 6-chloropicolyl moiety were oxidised with alkaline potassium permanganate solution to yield 6-chloronicotinic acid. This was followed by acidification and reduction of the excess permanganate and the developed manganese dioxide with sodium bisulfite. The 6-CNA was converted to the corresponding trimethylsilyl ester with MSTFA prior to quantitation by gas chromatography with mass selective detection in the single-ion monitoring mode (GC-MS).

In a comparable method presented by DeHaan, R. A. (1999) and Perez, R. (1999) thiacloprid total residues were extracted with a mixture of methanol and sulfuric acid. Residues were treated with alkaline potassium permanganate, which oxidised thiacloprid and all metabolites containing the 6-CNA. The 6-CNA was extracted from the oxidised mixture and derivatized. The derivative, trimethylsilyl 6-chloronicotinate, was measured by gas chromatography/mass spectroscopy selected ion monitoring (GC/MS-SIM).

Orosz, F. (2000 and 2000a) validated the method for the analysis of thiacloprid total residue in rape seeds and sunflower.

A thiacloprid total residue method was presented by Schoening, R. (1998b) using GC-MS after oxidisation to 6-CNA and derivatization with MSTFA.

Table 22. Validation data for special analytical methods for the determination of total thiacloprid residues in food of plant and animal origin.

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
Schoening, R., 1999 and Babczinski, P., 1997a	Cotton (seed)	0.05*	81	4.1	5
		0.0507[1]	85	3.2	5
		0.5	100	4.4	5
	Potato (tuber)	0.05*	84	8.1	5
		0.0507[1]	86	2.9	5
		0.5	91	0.5	5
DeHaan, R. A., 1999	Apples (whole fruit)	Thiacloprid:			
		0.01*	88	7.3	9
		0.05	87	9.7	9
		0.3	90	1.7	3
		4-hydroxy-thiacloprid :			
		0.01*	61	7.7	13
		0.05	69	8.4	8
		0.3	61	2.3	3
	Apples (juice)	Thiacloprid:			
		0.01*	85	5.0	4
		0.25	84	8.4	3
		4-hydroxy-thiacloprid:			
		0.01*	68	4.2	3
		0.25	62	3.8	3
	Apples (wet pomace)	Thiacloprid:			
		0.01*	81	10.3	3
		0.6	89	4.6	3
		4-hydroxy-thiacloprid:			
		0.01*	58	5.7	3
		0.6	61	3.6	3
	Pears (whole fruit)	Thiacloprid:			
		0.01*	100	10.6	5
		0.05	87	13.3	7
		0.4	79	14.4	3
		4-hydroxy-thiacloprid:			
		0.01*	56	10.3	10
		0.05	62	15.8	6
		0.4	59	8.9	3
	Cotton (meal)	Thiacloprid:			
		0.05*	80	-	1
		6-CNA:			
		0.05*	98	-	1
		mix of equimolar amounts of thiacloprid and 6-CNA:			
		0.05*	88	-	1
	Cotton (hulls)	Thiacloprid:			
		0.05*	66	-	1
		0.2	65	-	1
		6-CNA:			
		0.05*	100	-	1
		0.2	87	-	1
		mix of equimolar amounts of thiacloprid and 6-CNA:			
		0.05*	66	-	1
		0.2	78	-	1

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
	Cotton (refined oil)	Thiacloprid:			
		0.05*	94	-	1
		0.5	86	-	1
		6-CNA:			
		0.05*	100	-	1
		0.5	95	-	1
		mix of equimolar amounts of thiacloprid and 6-CNA:			
		0.05*	94	-	1
		0.5	91	-	1
	Cotton (undelinted seed)	Thiacloprid:			
		0.05*	83	15.1	4
		0.1	78	6.5	5
		0.5	104	-	1
		1.0	81	7.1	2
		6-CNA:			
		0.05*	98	-	1
		0.5	97	-	1
		1.0	88	-	1
		mix of equimolar amounts of thiacloprid and 6-CNA:			
		0.05*	82	-	1
		0.5	102	-	1
		1.0	78	-	1
	Cotton (gin trash)	Thiacloprid:			
		0.05*	94	16.9	2
		0.5	80	-	1
		5.0	110	-	1
		11	73	-	1
		15	97	-	1
		6-CNA:			
		0.05*	106	-	1
		11	61	-	1
		mix of equimolar amounts of thiacloprid and 6-CNA:			
		0.05*	86	-	1
		11	71	-	1
Perez, R., 1999	Cotton (seed)	Thiacloprid:			
		0.05*	83	9.9	2
		1.0	77	5.7	2
		6-CNA:			
		0.05*	89	5.7	2
		1.0	124	0.0	2
Orosz, F. 2000	Rape (seed)	0.02*	89	20.8	7
		0.1	88	17.3	4
		0.5	86	6.3	4
Orosz, F. 2000a	Sunflower (seed)	0.02*	92	15.3	7
		0.1	93	8.8	4
		0.5	83	6.2	4
Schoening, R., 1998b	Milk	Total residue:			
		0.01*	92	2.0	5
		0.1	85	3.1	5
		6-CP-urea sulfoxide:			
		0.01*	86	3.5	3
	Muscle	0.02*	82	6.6	5
		0.2	88	2.5	5
	Liver	0.02*	87	1.3	3

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
		0.2	94	1.0	3
	Kidney	Total residue: 0.02* 0.2 6-CP-urea sulfoxide: 0.02*	 85 84 64	 4.2 1.3 3.5	 3 3 3
	Fat	0.02* 0.2	102 91	3.7 3.5	3 3

*: LOQ, defined by the lowest validated fortification level

1: Fortification with a mixture of amide-thiacloprid and 6-CNA at 0.02 mg/kg, each, corresponding to 0.0507 mg/kg thiacloprid

Specialised methods- thiacloprid parent and metabolites

An LC-MS/MS method for measuring thiacloprid, thiacloprid-amide, 4-hydroxy-thiacloprid-amide and thiacloprid-sodium sulfonate was developed by Moore, S. M., 2002 and Harbin, A. M., 2004. The analytes were extracted using methanol/water (3:1) followed by 18C solid phase extraction. The quantitation was based on comparison of daughter ion transitions between the analytes and their deuterated analogs, which were used as the internal standards.

Table 23. Validation data for special analytical methods for the determination of thiacloprid residues and its metabolites in food of plant and animal origin.

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
Moore, S. M., 2002	Soybean seed	Thiacloprid: 0.01* 0.1 thiacloprid-amide: 0.01* 0.1 4-hydroxy-thiacloprid-amide: 0.01* 0.1 thiacloprid-sodium-sulfonate: 0.01* 0.1	 98 95 96 80 102 91 108 94	 4.8 0.58 4.1 2.9 2.5 2.1 2.2 1.5	 10 3 10 3 10 3 10 3
	Soybean forage	Thiacloprid: 0.01* 0.1 thiacloprid-amide: 0.01* 0.1 4-hydroxy-thiacloprid-amide: 0.01* 0.1 thiacloprid-sodium-sulfonate: 0.01* 0.1	 97 102 100 100 101 95 111 92	 5.0 1.5 3.2 1.0 3.0 2.0 2.9 0.58	 8 3 8 3 8 3 8 3

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
	Soybean hay	Thiacloprid:			
		0.01*	94	3.1	8
		0.1	91	4.7	3
		thiacloprid-amide:			
		0.01*	103	6.2	8
		0.1	98	3.6	3
		4-hydroxy-thiacloprid-amide:			
		0.01*	100	1.8	8
		0.1	100	1.2	3
		thiacloprid-sodium-sulfonate:			
		0.01*	105	2.7	8
		0.1	91	1.5	3
	Wheat grain	Thiacloprid:			
		0.01*	93	2.8	9
		0.1	96	2.3	3
		thiacloprid-amide:			
		0.01*	94	3.5	9
		0.1	93	2.1	3
		4-hydroxy-thiacloprid-amide:			
		0.01*	92	4.4	9
		0.1	93	2.1	3
		thiacloprid-sodium-sulfonate:			
		0.01*	99	5.9	9
		0.1	93	1.2	3
	Wheat forage	Thiacloprid:			
		0.01*	94	2.2	9
		0.1	85	2.1	3
		thiacloprid-amide:			
		0.01*	94	2.9	9
		0.1	85	1.7	3
		4-hydroxy-thiacloprid-amide:			
		0.01*	94	3.8	9
		0.1	85	1.5	3
		thiacloprid-sodium-sulfonate:			
		0.01*	107	4.4	9
		0.1	92	3.5	3
	Wheat hay	Thiacloprid:			
		0.01*	94	4.3	9
		0.1	91	1.0	3
		thiacloprid-amide:			
		0.01*	93	4.5	9
		0.1	91	2.1	3
		4-hydroxy-thiacloprid-amide:			
		0.01*	95	4.3	9
		0.1	87	0.58	3
		thiacloprid-sodium-sulfonate:			
		0.01*	102	6.5	9
		0.1	91	1.0	3

Reference	Sample	Fortified level, mg/kg	Average recovery [%]	RSD [%]	No. of analyses
Harbin, A. M., 2004	Pecan nutmeat	Thiacloprid: 0.01*	97	3.2	7
		thiacloprid-amide: 0.01*	97	4.3	7
		4-hydroxy-thiacloprid-amide: 0.01*	98	3.2	7
	Almond nutmeat	Thiacloprid: 0.01*	96	1.9	6
		thiacloprid-amide: 0.01*	96	6.3	6
		4-hydroxy-thiacloprid-amide: 0.01*	97	2.3	6
	Almond hulls	Thiacloprid: 0.01*	79	7.2	9
		thiacloprid-amide: 0.01*	86	3.0	9
		4-hydroxy-thiacloprid-amide: 0.01*	89	5.8	9

Stability of residues in stored analytical samples

Storage stability was examined in three different water-containing crop commodities (apple fruit, tomato fruit, melon peel), and in cotton seed and potato tuber, representing oil-containing and starch-containing matrices, up to a period of 18 months. In a follow-up study, freezer storage stability was demonstrated for the extended period of 24 months in the additional crops tobacco, wheat, rape, pea, currant and potato. A summary of the results is presented in Table 24.

In the study by Placke, F.J. (1997), samples of apple, tomatoes and melons were fortified with 0.2 mg/kg thiacloprid each. Immediately after fortification, a sample from each matrix was taken to determine the initial residues (fortification level). The remaining fortified samples were deep frozen (approx. -20°C) and analysed after nominal storage intervals of 1, 3, 6, 12 and 18 months.

Schoening, R. (2000 & 2005a) examined the storage stability of thiacloprid using samples of potato tubers, cotton seed, wheat straw, rape seed, peas with pods, currants and tobacco leaves. Tobacco leaf was fortified with a level of 2 mg/kg, all other samples with 0.2 mg/kg. The remaining fortified samples were deep frozen (approximately -20°C) and analysed after nominal storage intervals of 1, 3, 6, 12, 18 and 24 months.

Table 24. Stability of residues in stored analytical samples.

Reference	Commodity and fortification level	Storage Interval (days)	Procedural recovery (%)	Thiacloprid in stored sample, uncorrected (%)
Placke, F.J. 1997	Tomato, fruit 0.2 mg/kg	0	-	90.5
		33	76.5	78.7
		90	96.9	95.6
		180	92.3	95.2
		365	95.8	96.2
		540	96.2	97.6
	Apple, fruit 0.2 mg/kg	0	-	89.7
		32	95.0	99.5
		89	98.9	98.9
		180	92.1	87.7
		364	94.2	95.0
		539	96.1	97.2

Reference	Commodity and fortification level	Storage Interval (days)	Procedural recovery (%)	Thiacloprid in stored sample, uncorrected (%)
	Melon, peel 0.2 mg/kg	0	-	83.8
		29	87.1	88.4
		90	94.4	97.7
		182	89.3	91.2
		365	92.3	91.8
		540	95.4	94.6
Schoening, R. 2000	Potato, tuber 0.2 mg/kg	0	-	98.6
		75	99.9	101.2
		152	93.3	94.5
		300	94.5	95.7
		540	100.3	98.9
	Cotton, seed 0.2 mg/kg	0	-	93.9
		75	103.2	94.5
		152	99.3	97.0
		300	95.0	100.0
		540	99.1	93.4
Schoening, R. 2005a	Potato, tuber 0.2 mg/kg	0	-	105
		30	110	108
		90	100	101
		180	99	98
		360	95	96
		540	102	98
		730	96	92
	Wheat, straw 0.2 mg/kg	0	-	104
		30	106	100
		90	97	97
		180	100	96
		360	102	96
		540	91	91
		730	93	91
	Tobacco, leafs dry 2 mg/kg	0	-	104
		30	103	102
		90	92	97
		180	102	102
		360	105	106
		540	93	92
		730	95	96
	Peas with pod 0.2 mg/kg	0	-	107
		30	108	106
		90	104	101
		180	105	101
		360	102	99
		540	100	92
		730	93	102
	Rape seed 0.2 mg/kg	0	-	105
		30	107	106
		90	101	96
		180	100	95
		360	101	103
		540	95	91
		730	95	97
	Currant, fruits 0.2 mg/kg	0	-	106
		30	108	108
		90	102	99
		180	101	94
		360	102	93
		540	95	85
		730	98	90

USE PATTERNS

Thiacloprid is registered globally as an insecticide and is used for foliar treatment on a wide variety of crops. The information available to the Meeting on registered uses relevant to the supervised field data is summarised in Table 25. It is based on the labels or translation of labels provided by the manufacture.

Additional uses were also submitted by the Queensland Government Department of Primary Industries and Fisheries, Australia.

Table 25. Registered uses of thiacloprid.

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Almond	United Kingdom	SC, 48	0.18	0.018	2	
American upland	Israel	SC, 48	0.19	0.095 - 0.19	1	21
Apple	Argentina	SC, 48	0.072 – 0.084 kg ai/m canopy height	0.004 - 0.006 per m canopy height	2	14
Apple	Belgium	SC, 48	0.06 per m canopy height	0.004 - 0.006 per m canopy height	2	14
Apple	Chile	SC, 48		0.0096	2	1
Apple	Croatia	SC, 48		0.0096	2	14
Apple	Cyprus	SC, 48		0.0096 - 0.014	2	14
Apple	Czech Republic	SC, 48	0.04 - 0.06 per m canopy height	0.004 - 0.006 per m canopy height	2	14
Apple	Estonia	SC, 48	0.072 - 0.096	0.00960 - 0.019	1	14
Apple	Georgia	SC, 48	0.096 - 0.14			
Apple	Greece	SC, 48	0.096 - 0.18	0.0096 - 0.012	2	14
Apple	Hungary	SC, 48		0.014	3	14
Apple	Israel	SC, 48	0.2	0.01	2	3
Apple	Italy	SC, 48	0.18	0.012	2	14
Apple	Japan	WG, 30	(1.05)	0.015	3	7
Apple	Latvia	SC, 48		0.072 - 0.096	2	14
Apple	Lithuania	SC, 48		0.048 - 0.096	3	14
Apple	Mexico	SC, 48	Min. 0.14	0.014		30
Apple	Morocco	SC, 48	(0.014)	0.0067		14
Apple	Netherlands	SC, 48	0.12	0.012	2	14
Apple	New Zealand	SC, 48	0.17	0.029	2	42
Apple	Poland	SC, 48	0.096	0.013 - 0.019	1	14
Apple	Portugal	SC. 48	0.096	0.0096	2	14
Apple	Romania	SC, 48	0.144	0.0096		
Apple	Russia	SC, 48		0.014	2	28
Apple	Slovakia	SC, 48	0.096	(0.0096)	2	14
Apple	Slovenia	SC, 48	0.144	0.0096	2	14
Apple	South Africa	SC, 48		0.0072	4	14
Apple	South Korea	SC, 10		0.0005	5	21
Apple	Spain	SC, 48	(0.18)	0.0096	2	14
Apple	Tunisia	SC, 48		0.0096	3	30
Apple	Turkey	SC, 48		0.0096		14
Apple	United Kingdom	SC, 48	0.18	0.012 - 0.018	2	14
Apricot	Australia	SC, 48	0.27	0.018	3	14
Apricot	Cyprus	SC, 48		0.0096	2	14
Apricot	Germany	SC, 48	0.048 per m canopy height	0.0032	1	21
Apricot	Italy	SC, 48	0.18	0.012		14
Apricot	Slovenia	SC, 48	0.18	0.012	2	14
Apricot	Spain	SC, 48		0.014	2	14
Aubergine	Brazil	SC, 48	0.096	(0.0096)		7
Aubergine	Cyprus	SC, 48		0.014	3	3
Aubergine	Greece	SC, 48	0.216	0.014	2	3
Aubergine	Italy	SC, 48	0.14	0.014		3

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Aubergine	Japan	WG, 30	0.23	0.0075	3	1
Aubergine	Kenya	SC, 48	0.19	(0.019)	4	3
Aubergine	Netherlands (greenhouse use)	SC, 48		0.012	4	1
Aubergine	Netherlands (greenhouse use, drip irrigation)	SC, 48	0.12		1	3
Aubergine	Slovenia	SC, 48	0.21	0.014	2	3
Aubergine	South Korea	SC, 10		0.00025	3	3
Aubergine	Spain	SC, 48		0.014	3	3
Aubergine	United Kingdom	SC, 48	0.22	max. 0.022	3	3
Barley	Romania	SC, 48	0.048	0.012 - 0.016	1	
Bell Pepper	Tunisia	SC, 48		0.014	2	3
Berries	Switzerland	SC, 48	0.096	0.0096	2	21
Bilberry	Netherlands	SC, 48	0.14	0.012	2	3
Bilberry	United Kingdom	SC, 48	0.12	0.024	3	3
Black currants	Latvia	SC, 48	0.072	(0.019)	2	14
Blackberry	Germany	SC, 48	0.096	0.0096	2	14
Blackberry	Netherlands	SC, 48	0.14	0.012	2	3
Blackberry	Poland	SC, 48	0.072	0.0096	2	5
Blackberry	United Kingdom	SC, 48	0.12	0.024	3	3
Blueberry	Germany	SC, 48	0.096	0.0096	2	14
Blueberry	Netherlands	SC, 48	0.14	0.012	2	3
Blueberry	United Kingdom	SC, 48	0.12	0.024	3	3
Cherry	Australia	SC, 48	0.27	0.018	3	14
Cherry	Croatia	SC, 48	0.096	0.0048	2	14
Cherry	Cyprus	SC, 48		0.0096	2	14
Cherry	Czech Republic	SC, 48	0.096	0.0096	2	14
Cherry	Germany	SC, 48	0.048 per m canopy height	0.0032	2	14
Cherry	Hungary	SC, 48		0.0067	3	14
Cherry	Japan	WG, 30	(1.05)	0.015	2	1
Cherry	Netherlands	SC, 48	0.12	0.012	2	14
Cherry	Poland	SC, 48	0.096	0.013 - 0.019	1	14
Cherry	Poland	SC, 49	0.048	0.007 - 0.01	1	14
Cherry	Romania	SC, 48	0.096	0.0096	2	14
Cherry	Slovakia	SC, 48	0.096			14
Cherry	Slovenia	SC, 48	0.18	0.012	2	14
Cherry	Turkey	SC, 48		0.0096		14
Cherry	United Kingdom	SC, 48	0.15	0.015	2	14
Chestnut	United Kingdom	SC, 48	0.18	0.018	2	
Chili	Belize	SC, 10	0.1	(0.02)		21
Chili	Costa Rica	SC, 10	0.1	(0.02)		21
Chili	Dom. Republic	SC, 10	0.1	(0.02)		21
Chili	El Salvador	SC, 10	0.1	(0.02)		21
Chili	Guatemala	SC, 10	0.1	(0.02)		21
Chili	Honduras	SC, 10	0.1	(0.02)		21
Chili	Kenya	SC, 48	0.19	(0.019)	4	3
Chili	Netherlands (greenhouse use)	SC, 48		0.012	4	1
Chili	Netherlands (greenhouse use, drip irrigation)	SC, 48	0.12		1	3
Chili	Nicaragua	SC, 10	0.1	(0.02)		21
Chili	Panama	SC, 10	0.1	(0.02)		21
Citrus	Brazil	SC, 48		0.0048		21
Citrus	Georgia	SC, 48	0.19 – 0.24			
Citrus	South Africa	SC. 48		0.0067		
Citrus	South Korea	SC, 10		0.0024	3	14
Cotton	Argentina	SC, 48	0.096		1	
Cotton	Belize	SC, 10	0.1	(0.02)		21
Cotton	Brazil	SC, 48	0.096	0.096	1	28

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Cotton	Costa Rica	SC, 10	0.1	(0.02)		21
Cotton	Dom. Republic	SC, 10	0.1	(0.02)		21
Cotton	El Salvador	SC, 10	0.1	(0.02)		21
Cotton	Greece	SC, 48	0.072	0.01	2	21
Cotton	Guatemala	SC, 10	0.1	(0.02)		21
Cotton	Honduras	SC, 10	0.1	(0.02)		21
Cotton	India	SC, 24	0.14	0.024		52
Cotton	Israel	SC, 48	0.19	0.095 - 0.19	1	21
Cotton	Mexico	SC, 48	0.072		1	14
Cotton	Nicaragua	SC, 10	0.1	(0.02)		21
Cotton	Panama	SC, 10	0.1	(0.02)		21
Cotton	Peru	SC, 48	(0.096)	0.024		
Cotton	Spain	SC, 48	0.096		3	21
Cotton	Turkey	SC, 48	0.12			28
Cotton	USA	WG, 70	0.1		6	14
Cotton	USA	SC, 48	0.089		6	14
Courgette	Greece	SC, 48	0.21	0.014	2	3
Courgette	Italy	SC, 48	0.14	0.014	2	3
Courgette	Kenya	SC, 48	0.19	0.019	3	3
Courgette	Netherlands	SC, 48		0.012	4	1
Courgette	Slovenia	SC 48	0.21	0.014	2	3
Courgette	Spain	SC, 48		0.014	3	3
Courgette	United Kingdom	SC, 48	0.22	min. 0.022	3	3
Cranberry	Netherlands	SC, 48	0.14	0.012	2	3
Cranberry	United Kingdom	SC, 48	0.12	0.024	3	3
Cucumber	Belize	SC, 10	0.1	(0.02)		21
Cucumber	Brazil	SC, 48	0.096	0.0048		7
Cucumber	Costa Rica	SC, 10	0.1	(0.02)		21
Cucumber	Croatia	SC, 48	0.14		2	4
Cucumber	Cyprus	SC, 48		0.014	3	3
Cucumber	Dom. Republic	SC, 10	0.1	(0.02)		21
Cucumber	El Salvador	SC, 10	0.1	(0.02)		21
Cucumber	Georgia	SC, 48	0.15			
Cucumber	Greece	SC, 48	0.14	0.0096	2	3
Cucumber	Guatemala	SC, 10	0.1	(0.02)		21
Cucumber	Honduras	SC, 10	0.1	(0.02)		21
Cucumber	Italy	SC, 48	0.14	0.014	2	3
Cucumber	Kenya	SC, 48	0.19	0.019	3	3
Cucumber	Netherlands	SC, 48	0.12	0.012	4	1
Cucumber	Nicaragua	SC, 10	0.1	(0.02)		21
Cucumber	Panama	SC, 10	0.1	(0.02)		21
Cucumber	Slovakia	SC, 48		0.014		3
Cucumber	Slovenia	SC, 48	0.21	0.014	2	3
Cucumber	South Korea	SC, 10		0.0005	3	3
Cucumber	Spain	SC, 48		0.014	3	3
Cucumber	United Kingdom	SC, 48	0.22	min. 0.022	3	3
Currants	Germany	SC, 48	0.096	0.0096	1	21
Currants	Netherlands	SC, 48	0.14	0.012	2	3
Currants	United Kingdom	SC, 48	0.12	0.024	3	3
Garlic	Belize	SC, 10	0.1	(0.02)		21
Garlic	Brazil	SC, 48	(0.077)	0.0096		21
Garlic	Costa Rica	SC, 10	0.1	(0.02)		21
Garlic	Dom. Republic	SC, 10	0.1	(0.02)		21
Garlic	El Salvador	SC, 10	0.1	(0.02)		21
Garlic	Guatemala	SC, 10	0.1	(0.02)		21
Garlic	Honduras	SC, 10	0.1	(0.02)		21
Garlic	Nicaragua	SC, 10	0.1	(0.02)		21
Garlic	Panama	SC, 10	0.1	(0.02)		21
Gherkin	Greece	SC, 48	0.21	0.014	2	3
Gherkin	Netherlands	SC, 48		0.012	4	1
Gooseberry	Germany	SC, 48	0.096	0.0096	1	21
Gooseberry	Latvia	SC, 48	0.072	(0.019)	2	14

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Gooseberry	Netherlands	SC, 48	0.14	0.012	2	3
Gooseberry	United Kingdom	SC, 48	0.12	0.024	3	3
Grains	Latvia	SC, 48	0.1		2	14
Grape	Japan	WG, 30	0.53	0.0075	2	21
Green Pepper	Japan	WG, 30	0.23	0.0075	3	1
Hazelnut	Germany	SC, 48	0.096	0.0096	2	
Hazelnut	Turkey	SC, 48		0.012		21
Hazelnut	United Kingdom	SC, 48	0.18	0.018	2	
Japan Apricot	Japan	WG, 30	0.53	0.0075	2	7
Japan pear	Japan	WG, 30	(1.05)	0.015	3	7
Kiwi	New Zealand	SC, 48		0.0096	2	pre-flowering app.
Loganberry	Netherlands	SC, 48	0.14	0.012	2	3
Maize	Belize	SE, 11	0.1	(0.02)		21
Maize	Costa Rica	SE, 11	0.1	(0.02)		21
Maize	Dom. Republic	SE, 11	0.1	(0.02)		21
Maize	El Salvador	SE, 11	0.1	(0.02)		21
Maize	Guatemala	SE, 11	0.1	(0.02)		21
Maize	Honduras	SE, 11	0.1	(0.02)		21
Maize	Nicaragua	SE, 11	0.1	(0.02)		21
Maize	Panama	SE, 11	0.1	(0.02)		21
Maize	Romania	SC, 48	0.048	0.012 - 0.016	1	
Mandarin	Croatia	SC, 48		0.038	2	21
Mandarin	Peru	SC, 48		0.014 – 0.024	1	
Marrow	Spain	SC, 48		0.0067	3	3
Melon	Belize	SC, 10	0.1	(0.02)		21
Melon	Brazil	SC, 48	0.096	0.0048		7
Melon	Costa Rica	SC, 10	0.1	(0.02)		21
Melon	Croatia	SC, 48	0.14		2	4
Melon	Dom. Republic	SC, 10	0.1	(0.02)		21
Melon	El Salvador	SC, 10	0.1	(0.02)		21
Melon	Greece	SC, 48	0.21	0.014	2	3
Melon	Guatemala	SC, 10	0.1	(0.02)		21
Melon	Honduras	SC, 10	0.1	(0.02)		21
Melon	Israel	SC, 48	0.19	0.026 - 0.128	2	10
Melon	Italy	SC, 48	0.14	0.014	2	3
Melon	Japan	WG, 30	0.45	0.015	3	1
Melon	Kenya	SC, 48	0.19	0.019	3	3
Melon	Nicaragua	SC, 10	0.1	(0.02)		21
Melon	Panama	SC, 10	0.1	(0.02)		21
Melon	Spain	SC, 48	0.14	0.0067	3	3
Mirabelle	United Kingdom	SC, 48	0.15	0.015	2	14
Nectarine	Argentina	SC, 48		0.0096	2	14
Nectarine	Australia	SC, 48	0.27	0.018	3	14
Nectarine	Chile	SC, 48		0.0096	2	1
Nectarine	Cyprus	SC, 48		0.0096	2	14
Nectarine	Greece	SC, 48	0.108	0.0072	2	14
Nectarine	Israel	SC, 48	0.2	0.01	1	30
Nectarine	South Africa	SC, 48		0.0034	3	60
Nectarine	Spain	SC, 48		0.014	2	14
Oats	Romania	SC, 48	0.048	0.012 - 0.016	1	
Oilseed rape	Czech Republic	SC, 48	0.096	0.016 - 0.048	2	
Oilseed rape	Hungary	SC, 48	0.048	0.012 - 0.018		30
Oilseed rape	Romania	SC, 48	0.048	0.012 - 0.018	1	
Oilseed rape	Slovakia	SC, 48	0.096			
Oilseed rape	Switzerland	SC, 48	0.096		2	21
Oilseed rape	United Kingdom	OD, 24	0.14	0.035 - 0.07	1	30
Onion	Belize	SC, 10	0.1	(0.02)		21
Onion	Brazil	SC, 48	(0.077)	0.0096		21
Onion	Costa Rica	SC, 10	0.1	(0.02)		21
Onion	Dom. Republic	SC, 10	0.1	(0.02)		21
Onion	El Salvador	SC, 10	0.1	(0.02)		21

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Onion	Guatemala	SC, 10	0.1	(0.02)		21
Onion	Honduras	SC, 10	0.1	(0.02)		21
Onion	Nicaragua	SC, 10	0.1	(0.02)		21
Onion	Panama	SC, 10	0.1	(0.02)		21
Orange	Croatia	SC, 48		0.038	2	21
Paddy rice	India	SC, 24	0.12	0.024		30
Peach	Argentina	SC, 48		0.0096	2	14
Peach	Australia	SC, 48	0.27	0.018	3	21
Peach	Chile	SC, 48		0.0096	2	1
Peach	Croatia	SC, 48	0.096	0.0048	2	21
Peach	Cyprus	SC, 48		0.0096	2	14
Peach	Germany	SC, 48	0.048 per m canopy height	0.0032	1	21
Peach	Greece	SC, 48	0.108	0.0072	2	14
Peach	Israel	SC, 48	0.2	0.01	1	30
Peach	Italy	SC, 48	0.18	0.012		14
Peach	Japan	WG, 30	(1.05)	0.015	3	7
Peach	Slovenia	SC, 48	0.18	0.012	2	14
Peach	South Africa	SC, 48		0.0034	3	60
Peach	South Korea	SC, 10		0.0005	3	14
Peach	Spain	SC, 48		0.014	2	14
Peach	Turkey	SC, 48		0.0096		14
Pear	Argentina	SC, 48	0.072 – 0.084 kg ai/m canopy height	0.004 - 0.006 per m canopy height	2	14
Pear	Belgium	SC, 48	0.06 per m canopy height	0.004 - 0.006 per m canopy height	2	14
Pear	Chile	SC, 48		0.0096	2	1
Pear	Estonia	SC, 48	0.072 - 0.096	0.00960 - 0.019	1	14
Pear	Greece	SC, 48	0.096 - 0.18	0.0096 - 0.012	2	14
Pear	Italy	SC, 48	0.18	0.012	2	14
Pear	Japan	WG, 30	1.05	0.015	3	7
Pear	Latvia	SC, 48		0.072 - 0.096	2	14
Pear	Netherlands	SC, 48	0.12	0.12	2	14
Pear	Portugal	SC. 48	0.096	0.0096	2	14
Pear	South Africa	SC, 48		0.0072	4	14
Pear	South Korea	SC, 10		0.0005	5	21
Pear	Spain	SC, 48	(0.18)	0.0096	2	14
Pepper	Belize	SC, 10	0.1	(0.02)		21
Pepper	Brazil	SC, 48	0.096	0.0096		7
Pepper	Costa Rica	SC, 10	0.1	(0.02)		21
Pepper	Croatia	SC, 48	0.14	0.014	2	7
Pepper	Cyprus	SC, 48		0.014	3	3
Pepper	Dom. Republic	SC, 10	0.1	(0.02)		21
Pepper	El Salvador	SC, 10	0.1	(0.02)		21
Pepper	Greece	SC, 48	0.216	0.014	2	3
Pepper	Guatemala	SC, 10	0.1	(0.02)		21
Pepper	Honduras	SC, 10	0.1	(0.02)		21
Pepper	Italy	SC, 48	0.14	0.014		3
Pepper	Kenya	SC, 48	0.19	0.019	3	3
Pepper	Netherlands (greenhouse use)	SC, 48	0.12	0.012	4	1
Pepper	Netherlands (greenhouse use, drip irrigation)	SC, 48	0.0096 kg ai per 1000 plants		1	3
Pepper	Nicaragua	SC, 10	0.1	(0.02)		21
Pepper	Panama	SC, 10	0.1	(0.02)		21
Pepper	Slovakia	Sc, 48		0.014		3
Pepper	Slovenia	SC, 48	0.21	0.014	2	3
Pepper	Spain	SC, 48		0.014	3	3
Pepper	United Kingdom	SC, 48	0.22	max. 0.022	3	3
Pistachio	Turkey	SC, 48		0.012		21

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Plum	Argentina	SC, 48		0.0096	2	14
Plum	Australia	SC, 48	0.27	0.018	3	14
Plum	Chile	SC, 48		0.0096	2	1
Plum	Croatia	SC, 48	0.096	0.0048	2	14
Plum	Czech Republic	SC, 48	0.12	0.012	2	14
Plum	Germany	SC, 48	0.048 per m canopy height	0.0032	2	14
Plum	Japan	WG, 30	0.53	0.0075	3	7
Plum	Netherlands	SC, 48	0.12	0.012	2	14
Plum	Poland	SC, 48	0.096	0.013 - 0.019	1	14
Plum	Romania	SC, 48	0.096	0.0096	2	14
Plum	Slovakia	SC, 48	0.096			14
Plum	United Kingdom	SC, 48	0.144	0.014	3	14
Pome fruit	Australia	SC, 48	0.27	0.018	3	14
Pome fruit	Austria	SC, 48		0.01 – 0.012	1-2	14
Pome fruit	Germany	SC, 48	0.048 per m canopy height		2	14
Pome fruit	Switzerland	SC, 48	(0.19)	0.0192	2	21
Pome fruit	USA	SC, 40	0.28	0.01	6	30
Potato	Argentina	SC, 48	0.072		min. 1	7
Potato	Austria	SC, 48	0.096	0.019 - 0.048	2	21
Potato	Belize	SC, 10	0.1	(0.02)		21
Potato	Brazil	SC, 48	0.048			21
Potato	Costa Rica	SC, 10	0.1	(0.02)		21
Potato	Croatia	SC, 48	0.048		2	14
Potato	Cyprus	SC, 48		0.0096	1	21
Potato	Czech Republic	SC, 48	0.048	0.0096 - 0.016	2	21
Potato	Dom. Republic	SC, 10	0.1	(0.02)		21
Potato	El Salvador	SC, 10	0.1	(0.02)		21
Potato	Estonia	SC, 48	0.048	0.096 - 0.024	1	21
Potato	Georgia	SC, 48	0.04			
Potato	Greece	SC, 48	0.072	0.005 - 0.014	2	21
Potato	Guatemala	SC, 10	0.1	0(0.02)		21
Potato	Honduras	SC, 10	0.1	(0.02)		21
Potato	Hungary	SC, 48	0.048	0.012		7
Potato	Israel	SC, 48	0.096	0.0048 - 0.0096	1	21
Potato	Japan	WG, 30	(0.23)	0.0075	3	7
Potato	Latvia	SC, 48	0.048		3	21
Potato	Lithuania	SC, 48	0.024 – 0.048	0.006 – 0.024	3	21
Potato	Mexico	SC, 48	0.096			7
Potato	Netherlands	SC, 48	0.12		3	14
Potato	Nicaragua	SC, 10	0.1	(0.02)		21
Potato	Panama	SC, 10	0.1	(0.02)		21
Potato	Poland	SC, 48	0.048	0.012	1	3
Potato	Portugal	SC, 48	0.072	0.009	2	21
Potato	Romania	SC, 48	0.077		2	
Potato	Slovakia	SC, 48	0.048	0.012	2	14
Potato	Slovenia	SC, 48	0.048	(0.006 - 0.0096)	2	21
Potato	South Korea	SC, 10		0.00075	3	21
Potato	Spain	SC, 48	0.096		3	21
Potato	Switzerland	SC, 48	0.048		3	21
Potato (seed)	United Kingdom	OD, 24	0.096	0.024 – 0.048	2	14
Potato (ware)	United Kingdom	OD, 24	0.096	0.024 – 0.048	1	14
Raspberry	Germany	SC, 48	0.096	0.0096	2	14
Raspberry	Netherlands	SC, 48	0.14	0.012	2	3
Raspberry and rubus hybrids	United Kingdom	SC, 48	0.12	0.024	3	3
Red currants	Latvia	SC, 48	0.072	(0.019)	2	14
Red Pepper	South Korea	SC, 10		0.0005	3	3
Rice	Belize	SE, 11	0.1	(0.02)		21
Rice	Costa Rica	SE, 11	0.1	(0.02)		21
Rice	Dom. Republic	SE, 11	0.1	(0.02)		21

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Rice	El Salvador	SE, 11	0.1	(0.02)		21
Rice	Guatemala	SE, 11	0.1	(0.02)		21
Rice	Honduras	SE, 11	0.1	(0.02)		21
Rice	Indonesia	SC, 24	0.14	0.028		
Rice	Nicaragua	SE, 11	0.1	(0.02)		21
Rice	Panama	SE, 11	0.1	(0.02)		21
Rice	South Korea	GR, 1	0.5 g/box		1	
Rice	Thailand	SC, 24		0.018		14
Rice (nursery box)	Japan	GR, 1,5	50 g/box = 0.15 kg ai/ha		1	
Squash	Cyprus (field and greenhouse use)	SC, 48		0.014	3	3
Squash	Netherlands	SC, 48		0.012	4	1
Stone fruit	Argentina	SC, 48		0.0096	2	14
Stone fruit	Australia	SC, 48	0.27	0.018	3	14
Stone fruit	Chile	SC, 48		0.0096	2	1
Stone fruit	Czech Republic	SC, 48	0.096	0.0096	2	14
Stone fruit	Switzerland	SC, 48		0.0058	2	21
Stone fruit	Tunisia	SC, 48		0.0096		30
Strawberry	Japan	WG, 30	0.23	0.0075	3	1
Strawberry	Latvia	SC, 48	0.096	(0.024)	2	14
Strawberry	Netherlands	SC, 48	0.14	0.012	2	3
Strawberry	Netherlands (greenhouse use)	SC, 48	0.14	0.012	2	1
Strawberry	United Kingdom	Sc, 48	0.12	0.024	2	3
Strawberry	United Kingdom (greenhouse use)	Sc, 48	0.12	0.024	2	3
Sunflower	Hungary	SC, 48	0.036	0.008 - 0.012		30
Sunflower	Slovakia	SC, 48	0.048			
Sweet Corn	Israel	SC, 48	0.096	0.013 - 0.064	2	3
Sweet Pepper	Japan	WG, 30	0.23	0.0075	3	1
Sweet Pepper	Tunisia	SC, 48		0.014	2	3
Tayberry	Netherlands	SC, 48	0.14	0.012	2	3
Tea	Japan	WG, 30	0.6	0.015	1	7
Tomato	Argentina	SC, 48	0.144		min. 1	3
Tomato	Belize	SC, 10	0.1	(0.02)		21
Tomato	Brazil	SC, 48	0.096	(0.0096)		7
Tomato	Costa Rica	SC, 10	0.1	(0.02)		21
Tomato	Croatia	SC, 48	0.14	0.014	2	4
Tomato	Cyprus	SC, 48		0.014	3	3
Tomato	Dom. Republic	SC, 10	0.1	(0.02)		21
Tomato	El Salvador	SC, 10	0.1	(0.02)		21
Tomato	Greece	SC, 48	0.216	0.014	2	3
Tomato	Guatemala	SC, 10	0.1	(0.02)		21
Tomato	Honduras	SC, 10	0.1	(0.02)		21
Tomato	Israel	SC, 48	0.192			3
Tomato	Italy	SC, 48	0.14	0.014		3
Tomato	Japan	WG, 30	0.23	0.015	3	1
Tomato	Kenya	SC, 48	0.19	(0.019)	4	3
Tomato	Morocco	SC, 48		0.014		3
Tomato	Netherlands (greenhouse use)	SC, 48	0.12	0.012	4	1
Tomato	Netherlands (greenhouse use, drip irrigation)	SC, 48	0.0096 kg ai per 1000 plants		1	3
Tomato	Nicaragua	SC, 10	0.1	(0.02)		21
Tomato	Panama	SC, 10	0.1	(0.02)		21
Tomato	Peru	SC, 48		0.036		3
Tomato	Slovakia	SC, 48		0.014		3
Tomato	Slovenia	SC, 48	0.21	0.014	2	3
Tomato	Spain	SC, 48		0.014	3	3
Tomato	Tunisia	SC, 48		0.014	2	3

Crop	Country	Formulation, ai %	Application rate		No. Per season	PHI (days)
			kg ai/ha	kg ai/hL		
Tomato	Turkey	SC, 48		0.0096		3
Tomato	United Kingdom	SC, 48	0.22	max. 0.022	3	3
Tree nuts	Italy	SC, 48	0.18	0.012		14
Walnut	Argentina	SC, 48		0.0096	2	21
Walnut	Chile	SC, 48		0.0096	2	1
Walnut	Italy	SC, 48	0.18	0.012		14
Walnut	United Kingdom	SC, 48	0.18	0.018	2	
Watermelon	Belize	SC, 10	0.1	(0.02)		21
Watermelon	Brazil	Sc, 48	0.096			21
Watermelon	Costa Rica	SC, 10	0.1	(0.02)		21
Watermelon	Cyprus	SC, 48		0.014	3	3
Watermelon	Dom. Republic	SC, 10	0.1	(0.02)		21
Watermelon	El Salvador	SC, 10	0.1	(0.02)		21
Watermelon	Guatemala	SC, 10	0.1	(0.02)		21
Watermelon	Honduras	SC, 10	0.1	(0.02)		21
Watermelon	Japan	WG, 30	0.45	0.0075	3	1
Watermelon	Kenya	SC, 48	0.19	0.019	3	3
Watermelon	Nicaragua	SC, 10	0.1	(0.02)		21
Watermelon	Panama	SC, 10	0.1	(0.02)		21
Watermelon	South Korea	SC, 10		0.0005	3	3
Watermelon	Spain	SC, 48	0.14	0.0067	3	3
Wheat	Romania	SC, 48	0.048	0.012 - 0.016	1	
White mustard	Czech Republic	SC, 48	0.096	0.016 - 0.048	2	
Winter wheat	Lithuania	SC, 48	0.034		3	21
Wintersquash	Israel	SC, 48	0.19	0.026 - 0.128	2	10

Values in parenthesis are calculated from the spray volume

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The Meeting received information on thiacloprid supervised trials on the following crops (Table 26).

Trials were well documented with laboratory and field reports. The former included method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analysis or duration of sample storage were also provided. Although trials included control plots, no control data are recorded in the Tables because no residues in control samples exceeded the LOQ. Residues are unadjusted for recoveries.

When residues were not detected they are shown as below the LOQ (e.g. < 0.01 mg/kg). Residues, application rates and spray concentrations have generally been rounded to two significant figures or, for residues near the LOQ, to one significant figure. Residues from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels. These results are double underlined.

Periods of freezer storage between sampling and analysis were recorded for all trials and were covered by the periods of the freezer storage stability studies.

Table 26. Overview of supervised residue trials.

Commodity	Application	Country	Table no.
Citrus	Foliar	Brazil, New Zealand, South Africa	Table 27
Apple	Foliar	Australia, Belgium, France, Germany, Italy, Japan, Netherlands, South Africa, Spain, United Kingdom, USA	Table 28
Pear	Foliar	Australia, Japan, South Africa, USA	Table 29
Apricot, Japanese	Foliar	Japan	Table 30
Peach	Foliar	France, Italy, Japan, Spain	Table 31
Cherry	Foliar	Belgium, France, Germany, Italy, Japan, Spain, USA	Table 32
Plum	Foliar	France, Germany, Japan, Spain, USA	Table 33

Grapes	Foliar (glasshouse use)	Japan	Table 34
Strawberries	Foliar (field use)	Belgium, France, Germany, United Kingdom	Table 35
Strawberries	Foliar (greenhouse use)	France, Germany, Italy, Japan, Netherlands, Spain	Table 36
Currants	Foliar	Belgium, Germany, United Kingdom	Table 37
Raspberries	Foliar	Germany, United Kingdom	Table 38
Kiwi fruits	Foliar	New Zealand	Table 39
Onions	Foliar	Brazil. Germany	Table 40
Garlic	Foliar	Brazil	Table 41
Eggplants	Foliar (glasshouse use)	Japan	Table 42
Cucumbers	Foliar (field use)	Germany, Italy, Spain	Table 43
Cucumbers	Foliar (greenhouse use)	Belgium, France, Germany, Greece, Italy, Netherlands, Spain	Table 44
Melons	Foliar (field use)	France, Greece, Italy	Table 45
Melons	Foliar (glasshouse use)	Japan	Table 46
Watermelons	Foliar (field use)	Greece, Spain	Table 47
Watermelons	Foliar (glasshouse use)	Japan	Table 48
Tomato	Foliar (field use)	France, Italy	Table 49
Tomato	Foliar (greenhouse use)	France, Germany, Japan, Spain	Table 50
Tomato	Drip application (greenhouse use)	Belgium, Netherlands	Table 51
Pepper	Foliar (field use)	France, Italy, Spain	Table 52
Pepper	Foliar (greenhouse use)	France, Netherlands, Japan, Spain	Table 53
Pepper	Drip application (greenhouse use)	Belgium, Netherlands	Table 54
Potato	Foliar	Belgium, Brazil, France, Germany, Italy, Japan, Spain, United Kingdom	Table 55
Wheat	Foliar	France, Germany	Table 56
Barley	Foliar	France, Germany	Table 57
Rice	Foliar	India	Table 58
Rice	Granular	Japan	Table 59
Maize	Foliar	France, Germany, Greece, Italy, Spain	Table 60
Walnuts	Foliar	Italy	Table 61
Almonds	Foliar	USA	Table 62
Pecan	Foliar	USA	Table 63
Oilseed rape	Foliar	France, Germany, Hungary, Spain, Sweden	Table 64
Cotton	Foliar	Greece, Spain, USA	Table 65[1]
Sunflowers	Foliar	Hungary	Table 66
Green tea	Foliar	Japan	Table 67

[1] Single underlined values were used for the evaluation of rape forage. Double underlined values were used for the evaluation of rape seed and white mustard.

Citrus fruits

Table 27. Thiacloprid residues resulting from foliar application to citrus.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Brazil, Riberao Preto/SP 1998 (Pera Rio)	480 SC	0.096	0.0048	3	Lemon, peel Lemon, pulp	21 21	0.02 < 0.02	Lancas, F. M. 1998, 1998a M-005338-01-2 and M-005340-01-2
Brazil, Riberao Preto/SP 1998 (Pera Rio)	480 SC	0.19	0.0096	3	Lemon, peel Lemon, pulp	21 21	0.06 0.04	Lancas, F. M. 1998, 1998a M-005338-01-2 and M-005340-01-2

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
New Zealand Kerikeri 2002 (Yen Ben)	480 SC	0.19	0.0096	1	Lemon, whole fruit	1 3 5 7 10 14	0.19 0.2 0.1 0.14 0.15 0.07	Clay, S. 2002 M-261169-01-1
South Africa Vaalwater, Northern Province 1999 (Navel)	480 SC	0.00043	0.014	1	Orange, whole fruit Orange, peel Orange, pulp	44 93 123 151 190 93 123 151 190	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Zyl, P. F. C. van 2000a M-048686-02-1
South Africa Vaalwater, Northern Province 1999 (Navel)	480 SC	0.00086	0.029	1	Orange, whole fruit Orange, peel Orange, pulp	44 93 123 151 190 93 123 151 190	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Zyl, P. F. C. van 2000a M-048686-02-1

Pome fruits

Table 28. Thiacloprid residues resulting from foliar application to apples.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
United Kingdom Thurston 1995 (Gloster 69)	480 SC	0.14 – 0.15	0.0096	2	Fruit	0[1] 0 7 10 14 22	< 0.02 0.03 0.05 0.03 0.04 0.04	Placke, F. J. 1997a RA-2062/95
Belgium Kortenaken 1995 (Jonagold)	480 SC	0.14 – 0.15	0.0096	2	Fruit	0[1] 0 7 14 21	0.04 0.18 0.17 0.12 0.09	Placke, F. J. 1997a RA-2062/95
Germany Burscheid 1995 (Jonagold)	480 SC	0.14	0.0096	2	Fruit	0[1] 0 7 10 14 21	0.04 0.16 0.09 0.06 0.07 0.04	Placke, F. J. 1997a RA-2062/95
Germany Monheim 1995 (Golden Delicious)	480 SC	0.14	0.029	2	Fruit	0[1] 0 7 10 14 21	0.04 0.25 < 0.02 0.09 0.07 0.05	Placke, F. J. 1997a RA-2062/95
United Kingdom Bury St. Edmunds 1996 (Golden Delicious)	480 SC	0.18	0.012	2	Fruit	0 14	0.26, 0.28 (0.27) 0.15, 0.16 (0.16)	Placke, F. J. 1997b RA-2114/96

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Netherlands Kruisland 1996 (Jonagold)	480 SC	0.18	0.012	2	Fruit	0 14	0.11 0.05	Placke, F. J. 1997b RA-2114/96
Germany Burscheid 1996 (Elstar)	480 SC	0.18	0.012	2	Fruit	0 13	0.23 0.11	Placke, F. J. 1997b RA-2114/96
Germany Monheim 1996 (Golden Delicious)	480 SC	0.14	0.036	2	Fruit	0 14	0.23 0.11	Placke, F. J. 1997b RA-2114/96
France Bossay 2000 (Reine des Reinettes)	480 SC	0.18	0.012	2	Fruit	0 14	0.19 0.21	Schoening, R. 2001a M-080245-01-1
France Azay le Rideau 2000 (Golden)	480 SC	0.18	0.012	2	Fruit	0 14	0.11 0.1	Schoening, R. 2001a M-080245-01-1
Spain Pere Pescador 1995 (Starking)	480 SC	0.14	0.0096	2	Fruit	0[1] 0 7 10 14 21	0.05 0.15 0.11 0.09 0.08 0.07	Placke, F. J. 1997c M-000919-01-1
Italy Laives 1995 (Golden Delicious)	480 SC	0.14	0.0096	2	Fruit	0[1] 0 7 10 14 21	0.03 0.15 0.03 0.03 0.02 0.02	Placke, F. J. 1997c M-000919-01-1
Italy Laives 1995 (Granny Smith)	480 SC	0.14	0.0096	2	Fruit	0[1] 0 7 10 14 21	0.02 0.12 0.13 0.15 0.1 0.08	Placke, F. J. 1997c M-000919-01-1
Spain Pere Pescador 1995 (Golden)	480 SC	0.14	0.0096	2	Fruit	0[1] 0 7 10 14 21	0.05 0.15 0.13 0.13 0.11 0.1	Placke, F. J. 1997c M-000919-01-1
Spain Pere Pescador 1995 (Suprema)	480 SC	0.18	0.012	2	Fruit	0 14	0.19 0.14	Placke, F. J. 1997d M-000913-01-1
Italy Pineta di Laives 1996 (Stark Delicious)	480 SC	0.18	0.012	2	Fruit	0 14	0.14 0.1	Placke, F. J. 1997d M-000913-01-1
Italy Montemarzino 1996 (Golden)	480 SC	0.18	0.012	2	Fruit	0 14	0.48 0.36	Placke, F. J. 1997d M-000913-01-1
France Roches-Prémarie-Andillé 1996 (Golden)	480 SC	0.18	0.012	2	Fruit	0 14	0.22 0.04	Placke, F. J. 1997d M-000913-01-1

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Mas Grenier 2000 (Golden)	480 SC	0.18	0.012	2	Fruit	0 14	0.3 0.13	Schoening, R. 2001b M-075119-01-1
USA Pennsylvania 1998 (Starkrimson Red Delicious)	480 SC	0.28	0.046	2	Fruit	29 46	0.06 0.07	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Starkrimson Red Delicious)	480 SC	0.28	0.0098	2	Fruit	29 46	0.11 0.08	Harbin, A.M. 1999 M-009903-01-1
USA New York 1998 (Red Delicious)	480 SC	0.28	0.037	2	Fruit	30 44	0.11 0.05	Harbin, A.M. 1999 M-009903-01-1
USA New York 1998 (Red Delicious)	480 SC	0.28	0.0075	2	Fruit	30 44	0.096 0.05	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Law Rome/MM111)	480 SC	0.28	0.048	2	Fruit	30 45	0.03 0.02	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Law Rome/MM111)	480 SC	0.28	0.0085	2	Fruit	30 45	0.04 0.03	Harbin, A.M. 1999 M-009903-01-1
USA North Carolina 1998 (Red Delicious)	480 SC	0.28	0.06	2	Fruit	31 45	0.02 0.02	Harbin, A.M. 1999 M-009903-01-1
USA North Carolina 1998 (Red Delicious)	480 SC	0.28	0.0081	2	Fruit	31 45	0.06 0.04	Harbin, A.M. 1999 M-009903-01-1
USA Illinois 1998 (Jonathon)	480 SC	0.28	0.043	2	Fruit	30 45	0.06 0.06	Harbin, A.M. 1999 M-009903-01-1
USA Illinois 1998 (Jonathon)	480 SC	0.28	0.0078	2	Fruit	30 45	0.07 0.03	Harbin, A.M. 1999 M-009903-01-1
USA Utah 1998 (Red Delicious)	480 SC	0.28	0.047	2	Fruit	29 47	0.04 0.01	Harbin, A.M. 1999 M-009903-01-1
USA Utah 1998 (Red Delicious)	480 SC	0.28	0.0074	2	Fruit	29 47	0.02 0.01	Harbin, A.M. 1999 M-009903-01-1
USA Idaho 1998 (Law Spur Rome)	480 SC	0.28	0.034	2	Fruit	30 45	0.03 0.02	Harbin, A.M. 1999 M-009903-01-1

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Idaho 1998 (Law Spur Rome)	480 SC	0.28	0.0078	2	Fruit	30 45	0.06 0.04	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Jonagold)	480 SC	0.28	0.033	2	Fruit	30 46	0.07 0.02	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Jonagold)	480 SC	0.28	0.0073	2	Fruit	30 46	0.28 0.04	Harbin, A.M. 1999 M-009903-01-1
USA Washington 1998 (Red Delicious)	480 SC	0.28	0.041	2	Fruit	30 45	0.13 0.04	Harbin, A.M. 1999 M-009903-01-1
USA Washington 1998 (Red Delicious)	480 SC	0.28	0.0077	2	Fruit	30 45	0.14 0.05	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Fuji Apple)	480 SC	0.28	0.04	2	Fruit	23 30 37 44 52	0.05 0.03 0.03 0.02 0.03	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Fuji Apple)	480 SC	0.28	0.007	2	Fruit	23 30 37 44 52	0.09 0.09 0.03 0.03 0.07	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Rome Beauty)	480 SC	0.28	0.038	2	Fruit	25 32 39 46 53	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Rome Beauty)	480 SC	0.28	0.007	2	Fruit	25 32 39 46 53	0.02 0.02 0.06 0.02 0.05	Harbin, A.M. 1999 M-009903-01-1
USA Kansas 1998 (Golden Delicious)	480 SC	0.28	0.048	2	Fruit	41	< 0.01	Harbin, A.M. 1999 M-009903-01-1
USA Kansas 1998 (Golden Delicious)	480 SC	0.28	0.0082	2	Fruit	41	0.05	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Fuji Apples)	70 WG	0.28	0.04	2	Fruit	23 30 37 44 52	0.08 0.04 0.02 0.05 0.03	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Fuji Apples)	70 WG	0.28	0.007	2	Fruit	23 30 37 44 52	0.097 0.07 0.02 0.03 0.03	Harbin, A.M. 1999 M-009903-01-1

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA California 1998 (Rome Beauty)	70 WG	0.08	0.038	2	Fruit	25 32 39 46 53	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Rome Beauty)	70 WG	0.08	0.007	2	Fruit	25 32 39 46 53	0.02 0.03 0.02 0.01 0.05	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Starkrimson Red Delicious)	70 WG	0.28	0.046	2	Fruit	29 46	0.07 0.08	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Starkrimson Red Delicious)	70 WG	0.28	0.0098	2	Fruit	29 46	0.09 0.09	Harbin, A.M. 1999 M-009903-01-1
South Africa Villiersdorp 2000 (Golden Delicious)	480 SC	0.24	0.0096	4	Fruit	0[1] 0 14	0.32, 0.31 (0.32) 0.68, 0.67 (0.68) 0.54, 0.54 (0.54)	Zyl, P. F. C. van 2000b 5438/1493281/T392
South Africa Villiersdorp 2000 (Granny Smith)	480 SC	0.24	0.0096	4	Fruit	0[1] 0 14	0.23, 0.26 (0.25) 0.73, 0.76 (0.75) 0.43, 0.43 (0.43)	Zyl, P. F. C. van 2000c 5438/1493257/T389
South Africa Villiersdorp 2000 (Royal Galaxy)	480 SC	0.19	0.0096	4	Fruit	0[1] 0 14	0.06, 0.06 (0.06) 0.48, 0.45 (0.47) 0.15, 0.14 (0.15)	Garbers, H. V. 2000 5438/1493265/T390
South Africa Villiersdorp 2000 (Royal Galaxy)	480 SC	0.38	0.019	4	Fruit	0[1] 0 14	0.12, 0.13 (0.13) 0.51, 0.71 (0.61) 0.60, 0.51 (0.56)	Garbers, H. V. 2000 5438/1493265/T390
Australia Applethorpe 1998 (Granny Smith)	480 SC	0.24	0.018	10	Fruit	0 7 14 21	0.28, 0.55 (0.42) 0.21, 0.21 (0.21) 0.50, 0.23 (0.37) 0.30, 0.31 (0.31)	Tancred, S. 1999 EMH453/99
					Replicate trial Fruit	0 7 14 21	0.70, 0.44 (0.57) 0.44, 0.38 (0.41) 0.25, 0.31 (0.28) 0.25, 0.32 (0.29)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Iwate 1996 (Fuji)	WG, 30	0.6	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997, 1997a, 1997b, 1997c
						7	0.30, 0.28, 0.30[2], 0.30[2] (0.30)	
						15	0.33, 0.29, 0.27[2], 0.26[2] (0.29)	
						22	0.26, 0.25, 0.28[2], 0.27[2] (0.27)	
					Thiacloprid/amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						15	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						22	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
Japan, Nagano 1996 (Tugaru)	WG, 30	0.6	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997, 1997a, 1997b, 1997c
						7	0.09, 0.09, 0.13[2], 0.13[2] (0.11)	
						15	0.05, 0.04, 0.05[2], 0.05[2] (0.05)	
						22	0.06, 0.06, 0.06[2], 0.06[2] (0.06)	
					Thiacloprid-amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						15	< 0.005,	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						    22	< 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1) sampling before last application

2) replicate analysis

Table 29. Thiacloprid residues resulting from foliar application to pears.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Pennsylvania 1998 (Bartlett)	480 SC	0.28	0.039	2	Fruit	31 45	0.06 0.08	Harbin, A.M. 1999 M-009903-01-1
USA Pennsylvania 1998 (Bartlett)	480 SC	0.28	0.0097	2	Fruit	31 45	0.13 0.14	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Bartlett)	480 SC	0.28	0.031	2	Fruit	29 44	0.25 0.21	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Bartlett)	480 SC	0.28	0.0099	2	Fruit	29 44	0.23 0.13	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Bosc)	480 SC	0.28	0.032	2	Fruit	30 44	0.21 0.26	Harbin, A.M. 1999 M-009903-01-1
USA California 1998 (Bosc)	480 SC	0.28	0.0094	2	Fruit	30 44	0.27 0.12	Harbin, A.M. 1999 M-009903-01-1
USA Idaho 1998 (Max Red Bartlett)	480 SC	0.28	0.033	2	Fruit	22 29 36 43 50	0.06 0.05 0.05 0.03 0.03	Harbin, A.M. 1999 M-009903-01-1
USA Idaho 1998 (Max Red Bartlett)	480 SC	0.28	0.01	2	Fruit	22 29 36 43 50	0.08 0.06 0.06 0.04 0.05	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Red Clapp)	480 SC	0.28	0.033	2	Fruit	30 45	0.04 0.03	Harbin, A.M. 1999 M-009903-01-1
USA Oregon 1998 (Red Clapp)	480 SC	0.28	0.01	2	Fruit	30 45	0.05 0.04	Harbin, A.M. 1999 M-009903-01-1

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Washington 1998 (Red Bartlett)	480 SC	0.28	0.033	2	Fruit	30 45	0.18 0.14	Harbin, A.M. 1999 M-009903-01-1
USA Washington 1998 (Red Bartlett)	480 SC	0.28	0.01	2	Fruit	30 45	0.24 0.15	Harbin, A.M. 1999 M-009903-01-1
USA Sacramento 1998 (Bartlett)	70 WG	0.28	0.031	2	Fruit	29 44	0.22 0.17	Harbin, A.M. 1999 M-009903-01-1
USA Sacramento 1998 (Bartlett)	70 WG	0.28	0.0099	2	Fruit	29 44	0.14 0.13	Harbin, A.M. 1999 M-009903-01-1
USA Idaho 1998 (Max Red Bartlett)	70 WG	0.28	0.033	2	Fruit	22 29 36 43 50	0.06 0.05 0.08 0.02 0.02	Harbin, A.M. 1999 M-009903-01-1
USA Idaho 1998 (Max Red Bartlett)	70 WG	0.28	0.01	2	Fruit	22 29 36 43 50	0.11 0.08 0.08 0.10 0.06	Harbin, A.M. 1999 M-009903-01-1
South Africa Groot Drakenstein 2000 (Forelle)	480 SC	0.24	0.0096	4	Fruit	0[1] 0 14	0.19, 0.21 (0.20) 0.55, 0.48 (0.52) 0.22, 0.21 (0.22)	Zyl, P. F. C. van 2000d 5438/1502352/T465
South Africa Groot Drakenstein 2000 (Forelle)	480 SC	0.31	0.0096	4	Fruit	0[1] 0 14	0.51, 0.49 (0.50) 0.98, 1.1 (1.04) 0.51, 0.48 (0.50)	Zyl, P. F. C. van 2000e 5438/1502361/T466
South Africa Groot Drakenstein 2000 (Forelle)	480 SC	0.61	0.0192	4	Fruit	0[1] 0 14	0.85, 0.82 (0.84) 1.4, 1.5 (1.5) 1.1, 1.1 (1.1)	Zyl, P. F. C. van 2000e 5438/1502361/T466
Australia Cottenvale 1999 (Packham)	480 SC	0.35	0.018	8	Fruit	0[1] 0 7 14 21 28	0.43 0.66 0.30 0.37 0.34 0.29	Tancred, S. 2001 ADM 172/01
Australia Cottenvale 1999 (Packham)	480 SC	0.35	0.018	4	Fruit	0[1] 0 7 14 21 28	0.41 0.62 0.33 0.26 0.28 0.38	Tancred, S. 2001 ADM 172/01
Japan, Fukushima 1997 (Kousui)	30 WG	0.6	0.015	3	Thiacloprid: Whole fruit	 0[1]	 < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997l, 1997m, 1997n, 1997o

Location Year (variety)	Form	Application kg ai/ha	kg ai/hL	No	Analysis Sample	PHI	Residues	Reference, Report No.
						7	0.67, 0.64, 0.57², 0.57² (0.61)	
						14	0.45, 0.45, 0.34², 0.33 (0.39)	
						21	0.31, 0.31, 0.19², 0.18² (0.25)	
					Thiacloprid/amide: Whole Fruit	0¹	< 0.005, < 0.005, < 0.005², < 0.005² (< 0.005)	
						7	0.02, 0.01, 0.01², 0.01² (0.01)	
						14	0.01, 0.01, 0.01², 0.01² (0.01)	
						21	0.01, 0.01, 0.01², 0.01² (0.01)	

1 sampling before last application

2 replicate analysis

Stone fruits

Table 30. Thiacloprid residues resulting from foliar application to Japanese apricots.

Location Year (variety)	Form	Application kg ai/ha	kg ai/hL	No	Analysis Sample	PHI	Residues	Reference, Report No.
Japan, Fukui 1997 (Benisashi)	WG, 30	0.6	0.015	2	Thiacloprid: Whole fruit w/o stone	0¹	< 0.005, < 0.005, < 0.005², < 0.005² (< 0.005)	Anon. 2001a, 2001b
						7	1.7, 1.6, 1.3², 1.3² (1.5)	
						14	0.91, 0.81, 0.81², 0.77² (0.83)	
						21	0.94, 0.83, 0.69², 0.66² (0.78)	
					Thiacloprid/amide: Whole Fruit w/o stone	0¹	< 0.005, < 0.005, < 0.005², < 0.005² (< 0.005)	
						7	0.09, 0.08,	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
							0.06[2], 0.06[2] (0.07)	
						14	0.05, 0.05, 0.03[2], 0.02[2] (0.04)	
						21	0.04, 0.04, 0.02[2], 0.02[2] (0.03)	
Japan, Wakayama 1997 (Nanko)	WG, 30	0.6	0.015	2	Thiacloprid: Whole fruit w/o stone	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 2001a, 2001b
						7	1.3, 1.3, 0.96[2], 0.94[2] (1.1)	
						14	1.4, 1.4, 0.80[2], 0.79[2] (1.1)	
						21	0.44, 0.43, 0.28[2], 0.27[2] (0.36)	
					Thiacloprid/amide: Whole Fruit w/o stone	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	0.08, 0.07, 0.05[2], 0.05[2] (0.06)	
						14	0.07, 0.05, 0.04[2], 0.04[2] (0.05)	
						21	0.03, 0.03, 0.02[2], 0.02[2] (0.03)	

1 sampling before last application

2 replicate analysis

Table 31. Thiacloprid residues resulting from foliar application to peaches.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Eyragues 2000 (Meryl Gen Free)	480 SC	0.11	0.0096	2	Fruit, whole	0 14	0.13 <u>0.03</u>	Schoening, R. 2001c RA-2113/00
Spain La Fortesa 1995 (Fire Red)	480 SC	0.14	0.0096	2	Fruit, whole	0[1] 0 8 10 14 21	0.13 0.23 0.24 0.17 <u>0.13</u> 0.07	Placke, F. J. 1997e RA-2064/95

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Gualta 1995 (Baby Gold 5)	480 SC	0.14	0.0096	2	Fruit, whole	0[1] 0 7 10 14 21	0.05 0.15 0.09 0.10 0.08 0.05	Placke, F. J. 1997e RA-2064/95
Italy Ravenna 1995 (Red Heaven)	480 SC	0.14	0.0096	2	Fruit, whole	0[1] 0 7 10 14 21	0.02 0.08 0.06 0.04 0.03 < 0.02	Placke, F. J. 1997e RA-2064/95
Italy Fondi 1995 (O'Henry)	480 SC	0.14	0.0096	2	Fruit, whole	0[1] 0 7 10 14 21	0.06 0.24 0.17 0.11 0.06 0.05	Placke, F. J. 1997e RA-2064/95
Spain La Fortesa 1996 (Baby Gold 9)	480 SC	0.14	0.0096	2	Fruit, whole	0 14	0.19 0.09	Placke, F. J. 1997f RA-2121/96
Spain Can Rosell-Subiratt 1996 (Springcrest)	480 SC	0.14	0.0096	2	Fruit, whole	0 14	0.55 0.19	Placke, F. J. 1997f RA-2121/96
Italy Ravenna 1996 (Red Heaven)	480 SC	0.14	0.0096	2	Fruit, whole	0 14	0.10 0.03	Placke, F. J. 1997f RA-2121/96
France Eyragues 1996 (Meryl Gen Free)	480 SC	0.14	0.0096	2	Fruit, whole	0 14	0.18 0.13	Placke, F. J. 1997f RA-2121/96
Japan, Fukushima 1997 (Kawanakajimahakutou)	30 WG	0.6	0.015	3	Thiacloprid: Whole fruit w/o stone	0[1] 7 14 21	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) 0.48, 0.48, 0.24[2], 0.24[2] (0.36) 0.42, 0.40, 0.33[2], 0.33[2] (0.37) 0.43, 0.42, 0.38[2], 0.36[2] (0.40)	Anon. 1997h, 1997i, 1997j, 1997k
					Thiacloprid-amide: Whole Fruit w/o stone	0[1] 7 14	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) 0.01, 0.01, < 0.005[2], < 0.005[2] (0.01) 0.01, 0.01, < 0.005[2], < 0.005[2]	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
							(0.01)	
						21	0.01, 0.01, < 0.005[2], < 0.005[2] (0.01)	
Japan, Wakayama 1997 (Takeihakuhou)	30 WG	0.6	0.015	3	Thiacloprid: Whole fruit w/o stone	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997h, 1997i, 1997j, 1997k
						7	0.31, 0.30, 0.23[2], 0.22[2] (0.27)	
						14	0.1, 0.1, 0.14[2], 0.14[2] (0.12)	
						21	0.07, 0.06, 0.09[2], 0.09[2] (0.08)	
					Thiacloprid-amide: Whole Fruit w/o stone	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						14	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						21	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 32. Thiacloprid residues resulting from foliar application to cherries.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Engelmanshoven 1998 (Cherry, sour Kollaris)	480 SC	0.18	0.012	2	Fruit, whole	0[1] 0 7 14 21	0.03 0.33 0.10 0.04 < 0.02	Schoening, R. 1999a RA-2070/98
Germany Wachtberg – Niederbachem 1998 (Cherry, sour Schattenmorelle)	480 SC	0.18	0.012	2	Fruit, whole	0[1] 0 7 14 21	< 0.02 0.35 0.06 0.02 0.02	Schoening, R. 1999a RA-2070/98

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Toenisvorst-Tackheide 1998 (Cherry, sweet Castor)	480 SC	0.18	0.012	2	Fruit, whole	0[1] 0 7 14	0.08 0.23 0.17 0.15	Schoening, R. 1999a RA-2070/98
France Jussy 1998 (Cherry, sweet Gemersdorf)	480 SC	0.15	0.012	2	Fruit, whole	0[1] 0 7 14 21	0.02 0.22 0.13 0.10 0.05	Schoening, R. 1999a RA-2070/98
Germany Wachtberg – Niederbachem 1999 (Cherry, sour Schattenmorelle)	480 SC	0.12	0.012	2	Fruit, whole	0 14	0.24 < 0.02	Sur, R. and Schoening, R. 2000 RA-2070/99
Germany Burscheid 1999 (Cherry, sour Schattenmorelle)	480 SC	0.12	0.012	2	Fruit, whole	0 14	0.47 0.03	Sur, R. and Schoening, R. 2000 RA-2070/99
Germany Muehlheim-Kehrlich 2002 (Cherry, sweet Regina)	480 SC	0.18	0.012	2	Fruit, whole	0 14	0.30 0.11	Schoening, R. and Billian, P. 2003 RA-2030/02
France Pouligny St. Pierre 2002 (Cherry, sweet Garnet)	480 SC	0.12	0.012	2	Fruit, whole	0 14	0.25 0.06	Schoening, R. and Billian, P. 2003 RA-2030/02
Italy Bisceglie 1998 (Cherry, sweet New Star)	480 SC	0.14	0.012	2	Fruit, whole	0[1] 0 7 14 21	0.02 0.12 0.12 0.06 0.04	Schoening, R. 1999b RA-2071/98
Italy Bisceglie 1998 (Cherry, sweet Lapins)	480 SC	0.18	0.012	2	Fruit, whole	0[1] 0 7 14 21	< 0.02 0.35 0.05 0.02 < 0.02	Schoening, R. 1999b RA-2071/98
Italy Bisceglie 1999 (Cherry, sweet Lapins)	480 SC	0.15	0.012	2	Fruit, whole	0 14	0.17 0.08	Heinemann, O. and Schoening, R. 2000 RA-2071/99
Spain Begues 1999 (Cherry, sweet Starking)	480 SC	0.16	0.012	2	Fruit, whole	0 14	0.23 0.07	Heinemann, O. and Schoening, R. 2000 RA-2071/99
USA Porterville, California 2001 (Cherry, sweet Brooks)	480 SC	0.28	0.0083	2	Fruit, w/o stone	13 25	0.17, 0.18 (0.18) 0.13, 0.11 (0.12)	Dorschner, K. W. 2002 200540

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Visalia, California 2001 (Cherry, sweet Brooks)	480 SC	0.28	0.044	2	Fruit, w/o stone	14 28	< 0.02, < 0.02 (< 0.02) < 0.02 < 0.02 (< 0.02)	Dorschner, K. W. 2002 200540
USA Idaho 2001 (Cherry, sweet Brooks)	480 SC	0.28	0.012	2	Fruit, w/o stone	14 26	0.22, 0.25 (0.24) 0.15, 0.13 (0.14)	Dorschner, K. W. 2002 200540
USA Michigan 2001 (Cherry, sweet Emperor Francis)	480 SC	0.29	0.0498	2	Fruit, w/o stone	14 28	0.22, 0.26 (0.24) 0.13, 0.11 (0.12)	Dorschner, K. W. 2002 200540
USA Michigan 2001 (Cherry, sweet Cavalier)	480 SC	0.29	0.013	2	Fruit, w/o stone	13 27	0.12, 0.13 (0.13) 0.05, 0.05 (0.05)	Dorschner, K. W. 2002 200540
USA Oregon 2001 (Cherry, sweet Bing)	480 SC	0.28	0.011	2	Fruit, w/o stone	14 26	0.18, 0.19 (0.19) 0.10, 0.09 (0.10)	Dorschner, K. W. 2002 200540
USA Washington 2001 (Cherry, sweet Bing)	480 SC	0.295	0.047	2	Fruit, w/o stone	13 26	0.16, 0.17 (0.17) 0.05, 0.05 (0.05)	Dorschner, K. W. 2002 200540
Japan, Alita 2003 (Satonishiki)	WG, 30	0.75	0.015	1	Thiacloprid: Whole fruit w/o stone Thiacloprid-amide: Whole Fruit w/o stone	 1 3 7 14 1 3 7 14	 1.4, 1.4 (1.4) 0.8, 0.7 (0.8) 1.1, 1.0 (1.1) 0.6, 0.5 (0.6) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2)	Anon. 2003

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Fukushima 2003 (Satonishiki)	WG, 30	0.75	0.015	1	Thiacloprid: Whole fruit w/o stone Thiacloprid-amide: Whole Fruit w/o stone	 1 3 7 14 1 3 7 14	 2.4, 2.3 (2.4) 2.3, 2.1 (2.2) 2.4, 2.3 (2.4) 1.7, 1.7 (1.7) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2) < 0.2, < 0.2 (< 0.2)	Anon. 2003

1 sampling before last application

Table 33. Thiacloprid residues resulting from foliar application to plums.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Billy 2002 (Mirabelle de Nancy)	480 SC	0.1	0.0097	2	Fruit, whole	0 14	0.08 0.02	Schoening, R. and Billian, P. 2003a RA-2080/02
France Thillot 2003 (Mirabelle de Nancy)	480 SC	0.096	0.0096	2	Fruit, whole	0[1] 0 4 10 14 18	0.03. 0.07 0.03 0.02 0.03 0.03	Schoening, R. and Billian, P. 2003a RA-2080/02
Germany Freinsheim 2000 (Auerbacher)	480 SC	0.11	0.0096	2	Fruit, whole	0[1] 0 4 10 14 18	< 0.02 0.04 0.03 < 0.02 < 0.02 < 0.02	Schoening, R. 2001d RA-2126/00
France Saint Maurice 2000 (Dark Red Plum)	480 SC	0.16	0.015	2	Fruit, whole	0[1] 0 4 10 13 17	0.02 0.08 0.03 0.02 0.02 < 0.02	Schoening, R. 2001d RA-2126/00
Germany Freinsheim 2000 (Cydimer)	480 SC	0.11	0.0096	2	Fruit, whole	0 14	0.02 < 0.02	Schoening, R. 2001d RA-2126/00
France Vieville 2000 (Dark Red Plum)	480 SC	0.14	0.014	2	Fruit, whole	0 13	0.11 0.05	Schoening, R. 2001d RA-2126/00
Germany Freinsheim 2001 (Cydimer)	480 SC	0.12	0.0096	2	Fruit, whole	0 14	0.03 < 0.02	Schoening, R. 2002a RA-2120/01

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Freinsheim 2001 (Auerbacher)	480 SC	0.12	0.0096	2	Fruit, whole	0[1] 0 4 10 14 18	< 0.02 0.05 0.04 0.02 0.03 < 0.02	Schoening, R. 2002a RA-2120/01
France Moissac 2001 (Prune d'Ente	480 SC	0.14	0.0096	2	Fruit, whole	0 15	0.03 0.02	Schoening, R. 2002b RA-212101
France Montauban 2001 (President)	480 SC	0.096	0.0096	2	Fruit, whole	0[1] 0 4 10 14 18	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2002b RA-2121/01
Spain St. Feliu de Llobregat 2000 (Black Goal)	480 SC	0.14	0.0096	2	Fruit, whole	0 4 11 14 19	0.06 0.04 0.03 0.02 < 0.02	Schoening, R. 2002c RA-2127/00
Spain St. Vincent dels Horts 2000 (Golden Japan)	480 SC	0.14	0.0096	2	Fruit, whole	0 14	0.04 0.02	Schoening, R. 2002c RA-2127/00
France Montauban 2000 (President)	480 SC	0.096	0.0096	2	Fruit, whole	0[1] 0 4 10 14 18	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2002c RA-2127/00
France Orgueil 2000 (President)	480 SC	0.096	0.0096	2	Fruit, whole	0 14	0.02 < 0.02	Schoening, R. 2002c RA-2127/00
USA California 2001 (Casselman)	480 SC	0.29	0.046	2	Fruit, w/o stone Fruit, dried w/o stone	15 29 15 29	0.03, < 0.02 (0.03) < 0.02, < 0.02 (< 0.02) 0.05, 0.05 (0.05) 0.05, 0.08 (0.07)	Dorschner, K. W. 2002a 200509
USA California 2001 (Black Beaut)	480 SC	0.29	0.012	2	Fruit, w/o stone	14 28	< 0.02, < 0.02 (< 0.02) < 0.02, < 0.02 (< 0.02)	Dorschner, K. W. 2002a 200509
USA California 2001 (Angeleno)	480 SC	0.28	0.012	2	Fruit, w/o stone	14 28	< 0.02, < 0.02 (< 0.02) < 0.02, < 0.02 (< 0.02)	Dorschner, K. W. 2002a 200509
USA California 2001 (French)	480 SC	0.28	0.014	2	Fruit, w/o stone	14 28	0.03, 0.03 (0.03) 0.03, 0.03 (0.03)	Dorschner, K. W. 2002a 200509

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Michigan 2001 (Early Golden)	480 SC	0.28	0.060	2	Fruit, w/o stone	0 7 14 28 33	0.06, 0.04 (0.05) 0.08, 0.06 (0.07) < 0.02, 0.03 (0.03) 0.03, 0.03 (0.03) < 0.02, 0.02 (0.02)	Dorschner, K. W. 2002a 200509
USA Oregon 2001 (Brooks)	480 SC	0.28	0.069	2	Fruit, w/o stone	15 26	< 0.02, < 0.02 (< 0.02) < 0.02, < 0.02 (< 0.02)	Dorschner, K. W. 2002a 200509
Japan, Nagano 2001 (Ohishiwase)	30 WG	0.6	0.015	3	Thiacloprid: Whole fruit w/o stone	0[1] 7 14 21	< 0.01, < 0.01, < 0.005[2], < 0.005[2] (< 0.005) 0.06, 0.05, 0.03[2], 0.03[2] (0.04) 0.02, 0.02, 0.02[2], 0.02[2] (0.02) 0.06, 0.06, 0.02[2], 0.02[2] (0.04)	Anon. 1997ab, 1997ac, 1997ad, 1997ae
					Thiacloprid/amide: Whole Fruit w/o stone	0[1] 7 14 21	< 0.01, < 0.01 < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Wakayama 2001 (Ohishiwase)	30 WG	0.6	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.01, < 0.01, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997ab, 1997ac, 1997ad, 1997ae
						7	0.11, 0.10, 0.07[2], 0.06[2] (0.09)	
						14	0.05, 0.05, 0.02[2], 0.02[2] (0.04)	
						21	0.06, 0.06, 0.04[2], 0.04[2] (0.05)	
					Thiacloprid/amide: Whole Fruit	0[1]	< 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	
						7	< 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	
						14	< 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	
						21	< 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	

1 sampling before last application

2 replicate analysis

Berries and other small fruits

Table 34. Thiacloprid residues resulting from foliar application to grapes (glasshouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Ishikawa 2002 (Delaware)	WG, 30	0.6	0.015	2	Thiacloprid: Berries	0[1]	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	Anon. 2002c, 2002d
						21	0.96, 0.94, 0.64[2], 0.64[2] (0.80)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						28	0.67, 0.66, 0.53^2, 0.53^2 (0.60)	
						42	0.90, 0.88, 0.56^2, 0.54^2 (0.72)	
					Thiacloprid-amide: Berries	0^1	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						21	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						28	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						42	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
Japan, Osaka 2002 (Delaware)	WG, 30	0.6	0.015	2	Thiacloprid: Berries	0^1	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	Anon. 2002c, 2002d
						21	1.9, 1.9, 1.4^2, 1.3^2 (<u>1.6</u>)	
						28	1.8, 1.8, 1.5^2, 1.4^2 (1.6)	
						49	1.3, 1.3, 0.85^2, 0.83^2 (1.1)	
					Thiacloprid-amide: Berries	0^1	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						21	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						28	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	
						42	< 0.02, < 0.02, < 0.02^2, < 0.02^2 (< 0.02)	

Location Year (variety)	Form	Application kg ai/ha	kg ai/hL	No	Analysis Sample	PHI	Residues	Reference, Report No.
Japan, Nagano 2002 (Kyoho)	WG, 30	0.6	0.015	2	Thiacloprid: Berries	0[1]	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	Anon. 2002a, 2002b
						21	0.46, 0.43, 0.27[2], 0.26[2] (0.36)	
						28	0.45, 0.44, 0.45[2], 0.43[2] (0.44)	
						42	0.37, 0.37, 0.26[2], 0.26[2] (0.32)	
					Thiacloprid-amide: Berries	0[1]	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
						21	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
						28	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
						42	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
Japan, Kyoto 2002 (Pione)	WG, 30	0.6	0.015	2	Thiacloprid: Berries	0[1]	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	Anon. 2002a, 2002b
						21	0.11, 0.11, 0.07[2], 0.07[2] (0.09)	
						29	0.06, 0.06, 0.05[2], 0.05[2] (0.06)	
						42	0.12, 0.12, 0.13[2], 0.12[2] (0.12)	
					Thiacloprid-amide: Berries	0[1]	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
						21	< 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	
						29	< 0.02,	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						42	< 0.02, < 0.02[2], < 0.02[2] (< 0.02) < 0.02, < 0.02, < 0.02[2], < 0.02[2] (< 0.02)	

1 sampling before last application

2 replicate analysis

Table 35. Thiacloprid residues resulting from foliar application to strawberries (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Riemst 2000 (Elsanta)	480 SC	0.12	0.02	2	Fruit	0 3	0.1 0.07	Schoening, R. and Nuesslein, F. 2001 RA-2053/00
France Ecquevilly 2000 (Majeral)	480 SC	0.12	0.02	2	Fruit	0 3	0.02 0.02	Schoening, R. and Nuesslein, F. 2001 RA-2053/00
United Kingdom Thurston 2000 (Cambridge Favourite)	480 SC	0.12	0.02	2	Fruit	0 3	0.06 0.09	Schoening, R. and Nuesslein, F. 2001 RA-2053/00
Germany Monheim 2000 (Elsanta)	480 SC	0.12	0.02	2	Fruit	0 3	0.07 0.08	Schoening, R. and Nuesslein, F. 2001 RA-2053/00
Germany Leverkusen 1999 (Elsanta)	480 SC	0.12	0.02	2	Fruit	0[1] 0 1 3 7 14	0.03 0.13 0.09 0.08 0.05 0.03	Schoening, R. 2000a RA-2006/99
Germany Monheim 1999 (Symphonie)	480 SC	0.12	0.02	2	Fruit	0[1] 0 1 3 8 14	< 0.02 0.06 0.04 0.03 0.02 < 0.02	Schoening, R. 2000a RA-2006/99
France Glisolles 1999 (Pandora)	480 SC	0.12	0.02	2	Fruit	0[1] 0 1 3 7 14	0.05 0.10 0.05 0.04 0.04 0.02	Schoening, R. 2000a RA-2006/99
United Kingdom Thurston 1999 (Cambridge Favourite)	480 SC	0.12	0.02	2	Fruit	0[1] 0 1 3 7 14	< 0.02 0.05 0.06 0.07 0.06 0.04	Schoening, R. 2000a RA-2006/99

1 sampling before last application

Table 36. Thiacloprid residues resulting from foliar application to strawberries (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Telgte 2002 (Elsanta)	480 SC	0.12	0.012	2	Fruit	0 1 3	0.34 0.31 0.25	Schoening, R. and Billian, P. 2003b RA-2081/02
Germany Bocholt 2002 (Elsanta)	480 SC	0.12	0.012	2	Fruit	0 1 3	0.34 0.33 0.21	Schoening, R. and Billian, P. 2003b RA-2081/02
Netherlands Wognum 2002 (Elsanta)	480 SC	0.12	0.012	2	Fruit	0[1] 0 1 3 7	0.07 0.13 0.12 0.12 0.13	Schoening, R. and Billian, P. 2003b RA-2081/02
Netherlands Wognum 2002 (Polka)	480 SC	0.12	0.012	2	Fruit	0[1] 0 1 3 7	0.13 0.26 0.31 0.27 0.31	Schoening, R. and Billian, P. 2003b RA-2081/02
Italy Francolino 2002 (Marmolada)	480 SC	0.12	0.012	2	Fruit	0 1 3	0.05 < 0.02 0.04	Schoening, R. and Billian, P. 2003b RA-2081/02
Spain Sant Pol de Mar 2002 (Aromas)	480 SC	0.12	0.012	2	Fruit	0 1 3	0.20 0.19 0.22	Schoening, R. and Billian, P. 2003b RA-2081/02
Spain Calella 2002 (Diamante)	480 SC	0.12	0.012	2	Fruit	0[1] 0 1 3 7	0.12 0.39 0.31 0.23 0.25	Schoening, R. and Billian, P. 2003b RA-2081/02
France Reynies 2002 (Gariguette)	480 SC	0.12	0.012	2	Fruit	0[1] 0 1 3 7	0.04 0.06 0.05 0.05 0.04	Schoening, R. and Billian, P. 2003b RA-2081/02
Japan, Saitama 1997 (Nyohou)	30 WG	0.15	0.0075	2	Thiacloprid: Whole fruit Thiacloprid/amide: Whole Fruit	0[1] 1 3 7 0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) 0.41, 0.41, 0.34[2], 0.34[2] (0.38) 0.38, 0.35, 0.31[2], 0.28[2] (0.33) 0.24, 0.23, 0.19[2], 0.18[2] (0.21) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1996d, 1996e, 1996f, 1996g

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
Japan, Mie 1997 (Nyohou)	30 WG	0.15	0.0075	2	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1996d, 1996e, 1996f, 1996g
						1	0.81, 0.80, 0.69[2], 0.68[2] (0.75)	
						3	0.59, 0.52, 0.72[2], 0.69[2] (0.63)	
						7	0.53, 0.50, 0.47[2], 0.47[2] (0.49)	
					Thiacloprid/amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 37. Thiacloprid residues resulting from foliar application to currants.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Burscheid 2000 (Rofet)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	0.10 0.28 0.23 0.21 0.13 0.08	Schoening, R. and Nuesslein, F. 2001a RA-2054/00
Belgium Pringen 2000 (Tsema)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	0.21 0.38 0.39 0.35 0.32 0.32	Schoening, R. and Nuesslein, F. 2001a RA-2054/00
Germany Monheim 2000 (Red Lake)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 13	0.35 0.91 0.73 0.59 0.39 0.32	Schoening, R. and Nuesslein, F. 2001a RA-2054/00
United Kingdom Thurston 2000 (Ben Tirran)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	0.06 0.13 0.12 0.19 0.28 0.13	Schoening, R. and Nuesslein, F. 2001a RA-2054/00
Belgium Meeffe 2001 (Rovada)	480 SC	0.12	0.012	3	Fruit	0 3	0.19 0.16	Schoening, R. 2002d RA-2111/01
United Kingdom Thurston 2001 (Ben Tirran)	480 SC	0.12	0.012	3	Fruit	0 3	0.43 0.37	Schoening, R. 2002d RA-2111/01
Germany Burscheid 2001 (Rovada)	480 SC	0.12	0.012	3	Fruit	0 3	0.24 0.21	Schoening, R. 2002d RA-2111/01
Germany Burscheid 2001 (Titania)	480 SC	0.12	0.012	3	Fruit	0 3	0.19 0.08	Schoening, R. 2002d RA-2111/01

1 sampling before last application

Table 38. Thiacloprid residues resulting from foliar application to raspberries.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Wachtberg-Niederbachem 2001 (Resa)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	< 0.02 0.34 0.37 0.15 0.09 0.05	Heinemann, O. and Schoening, R. 2002 RA-2133/01
Germany Monheim 2001 (Schoenemann)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	0.12 0.81 0.88 0.10 0.08 0.06	Heinemann, O. and Schoening, R. 2002 RA-2133/01

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
United Kingdom Thurston 2001 (Malling Jewel)	480 SC	0.12 0.12 0.16	0.012 0.012 0.016	3	Fruit	0[1] 0 1 3 7 14	0.10 0.55 0.50 0.31 0.17 0.08	Heinemann, O. and Schoening, R. 2002 RA-2133/01
United Kingdom East Malling 2001 (Ample)	480 SC	0.12	0.012	3	Fruit	0[1] 0 1 3 7 14	0.04 0.29 0.31 0.27 0.19 0.09	Heinemann, O. and Schoening, R. 2002 RA-2133/01
Germany Burscheid 2002 (Winklers Sämling)	480 SC	0.12	0.012	3	Fruit	0 3	0.76 0.62	Schoening, R. and Billian, P. 2003c RA-2082/02
Germany Monheim 2002 (Schoenemann)	480 SC	0.12	0.012	3	Fruit	0 3	0.36 0.34	Schoening, R. and Billian, P. 2003c RA-2082/02
United Kingdom Thurston 2002 (Malling Jewel)	480 SC	0.12	0.012	3	Fruit	0 3	0.49 0.34	Schoening, R. and Billian, P. 2003c RA-2082/02
United Kingdom East Malling 2002 (Ample)	480 SC	0.12	0.012	3	Fruit	0 3	0.27 0.15	Schoening, R. and Billian, P. 2003c RA-2082/02

1 sampling before last application

Tropical fruits – inedible peel

Table 39. Thiacloprid residues resulting from foliar application to kiwi fruits.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
New Zealand Ramarama 2002 (Hayward)	480 SC	0.096	0.0048	1	Fruit	56 84 112 140 184	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Ramarama 2002 (Hayward)	480 SC	0.096	0.0048	2	Fruit	56 84 112 140 184	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Ramarama 2002 (Hayward)	480 SC	0.14	0.0072	1	Fruit	56 84 112 140 184	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
New Zealand Silvervale 2002 (Hayward)	480 SC	0.1	0.0096	2	Fruit	56 63 70 79 117	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Silvervale 2002 (Hayward)	480 SC	0.15	0.014	2	Fruit	56 63 70 79 177	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Silvervale 2002 (Hayward)	480 SC	0.1	0.0096	1	Fruit	56 63 70 79 177	0.04 0.03 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Brightwater 2002 (Hayward)	480 SC	0.096	0.0096	1	Fruit	56 63 70 78 84 173	0.03 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand Brightwater 2002 (Hayward)	480 SC	0.096	0.0096	2	Fruit	56 63 70 78 84 173	0.06 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2003a LabGLP75
New Zealand T.McCormack 2003 (Hayward)	480 SC	0.19 0.19	0.0096 0.013	2	Fruit	49 57 64 70 77 83	0.10 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Te Puke 2003 (Hayward)	480 SC	0.19 0.19	0.0096 0.019	2	Fruit	49 56 63 70 84	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Katikati 2003 (Hayward)	480 SC	0.19 0.19	0.0096 0.013	2	Fruit	48 57 63 70 76 85	0.03 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Gisborne 2003 (Hayward)	480 SC	0.19	0.0096	2	Fruit	49 56 63 70 77 84	0.10 0.05 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Makatu 2003 (Zespri Gold)	480 SC	0.096 0.12	0.0096	2	Fruit	63 70 77 84 91	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Makatu 2003 (Zespri Gold)	480 SC	0.14 0.17	0.014	2	Fruit	63 70 77 84 91	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
New Zealand Appleby 2003 (Hayward)	480 SC	0.19	0.0096	2	Fruit	70 77 84 91 98 105	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104
New Zealand Appleby 2003 (Hayward)	480 SC	0.19	0.0096	2	Fruit	49 56 63 70 77 84	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Clay, S. 2004 LabGLP104

Bulb vegetables

Table 40. Thiacloprid residues resulting from foliar application to onions.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Brazil Sta. Inacia 1998 (Taqui / Superex)	480 SC	0.096	0.024	4	Bulb	21	< 0.02	Lancas, F. M. 1998b M-005335-01-2
Brazil Sta. Inacia 1998 (Taqui / Superex)	480 SC	0.19	0.048	4	Bulb	21	0.04	Lancas, F. M. 1998b M-005335-01-2
Germany Schifferstadt 2004 (Elody)	480 SC	0.11	0.24	3	bulb	21 28	< 0.01 < 0.01	Schoening, R. 2005 MR-068/05
Germany Schifferstadt 2004 (Elody)	480 SC	0.1 0.096 0.096	0.016	3	Bulb	0 7 10 14	0.55 0.06 0.03 0.02	Schoening, R. 2005 MR-068/05
Germany Schifferstadt 2004 (Elody)	480 SC	0.096	0.016	3	Bulb	0 7 10 14	0.69 0.05 0.03 0.03	Schoening, R. 2005 MR-068/05
Germany Aholming 2004 (BGS 194)	480 SC	0.096	0.024	3	bulb	21 28	< 0.01 < 0.01	Schoening, R. 2005 MR-068/05

Table 41. Thiacloprid residues resulting from foliar application to garlic.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Brazil Fazenda Riberao 1998 (Lavinia)	480 SC	0.14	0.036	3	Bulb	21	0.12	Lancas, F. M. 1998c M-005328-01-2
Brazil Fazenda Riberao 1998 (Lavinia)	480 SC	0.29	0.072	3	Bulb	21	0.2	Lancas, F. M. 1998c M-005328-01-2

Fruiting vegetables

Table 42. Thiacloprid residues resulting from foliar application to eggplants (glasshouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Kochi 2001 (Ryuma)	WG, 30	0.3	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 2001, 2001a
						1	0.44, 0.42, 0.34[2], 0.33[2] (0.38)	
						3	0.24, 0.22, 0.30[2], 0.30[2] (0.27)	
						7	0.1, 0.06, 0.1[2], 0.1[2] (0.09)	
					Thiacloprid-amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
Japan, Miyazaki 2001 (Kokuyou)	WG, 30	0.3	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 2001, 2001a
						1	0.27, 0.26, 0.29[2], 0.28[2] (0.28)	
						3	0.24, 0.23, 0.22[2], 0.21[2] (0.23)	
						7	0.15, 0.14, 0.16[2], 0.16[2] (0.15)	
					Thiacloprid-amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2]	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						 1 3 7	(< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 43. Thiacloprid residues resulting from foliar application to cucumbers (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Vetschau 2004 (Dolomit)	480 SC	0.10 0.098	0.033	2	Fruit	3	0.03	Schoening, R. 2005a MR-067/05
Germany Vetschau 2004 (Dolomit)	480 SC	0.10 0.11	0.035	2	Fruit	3	0.02	Schoening, R. 2005a MR-067/05
Germany Aholming 2004 (Melody)	480 SC	0.096	0.024	2	Fruit	0 3 5	0.03 0.02 0.02	Schoening, R. 2005a MR-067/05
Germany Niederhausen 2004 (Dirigent)	480 SC	0.096	0.024	2	Fruit	0 3 5	0.02 0.02 0.01	Schoening, R. 2005a MR-067/05
Spain Cabrera de Mar 1995 (Dasher II)	480 SC	0.12	0.012	3	Fruit	0[1] 0 3 7 9	0.02 0.12 0.03 0.02 < 0.02	Placke, F. J. 1997g RA-2066/95
Italy Borgo Piave 1995 (Hyeld)	480 SC	0.12	0.012	3	Fruit	0[1] 0 3 7 10	< 0.02 0.05 0.03 < 0.02 < 0.02	Placke, F. J. 1997g RA-2066/95
Italy Comiso 1995 (Galo F1)	480 SC	0.12	0.012	3	Fruit	0[1] 0 3 7 10	0.02 0.16 0.10 0.03 < 0.02	Placke, F. J. 1997g RA-2066/95
Spain Viladecans 1995 (Dasher II)	480 SC	0.12	0.012	3	Fruit	0[1] 0 3 7 9	0.02 0.05 0.02 0.02 < 0.02	Placke, F. J. 1997g RA-2066/95

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Cabrera de Mar 1996 (Dasher)	480 SC	0.14	0.014	3	Fruit	0[1] 0 1 3 7	0.02 0.08 0.11 0.08 < 0.02	Placke, F. J. 1997h RA-2116/96
Italy Fondi 1996 (Hyeld)	480 SC	0.14	0.014	3	Fruit	0[1] 0 1 3 7	< 0.02 0.04 0.04 0.02 < 0.02	Placke, F. J. 1997h RA-2116/96
Italy Borgo Piave 1996 (Hyeld)	480 SC	0.14	0.014	3	Fruit	0[1] 0 1 3 7	< 0.02 0.03 0.03 0.02 < 0.02	Placke, F. J. 1997h RA-2116/96
Spain Gava 1996 (Dasher)	480 SC	0.14	0.014	3	Fruit	0[1] 0 1 3 7	0.04 0.12 0.14 0.08 0.03	Placke, F. J. 1997h RA-2116/96

1 sampling before last application

Table 44. Thiacloprid residues resulting from foliar application to cucumbers (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Leichlingen 1999 (Indira)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.04 0.13 0.12 0.08 0.04	Schoening, R. 2000a RA-2134/99
Germany Leichlingen 1999 (Indira)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.03 0.08 0.10 0.07 0.04	Schoening, R. 2000a RA-2134/99
Belgium Brecht 1999 (Korinda)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.02 0.14 0.12 0.08 0.03	Schoening, R. 2000a RA-2134/99
Netherlands HS Tholen 1999 (Flamingo)	480 SC	0.22 0.20 0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.02 0.05 0.07 0.04 0.02	Schoening, R. 2000a RA-2134/99
Greece Vasilika 1996 (Venus)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.06 0.18 0.17 0.12 0.05	Placke, F. J. 1997i RA-2117/96
Italy Pozzo Ribaudo 1996 (Sprint)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.04 0.13 0.11 0.08 0.04	Placke, F. J. 1997i RA-2117/96
Italy Fondi 1996 (Hyeld)	480 SC	0.22	0.014	3	Fruit	0[1] 0 1 3 7	0.03 0.12 0.10 0.07 0.03	Placke, F. J. 1997i RA-2117/96

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain	480 SC	0.22	0.014	3	Fruit	0[1]	0.07	Placke, F. J.
Ruescas						0	0.25	1997i
						1	0.18	RA-2117/96
1996						3	0.15	
(Alaska)						7	0.09	
France	480 SC	0.22	0.014	3	Fruit	0[1]	0.02	Placke, F. J.
Avignon						0	0.08	1997i
						1	0.08	RA-2117/96
1996						3	0.04	
(Aramon)						7	0.05	
Italy	480 SC	0.22	0.014	3	Fruit	0[1]	0.05	Placke, F. J.
Bosco Braccetto						0	0.08	1997i
						1	0.09	RA-2117/96
1996						3	0.08	
(Sprint)						7	0.05	
Spain	480 SC	0.22	0.014	3	Fruit	0[1]	0.09	Placke, F. J.
Ruescas						0	0.23	1997i
						1	0.20	RA-2117/96
1996						3	0.15	
(Alaska)						7	0.07	
Spain	480 SC	0.22	0.014	3	Fruit	0[1]	0.08	Placke, F. J.
Ruescas						0	0.26	1997i
						1	0.26	RA-2117/96
1996						3	0.18	
(Virginia)						7	0.07	

1 sampling before last application

Table 45. Thiacloprid residues resulting from foliar application to melons (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Greece	480 SC	0.12	0.012	3	Peel	0[1]	0.03	Placke, F. J.
Larisa						0	0.08	1997j
						3	0.02	RA-2061/95
1995						7	0.02	
(Midi Star)						10	< 0.02	
					Pulp	0[1]	< 0.02	
						0	< 0.02	
						3	< 0.02	
						7	< 0.02	
						10	< 0.02	
					Whole fruit[2]	0[1]	< 0.02	
						0	0.04	
						3	< 0.02	
						7	< 0.02	
						10	< 0.02	
Italy	480 SC	0.12	0.012	3	Peel	0[1]	0.02	Placke, F. J.
Trinitapoli						0	0.23	1997j
						3	0.08	RA-2061/95
1995						7	0.05	
(Leglend)						10	< 0.02	
					Pulp	0[1]	< 0.02	
						0	< 0.02	
						3	< 0.02	
						7	< 0.02	
						10	< 0.02	
					Whole fruit[2]	0[1]	< 0.02	

Location Year (variety)	Form	Application kg ai/ha	kg ai/hL	No	Analysis Sample	PHI	Residues	Reference, Report No.
						0 3 7 10	0.09 0.03 0.02 < 0.02	
Greece Larisa 1996 (Gold Star F1)	480 SC	0.14	0.014	3	Whole fruit	0[1] 0 1	0.04 0.05 0.06	Placke, F. J. 1997k RA-2118/96
					Peel	3 7	0.36 0.28	
					Pulp	3 7	< 0.02 < 0.02	
					Whole fruit[2]	3 7	0.06 0.04	
Italy Lequile 1996 (Galia)	480 SC	0.14	0.014	3	Whole fruit	0[1] 0 1	0.03 0.06 0.06	Placke, F. J. 1997k RA-2118/96
					Peel	3 7	0.23 0.23	
					Pulp	3 7	< 0.02 < 0.02	
					Whole fruit[2]	3 7	0.06 0.06	
France Verlhac7Tescou 2000 (Figaro)	480 SC	0.14	0.014	3	Whole fruit	0 3	0.07 0.05	Schoening, R. and Nuesslein, F. 2001b RA-2115/00
					Peel	3	0.13	
					Pulp	3	< 0.02	
France Sarrians 2000 (Sirio)	480 SC	0.14	0.014	3	Whole fruit	0 3	0.05 0.02	Schoening, R. and Nuesslein, F. 2001b RA-2115/00
					Peel	3	0.05	
					Pulp	3	< 0.02	

1 sampling before last application

2 calculated

Table 46. Thiacloprid residues resulting from foliar application to melons (glasshouse use).

Location Year (variety)	Form	Application kg ai/ha	kg ai/hL	No	Analysis Sample	PHI	Residues	Reference, Report No.
Japan, Ishikawa 1997 (Arlseseinunatu II)	WG, 30	0.38	0.015	3	Thiacloprid: Pulp	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997d, 1997e, 1997f, 1997g
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						6	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
					Thiacloprid-amide: Pulp	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						6	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
Japan, Aichi 1997 (Natsukei No. 15)	WG, 30	0.38	0.015	3	Thiacloprid: Pulp	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997d, 1997e, 1997f, 1997g
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
					Thiacloprid-amide: Pulp	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 47. Thiacloprid residues resulting from foliar application to watermelons (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Greece Larisa 1995 (Crimson Sweet)	480 SC	0.12	0.012	3	Peel	0[1] 0 3 7 10	< 0.02 0.03 < 0.02 < 0.02 < 0.02	Placke, F. J. 1997j RA-2061/95
					Pulp	0[1] 0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	
					Whole fruit[2]	0[1] 0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	
Spain Gavá 1995 (Super Sugarbaby)	480 SC	0.12	0.012	3	Peel	0[1] 0 3 7 10	0.04 0.07 0.03 < 0.02 < 0.02	Placke, F. J. 1997j RA-2061/95
					Pulp	0[1] 0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	
					Whole fruit[2]	0[1] 0 3 7 10	< 0.02 0.03 < 0.02 < 0.02 < 0.02	
Spain Gavá 1996 (Patanegra)	480 SC	0.14	0.014	3	Whole fruit	0[1] 0 1 3 7	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Placke, F. J. 1997k RA-2118/96
					Peel	3 7	< 0.02 < 0.02	
					Pulp	3 7	< 0.02 < 0.02	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain La Almunia 1996 (Meridiam)	480 SC	0.14	0.014	3	Whole fruit Peel Pulp	0[1] 0 1 3 7 3 7 3 7	0.03 0.08 0.07 0.06 0.06 0.10 < 0.02 < 0.02 < 0.02	Placke, F. J. 1997k RA-2118/96

1 sampling before last application

2 calculated

Table 48. Thiacloprid residues resulting from foliar application to watermelons (glasshouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Ishikawa 2002 (Ajihimitsu)	30 WG	0.3	0.015	3	Thiacloprid: Pulp	 0[1] 1 3 7	 < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) 0.05, 0.04, 0.04[2], 0.04[2] (0.04) 0.1, 0.1, 0.09[2], 0.09[2] (0.1) 0.08, 0.07, 0.07[2], 0.07[2] (0.07)	Anon. 2002f, 2002g
					Thiacloprid-amide: Pulp	 0[1] 1 3 7	 < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Miyazaki 2002 (Madarball No. 2)	30 WG	0.36	0.015	3	Thiacloprid: Pulp	 0[1] 1 3 7	 < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) 0.08, 0.07, 0.07[2], 0.07[2] (0.07) 0.02, 0.02, 0.02[2], 0.02[2] (0.02) 0.06, 0.06, 0.05[2], 0.05[2] (0.06)	Anon. 2002f, 2002g
					Thiacloprid-amide: Pulp	 0[1] 1 3 7	 < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01) < 0.01, < 0.01, < 0.01[2], < 0.01[2] (< 0.01)	

1 sampling before last application

2 replicate analysis

Table 49. Thiacloprid residues resulting from foliar application to tomatoes (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Italy Andria 1995 (EXH 98063)	480 SC	0.18	0.018	2	Fruit	0[1] 0 1 3 7	0.02 0.17 0.09 0.03 0.02	Placke, F. J. 1997l RA-2068/95
France Pernes les Fontaines 1995 (Levica)	480 SC	0.18	0.064	2	Fruit	0[1] 0 1 3 7	0.02 0.07 0.07 0.02 < 0.02	Placke, F. J. 1997l RA-2068/95
France Tarascon 1995 (Cannegrow)	480 SC	0.18	0.064	2	Fruit	0[1] 0 1 3 8	0.04 0.14 0.12 0.03 0.03	Placke, F. J. 1997l RA-2068/95

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Italy Borgo Piave 1995 (Sunseed 6078)	480 SC	0.18	0.018	2	Fruit	0[1] 0 1 3 7	0.03 0.08 0.06 0.05 0.05	Placke, F. J. 1997l RA-2068/95
Italy Giorio 1996 (Marmende)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.14 0.12 0.16	Placke, F. J. 1997n RA-2122/96
France Les Valayans 1996 (Lerika)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.06 0.04 0.02	Placke, F. J. 1997n RA-2122/96
France Tarascon 1996 (Cannegrow)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.18 0.09 0.03	Placke, F. J. 1997n RA-2122/96
Italy Andria 1996 (Red Setter)	480 SC	0.14	0.014	2	Fruit	0 3 7	0.16 0.10 0.03	Placke, F. J. 1997n RA-2122/96

1 sampling before last application

Table 50. Thiacloprid residues resulting from foliar application to tomatoes (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Langenfeld- Reusrath 1995 (Hildares)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.11 0.26 0.19 0.15 0.14	Placke, F. J. 1997m RA-2067/95
Germany Langenfeld- Reusrath 1995 (Piranto)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.02 0.22 0.20 0.25 0.03	Placke, F. J. 1997m RA-2067/95
Spain La Redonda 1995 (Daniela)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.16 0.15 0.25 0.18 0.12	Placke, F. J. 1997m RA-2067/95
Spain Ruescas 1995 (Billante)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.08 0.28 0.20 0.14 0.19	Placke, F. J. 1997m RA-2067/95
Germany Langenfeld 1996 (Ferrari)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.23 0.12 0.08	Placke, F. J. 1997o RA-2123/96
Germany Leichlingen 1996 (Panovy)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.10 0.07 0.06	Placke, F. J. 1997o RA-2123/96
Spain Ruescas 1996 (Brillante)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.22 0.24 0.29	Placke, F. J. 1997o RA-2123/96

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Noves 1996 (Cecilia)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.18 0.12 0.09	Placke, F. J. 1997o RA-2123/96
Japan, Nagano 1997 (Momotaro)	30 WG	0.38	0.015	3	Thiacloprid: Whole fruit	0[1] 1 3 7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) 0.17, 0.16, 0.12[2], 0.11[2] (0.14) 0.15, 0.15, 0.11[2], 0.10[2] (0.13) 0.21, 0.21, 0.13[2], 0.12[2] (0.17)	Anon. 1997x, 1997y, 1997z, 1997aa
					Thiacloprid-amide: Whole Fruit	0[1] 1 3 7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Wakayama 1997 (Ohgatafukuju)	30 WG	0.38	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997x, 1997y, 1997z, 1997aa
						1	0.09, 0.08, 0.06[2], 0.06[2] (0.07)	
						3	0.05, 0.05, 0.06[2], 0.05[2] (0.05)	
						7	0.08, 0.08, 0.04[2], 0.04[2] (0.06)	
					Thiacloprid-amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 51. Thiacloprid residues resulting from drip application to tomatoes (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Putte 1998 (Tradino)	480 SC	0.25[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 0.02 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Belgium Katelinje-Waver 1998 (Fausto)	480 SC	0.24[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 0.02 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Putte 1998 (Tradino)	480 SC	0.24[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Belgium O-L-V Waver 1998 (Blitz)	480 SC	0.23[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.03 0.03 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Belgium O-L-V Waver 1999 (Style)	480 SC	0.24[1]	0.096	1	Fruit	1 3 7 15 21 28 35 49	< 0.02 < 0.02, < 0.02 (< 0.02) 0.02 0.03 0.03 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99
Netherlands Steenbergen 1999 (Jamaica)	480 SC	0.24[1]	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99
Belgium Katelinje-Waver 1999 (Tradiro)	480 SC	0.22[1]	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99
Netherlands Wouwse Plantage 1999 (Ambiance)	480 SC	0.25	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99

1 corresponding to 0.0096 kg ai per 1000 plants

Table 52. Thiacloprid residues resulting from foliar application to sweet peppers (field use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Viladecans 1995 (Lipari)	480 SC	0.18	0.012	2	Fruit	0[1] 0 1 3 7	< 0.02 0.19 0.24 0.06 0.04	Placke, F. J. 1997p RA-2070/95
Italy Trinitapoli 1995 (Antares)	480 SC	0.18	0.018	2	Fruit	0[1] 0 1 3 7	< 0.02 0.05 0.05 0.05 < 0.02	Placke, F. J. 1997p RA-2070/95
Italy C. da S. Giorgio 1995 (Pacific)	480 SC	0.18	0.018	2	Fruit	0[1] 0 1 3 7	0.05 0.15 0.16 0.10 0.07	Placke, F. J. 1997p RA-2070/95
Spain Malgrat de Mar 1995 (Italiano)	480 SC	0.18	0.012	2	Fruit	0[1] 0 1 3 7	< 0.02 0.41 0.24 0.11 0.10	Placke, F. J. 1997p RA-2070/95
Spain Vilanovadel Valles 1996 (Largo italiano)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.49 0.45 0.21	Placke, F. J. 1997r RA-2119/96
Italy Pigno 1996 (Rino)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.19, 0.18 (0.19) 0.17, 0.15 (0.16) 0.21, 0.20 (0.21)	Placke, F. J. 1997r RA-2119/96
Italy Andria 1996 (Antares)	480 SC	0.14	0.014	2	Fruit	0 3 7	0.07, 0.07 (0.07) 0.07, 0.07 (0.07) 0.04, 0.04 (0.04)	Placke, F. J. 1997r RA-2119/96
France Pernes les Fontaines 1996 (Lipari)	480 SC	0.22	0.014	2	Fruit	0 3 7	0.15, 0.14 (0.15) 0.07, 0.07 (0.07) 0.09, 0.06 (0.08)	Placke, F. J. 1997r RA-2119/96

1 sampling before last application

Table 53. Thiacloprid residues resulting from foliar application to sweet peppers (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Netherlands GS Breda 1995 (Cuby)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.07 0.09 0.09 0.07 0.05	Placke, F. J. 1997q RA-2069/95
Netherlands SW Heerle 1995 (Spirit)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.07 0.13 0.14 0.08 0.10	Placke, F. J. 1997q RA-2069/95

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Ruescas 1995 (Atol)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.27 0.54 0.47 0.37 0.34	Placke, F. J. 1997q RA-2069/95
Spain Ruescas 1995 (Espartaco)	480 SC	0.18	0.012	3	Fruit	0[1] 0 1 3 7	0.49 0.72 0.65 0.36 0.38	Placke, F. J. 1997q RA-2069/95
Spain El Ejido 1996 (Dallas)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.48 0.37 0.32	Placke, F. J. 1997s RA-2120/96
France St. Remy de Provence 1996 (Cyrano)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.13 0.11 0.09	Placke, F. J. 1997s RA-2120/96
Spain El Ejido 1996 (Mazurka)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.36 0.33 0.21	Placke, F. J. 1997s RA-2120/96
France Les Sablons 1996 (Laser)	480 SC	0.22	0.014	3	Fruit	0 3 7	0.13 0.08 0.04	Placke, F. J. 1997s RA-2120/96
Japan, Kochi 1997 (Tosahime)	30 WG	0.3	0.015	3	Thiacloprid: Whole fruit Thiacloprid-amide: Whole Fruit	 0[1] 1 3 7 0[1] 1 3 7	 < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) 1.3, 1.2, 0.97[2], 0.95[2] (1.1) 0.81, 0.80, 0.89[2], 0.83[2] (0.83) 0.64, 0.58, 0.58[2], 0.56[2] (0.59) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005) < 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1996, 1996a, 1996b, 1996c

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Miyazaki 1997 (TosahikariD)	30 WG	0.38	0.015	3	Thiacloprid: Whole fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1996, 1996a, 1996b, 1996c
						1	2.2, 2.0, 1.9[2], 1.8[2] (2.0)	
						3	1.7, 1.6, 1.5[2], 1.5[2] (1.6)	
						7	1.5, 1.4, 1.3[2], 1.3[2] (1.4)	
					Thiacloprid-amide: Whole Fruit	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						1	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						3	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 54. Thiacloprid residues resulting from drip application to peppers (greenhouse use).

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Katelinje-Waver 1998 (Mazurka)	480 SC	0.30[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.03 0.05 0.05 0.04 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Belgium Katelinje-Waver 1998 (Meteor)	480 SC	0.41[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.03 0.05 0.04 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Belgium Katelinje-Waver 1998 (Meteor)	480 SC	0.36[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.04 0.05 0.04 0.02 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Belgium Katelinje-Waver 1998 (Mazurka)	480 SC	0.28[1]	0.0096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.05 0.04 0.05 0.04 < 0.02 < 0.02	Schoening, R. 1999c RA-2072/98
Netherlands Steenbergen 1999 (Fiesta)	480 SC	0.29[1]	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.02 0.07 0.07 0.06 0.05 < 0.02	Schoening, R. 2000b RA-2072/99
Belgium Rumst 1999 (Meteor)	480 SC	0.22[1]	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 0.03 0.04 < 0.02 < 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99
Belgium Katalijne-Waver 1999 (Mandy)	480 SC	0.32[1]	0.096	1	Fruit	1 3 8 14 21 28 35 49	< 0.02 0.02 0.06 0.05 0.05 0.02 < 0.02 < 0.02	Schoening, R. 2000b RA-2072/99
Netherlands Steenbergen 1999 (Spirit)	480 SC	0.32[1]	0.096	1	Fruit	1 3 7 14 21 28 35 49	< 0.02 < 0.02 < 0.02 0.02 0.04 0.03 0.03 < 0.02	Schoening, R. 2000b RA-2072/99

1 corresponding to 0.0096 kg ai per 1000 plant

Root and tuber vegetables

Table 55. Thiacloprid residues resulting from foliar application to potatoes.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Burscheid 1997 (Hansa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000c RA-2150/97
France Quatremare 1997 (Lisa)	480 SC	0.096	0.034	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000c RA-2150/97
Germany Burscheid 1998 (Hansa)	480 SC	0.096	0.024	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
United Kingdom Thurston 1998 (Desiree)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
Germany Monheim 1998 (Hansa)	480 SC	0.096 0.096 0.096	0.012 0.024 0.024	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
United Kingdom Inham Hall 1998 (Fianna)	480 SC	0.096	0.032	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
France Quatremare 1998 (Mona Lisa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
Belgium Soreé 1998 (Bintje)	480 SC	0.096		3	Thiacloprid only: Tuber Total residue[1]	0 21 0 21	< 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000d RA-2068/98
Spain La Garriga 1997 (Red Pontiac)	480 SC	0.09 0.096 0.096	0.012 0.012 0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 22 0 22	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000e RA-2151/97

Location Year (variety)	Form	Application kg ai/ha	Application kg ai/hL	Application No	Analysis Sample	Analysis PHI	Analysis Residues	Reference, Report No.
Italy Molino dei Torti 1997 (Mona Lisa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000e RA-2151/97
Spain Cabrera de Mar 1998 (Jerla)	480 SC	0.096 0.09 0.096	0.012 0.012 0.012	3	Thiacloprid only: Tuber Total residue[1]	0 21 0 21	< 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
Italy Borgo Piave 1998 (Symfonia)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 7 14 21 0 7 14 21	 < 0.02 < 0.02 < 0.02 < 0.02 < 0.05 < 0.05 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
Italy Cervesina 1998 (Mona Lisa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1]	0 7 14 21 0 7 14 21	< 0.02 < 0.02 < 0.02 < 0.02 < 0.05 < 0.05 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
France Les Valayans 1998 (Mona Lisa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
France Noves 1998 (Mona Lisa)	480 SC	0.096	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
Spain Vilanova del Valles 1998 (Ped Pontiac)	480 SC	0.096 0.096 0.085	0.012	3	Thiacloprid only: Tuber Total residue[1] Tuber	 0 21 0 21	 < 0.02 < 0.02 < 0.05 < 0.05	Schoening, R. 2000f RA-2069/98
Brazil Facenda Rodeio 1998 (Jaete Bintje)	480 SC	0.14	0.024	4	Thiacloprid only: Tuber	21	< 0.02	Lancas, F. M. 1998d RE-059/98
Brazil Facenda Rodeio 1998 (Jaete Bintje)	480 SC	0.29	0.048	4	Thiacloprid only: Tuber	21	< 0.02	Lancas, F. M. 1998d RE-059/98

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Ushiku 1997 (Danshaku)	30 WG	0.3	0.015	3	Thiacloprid: Tuber, washed	0[2]	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	Anon. 1997p, 1997q, 1997r, 1997s
						7	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						14	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						21	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
					Thiacloprid-amide: Tuber, washed	0[2]	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						7	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						14	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						21	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
Japan, Hiroshima 1997 (Nourin No. 1)	30 WG	0.3	0.015	3	Thiacloprid: Tuber, washed	0[2]	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	Anon. 1997p, 1997q, 1997r, 1997s
						7	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						14	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	
						21	< 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
					Thiacloprid-amide: Tuber, washed	 0[2] 7 14 21	 < 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005) < 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005) < 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005) < 0.005, < 0.005, < 0.005[3], < 0.005[3] (< 0.005)	

1 Determined as 6-CAN

2 sampling before last application

3 replicate analysis

Cereals

Table 56. Thiacloprid residues resulting from foliar application to wheat.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Burscheid 2000 (Lavett)	480 SC	0.062	0.021	2	Ear Rest of Plant Grain Straw	-1 0 7 14 -1 0 7 14 21 29 21 29	< 0.02 0.69 0.15 0.08 < 0.02 1.3 0.15 0.09 < 0.02 < 0.02 0.11 0.14	Schoening, R. and Eberhardt, R. 2001 RA-2120/00
France La Chapelle Vendomoise 2000 (Florence Aurore)	480 SC	0.067 0.069	0.021 0.022	2	Ear Rest of Plant Grain Straw	0[1] 0 7 14 0[1] 0 7 14 21 21	0.16 0.83 0.36 0.51 0.53 1.9 0.54 0.70 < 0.02 0.53	Schoening, R. and Eberhardt, R. 2001 RA-2120/00

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Monheim 2000 (Lavett)	480 SC	0.062	0.021	2	Ear	0 21	0.58 0.05	Schoening, R. and Eberhardt, R. 2001 RA-2120/00
					Rest of Plant	0 21	1.7 0.05	
					Grain	30	< 0.02	
					Straw	30	0.07	
France Villexanton 2000 (Lloyd)	480 SC	0.066 0.062	0.022 0.021	2	Ear	0	0.84	Schoening, R. and Eberhardt, R. 2001 RA-2120/00
					Rest of Plant	0	1.3	
					Grain	21	0.04	
					Straw	21	0.89	
France Montamat 2000 (Apache)	480 SC	0.062	0.021	2	Ear	0[1] 0 7	0.20, 0.18 (0.19) 0.87, 0.88 (0.88) 1.4, 1.3 (1.4)	Schoening, R. and Sur, R. 2001 RA-2121/00
					Rest of Plant	0[1] 0 7	0.25, 0.23 (0.24) 1.9, 1.8 (1.9) 2.4, 1.9 (2.2)	
					Grain	14 22	0.02, < 0.02 (0.02) 0.03, 0.03 (0.03)	
					Straw	14 22	1.6, 1.6 (1.6) 1.4, 1.4 (1.4)	
France Martres 2000 (Sidéral)	480 SC	0.062	0.021	2	Ear	0[1]	1.1	Schoening, R. and Sur, R. 2001 RA-2121/00
					Rest of Plant	0	1.8	
					Grain	20	0.03	
					Straw	20	0.97	
Germany Burscheid 2002 (Picolo)	110 OD	0.05	0.017	2	Ear	0[1] 0 21	0.04 0.43 0.03	Schoening, R. 2004 RA/2177/02
					Rest of Plant	0[1] 0 21	0.03 1.2 0.04	
					Grain	35	< 0.02	
					Straw	35	0.07	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Pithienvile	110 OD	0.05	0.017	2	Ear	0[1]	0.2	Schoening, R. 2004
						0	0.71	RA/2177/02
2002 (Apache)					Rest of Plant	0[1]	0.6	
						0	1.8	
					Grain	21	0.04	
						35	< 0.02	
					Straw	21	1.7	
						35	0.96	
Germany Burscheid	110 OD	0.05	0.017	1	Ear	0	0.36	Schoening, R. 2004a
						21	0.04	RA-2177/02
2002 (Picolo)					Rest of Plant	0	1.3	
						21	0.04	
					Grain	35	< 0.02	
					Straw	35	0.06	
France Pithienvile	110 OD	0.05	0.017	1	Ear	0	0.55	Schoening, R. 2004a
								RA-2178/02
2002 (Apache)					Rest of Plant	0	1.2	
					Grain	21	0.03	
						35	0.02	
					Straw	21	1.2	
						35	0.56	

1 sampling before last application

Table 57. Thiacloprid residues resulting from foliar application to barley.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Burscheid	480 SC	0.062	0.021	2	Ear	0[1]	< 0.02	Schoening, R. and
						0	0.90	Eberhardt, R.
						6	0.11	2002
2000 (Baronesse)						14	0.08	RA-2122/00
					Rest of Plant	0[1]	0.04	
						0	1.5	
						6	0.18	
						14	0.06	
					Grain	22	0.03	
						29	0.06	
					Straw	22	0.05	
						29	0.07	
France Monnaie	480 SC	0.062	0.021	2	Ear	0[1]	0.53	Schoening, R. and
		0.062	0.019			0	2.6	Eberhardt, R.
						8	0.61	2002
2000 (Prisma)						14	0.36	RA-2122/00
					Rest of Plant	0[1]	1.8	
						0	3.4	
						8	1.6	
						14	0.44	
					Grain	21	0.12	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
					Straw	21	0.41	
Germany Monheim 2000 (Alexis)	480 SC	0.062	0.021	2	Ear Rest of Plant Grain Straw	0 0 20 30 20 30	0.97 1.6 < 0.02 < 0.02 0.08 0.04	Schoening, R. and Eberhardt, R. 2002 RA-2122/00
France Courcy 2000 (Cork)	480 SC	0.068 0.062	0.021 0.021	2	Ear Rest of Plant Grain Straw	0 0 22 22	0.82 1.1 0.05 0.29	Schoening, R. and Eberhardt, R. 2002 RA-2122/00
France St. Pey De Castet 2000 (Gaelic)	480 SC	0.062 0.075	0.021 0.021	2	Ear Rest of Plant Grain Straw	0[1] 0 7 15 0[1] 0 7 15 21 21	0.52 2.0 1.5 1.4 0.25 1.2 0.76 0.99 0.45 0.88	Schoening, R. 2001e RA-2123/00
France Soulan 2000 (Nikel)	480 SC	0.062	0.021	2	Ear Rest of Plant Grain Straw	0 0 21 21	0.88 0.90 0.11 0.15	Schoening, R. 2001e RA-2123/00

1 sampling before last application

Table 58. Thiacloprid residues resulting from foliar application to rice

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
India Chakdaha 2000 (Swama masuri)	240 SC	0.18		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 39 39 39	12.0 10.2 8.5 6.98 3.0 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Anon. 2002 India-Rice-2002 Season-I, Replicate 1
	240 SC	0.18		1	Whole plant w/o roots	0 1 3 7 15 30	8.1 7.1 6.0 4.4 4.1 < 0.001[1]	Season-I, Replicate 2

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
					Grain	39	< 0.001[1]	
					Husk	39	< 0.001[1]	
					Straw	39	< 0.001[1]	
	240 SC	0.18		1	Whole plant w/o roots	0	9.1	Season-I, Replicate 3
						1	8.96	
						3	7.99	
						7	4.9	
						15	2.9	
						30	< 0.001[1]	
					Grain	39	< 0.001[1]	
					Husk	39	< 0.001[1]	
					Straw	39	< 0.001[1]	
India Chakdaha 2000 (Swama masuri)	240 SC	0.36		1	Whole plant w/o roots	0	18.9	Anon. 2002 India-Rice-2002 Season-I, Replicate 1
						1	15.98	
						3	15.1	
						7	10.9	
						15	3.7	
						30	< 0.001[1]	
					Grain	39	< 0.001[1]	
					Husk	39	< 0.001[1]	
					Straw	39	< 0.001[1]	
	240 SC	0.36		1	Whole plant w/o roots	0	17.4	Season-I, Replicate 2
						1	16.8	
						3	11.6	
						7	8.8	
						15	4.0	
						30	< 0.001[1]	
					Grain	39	< 0.001[1]	
					Husk	39	< 0.001[1]	
					Straw	39	< 0.001[1]	
	240 SC	0.36		1	Whole plant w/o roots	0	16.1	Season-I, Replicate 3
						1	14.3	
						3	14.0	
						7	10.1	
						15	6.9	
						30	< 0.001[1]	
					Grain	39	< 0.001[1]	
					Husk	39	< 0.001[1]	
					Straw	39	< 0.001[1]	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
India Chakdaha 2000 (Khitish)	240 SC	0.18		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 29 29 29	11.1 8.7 8.2 4.5 2.7 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Anon. 2002 India-Rice-2002 Season-II, Replicate 1
	240 SC	0.18		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 29 29 29	8.9 9.1 7.4 5.9 5.2 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Season-II, Replicate 2
	240 SC	0.18		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 29 29 29	9.99 10.1 8.5 6.9 3.2 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Season-II, Replicate 3
India Chakdaha 2000 (Khitish)	240 SC	0.36		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 29 29 29	19.5 17.9 12.6 11.9 4.9 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Anon. 2002 India-Rice-2002 Season-II, Replicate 1
	240 SC	0.36		1	Whole plant w/o roots Grain Husk Straw	0 1 3 7 15 30 29 29 29	16.6 14.9 15.3 9.1 6.2 < 0.001[1] < 0.001[1] < 0.001[1] < 0.001[1]	Season-II, Replicate 2

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
	240 SC	0.36		1	Whole plant w/o roots	0 1 3 7 15 30	17.0 17.5 16.3 12.3 5.9 < 0.001[1]	Season-II, Replicate 3
					Grain	29	< 0.001[1]	
					Husk	29	< 0.001[1]	
					Straw	29	< 0.001[1]	
India Chakdaha 2001 (Swama masuri)	240 SC	0.18		1	Whole plant w/o roots	0 1 3 7 15 30	8.98 8.4 8.5 5.3 2.5 < 0.001[1]	Anon. 2002 India-Rice-2002 Season-III, Replicate 1
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	
	240 SC	0.18		1	Whole plant w/o roots	0 1 3 7 15 30	10.96 7.1 7.9 6.7 3.9 < 0.001[1]	Season-III, Replicate 2
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	
	240 SC	0.18		1	Whole plant w/o roots	0 1 3 7 15 30	9.8 10.7 6.6 4.98 3.6 < 0.001[1]	Season-III, Replicate 3
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	
India Chakdaha 2001 (Swama masuri)	240 SC	0.36		1	Whole plant w/o roots	0 1 3 7 15 30	16.7 14.2 13.96 10.2 3.4 < 0.001[1]	Anon. 2002 India-Rice-2002 Season-III, Replicate 1
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
	240 SC	0.36		1	Whole plant w/o roots	0 1 3 7 15 30	15.9 16.6 12.2 8.4 5.0 < 0.001[1]	Season-III, Replicate 2
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	
	240 SC	0.36		1	Whole plant w/o roots	0 1 3 7 15 30	18.1 14.7 14.8 12.0 5.5 < 0.001[1]	Season-III, Replicate 3
					Grain	44	< 0.001[1]	
					Husk	44	< 0.001[1]	
					Straw	44	< 0.001[1]	

1 limit of detection

Table 59: Thiacloprid residues resulting from granular application to rice.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan Miyagi 1997 (Sasanishiki)	GR, 15	1.5	-	1	Thiacloprid: Grain	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997t, 1997u, 1997v, 1997w
						152	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
					Thiacloprid-amide: Grain	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						152	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
Japan, Kagoshima 1997 (Koshihikari)	GR, 15	1.5	-	1	Thiacloprid: Grain	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	Anon. 1997t, 1997u, 1997v, 1997w
						117	< 0.005, < 0.005, < 0.005[2], < 0.005[2]	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
							(< 0.005)	
					Thiacloprid-amide: Grain	0[1]	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	
						117	< 0.005, < 0.005, < 0.005[2], < 0.005[2] (< 0.005)	

1 sampling before last application

2 replicate analysis

Table 60. Thiacloprid residues resulting from foliar application to maize.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Saint Symphorien d'Ancelles 2004 (Texxud)	110 OD	0.075	0.025	2	Green material	0[1] 0 2 7 21	0.31 1.7 0.89 0.76 0.56	Diot, R. 2005 RA-2512/04
					Ear, corn	0[1] 0 2 7 21	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	
					Kernel	30	< 0.01	
Germany Leverkusen 2004 (Justine)	110 OD	0.075	0.025	2	Green material	0[1] 0 2 7 21	< 0.05 0.90 0.18 0.10 < 0.05	Diot, R. 2005 RA-2512/04
					Ear, corn	0[1] 0 2 7 21	< 0.01 0.03 0.03 0.02 0.01	
					Kernel	30	< 0.01	
Germany Gersthofen 2004 (Banguy)	110 OD	0.075	0.025	2	Green material	0[1] 0 2 7 22	0.21 0.85 0.67 0.42 0.28	Diot, R. 2005 RA-2512/04
					Ear, corn	0[1] 0 2 7 22	0.01 0.02 0.04 0.03 0.04	
					Kernel	31	< 0.01	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
France Bacquepuis 2004 (Anjou 285)	110 OD	0.075	0.025	2	Green material	0[1] 0 2 7 21	0.17 0.87 0.81 0.55 0.66	Diot, R. 2005 RA-2512/04
					Ear, corn	0[1] 0 2 7 21	< 0.01 0.02 0.03 0.02 0.02	
					Kernel	31	< 0.01	
France Ambérieux 2004 (34B23)	110 OD	0.075	0.025	2	Green material	0[1] 0 3 7 22	0.33 1.7 1.7 1.1 0.58	Diot, R. 2005a RA-2511/04
					Ear, corn	0[1] 0 3 7 22	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	
					Kernel	31	< 0.01	
Spain Vila-sacra 2004 (PR32R42)	110 OD	0.075	0.025	2	Green material	0[1] 0 3 7 21	0.12 0.46 0.36 0.32 0.10	Diot, R. 2005a RA-2511/04
					Ear, corn	0[1] 0 3 7 21	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	
					Kernel	30	< 0.01	
Italy Albaro Di Ronco All'Adige 2004 (PR-33-A46)	110 OD	0.075	0.025	2	Green material	0[1] 0 3 7 21	0.14 0.74 0.71 0.63 0.13	Diot, R. 2005a RA-2511/04
					Ear, corn	0[1] 0 3 7 21	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	
					Kernel	28	< 0.01	

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Greece Xehasmeni-Imathias 2004 (Brasco)	110 OD	0.075	0.025	2	Green material Ear, corn Kernel	0[1] 0 2 7 21 0[1] 0 2 7 21 31	0.62 1.9 1.2 1.3 1.8 0.04, 0.04, 0.03 (0.04) 0.16, 0.15, 0.15 (0.15) 0.08, 0.07, 0.08 (0.08) 0.11, 0.11, 0.11 (0.11) 0.14, 0.12, 0.12 (0.13) < 0.01	Diot, R. 2005a RA-2511/04

1 sampling before last application

Nuts and seeds

Table 61. Thiacloprid residues resulting from foliar application to walnuts.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Italy Villadose 2003 (Lara)	480 SC	0.17 0.19	0.03 0.03	2	Nutmeat	0 3 7 14	< 0.005 < 0.005 < 0.005 < 0.005	Baravelli, P. L. 2003 AGRI012/03DEC
Italy Villadose 2003 (Lara)	480 SC	0.17 0.19	0.03 0.03	2	Nutmeat	0 3 7 14	< 0.005 < 0.005 < 0.005 < 0.005	Baravelli, P. L. 2003 AGRI012/03DEC
Italy San Dona di Piave 2003 (Lara)	480 SC	0.19 0.19	0.03 0.03	2	Nutmeat	0 3 7 14	< 0.005 < 0.005 < 0.005 < 0.005	Baravelli, P. L. 2003 AGRI012/03DEC
Italy San Dona di Piave 2003 (Lara)	480 SC	0.19 0.19	0.03 0.03	2	Nutmeat	0 3 7 14	< 0.005 < 0.005 < 0.005 < 0.005	Baravelli, P. L. 2003 AGRI012/03DEC

Table 62. Thiacloprid residues resulting from foliar application to almonds

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA California 2000 (Monterey)	480 SC	0.14 0.15 0.15	0.029	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 1.4 < 0.01 1.4	Harbin, A. M. 2004 110307
USA California, Kerman 2000 (Monterey)	480 SC	0.14 0.14 0.14	0.005	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 1.5 < 0.01 1.5	Harbin, A. M. 2004 110307
USA California, Hughson 2000 (Merced)	480 SC	0.14 0.14 0.15	0.028 0.028 0.029	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 0.99 < 0.01 1.0	Harbin, A. M. 2004 110307
USA California, Hughson 2000 (Merced)	480 SC	0.14 0.14 0.14	0.006 0.006 0.007	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 1.3 < 0.01 1.3	Harbin, A. M. 2004 110307
USA California, Porterville 2000 (Mission)	480 SC	0.14 0.14 0.14	0.025 0.026 0.025	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 10 10 10 10	 < 0.01 2.1 < 0.01 2.1	Harbin, A. M. 2004 110307
USA California, Porterville 2000 (Mission)	480 SC	0.14 0.14 0.14	0.006 0.006 0.007	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 10 10 10 10	 < 0.01 1.8 < 0.01 1.8	Harbin, A. M. 2004 110307

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA California, Glenn 2000 (Non-Pareil)	480 SC	0.14 0.14 0.14	0.038 0.038 0.033	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 1.8 < 0.01 1.8	Harbin, A. M. 2004 110307
USA California, Glenn 2000 (Non-Pareil)	480 SC	0.14	0.007	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 3.4 < 0.01 3.4	Harbin, A. M. 2004 110307
USA California, Glenn 2000 (Non-Pareil)	70 WG	0.14 0.14 0.14	0.038 0.038 0.033	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 0.01 2.0 0.01 2.0	Harbin, A. M. 2004 110307
USA California, Glenn 2000 (Non-Pareil)	70 WG	0.14	0.007	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 14 14 14 14	 < 0.01 4.9 < 0.01 4.9	Harbin, A. M. 2004 110307
USA California, Terra Bella 2000 (Monterey)	480 SC	0.14	0.022	3	Thiacloprid only: Nutmeat Hulls Total residue[1]: Nutmeat Hulls	 8 14 20 23 8 14 20 23 8 14 20 23 8 14 20 23	 < 0.01 < 0.01 < 0.01 < 0.01 2.3 3.3 2.8 1.8 < 0.01 < 0.01 < 0.01 < 0.01 2.3 3.3 2.8 1.8	Harbin, A. M. 2004 110307

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA California, Terra Bella	480 SC	0.14	0.007	3	Thiacloprid only:			Harbin, A. M.
					Nutmeat	8	< 0.01	2004
						14	< 0.01	110307
						20	< 0.01	
2000						23	< 0.01	
(Monterey)								
					Hulls	8	3.8	
						14	3.7	
						20	4.5	
						23	2.4	
					Total residue[1]:			
					Nutmeat	8	< 0.01	
						14	< 0.01	
						20	< 0.01	
						23	< 0.01	
					Hulls	8	3.8	
						14	3.7	
						20	4.6	
						23	2.5	
USA California, Terra Bella	70 WG	0.14	0.022	3	Thiacloprid only:			Harbin, A. M.
					Nutmeat	8	< 0.01	2004
						14	< 0.01	110307
						20	< 0.01	
2000						23	< 0.01	
(Monterey)								
					Hulls	8	2.0	
						14	3.2	
						20	2.6	
						23	1.4	
					Total residue[1]:			
					Nutmeat	8	< 0.01	
						14	< 0.01	
						20	< 0.01	
						23	< 0.01	
					Hulls	8	2.1	
						14	3.2	
						20	2.6	
						23	1.4	
USA California, Terra Bella	70 WG	0.14	0.007	3	Thiacloprid only:			Harbin, A. M.
					Nutmeat	8	< 0.01	2004
						14	< 0.01	110307
						20	< 0.01	
2000						23	< 0.01	
(Monterey)								
					Hulls	8	2.4	
						14	3.3	
						20	2.4	
						23	2.3	
					Total residue[1]:			
					Nutmeat	8	< 0.01	
						14	< 0.01	
						20	< 0.01	
						23	< 0.01	
					Hulls	8	2.4	
						14	3.4	
						20	2.4	
						23	2.4	

1 Determined as sum of thiacloprid, thiacloprid -amide and 4-hydroxy-thiacloprid-amide

Table 63. Thiacloprid residues resulting from foliar application to pecan.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Georgia, Chula 2000 (Summer)	480 SC	0.14 0.15 0.14	0.023 0.027 0.025	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 13 13	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Georgia, Chula 2000 (Summer)	480 SC	0.14 0.14 0.14	0.004 0.005 0.005	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 13 13	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Louisiana, Alexandria 2000 (Cape Fear)	480 SC	0.14	0.029	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Louisiana, Alexandria 2000 (Cape Fear)	480 SC	0.14	0.006	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Louisiana, Alexandria 2000 (Cape Fear)	70 WG	0.14	0.029	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Louisiana, Alexandria 2000 (Cape Fear)	70 WG	0.14	0.006	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Texas, Boling 2000 (Choctaw)	480 SC	0.14	0.029	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Texas, Boling 2000 (Choctaw)	480 SC	0.14	0.006	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 14 14	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Texas, Uvalde 2000 (Stuart)	480 SC	0.14 0.14 0.15	0.033 0.035 0.033	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 12 12	 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Texas, Uvalde 2000 (Stuart)	480 SC	0.14	0.007	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 12 12	 < 0.01 < 0.01	Harbin, A. M. 2004 110307

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Georgia, Albany 2000 (Stuart)	480 SC	0.14 0.14 0.14	0.027 0.029 0.027	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 9 14 19 23 9 14 19 23	 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Georgia, Albany 2000 (Stuart)	480 SC	0.14	0.005	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 9 14 19 23 9 14 19 23	 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Georgia, Albany 2000 (Stuart)	70 WG	0.14 0.14 0.14	0.027 0.029 0.027	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 9 14 19 23 9 14 19 23	 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A. M. 2004 110307
USA Georgia, Albany 2000 (Stuart)	70 WG	0.14	0.005	3	Thiacloprid only: Nutmeat Total residue[1]: Nutmeat	 9 14 19 23 9 14 19 23	 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	Harbin, A. M. 2004 110307

1 Determined as sum of thiacloprid, thiacloprid -amide and 4-hydroxy-thiacloprid-amide

Oilseeds

Table 64. Thiacloprid residues resulting from foliar application to oilseed rape.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Hungary Kaposvár-Dénes-major 2000 (Valeska)	480 SC	0.096	0.031	1	Seed	31	0.02, < 0.02, < 0.02 (0.02)	Orosz, F. 2000b 00-BAY-AA-14-04
France Villettes 2001 (Pollen)	240 OD	0.096	0.032	1	Green material Straw Seed	0 30 30	1.0 0.25 0.07	Schoening, R. 2002e RA-2171/01
Germany Burscheid 2001 (Express)	240 OD	0.096	0.032	1	Green material Pod Rest of Plant Seed Straw	0 7 14 7 14 22 29 33 29	1.6 1.4 0.50 0.71 0.08 0.06 0.05 0.04 0.28	Schoening, R. 2002e RA-2171/01
Germany Burscheid 2002 (Licondor)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 0 31 31	2.6 2.2 < 0.02 0.18	Billian, P. and Schoening, R. 2003d RA-2025/02
France Etrepagny 2002 (Zenith)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 7 14 22 0 7 14 22 30 35 30	1.9 0.31 0.22 0.18 1.1 0.17 0.08 0.04 < 0.02 < 0.02 0.31	Billian, P. and Schoening, R. 2003d RA-2025/02
Sweden Dalby 2002 (Stratos)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 0 29 29	3.1 1.9 0.05 0.07	Billian, P. and Schoening, R. 2003d RA-2025/02

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Germany Boerrstadt 2002 (Capitol)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 0 30 30	2.2 <u>1.4</u> <u>0.07</u> 0.40	Billian, P. and Schoening, R. 2003d RA-2025/02
France Chambourg 2002 (Pollen)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 7 14 21 0 7 14 21 30 36 30	0.58 0.85 0.60 0.66 <u>1.5</u> 0.12 0.05 0.04 0.08 <u>0.10</u> 0.45	Billian, P. and Schoening, R. 2003d RA-2025/02
Germany Worms-Heppenheim 2002 (Zenith)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 7 14 0 7 14 21 29 33 29	2.1 1.1 0.69 <u>1.1</u> 0.30 0.13 <u>0.22</u> 0.16 0.18 0.18	Billian, P. and Schoening, R. 2003d RA-2025/02
Spain Vilademuls 2001 (Fabiola)	240 OD	0.12	0.032	1	Green material Seed Straw	0 30 40 40	<u>1.7</u> 0.14 <u>0.09</u> 0.17	Schoening, R. 2002f RA-2172/01
France Varennes 2001 (Constant)	240 OD	0.088	0.032	1	Green material Pod Rest of Plant Seed Straw	0 7 14 7 14 21 29 34 29	<u>1.2</u> 0.54 0.76 0.18 0.15 0.06 0.05 <u>0.07</u> 0.95	Schoening, R. 2002f RA-2172/01

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Vilobi D'Onyar 2001 (Fabiola)	240 OD	0.12	0.04	1	Pod Rest of Plant Seed Straw	0 7 13 20 0 7 13 20 30 34 30	2.5 1.4 1.2 1.4 1.1 0.38 0.22 0.17 0.33 0.30 0.87	Billian, P. and Schoening, R. 2003e RA-2026/02
France Bouloc 2002 (Olara)	240 OD	0.11	0.04	1	Pod Rest of Plant Seed Straw	0 0 30 30	2.3 1.1 0.03 0.10	Billian, P. and Schoening, R. 2003e RA-2026/02

Single underlined values were used for the evaluation of rape forage

Double underlined values were used for the evaluation of rape seed and white mustard seed

Table 65. Thiacloprid residues resulting from foliar application to cotton.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Coria del Rio 1997 (Bravo)	480 SC	0.096	0.019	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 0.94	Schoening, R. and Sur, R. 2000a RA-2115/97 Replicate 1
Spain Coria del Rio 1997 (Bravo)	480 SC	0.096	0.019	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 1.1	Schoening, R. and Sur, R. 2000a RA-2115/97 Replicate 2
Greece Alexandria 1997 (Tempra)	480 SC	0.096	0.0096	3	Thiacloprid only: Seed Total residue[1]: Seed	 20 20	 < 0.02 1.4	Schoening, R. and Sur, R. 2000a RA-2115/97
Greece Alexandria 1997 (Bravo)	480 SC	0.096	0.096	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 2.0	Schoening, R. and Sur, R. 2000a RA-2115/97
Spain Palomares 1998 (Bravo)	480 SC	0.096	0.019	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 0.76	Schoening, R. and Sur, R. 2000b RA-2073/98 Replicate 1

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Spain Palomares 1998 (Bravo)	480 SC	0.096	0.019	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 1.0	Schoening, R. and Sur, R. 2000b RA-2073/98 Replicate 2
Greece Trikala 1998 (Bravo)	480 SC	0.096	0.0096	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 1.7	Schoening, R. and Sur, R. 2000b RA-2073/98
Greece Alexandria 1998 (Bravo)	480 SC	0.096	0.0096	3	Thiacloprid only: Seed Total residue[1]: Seed	 21 21	 < 0.02 0.83	Schoening, R. and Sur, R. 2000b RA-2073/98
USA Louisiana, Cheneyville 1997 (Delta and Pine Land)	480 SC	0.11	0.12	3	Total residue[1]: Seed Gintrash	 13 13	 0.24, 0.33 (0.29) 9.5, 10.7 (10.1)	Koch, A. 1999 109011
USA Louisiana, Cheneyville 1997 (Delta and Pine Land)	70 WG	0.11	0.12	3	Total residue[1]: Seed Gintrash	 13 13	 0.46, 0.42 (0.44) 9.4, 8.6 (9.0)	Koch, A. 1999 109011
USA Arkansas, Shoffner 1997 (Suregrow 125)	480 SC	0.11	0.15	3	Total residue[1]: Seed gintrash	 15 15	 0.49, 0.38 (0.44) 10.9, 8.2 (9.6)	Koch, A. 1999 109011
USA Arkansas, Shoffner 1997 (Suregrow 125)	70 WG	0.11	0.15	3	Total residue[1]: Seed Gintrash	 15 15	 0.23, 0.21 (0.22) 8.6, 9.2 (8.9)	Koch, A. 1999 109011
USA Texas, Bernard 1997 (Deltapine 33B)	480 SC	0.11	0.12	3	Total residue[1]: Seed	 14	 0.84, 0.62 (0.73)	Koch, A. 1999 109011
USA Texas, Bernard 1997 (Deltapine 33B)	70 WG	0.11	0.12	3	Total residue[1]: Seed	 14	 0.31, 0.75 (0.53)	Koch, A. 1999 109011
USA Texas, Floydada 1997 (HS-26)	480 SC	0.11	0.12	3	Total residue[1]: Seed	 14	 0.09, 0.11 (0.10)	Koch, A. 1999 109011
USA Texas, Floydada 1997 (HS-26)	70 WG	0.11	0.13	3	Total residue[1]: Seed	 14	 0.08, 0.08 (0.08)	Koch, A. 1999 109011

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Texas, Olton 1997 (Paymaster 145)	480 SC	0.11	0.13	3	Total residue[1]: Seed Gintrash	 14 14	 0.70, 0.64 (0.67) 8.4, 8.0 (8.2)	Koch, A. 1999 109011
USA Texas, Olton 1997 (Paymaster 145)	70 WG	0.11	0.13	3	Total residue[1]: Seed Gintrash	 14 14	 0.54, 0.50 (0.52) 9.7, 8.1 (8.9)	Koch, A. 1999 109011
USA Oklahoma, Eakly 1997 (Paymaster 183)	480 SC	0.11	0.12	2	Total residue[1]: Seed Gintrash	 17 17	 0.14, 0.23 (0.19) 1.1, 1.3 (1.2)	Koch, A. 1999 109011
USA Oklahoma, Eakly 1997 (Paymaster 183)	70 WG	0.11	0.12	3	Total residue[1]: Seed Gintrash	 17 17	 0.20, 0.18 (0.19) 1.4, 0.95 (1.2)	Koch, A. 1999 109011
USA Oklahoma, Dill City 1997 (Paymaster HS-200)	480 SC	0.11	0.13	3	Total residue[1]: Seed Gintrash	 20 20	 0.56, 0.55 (0.56) 2.5, 1.7 (2.1)	Koch, A. 1999 109011
USA Oklahoma, Dill City 1997 (Paymaster HS-200)	70 WG	0.11	0.13	3	Total residue[1]: Seed Gintrash	 20 20	 0.33, 0.41, (0.37) 2.3, 3.2 (2.8)	Koch, A. 1999 109011
USA California, Madera 1997 (Maxxa)	480 SC	0.11	0.15	3	Total residue[1]: Seed	 15	 < 0.05, < 0.05 < 0.05)	Koch, A. 1999 109011
USA California, Madera 1997 (Maxxa)	70 WG	0.11	0.15	3	Total residue[1]: Seed	 15	 < 0.05, < 0.05 (< 0.05)	Koch, A. 1999 109011
USA California, Kerman 1997 (Maxxa)	480 SC	0.11	0.15	3	Total residue[1]: Seed	 14	 0.15, 0.11 (0.13)	Koch, A. 1999 109011
USA California, Kerman 1997 (Maxxa)	70 WG	0.11	0.15	3	Total residue[1]: Seed	 14	 0.21, 0.26 (0.24)	Koch, A. 1999 109011

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
USA Mississippi, Benoit 1997 (Deltapine 50)	480 SC	0.11	0.20	3	Total residue[1]: Seed gintrash	 8 12 17 21 8 12 17 21	 0.11, 0.13 (0.12) 0.09, 0.23 (0.16) 0.26, 0.25 (0.26) 0.46, 0.22 (0.34) 3.5, 5.0 (4.3) 3.3, 3.9 (3.6) 2.4, 2.4 (2.4) 2.9, 2.2 (2.6)	Koch, A. 1999 109011
USA Mississippi, Benoit 1997 (Deltapine 50)	70 WG	0.11	0.21	3	Total residue[1]: Seed Gintrash	 12 12	 < 0.05, 0.11 (0.08) 3.1, 3.8 (3.5)	Koch, A. 1999 109011
USA California, Fresno 1997 (Maxxa)	480 SC	0.11	0.12	3	Total residue[1]: Seed	 14	 0.34, 0.15 (0.25)	Koch, A. 1999 109011
USA Georgia, Tifton 1997 (DPL5415)	480 SC	0.11	0.13	3	Total residue[1]: Seed	 16	 0.48, 0.54 (0.51)	Koch, A. 1999 109011
USA Georgia, Tifton 1997 (DPL5415)	70 WG	0.11	0.13	3	Total residue[1]: Seed	 16	 0.49, 0.63 (0.56)	Koch, A. 1999 109011

1 determined as 6-CNA

Table 66. Thiacloprid residues resulting from foliar application to sunflowers.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Hungary Fonó Somogy 2000 (Arena)	480 SC	0.097	0.031	1	Seed	30	0.02, 0.03, 0.03 (0.03)	Orosz, F. 2000c 00-BAY-AA-14-05

Tea

Table 67. Thiacloprid residues resulting from foliar application to green tea.

Location Year (variety)	Form	Application			Analysis			Reference, Report No.
		kg ai/ha	kg ai/hL	No	Sample	PHI	Residues	
Japan, Mie 1997 (Yabukita)	30 WG	0.3	0.015	1	Thiacloprid: Leaves	0[1]	< 0.01, < 0.01, < 0.04[2], < 0.04[2] (< 0.04)	Fukuda, T. 1998 NR98020
						3	9.9, 9.7, 7.9[2], 7.1[2] (8.2)	
						7	17, 16, 11[2], 10[2] (14)	
						14	5.1, 5.0, 4.3[2], 4.0[2] (4.6)	
					Thiacloprid-amide: Leaves	0[1]	< 0.01, < 0.01, < 0.04[2], < 0.04[2] (< 0.04)	
						3	0.02, 0.01, < 0.04[2], < 0.04[2] (0.04)	
						7	0.05, 0.05, 0.06, 0.06 (0.06)	
						14	0.02, 0.02, < 0.04[2], < 0.04[2] (0.04)	
Japan, Miyazaki 1997 (Yamanami)	30 WG	0.3	0.015	1	Thiacloprid: Leaves	0[1]	< 0.01, < 0.01, < 0.04[2], < 0.04[2] (< 0.04)	Fukuda, T. 1998 NR98020
						3	44, 42, 39[2], 38[2] (41)	
						7	19, 19, 15[2], 14[2] (17)	
						14	4.2, 3.9, 2.9[2], 2.9[2] (3.5)	
					Thiacloprid-amide: Leaves	0[1]	< 0.01, < 0.01, < 0.04[2], < 0.04[2] (< 0.04)	
						3	0.07, 0.06, 0.08[2], 0.08[2] (0.07)	
						7	0.07, 0.06, 0.08, 0.08 (0.07)	
						14	0.02, 0.02, < 0.04[2], < 0.04[2] (0.04)	

1 sampling before last application

2 replicate analysis

FATE OF RESIDUES IN STORAGE AND PROCESSING

Processing

In hydrolysis experiments designed to simulate typical procesing operations (Riegner, K., 1998) [methylene-^{14}C]-thiacloprid was incubated in aqueous buffer solutions at a concentration of 0.41 mg/L at 90°C (pH 4 for 20 min), 100°C (pH 5 for 60 min) and 120°C (pH 6 for 20 min) (Table 68).

At zero-time and test termination the samples were analysed by HPLC and by thin-layer chromatography. The content of radioactivity was determined by liquid scintillation counting. Material balances were established at each sampling time.

Table 68. Representative hydrolysis conditions.

Hydrolysis Conditions	Sampling time (min)	Content of thiacloprid (% of applied radioactivity *)
pH 4; 90 °C; 20 min.	0 20	97.6 98.1
pH 5; 100 °C; 60 min.	0 60	97.0 96.5
pH 6; 120 °C; 20 min.	0 20	96.9 97.0

After incubation, the radioactivity in the neutralised buffer solutions represented unchanged thiacloprid (96.5–98.1% of the applied radioactivity), demonstrating that no significant hydrolytic degradation had taken place under the simulated processing conditions.

Processing studies on melons and watermelons, apples, peaches, cherries and tomatoes were reported.

Melons

Residues in melons and watermelons incurred as a result of foliar treatment . The specific trial data is presented in Table 45 and Table 47. As relevant processing step the seperation of pulp and peel was investigated. In Table 69 the residues and processing factors for melons and watermelons are summarised.

Table 69. Processing studies on melons.

Location Year (variety)	Sample	PHI	Residues	Processing factor	Reference, Report No.
MELONS					
Greece Larisa 1995 (Midi Star)	Peel	0[1] 0 3 7 10	0.03 0.08 0.02 0.02 < 0.02	 2 1 1 nc	Placke, F. J. 1997j RA-2061/95
	Pulp	0[1] 0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	 0.5 nc nc nc	
	Whole fruit[2]	0[1] 0 3 7 10	< 0.02 0.04 < 0.02 < 0.02 < 0.02		

Location Year (variety)	Sample	PHI	Residues	Processing factor	Reference, Report No.
Italy Trinitapoli 1995 (Leglend)	Peel	0[1] 0 3 7 10	0.02 0.23 0.08 0.05 < 0.02	 2.6 2.7 2.5 nc	Placke, F. J. 1997j RA-2061/95
	Pulp	0[1] 0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	 0.22 0.66 1 nc	
	Whole fruit[2]	0[1] 0 3 7 10	< 0.02 0.09 0.03 0.02 < 0.02		
Greece Larisa 1996 (Gold Star F1)	Whole fruit	0[1] 0 1	0.04 0.05 0.06		Placke, F. J. 1997k RA-2118/96
	Peel	3 7	0.36 0.28	6 7	
	Pulp	3 7	< 0.02 < 0.02	0.33 0.5	
	Whole fruit[2]	3 7	0.06 0.04		
Italy Lequile 1996 (Galia)	Whole fruit	0[1] 0 1	0.03 0.06 0.06		Placke, F. J. 1997k RA-2118/96
	Peel	3 7	0.23 0.23	3.8 3.8	
	Pulp	3 7	< 0.02 < 0.02	0.33 0.33	
	Whole fruit[2]	3 7	0.06 0.06		
France Verlhac7Tescou 2000 (Figaro)	Whole fruit	0 3	0.07 0.05		Schoening, R. and Nuesslein, F. 2001b RA-2115/00
	Peel	3	0.13	2.6	
	Pulp	3	< 0.02	0.4	
France Sarrians 2000 (Sirio)	Whole fruit	0 3	0.05 0.02		Schoening, R. and Nuesslein, F. 2001b RA-2115/00
	Peel	3	0.05	2.5	
	Pulp	3	< 0.02	1	

Location Year (variety)	Sample	PHI	Residues	Processing factor	Reference, Report No.
WATERMELONS					
Greece Larisa 1995 (Crimson Sweet)	Peel	0[1]	< 0.02		Placke, F. J. 1997j RA-2061/95
		0	0.03	1.5	
		3	< 0.02	nc	
		7	< 0.02	nc	
		10	< 0.02	nc	
	Pulp	0[1]	< 0.02		
		0	< 0.02	nc	
		3	< 0.02	nc	
		7	< 0.02	nc	
		10	< 0.02	nc	
	Whole fruit[2]	0[1]	< 0.02		
		0	< 0.02		
		3	< 0.02		
		7	< 0.02		
		10	< 0.02		
Spain Gavá 1995 (Super Sugarbaby)	Peel	0[1]	0.04		Placke, F. J. 1997j RA-2061/95
		0	0.07	2.3	
		3	0.03	1.5	
		7	< 0.02	nc	
		10	< 0.02	nc	
	Pulp	0[1]	< 0.02		
		0	< 0.02	0.66	
		3	< 0.02	nc	
		7	< 0.02	nc	
		10	< 0.02	nc	
	Whole fruit[2]	0[1]	< 0.02		
		0	0.03		
		3	< 0.02		
		7	< 0.02		
		10	< 0.02		
Spain Gavá 1996 (Patanegra)	Whole fruit	0[1]	< 0.02		Placke, F. J. 1997k RA-2118/96
		0	< 0.02		
		1	< 0.02		
		3	< 0.02		
		7	< 0.02		
	Peel	3	< 0.02	nc	
		7	< 0.02	nc	
	Pulp	3	< 0.02	nc	
		7	< 0.02	nc	
Spain La Almunia 1996 (Meridiam)	Whole fruit	0[1]	0.03		Placke, F. J. 1997k RA-2118/96
		0	0.08		
		1	0.07		
		3	0.06		
		7	0.06		
	Peel	3	0.10	1.7	
		7	< 0.02	0.33	
	Pulp	3	< 0.02	0.33	
		7	< 0.02	0.33	

nc: pf cannot be calculated

1 treatment before last application

2 calculated value

RAC: raw agricultural commodity

Residues were below the limit of quantification (< 0.02 mg/kg) in melons before processing, but were quantified in peel or pulp. In cases were residues were measurable in processed fractions, transfer values were calculated by taking residues in whole fruits before processing as equal to the LOQ (0.02 mg/kg).

Apples

Two trials on apples were conducted in Italy and Germany 1995. The application rate was 0.144 kg ai/ha. The water rate was 500 and 1500 L/ha corresponding to a spray concentration of 0.02% or 0.06%, respectively. The two treatments were conducted during fruit development and fruit colouring at an interval of 14 days. The last application was carried out 14 days prior to the expected harvest (recommended waiting period). For processing, apple fruits were taken from the treated and the untreated plot on day 14 (harvest).

The washing of apples was done using domestic practice (see Figure 5). The preparation of dried apples, apple juice, dried pomace and apple sauce simulated the industrial practice at a laboratory scale (see Figures 6, 7 and 8).

The residues of thiacloprid were determined according to method 00419. The recoveries ranged from 77 to 108% at fortification levels of 0.02 and 0.20 mg/kg for fruit, from 92 to 104% at fortification level of 0.02 mg/kg for juice, from 75 to 80% at fortification level of 0.02 mg/kg for pomace, from 88 to 89% at fortification level of 0.02 mg/kg for dried fruit and from 89 to 98% at fortification levels of 0.02 and 0.20 mg/kg for sauce. The limit of quantitation (LOQ) was 0.02 mg/kg.

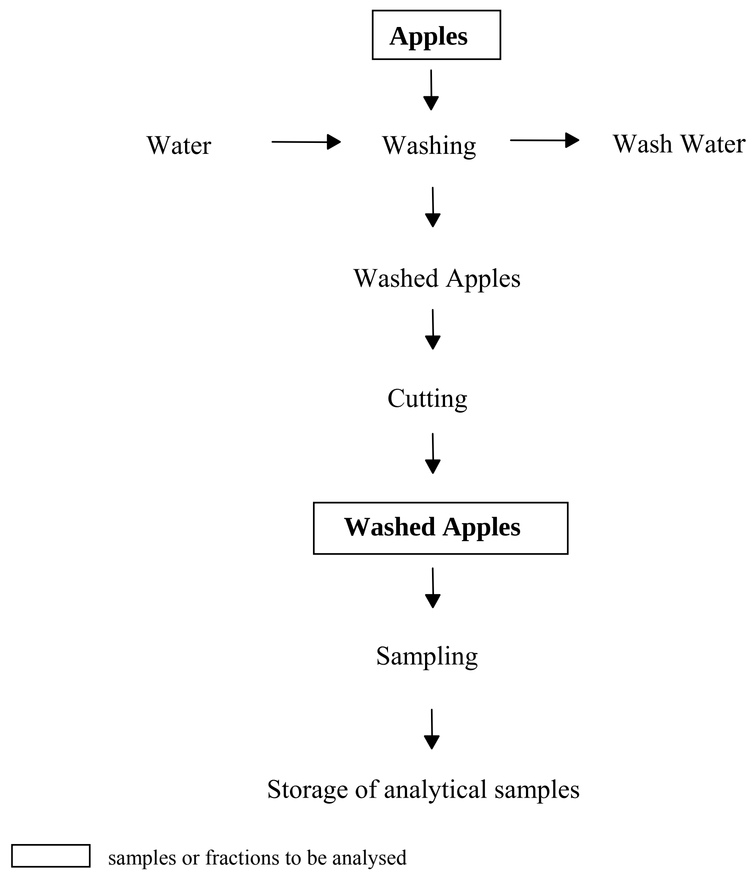


Figure 5. Flow Diagram for the preparation of washed apples.

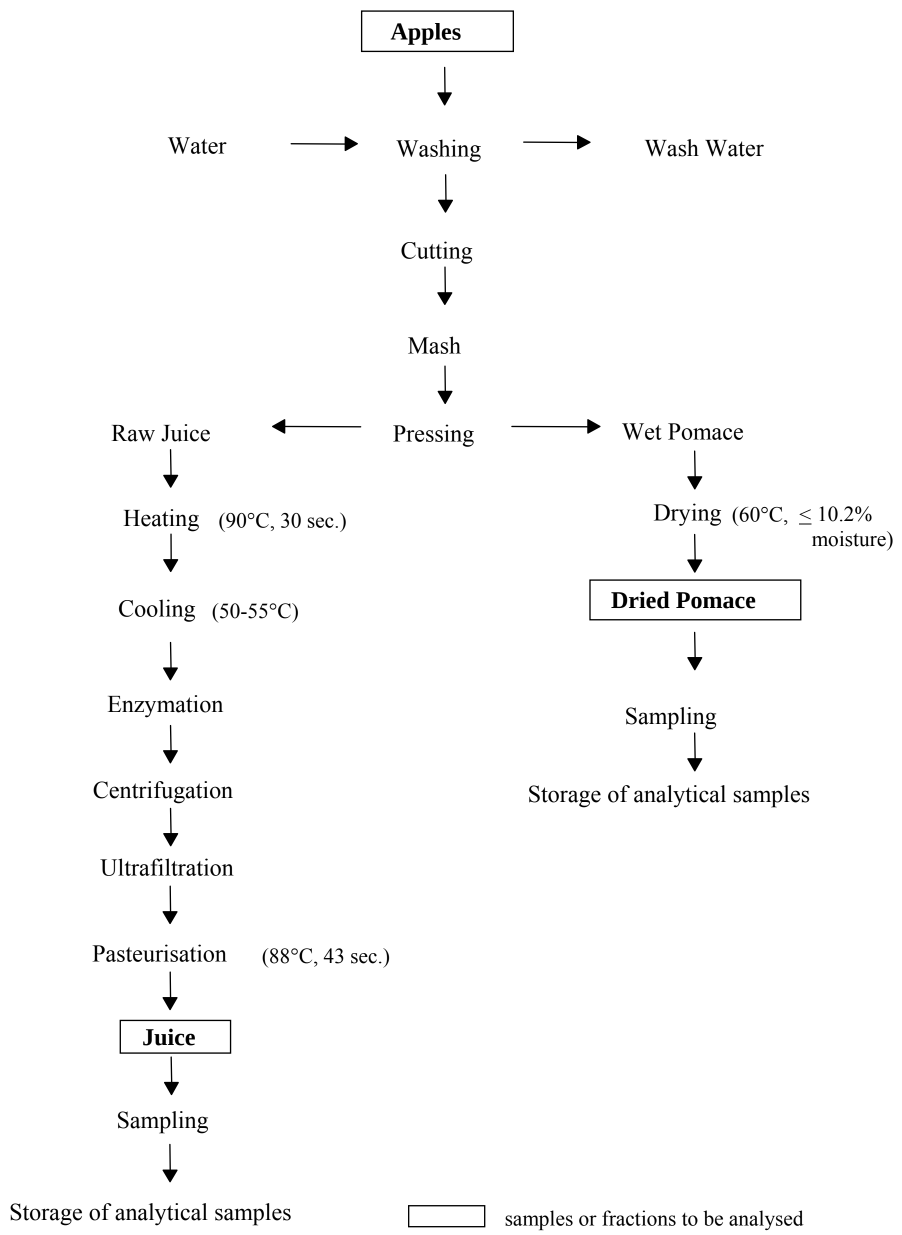


Figure 6. Flow Diagram for the preparation of apple juice and dried pomace.

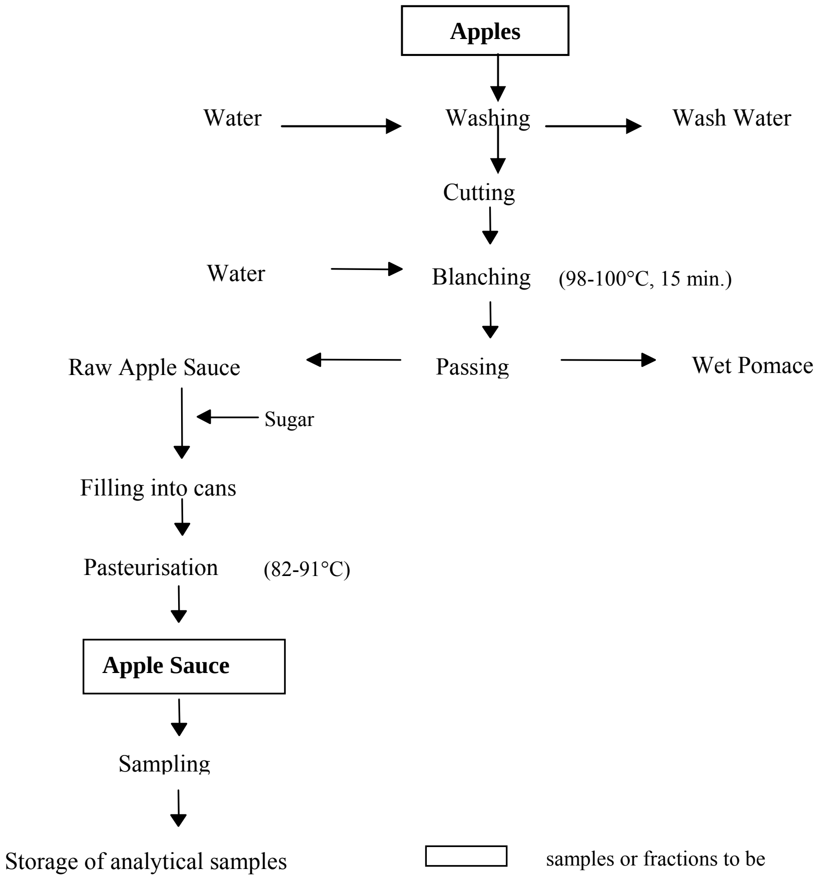


Figure 7. Flow Diagram for the preparation of apple sauce.

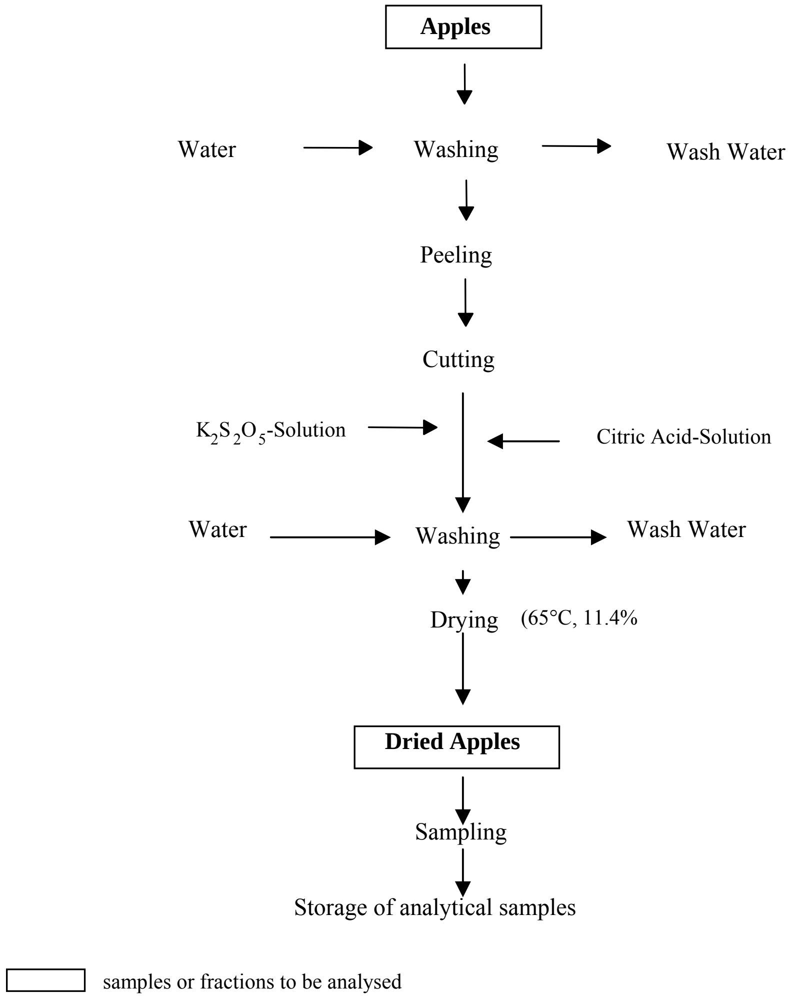


Figure 8. Flow Diagram for the preparation of dried apples.

Table 70. Results from processing studies on apple.

Country Year (Variety)	Application					Commodity	Thiacloprid mg/kg	Processing factor	Author Date Report No.
	From	No.	kg ai/ha	kg ai/hL	PHI days				
Italy Laives 1995 (Granny Smith)	480 SC	2	0.14	0.096	14	Fruit (RAC)	0.1		Placke, F. J. 1997t RA-3063/95
						Fruit, washed	0.08, 0.07 (0.08)	0.8	
						Fruit, dried	0.03, 0.02 (0.03)	0.3	
						Juice	0.02, 0.02 (0.02)	0.2	
						Sauce	0.06, 0.05 (0.06)	0.6	
						Pomace, dried	0.42, 0.43 (0.43)	4.3	
Germany Monheim 1995 (Golden Delicious)	480 SC	2	0.14	0.023	14	Fruit (RAC)	0.07		Placke, F. J. 1997u RA-3062/95
						Fruit, washed	0.06, 0.07 (0.07)	1	
						Fruit, dried	0.06, 0.04 (0.05)	0.7	
						Juice	< 0.02, < 0.02 (< 0.02)	0.29	
						Sauce	0.06, 0.06 (0.06)	0.86	
						Pomace, dried	0.63, 0.59 (0.61)	8.7	

RAC: raw agricultural commodity

Peaches

Three trials on peaches were performed in Italy and Spain in 1995 and 1996. The application rate was 0.144 kg ai/ha. The water rate was 1500 L/ha corresponding to a spray concentration of 0.02%. The two treatments were conducted during fruit development and fruit colouring at an interval of 14 days. The last application was carried out 14 days prior to the expected harvest (recommended waiting period). All applications were at the required rate. For processing peaches were taken on day 14 from the treated and the untreated plot.

The washing of peaches was done using domestic practice, i.e., washing in standing water and stoning (Figure). The preparation of peach preserves simulated industrial practice at a laboratory scale (Figure). For the preparation of preserves, the peaches were washed in standing water, peeled and stoned. The peeled and stoned peaches were filled into 1L preserving cans and a solution of sugar was added. Then the peach preserves were pasteurised at about 90°C. After pasteurisation, the peach preserve was minced in a mixer.

The residues of thiacloprid were determined according to method 00419. The recoveries ranged from 92 to 104% at fortification levels of 0.02 and 0.20 mg/kg for fruit and from 92 to 99% at a fortification level of 0.02 mg/kg for the peach preserve. The limit of quantitation (LOQ) was 0.02 mg/kg.

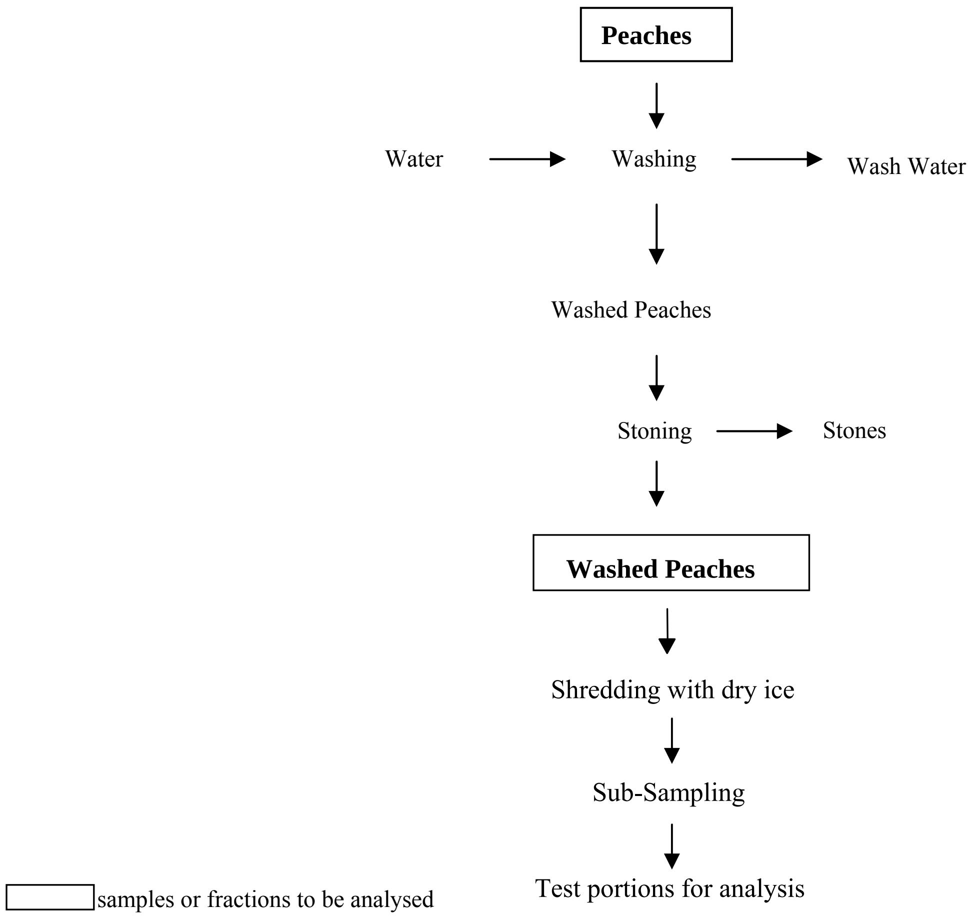


Figure 9. Flow Diagram for the preparation of washed peaches

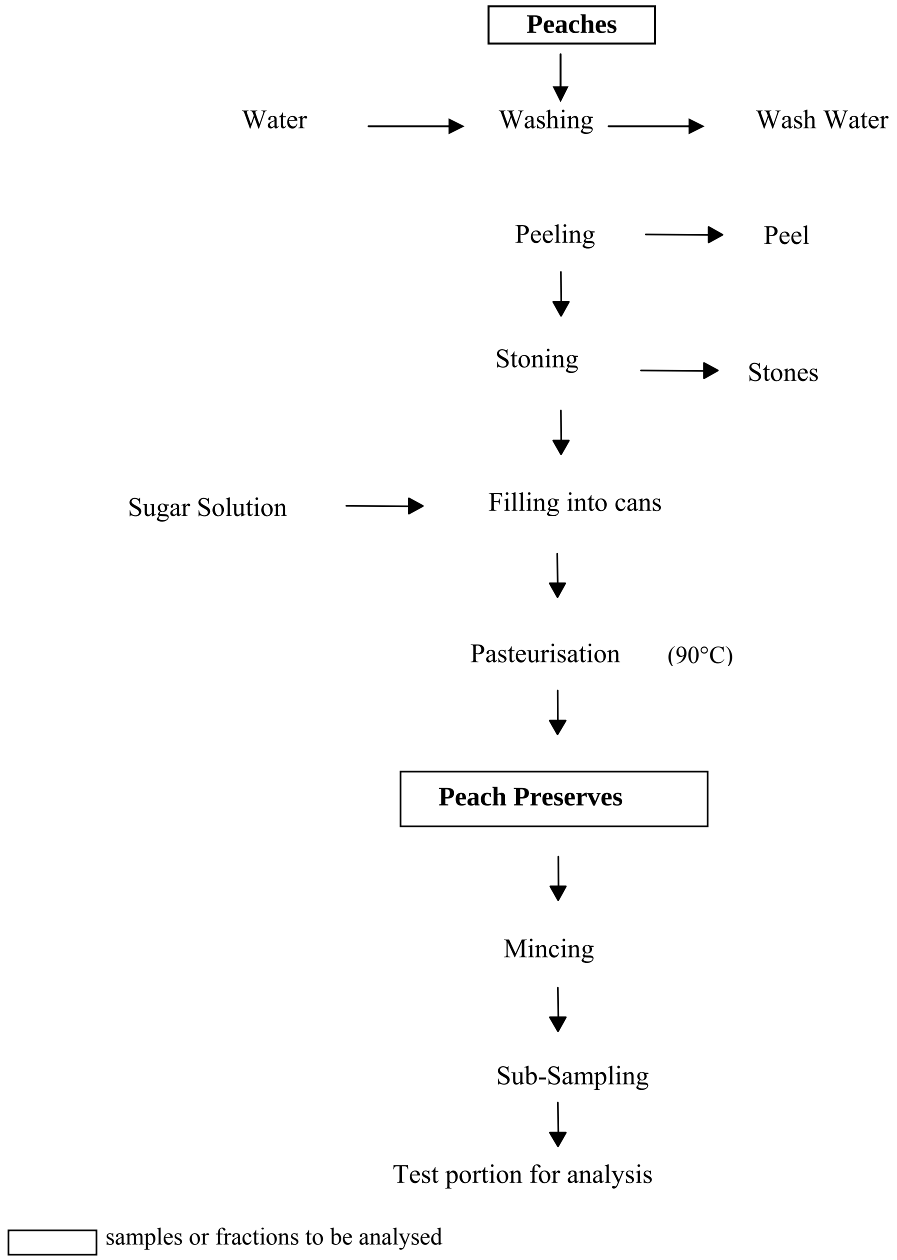


Figure 10. Flow Diagram for the preparation of peach preserve

Table 71. Results from processing studies on peach.

Country Year (Variety)	Application					Commodity	Thiacloprid mg/kg	Processing factor	Author Date Report No.
	From	No.	kg ai/ha	kg ai/hL	PHI days				
Italy Ravenna 1995 (Red Haven)	480 SC	2	0.14	0.096	14	Fruit w/o stone (RAC) Fruit, washed Preserve	0.03 0.02, 0.02 (0.02) < 0.02, < 0.02 (< 0.02)	 0.66 0.66	Placke, F. J. 1997v RA-3064/95

Country Year (Variety)	Application					Commodity	Thiacloprid mg/kg	Processing factor	Author Date Report No.
	From	No.	kg ai/ha	kg ai/hL	PHI days				
Italy Ravenna 1996 (Red Haven)	480 SC	2	0.14	0.096	14	Fruit with stone (RAC)	0.03		Placke, F. J. 1997w RA-3121/96
						Fruit, washed	< 0.02, < 0.02 (< 0.02)	0.66	
						Preserve	< 0.02, < 0.02 (< 0.02)	0.66	
Spain La Fortesa 1996 (Baby Gold 9)	480 SC	2	0.14	0.096	14	Fruit with stone (RAC)	0.09		Placke, F. J. 1997w RA-3121/96
						Fruit, washed	0.06, 0.06 (0.06)	0.66	
						Preserve	< 0.02, < 0.02 (< 0.02)	0.22	

RAC: raw agricultural commodity

Cherries

For cherries one trial was conducted in Germany in 1999 (Schoening, R. and Sur, R., 2000c). Thiacloprid 480 SC was sprayed twice to sour cherry trees at a rate of 0.25 L/ha, corresponding to 0.12 kg ai/ha. The spray volume was 500 L per metre of plant height per hectare. The volume was adapted to the height of the leafy surface (500 L/(ha × m height) not exceeding 1500 L water/ha). The last treatment was performed 14 days prior to harvest. Samples were taken 14 days after the last application. The washing of cherries was done according to household practice. The preparation of cherry preserves simulated the industrial practice at laboratory scale. The processing procedures are described in Figure 11 and Figure 12. Analysis of thiacloprid was done according to method 00548.

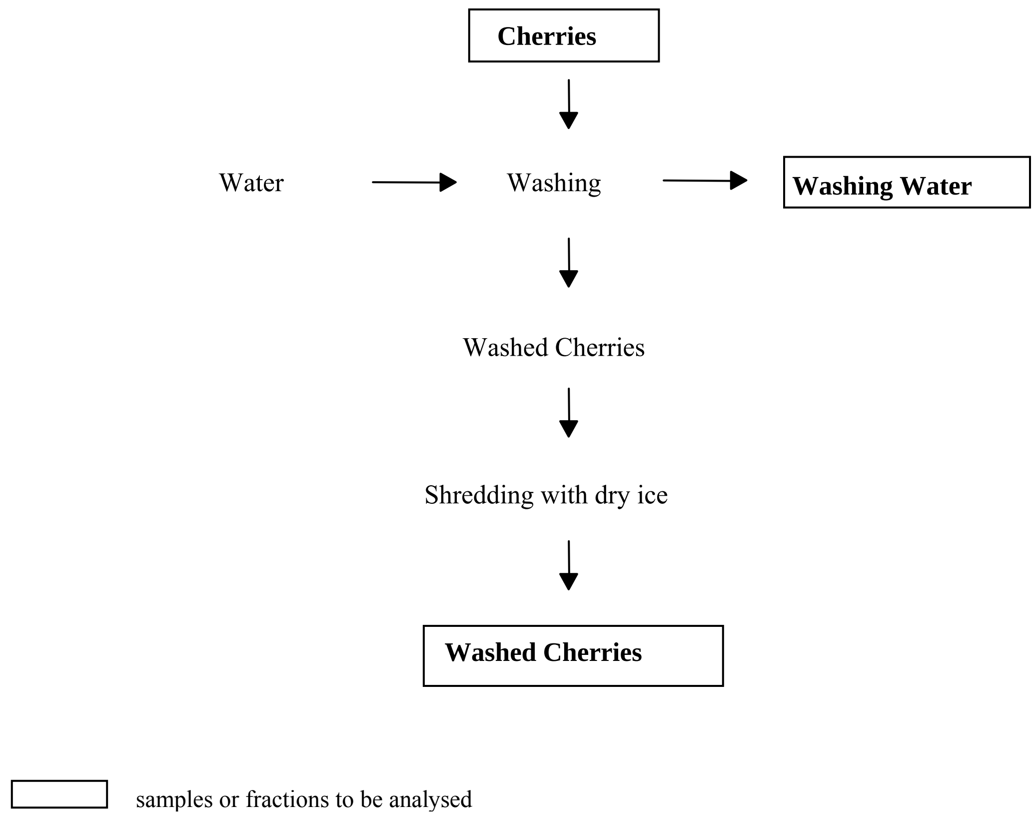


Figure 6. Flow diagram for the preparation of washed cherries.

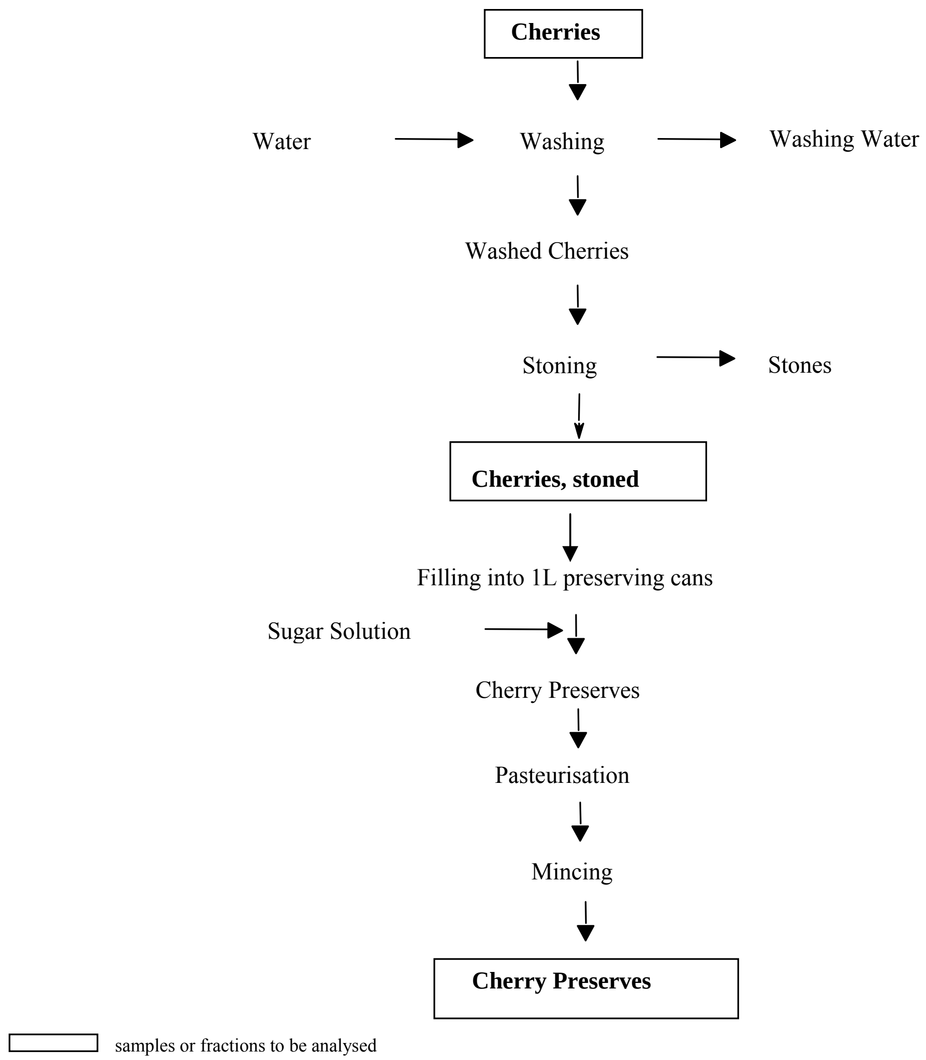


Figure 7. Flow diagram for the preparation of cherry preserve.

Residues of thiacloprid in the raw agricultural commodity (cherry fruit) and processed products harvested at a PHI of 14 days were below the limit of quantitation of 0.02 mg/kg. Therefore transfer factors could not be calculated.

Tomatoes

Two greenhouse trials on tomatoes were performed in Spain and Germany in 1996. The application rate was 0.216 kg ai/ha. The water rate was 1500 L/ha corresponding to a spray concentration of 0.025% and 0.030%, respectively. The treatments were conducted during fruit development and fruit colouring at an interval of 14 days between the first and the second application and an interval of 7 days between the second and third application. The last application was carried out 3 days prior to the expected harvest (recommended harvest interval). For processing, tomato fruits were taken on day 3 from the treated and the untreated plots.

Treated tomatoes were washed and processed into juice, paste and preserves. The washing and peeling was done using domestic practice (see Figure 13); whereas the production of juice, paste and preserve simulated commercial processing at a laboratory scale (see Figures 14 and 15).

For the preparation of juice the tomatoes were washed in standing water and then cut into small pieces. The tomato pieces were heated, with the addition of 100 mL water per 1 kg of tomatoes, to 100°C for about 8–10 minutes to prevent enzymatic reactions. After this blanching process the tomato pulp was passed through a strainer to separate juice and pomace. Sodium chloride (0.5–0.7% relative to the amount of juice) was added to the raw juice. The tomato juice was then filled into preserving cans and pasteurised for 2 minutes at about 90°C.

For the preparation of tomato paste the tomatoes were washed in standing water and then cut into small pieces. The tomato pieces were heated, with the addition of 100 mL water per 1 kg tomatoes, to approximately 100°C for about 8–10 minutes in order to prevent enzymatic reactions. After this blanching process the tomato pulp was passed through a strainer to separate juice and pomace. Subsequently the tomato juice was concentrated to 38–45% dry weight. After concentration the tomato paste was filled into cans. The tomato paste was then pasteurised for 5 minutes at about 90°C.

For the preparation of preserves the tomatoes were transferred into lukewarm water. After a few minutes the peel was removed. The peeled tomatoes were filled into 1L preserving cans with tomato juice added. The preserves were then pasteurised for 2–3 minutes at about 90 °C.

The residues of thiacloprid were determined according to method 00419. The recoveries ranged from 86 to 107% for fruit, from 89 to 108% for juice, from 93 to 97% for paste and from 80 to 98% for preserve at fortification levels of 0.02 and 0.20 mg/kg. The limit of quantification (LOQ) was 0.02 mg/kg.

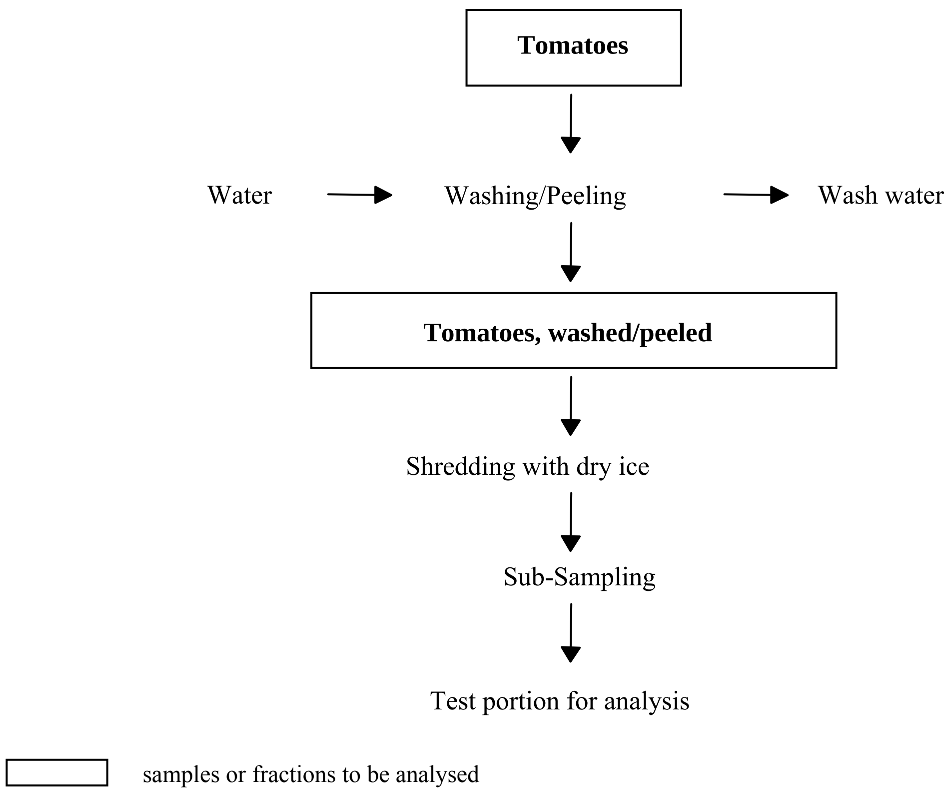


Figure 13. Flow diagram for the preparation of peeled tomatoes.

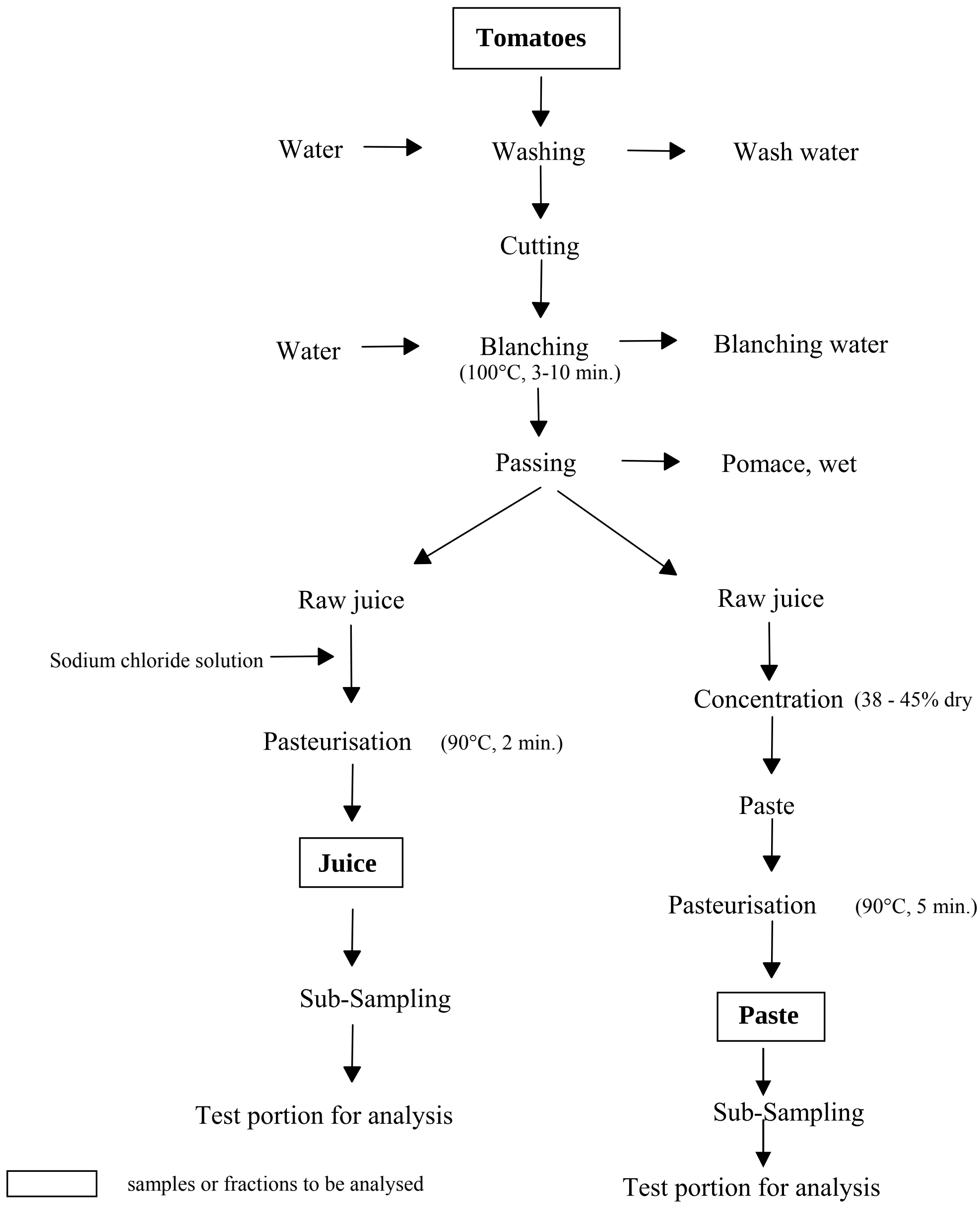


Figure 14. Flow diagram for the preparation of tomato juice and paste

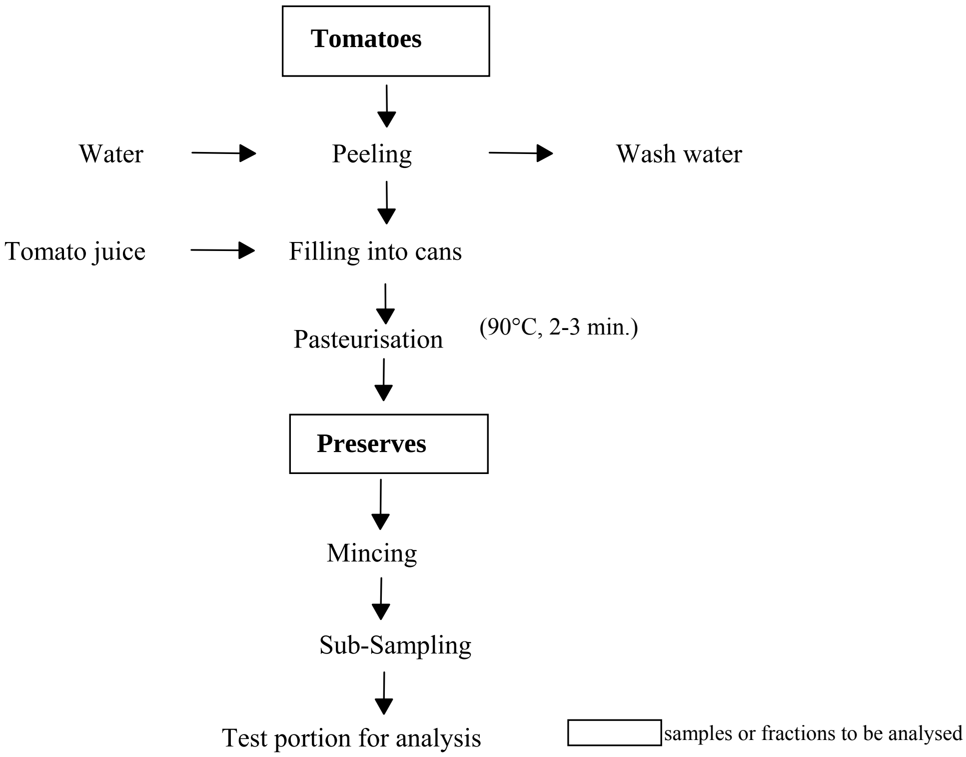


Figure 15. Flow diagram for the preparation of tomato preserves.

Table 72. Results from processing studies on tomato.

Country Year (Variety)	Application					Commodity	Thiacloprid mg/kg	Processing factor	Author Date Report No.
	From	No.	kg ai/ha	kg ai/hL	PHI days				
Spain Ruescas 1996 (Brillante)	480 SC	3	0.22	0.014	3	Fruit (RAC) Fruit, washed Fruit, peeled Paste Juice Preserve	0.24 0.13, 0.12 (0.125) 0.06, 0.05 (0.06) 0.48 0.09, 0.10 (0.10) 0.08, 0.07 (0.08)	 0.54 0.25 2 0.42 0.33	Placke, F. J. 1997x RA-3123/96
Germany Leichlingen 1996 (Ferrari)	480 SC	3	0.18	0.012	3	Fruit (RAC) Fruit, washed Fruit, peeled Paste Juice Preserve	0.07 0.06, 0.06 (0.06) 0.03, 0.03 (0.03) 0.22, 0.22 (0.22) 0.05, 0.05 (0.05) 0.05, 0.05 (0.05)	 0.86 0.43 3.1 0.71 0.71	Placke, F. J. 1997x RA-3123/96

RAC: raw agricultural commodity

RESIDUES IN ANIMAL COMMODITIES

Farm animal feeding studies

A ruminant feeding study was reported. No study was available on poultry feeding.

A feeding study on cow was carried out at three dosing levels equivalent to 2.1 (0.07 mg/kg bw) (1×), 6.2 (0.213 mg/kg bw) (3×) and 20.6 ppm (0.655 mg/kg bw) (10×) thiacloprid in the diet together with an untreated control group (Placke, F. J., 1998b). There were three cows in each of the treatment groups. After acclimatisation, thiacloprid was administered daily to the cows in gelatine capsules for 28 consecutive days. Milk samples were collected and composited for each cow. At the end of the 28-day dosing period, the cows were sacrificed, and kidney, liver, composite fat (omental and perirenal), and composite muscle (flank, leg, and loin) were removed from each cow. Blood was washed from the tissues. The tissues were immediately cut into small pieces, frozen with dry ice, and stored in a freezer below -18°C until processing. Tissues from each cow were kept separate for individual analysis. All milk samples were kept in a freezer below -18°C until analysis and were also individually processed and analysed.

Samples of tissues and milk were analysed for parent and total residues of thiacloprid. The total residues comprising the active substance and all metabolites containing the 6-chloropyridine moiety were determined according to method 00491 (Schoening, R., 1998b), while the active substance residues were determined according to method 00490 (Schoening, R., 1998a).

The results are shown in Table 73 to Table 76. On average of the three cows treated per dose group, liver contained the highest thiacloprid residue levels (0.10 mg/kg) followed by kidney (0.03 mg/kg), milk and muscle (0.02 mg/kg) and fat (0.01 mg/kg) at the 1× dose level. Maximum levels for tissues were 0.02 mg/kg for fat, 0.02 mg/kg for muscle, 0.04 mg/kg for kidney and 0.11 mg/kg for liver.

In the second dose group thiacloprid residue increased to average values of 0.04 mg/kg in milk and fat (highest value 0.04 mg/kg) 0.05 mg/kg in muscle (highest value 0.06 mg/kg), 0.1 mg/kg in kidney (highest value 0.11 mg/kg) and 0.29 mg/kg in liver (highest value 0.32 mg/kg). In the high dose group the findings were 0.17 mg/kg in milk, 0.12 mg/kg in fat (highest value 0.16 mg/kg), 0.16 mg/kg in muscle (highest value 0.18 mg/kg), 0.27 mg/kg in kidney (highest value 0.32 mg/kg) and 0.94 mg/kg in liver (highest value 1.1 mg/kg).

A linear relation between the dose levels and the residue concentrations was observed. In the milk, residues reached a plateau level within five days and no accumulation was observed.

Table 73. Residues in milk 1× dose group (2.1 ppm, 0.07 mg/kg bw).

Days	Cow 4		Cow 5		Cow 6		Average	
	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg
1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2	0.01	0.01	0.011	0.014	0.016	< 0.01	0.013	0.011
5	0.014	0.02	0.014	0.02	0.021	0.026	0.016	0.022
8	0.014	0.017	0.014	0.017	0.02	0.025	0.016	0.020
11	0.018	0.02	0.020	0.014	0.03	0.025	0.023	0.020
14	0.013	0.017	0.017	0.022	0.022	0.026	0.017	0.022
17	0.017	0.02	0.015	0.02	0.025	0.027	0.019	0.022
20	0.021	0.025	0.013	0.019	0.021	0.022	0.018	0.022
25	0.011	0.016	0.012	0.017	0.016	0.018	0.013	0.017
28	0.012	< 0.01	< 0.01	0.014	0.016	0.015	0.013	0.013

1 determined as 6-CAN

Table 74. Residues in milk 3× dose group (6.2 ppm, 0.213 mg/kg bw).

Days	Cow 6		Cow 8		Cow 9		Average	
	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg
1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2	0.031	0.05	0.035	0.052	0.04	0.055	0.035	0.052
5	0.035	0.061	0.034	0.064	0.057	0.084	0.042	0.070
8	0.039	0.066	0.046	0.064	0.054	0.08	0.046	0.070
11	0.039	0.055	0.038	0.043	0.050	0.066	0.042	0.055
14	0.032	0.043	0.04	0.047	0.053	0.059	0.042	0.050

Days	Cow 6		Cow 8		Cow 9		Average	
	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg
20	0.043	0.059	0.059	0.068	0.059	0.061	0.054	0.063
28	0.033	0.046	0.042	0.051	0.043	0.057	0.039	0.051

1 determined as 6-CNA

Table 75. Residues in milk 10× dose group (20.6 ppm, 0.655 mg/kg bw).

Days	Cow 10		Cow 11		Cow 12		Average	
	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg
1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2	0.119	0.147	0.097	0.119	0.080	0.104	0.099	0.123
5	0.147	0.185	0.142	0.192	0.123	0.155	0.137	0.177
8	0.143	0.192	0.142	0.182	0.126	0.162	0.137	0.179
11	0.122	0.148	0.139	0.189	0.124	0.152	0.128	0.163
14	0.121	0.153	0.152	0.208	0.146	0.184	0.140	0.182
17	0.122	0.201	0.154	0.212	0.150	0.234	0.142	0.216
20	0.127	0.180	0.171	0.230	0.107	0.122	0.135	0.177
25	0.1	0.144	0.094	0.151	0.120	0.170	0.105	0.155
28	0.096	0.136	0.098	0.170	0.063	0.094	0.086	0.133

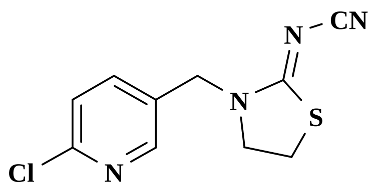
1 determined as 6-CNA

Table 76. Residue concentrations in the edible tissues.

Animal	Liver		Kidney		Muscle		Fat	
	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg	Thiacloprid mg/kg	Total residue[1] mg/kg
Control, Cow 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Control, Cow 3	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1×, Cow 4	0.09, 0.09 (0.09)	0.09, 0.09 (0.09)	0.03, 0.03 (0.03)	0.05, 0.04 (0.05)	0.02, 0.02 (0.02)	0.02, 0.02 (0.02)	0.01, 0.01 (0.01)	0.02, 0.02 (0.02)
1×, Cow 5	0.09, 0.09 (0.09)	0.08, 0.08 (0.08)	0.03, 0.03 (0.03)	0.05, 0.04 (0.05)	0.02, 0.01 (0.02)	0.02, 0.02 (0.02)	0.01, 0.01 (0.01)	0.01, 0.01 (0.01)
1×, Cow 6	0.11, 0.11 (0.11)	0.12, 0.11 (0.12)	0.04, 0.04 (0.04)	0.06, 0.06 (0.06)	0.02, 0.02 (0.02)	0.02, 0.02 (0.02)	0.02, 0.02 (0.02)	0.02, 0.02 (0.02)
1×, mean	0.10	0.10	0.03	0.05	0.02	0.02	0.01	0.02
3×, Cow 7	0.28, 0.26 (0.27)	0.28, 0.27 (0.28)	0.09, 0.09 (0.09)	0.15, 0.14 (0.15)	0.05, 0.05 (0.05)	0.05, 0.05 (0.05)	0.03, 0.03 (0.03)	0.03, 0.03 (0.03)
3×, Cow 8	0.31, 0.32 (0.32)	0.27, 0.29 (0.28)	0.09, 0.09 (0.09)	0.17, 0.20 (0.19)	0.05, 0.05 (0.05)	0.05, 0.05 (0.05)	0.04, 0.04 (0.04)	0.04, 0.04 (0.04)
3×, Cow 9	0.29, 0.27 (0.28)	0.28, 0.30 (0.29)	0.11, 0.11 (0.11)	0.16, 0.18 (0.17)	0.06, 0.06 (0.06)	0.06, 0.06 (0.06)	0.04, 0.04 (0.04)	0.04, 0.04 (0.04)
3×, mean	0.29	0.28	0.10	0.17	0.05	0.05	0.04	0.04
10×, Cow 10	0.91, 0.91 (0.91)	0.87, 0.85 (0.86)	0.23, 0.24 (0.24)	0.51, 0.45 (0.48)	0.15, 0.14 (0.15)	0.15, 0.15 (0.15)	0.12, 0.12 (0.12)	0.14, 0.15 (0.15)
10×, Cow 11	1.1, 1.1 (1.1)	1.1, 1.2 (1.2)	0.32, 0.31 (0.32)	0.61, 0.60 (0.61)	0.18, 0.18 (0.18)	0.19, 0.18 (0.19)	0.12, 0.13 (0.13)	0.16, 0.15 (0.16)
10×, Cow 12	0.81, 0.79 (0.80)	0.81, 0.84 (0.83)	0.26, 0.24 (0.25)	0.48, 0.48 (0.48)	0.15, 0.15 (0.15)	0.15, 0.14 (0.15)	0.10, 0.09 (0.10)	0.12, 0.13 (0.13)
10×, mean	0.94	0.96	0.27	0.52	0.16	0.17	0.12	0.15

APPRAISAL

N-{3-[(6-Chloro-3-pyridinyl)methyl]-1,3-thiazolan-2-yliden}cyanamide



Residues and analytical aspects of thiacloprid were considered for the first time by the present Meeting.

Thiacloprid is a non-systemic insecticide with registered uses in many countries. Thiacloprid causes disruption of the insect nervous system by acting as an inhibitor at nicotinic acetylcholine receptors.

The following abbreviations are used for the metabolites discussed below:

thiacloprid-amide	{3-[(6-chloro-3-pyridinyl)methyl]-2-thiazolidinylidene}urea (M02)
6-CNA	6-chloro-3-pyridinecarboxylic acid (M03)
thiacloprid-sulfoxide	N-[(6-chloro-3-pyridinyl)methyl]-N'-cyano-N-[2-(methylsulfinyl)-ethyl]urea (M08)
M09	N-{[6-(methylthio)-3-pyridinyl]-carbonyl}glycine
M12	Glucuronic acid conjugate of {3-[(6-chloro-3-pyridinyl)methyl]-4(or 5)-hydroxy-2-thiazolidinylidene}=
thiacloprid sulfonic acid	Sodium 2-[[[(aminocarbonyl)amino]-carbonyl][(6-chloro-3-pyridinyl)-methyl]amino]ethanesulfonate (M30)

Animal metabolism

The Meeting received results of animal metabolism studies in lactating goats and laying hens.

Goats

One lactating goat was dosed with [methylene-^{14}C]-thiacloprid at a rate of 10 mg/kg body weight for three consecutive days. Approximately 53.7% of the total radioactivity administered was excreted until sacrifice. A portion of about 48.3% was eliminated with urine and 4.5% with faeces. Due to the short period between the last dose and sacrifice, 40% of the dose was not recovered in the excreta. A low amount (0.93%) was secreted with the milk. At sacrifice 6 hours after the last dose, the total radioactive residues (TRR) in the edible tissues and organs accounted for 5.6% of the administered radioactivity. The major portion and the highest equivalent concentration were observed in the kidney and the liver.

The metabolism of thiacloprid in goats is comparable to the metabolism in rats.

The unchanged parent compound was found in all goat tissues and ranged from 28% of the TRR (equiv. to 7 mg/kg) in kidney, 61% (equiv. to 1.5 mg/kg) in milk, 83% (equiv. to 14.5 mg/kg) in liver, 90% (equiv. to 1.6 mg/kg) in fat to 92% (equiv. to 3.5 mg/kg) in muscle.

Further main metabolites were identified in kidney. Thiacloprid-sulfoxide was found at levels of 12.3% of the TRR (equiv. to 3.1 mg/kg) and M12 at 10% of the TRR (equiv. to 2.5 mg/kg). Except for thiacloprid-sulfoxide in milk (8.7% of the TRR) no other relevant metabolites in concentrations above 8% of the TRR were identified.

Hens

A group of six laying hens were fed with [methylene-^{14}C]-thiacloprid for three consecutive days at a dose rate of 10 mg/kg body weight each. Until sacrifice the excretion amounted on average to 75.4% of the total radioactivity administered. About 29.4% and 29.6% of the radioactivity eliminated during the test period was excreted within 24 hours of the first and the second doses, respectively. Another 16.4% was excreted between the final dose and sacrifice. On average, only 0.06% (equivalent to 0.4 mg/kg) of the total dose was determined in the eggs. Residue levels in liver, kidney, muscle (leg), muscle (breast) and skin (without fat) were 3.1, 2.4, 0.15, 0.13 and 0.30 mg/kg TRR, respectively.

The metabolism of thiacloprid in laying hens is comparable to the metabolism in rats.

The unchanged parent compound was found in all hen tissues and ranged from 17% of the TRR (equiv. to 0.54 mg/kg) in liver, 19% (equiv. to 0.03 mg/kg) in muscle, 48% (equiv. to 0.06 mg/kg) in eggs to 72% (equiv. to 0.08 mg/kg) in fat.

Further main metabolites were identified in muscle only. M9 was found at levels of 10.9% of the TRR (equiv. to 0.016 mg/kg). Except for thiacloprid-sulfoxide in fat (8.9% of the TRR) no other relevant metabolites in concentrations above 8% of the TRR were identified.

Thiacloprid is only moderately metabolized by goats and hens with 5.6% (goats) and 0.7% (hens) of the applied dose remaining in tissues after three days. The proposed metabolic pathway was via hydroxylation and the formation of glucoronide and cysteine conjugates, resulting in a large variety of metabolites in small amounts.

Plant metabolism

The Meeting received plant metabolism studies for thiacloprid on apples, tomatoes, cotton and wheat. In all studies [methylene-^{14}C]-thiacloprid was applied as a spray.

All plant metabolism studies demonstrated that the metabolic pathway of thiacloprid is comparable in all crops investigated. The main metabolic reactions are:

the hydroxylation of the parent compound at the thiazolidine ring

the oxidative cleavage at the methylene bridge leading to the partially and fully oxidised products 6-chloropicolyl alcohol (M36), 6-chloronicotinic acid (M03)

conjugation of these two aglycones with sugars, phosphate/sulfate and endogenous plant components.

Uptake of soil metabolites followed by further metabolisation also took place. However, these metabolic reactions occurred only to a limited extent, the majority of residue remained on the surface of the fruits as unchanged parent compound exceeding 90% of the total residue. The major metabolites identified were the monohydroxylated derivative of thiacloprid (M01; apples) and the oxidation product 6-chloronicotinic acid (M03; cotton seed, wheat) as well as various conjugates thereof or of its precursor 6-chloropicolyl alcohol (M36; cotton, tomatoes, wheat).

In translocation experiments with tomatoes it was shown that less than 0.1% of the radioactivity in the soil was transported into the fruits after uptake via the roots.

In cotton seeds a different metabolic pattern with 6-chloronicotinic acid (M03), being the main residue (46%), was observed, which might be the result of partitioning and selective transport effects. In treated cotton leaves the metabolism followed the same steps found in the other plants investigated:

hydroxylation of the parent compound at the thiazolidine ring;

cleavage at the methylene bridge leading to the partially and fully oxidised products 6-chloropicolyl alcohol (M36) and 6-chloronicotinic acid (M03);

conjugation of these two aglycones with sugars, phosphate/sulfate and endogenous plant components.

In each crop tested except cotton seeds, unchanged thiacloprid was found to be relevant residue with amount > 80% of the TRR.

Environmental fate

The Meeting received information on the environmental fate of thiacloprid in soil, including aerobic soil metabolism, field dissipation and crop rotational studies.

The soil photolysis study conducted with [methylene-^{14}C]-thiacloprid gave evidence that no accelerated degradation occurs under irradiation. Thiacloprid-amide could be identified as the main degradation byproduct. The calculated environmental half-life for thiacloprid was 74 days during midday and midsummer at 40° of latitude. No additional metabolites were identified in the samples.

In confined rotational crops studies, soil was treated with [pyridinyl-^{14}C-methyl]-thiacloprid. Turnips, lettuce and wheat were sown into the treated soil at intervals of 30, 170 and 354 days after treatment and were grown to maturity and harvested for analysis. In all matrices radioactivity above 0.01 mg/kg was found. After 354 days the residues measured ranged from 0.005 mg/kg in turnip bulbs up to 0.322 mg/kg in wheat straw. Thiacloprid-amide and thiacloprid sulfonic acid could be identified as relevant metabolites accounting for 15 – 35% of the TRR each. No parent thiacloprid was found.

The Meeting concluded that thiacloprid residues from the use of thiacloprid do not occur in concentrations above 0.01 mg/kg.

Methods of Analysis

The Meeting received descriptions and validation data for analytical methods for thiacloprid in plant and animal matrices. The method for enforcement purposes is based on extraction with acetone/water (3:1; v:v) and a subsequent clean-up by column chromatography on Florisil and elution with acetonitrile. The residues of thiacloprid parent compound are quantified by reversed phase HPLC with UV detection at 242 nm. Validation data for apples, tomatoes, cucumbers, peaches, citrus fruits, cotton seed, potatoes and tobacco was presented. In general a LOQ of 0.02 – 0.05 mg/kg was achieved, the recoveries were in the range of 72% to 105%.

Animal matrices were extracted with a mixture of acetonitrile/water or methanol. For milk samples, partitioning of the extracts against n-hexane was performed to remove fat. The aqueous remainder is partitioned against cyclohexane/ethyl acetate using a ChemElut column. Further clean-up is performed by column chromatography on Florisil and elution with acetonitrile. The residues are quantified by reversed phase HPLC with UV-detection at 242 nm. The method was validated by conducting recovery tests with muscle, milk and eggs. An LOQ of 0.01 mg/kg in milk and 0.02 mg/kg in muscle and egg was achieved, the recoveries were in the range of 75% to 104%

In addition the meeting received information on various specialized methods, mainly based on HPLC-MS/MS techniques with modification in the extraction and clean-up procedure. These methods for plant and animal matrices detect thiacloprid and possible metabolites with LOQs ranging from 0.01 mg/kg to 0.5 mg/kg (rice), depending on the matrix. In general an LOQ of 0.02 mg/kg could be achieved for all matrices except rice.

For thiacloprid, additional methods for the determination of all moieties containing 6-CNA were available. Thiacloprid and its metabolites were extracted from plant matrices with an acidic methanol / water mixture. After the clean-up thiacloprid and all metabolites containing the 6-chloropicolyl moiety were oxidized with alkaline potassium permanganate solution to yield 6-chloronicotinic acid. This was followed by acidification and reduction of the excess permanganate and the developed manganese dioxide with sodium bisulfite. The 6-CNA was converted to the corresponding trimethylsilyl ester with MSTFA (N-methyl-trimethylsilyltrifluoroacetamide) prior to quantitation by gas chromatography with mass selective detection in the single-ion monitoring mode

(GC-MS). Validation data for pome fruits, tomatoes, cotton seed, rape seed, sunflower seed, milk, muscle, liver, kidney and fat was presented. In general a LOQ of 0.05 mg/kg for plant matrices and 0.01 – 0.02 mg/kg for animal matrices was achieved, the recoveries were in the range of 66% to 102%.

Stability of pesticide residues in stored analytical samples

The Meeting received information on the stability of thiacloprid in apples, currants, tomatoes, melons, peas, potatoes, cotton seed, rape seed, wheat and tobacco. All samples were fortified at 0.2 mg/kg (except tobacco with 2 mg/kg) and stored at -20°C for between 540 and 730 days. In all matrices the remaining thiacloprid residues levels were above 80% of the initial fortification concentrations.

No stability study was submitted to the Meeting on animal matrices.

Residue definition

The results of the radiolabeled thiacloprid plant metabolism studies on apples, tomatoes, cotton and wheat indicate that thiacloprid metabolizes or degrades slowly under typical foliar application conditions. Greater than 80% of the TRR is recovered as thiacloprid and no significant metabolites or degradates were found in crops treated directly.

In rotational crop studies significant total radioactive residues were found in lettuce and wheat. Most of the residue consisted of the metabolites thiacloprid amide (M02) and thiacloprid sulfonic acid (M30). Unchanged thiacloprid was not identified. These metabolites are not considered toxicologically significant and need not be considered for the residue definition.

In ruminants, orally administered radiolabeled thiacloprid undergoes limited metabolism to glucoronide and cysteine conjugates after hydroxylation. The major component in all matrices was unchanged thiacloprid (> 80% TRR in liver, fat and muscle, 61% TRR in milk and 28% TRR in kidney). Further metabolites were identified in kidney at levels below 12% of the TRR. In poultry orally administered (dosed at 10 mg/kg body weight) thiacloprid was moderately metabolised. In all matrices thiacloprid was identified as the major component (17% TRR liver, 19% TRR muscle, 48% TRR in eggs, 72% TRR in fat). Further metabolite found in muscle, was only M9 which accounted for 10.9% of the TRR.

The log P_{ow} of thiacloprid is 1.26. As no accumulation in fat was observed in animal metabolism studies the Meeting concluded that thiacloprid is not fat-soluble.

The analytical methods determine thiacloprid, possible metabolites or the total residue determined as 6-CNA.

Based on the results of the metabolism studies the Meeting concluded that the residue definition for enforcement and dietary intake calculations in plant and animal commodities is thiacloprid. The residue is not fat-soluble.

Results of supervised trials on crops

Citrus fruit

The Meeting received information on supervised residue trials on lemons and oranges from Brazil, New Zealand and South Africa.

In Brazil thiacloprid can be applied to citrus at 0.0048 kg ai/hL with a PHI of 21 days. In two Brazilian trials on lemons three applications were made at a rate of 0.0048 kg ai/hL and 0.0096 kg ai/hL with a PHI of 21 days. No whole fruit residue data was submitted.

One trial on lemons was submitted from New Zealand where a single spray application of 0.0096 kg ai/hL was made. Residues on whole lemon fruit were found to decline from 0.19 mg/kg 1 day after treatment to 0.07 mg/kg by day 14. A GAP for New Zealand was not submitted.

In South Africa thiacloprid can be applied to citrus at a rate of 0.0067 kg ai/hL. Corresponding number of applications or PHI was not stated. In two residue trials on oranges one treatment was conducted with spray concentrations of 0.014 kg ai/hL to 0.029 kg ai/hL with the PHI ranging from 44 to 190 days. No residues above the LOQ of 0.02 mg/kg were found in all samples.

The Meeting concluded that there was insufficient data available to support a recommendation for citrus fruit.

Pome fruit

The Meeting received information on supervised residue trials on apples from Australia, Belgium, France, Germany, Italy, Japan, the Netherlands, South Africa, Spain, United Kingdom and the USA.

Thiacloprid is registered for use on apples or pome fruits in some European countries as a pre-harvest foliar spray treatment. Residue trials were carried out in Belgium, France, Germany, Italy, the Netherlands, Spain and the United Kingdom. The GAPs from Austria, Belgium, Cyprus, Czech Republic, Greece, Hungary, Italy, the Netherlands, Russia and the United Kingdom consisted of two to three spray applications at 0.012 – 0.014 kg ai/hL with a PHI of 14 days. The residues matching this GAP in the whole fruits were: 0.04, 0.05, 0.1 (2), 0.11, 0.13, 0.14, 0.16, 0.21 and 0.36 mg/kg.

In Croatia, Germany, Latvia, Lithuania, Portugal, Romania, Slovakia, Slovenia and Spain the GAP consists of two to three spray application at a rate of 0.0096 kg ai/hL with a PHI of 14 days. The residues matching this GAP in the whole fruits were: 0.02, 0.04, 0.07, 0.08, 0.1, 0.11 and 0.12 mg/kg.

GAP in USA for apples consists of up to six applications at 0.01 kg ai/hL and a PHI of 30 days. The residues from 14 supervised trials in the USA, matching the US GAP (± 30%), were: 0.02, 0.04, 0.05, 0.06 (3), 0.07 (2), 0.09 (2), 0.1, 0.11, 0.14 and 0.28 mg/kg.

GAP in South Africa for apples consists of up to four applications at 0.0072 kg ai/hL and a PHI of 14 days. Of the four supervised trials provided from South Africa none matching South African GAP.

GAP in Japan for apples consists of up to three applications at 0.015 kg ai/hL and a PHI of seven days. The residues from two supervised trials in Japan matching GAP were 0.11 and 0.30 mg/kg.

GAP in Australia for apples consists of up to three applications at 0.018 kg ai/hL and a PHI of 14 days. The residue from one trial in Australia, matching GAP (± 30%), was 0.37 mg/kg.

The Meeting decided to pool the data from Australia, Europe, Japan and the USA. The combined results (n = 34) for apples were: 0.02 (2), 0.04 (3), 0.05 (2), 0.06 (3), 0.07 (3), 0.08, 0.09 (2), 0.1 (4), 0.11 (4), 0.12, 0.13, 0.14, 0.14, 0.16, 0.21, 0.28, 0.30, 0.36 and 0.37 mg/kg.

Field trials involving thiacloprid on pears were provided from Australia, South Africa and USA.

GAP in USA for pears consists of up to six applications at 0.01 kg ai/hL and a PHI of 30 days. The residues from 14 supervised trials in the USA, matching GAP (± 30%), in ranked order were :0.05, 0.06, 0.1, 0.14, 0.14, 0.23, 0.24 and 0.27 mg/kg.

GAP in South Africa for pears consists of up to four applications at 0.0072 kg ai/hL and a PHI of 14 days. Of the four supervised trials provided from South Africa none matched GAP.

GAP in Japan for pears consists of up to three applications at 0.015 kg ai/hL and a PHI of seven days. The residues from two supervised trials in Japan matching GAP were: 0.61 and 0.87 mg/kg.

GAP in Australia for pears is up to three applications with 0.018 kg ai/hL each and a PHI of 14 days. The residues from two supervised trials in Australia, matching the GAP, were 0.37 and 0.38 mg/kg.

The Mann-Whitney-U test indicated that the medians of the residues from the Japanese and the combined Australian and US data set for pears were not similar. The Meeting decided to pool only the data from Australia and the USA. The combined results (n = 10) for pears were 0.05, 0.06, 0.1, 0.14, 0.14, 0.23, 0.24, 0.27, 0.37 and 0.38 mg/kg.

The Meeting decided to make a recommendation for the crop group of pome fruits based on the combined data for apples and pears.

For apples and pears the combined results were 0.02, 0.02, 0.04(3), 0.05(3), 0.06(4), 0.07(3), 0.08, 0.09, 0.09, 0.1(5), 0.11(4), 0.12, 0.13, 0.14(4), 0.16, 0.21, 0.23, 0.24, 0.27, 0.28, 0.30, 0.36, 0.37, 0.37 and 0.38 mg/kg.

Based on residue data for apples and pears the Meeting decided to recommend a maximum residue level of 0.7 mg/kg, a STMR of 0.11 mg/kg and a HR of 0.38 mg/kg for pome fruits.

Stone fruits

The Meeting received information on supervised residue trials on Japanese apricots from Japan.

GAP in Japan for Japanese apricots consists of up to two applications at 0.0075 kg ai/hL with a PHI of seven days. The residue trials from Japan were conducted with an application rate of 0.015 kg ai/hL, which did not correspond to the submitted GAP.

Field trials on peaches were available from France, Italy, Japan and Spain.

GAP in Cyprus, Greece, Italy and Slovenia for peaches/nectarines consists of up to two applications at 0.0096 to 0.012 kg ai/hL and a PHI of 14 days. The residues in whole fruits from nine supervised trials in Europe matching the GAP were: 0.03(3), 0.06, 0.08, 0.09, 0.13, 0.13 and 0.19 mg/kg.

GAP in Japan for peaches is up to three applications at 0.015 kg ai/hL and a PHI of 7 days. The residues from two supervised trials from Japan matching the GAP ± 30% were 0.27 and 0.40 mg/kg.

The Mann-Whitney-U test for the data from Japan and the residue data from Europe suggested a similar median for both distributions. The combined residue data was 0.03(3), 0.06, 0.08, 0.09, 0.13, 0.13, 0.19, 0.27 and 0.40 mg/kg.

Field trials on cherries were provided from Belgium, France, Germany, Italy, Japan, Spain and USA.

GAP in Croatia, Cyprus, Czech Republic, the Netherlands, Romania, Slovenia and the United Kingdom for cherries is up to two applications with 0.0096 to 0.015 kg ai/hL each and a PHI of 14 days. The residues in whole fruits from 12 supervised trials in Europe matching the GAP were for sour cherries < 0.02, 0.02, 0.03, 0.04 mg/kg and for sweet cherries 0.02, 0.06, 0.06, 0.07, 0.08, 0.1, 0.11 and 0.15 mg/kg.

GAP in Japan for cherries is up to two applications with 0.015 kg ai/hL each and a PHI of one day. The residues from two supervised trials in Japan matching the GAP were 1.4 and 2.4 mg/kg. The Mann-Whitney-U test indicated that the medians of residues, resulting from applications according to the Japanese and European GAP for cherries, were not similar. Therefore only the data from the European trials were considered for further evaluation.

The Mann-Whitney-U test gave evidence that a similar distribution for sweet and sour cherries were not similar. Therefore only the data for sweet cherries were used for further evaluation.

In Northern America thiacloprid is not registered for use in cherries. Therefore the available supervised residue trials from USA were not considered.

Field trials on plums were provided from France, Germany, Spain and USA.

GAP in the Czech Republic, the Netherlands and Romania for plums is up to two applications at 0.0096 to 0.012 kg ai/hL and a PHI of 14 days. The residues in whole fruits from 14 supervised trials in Europe matching the GAP were: < 0.02(6), 0.02(5), 0.03, 0.03 and 0.05 mg/kg.

GAP in Japan for plums is up to three applications with 0.0075 kg ai/hL each and a PHI of seven days. The residue trials from Japan were conducted with an application rate of 0.015 kg ai/hL, which does not correspond to the submitted GAP.

In Northern America thiacloprid is not registered for use in plums. Therefore the available supervised residue trials from USA are not considered for evaluation.

The Meeting decided to make a recommendation for the stone fruits crop group, based on the combined data for peaches and sweet cherries.

For peaches and sweet cherries the combined results were 0.02, 0.03(3), 0.06(3), 0.07, 0.08, 0.08, 0.09, 0.1, 0.11, 0.13, 0.13, 0.15, 0.19, 0.27 and 0.40 mg/kg.

Based on residue data for peaches and sweet cherries the Meeting recommends a maximum residue level of 0.5 mg/kg, a STMR of 0.08 mg/kg and a HR of 0.4 mg/kg for for thiacloprid in stone fruits.

Grapes

Field trials on grapes were provided from Japan.

GAP in Japan for grapes consists of up to two applications at 0.53 kg ai/ha each and a PHI of 21 days. The residues from 4 supervised trials in Japan matching the GAP (± 30%) were: 0.12, 0.44, 0.80 and 1.6 mg/kg. The Meeting decided that four residue trials were not sufficient for a recommendation for grapes.

Berries and other small fruits except grapes

Field and glasshouse trials on strawberries were provided from Belgium, France, Germany, Japan, the Netherlands, Italy, Spain and the United Kingdom.

The GAP for field use in the Netherlands and the United Kingdom for strawberries consists of up to two applications at 0.12 kg ai/ha each and a PHI of three days. The residues from eight supervised trials in Europe matching the GAP were: 0.02, 0.03, 0.04, 0.07, 0.07, 0.08, 0.08 and 0.09 mg/kg.

GAP for glasshouse use in the Netherlands and the United Kingdom for strawberries is up to two applications at 0.12 to 0.14 kg ai/ha each and a PHI of one day. The residues from eight supervised trials in Europe matching the GAP (± 30%) were 0.04, 0.05, 0.13, 0.22, 0.31(3) and 0.33 mg/kg.

GAP in Japan for protected strawberries is up to three applications with 0.23 kg ai/ha each and a PHI of one day. The residue trials from Japan were conducted with an application rate of 0.15 kg ai/ha, which does not correspond to the submitted GAP.

Field trials on currants were provided from Belgium, Germany and the United Kingdom. GAP in Germany, Latvia, the Netherlands and the United Kingdom for currants is up to three applications with 0.072 to 0.14 kg ai/ha each and a PHI of three days. The residues from eight supervised trials in Europe matching the GAP (± 30%) were: 0.08, 0.16, 0.21, 0.21, 0.28, 0.35, 0.37 and 0.59 mg/kg.

Field trials on raspberries were provided from Germany and the United Kingdom. GAP in Germany, the Netherlands and the United Kingdom for raspberries is up to three applications with 0.096 to 0.14 kg ai/ha each and a PHI of three days. The residues from eight supervised trials in Europe matching the GAP (± 30%) were: 0.1, 0.15, 0.15, 0.27, 0.31, 0.34, 0.34 and 0.62 mg/kg.

Various GAPs in Germany, Latvia, the Netherlands, Poland, Switzerland and the United Kingdom for small fruits and berries is up to three applications with 0.12 to 0.14 kg ai/ha each and a PHI of three days. The Meeting decided to make a recommendation for the whole group of berries and other small fruits except grapes based on the combined data for protected strawberries, currants and raspberries.

For protected strawberries, currants and raspberries the combined results were 0.04, 0.05, 0.08, 0.1, 0.13, 0.15, 0.15, 0.16, 0.21, 0.21, 0.22, 0.27, 0.28, 0.31(4), 0.33, 0.34, 0.34, 0.35, 0.37, 0.59 and 0.62 mg/kg.

Based on residue data for protected strawberries, currants and raspberries the Meeting recommends a maximum residue level of 1 mg/kg, a STMR of 0.275 mg/kg and a HR of 0.62 mg/kg for thiacloprid in berries and other small fruits except grapes.

Kiwi fruits

The Meeting received information on supervised residue trials on kiwi fruits from New Zealand.

GAP in New Zealand for kiwi fruit is up to two applications with 0.0096 kg ai/hL each before the flowering. The residues from nine supervised trials in New Zealand matching the GAP (± 30%) were: < 0.02 (5), 0.03, 0.04, 0.06 and 0.1 mg/kg.

The Meeting recommended a maximum residue level of 0.2 mg/kg, an STMR value of 0.02 mg/kg and a HR of 0.1 mg/kg for thiacloprid in kiwi fruits.

Onions

The Meeting received information on supervised residue trials on onions from Brazil and Germany.

GAP in Belize, Brazil, Costa Rica, Dominican Republic, El Salvador, Guatemala. Honduras, Nicaragua and Panama for onions is up to 0.1 kg ai/ha and a PHI of 21 days. Only one supervised residue trial from Brazil matched this GAP. The corresponding residue was < 0.02 mg/kg in bulb onion. From Germany two additional trials were provided with residues of < 0.01 and < 0.01 mg/kg.

The Meeting concluded that the data available for onions was not sufficient to support an STMR or MRL recommendation.

Garlic

The Meeting received information on supervised residue trials on garlic from Brazil.

GAP in Belize, Brazil, Costa Rica, Dominican Republic, El Salvador, Guatemala. Honduras, Nicaragua and Panama for garlic is up to 0.1 kg ai/ha and a PHI of 21 days. Neither of the two supervised residues trials matched the GAP for garlic within ± 30%.

The Meeting concluded that the data available for garlic was not sufficient to support a recommendation.

Cucumbers

The Meeting received information on supervised residue trials on field and glasshouse grown cucumbers from Belgium, France, Germany, Greece, the Netherlands, Italy and Spain.

The GAP for field use in Croatia, Cyprus, Georgia, Greece, Italy, the Netherlands and Spain for cucumbers is up to four applications at 0.12 to 0.15 kg ai/ha each and a PHI of one to three days. The residues from eight supervised trials in Europe matching the GAP (± 30%) were: 0.02, 0.03(3), 0.04, 0.1, 0.11 and 0.14 mg/kg.

The GAP for glasshouse use in the United Kingdom for cucumbers, which reflects the critical GAP, is up to three applications at 0.21 kg ai/ha each and a PHI of three days. The residues from 12 supervised trials in Europe matching the GAP (± 30%) were 0.04, 0.04, 0.07, 0.07, 0.08(4), 0.12, 0.15, 0.15 and 0.18 mg/kg.

The Meeting decided to pool the data from outdoor and indoor residues trials for a recommendation on cucumbers. The combined results are 0.02, 0.03(3), 0.04(3), 0.07, 0.07, 0.08(4), 0.1, 0.11, 0.12, 0.14, 0.15, 0.15 and 0.18 mg/kg.

For gherkins, GAPs from Greece and the Netherlands were available, which correspond to the GAPs for cucumber. The Meeting concluded that an extrapolation of the data from cucumbers to gherkins is not possible, because of the different surface area-to-mass ratio for gherkins, from higher residues can be expected than in cucumbers.

Based on the combined data for cucumbers the Meeting recommended a maximum residue level of 0.3 mg/kg, an STMR value of 0.08 mg/kg and a HR of 0.18 mg/kg for cucumbers.

Squash, summer

The Meeting received GAPs for courgettes and squash corresponding to the uses in cucumbers and gherkins. The treatment methods cover foliar spraying as well as drip application. The Meeting concluded that the residue data for cucumber can be extrapolated to summer squash.

Based on an extrapolation from cucumbers the Meeting recommended a maximum residue level of 0.3 mg/kg, an STMR value of 0.08 mg/kg and a HR of 0.18 mg/kg for thiacloprid in summer squash.

Melons and watermelons

The Meeting received information on supervised residue trials on melons from France, Greece and Italy. Data on protected melons was also received from Japan.

GAP in Croatia, Italy and Spain for melons and watermelons is up to three applications at 0.14 kg ai/ha each and a PHI of three to four days. The residues for whole melon fruits from six supervised trials in Europe matching the GAP (± 30%) were < 0.02, 0.02, 0.03, 0.05, 0.06 and 0.06 mg/kg. In melon pulp all residues were < 0.02(6) mg/kg.

GAP in Japan for protected melons is up to three applications at 0.45 kg ai/ha each and a PHI of one day. The residues from two supervised trials in Japan matching the GAP (±30%) were < 0.005 and < 0.005 mg/kg in the pulp.

Field trials on watermelons were available from Greece and Spain. Data on protected watermelons was also available from Japan.

GAP in Croatia, Italy and Spain for watermelons is up to three applications at 0.14 kg ai/ha each and a PHI of three to four days. The residues for whole watermelon from four supervised trials in Europe matching the GAP (± 30%) were < 0.02(3) and 0.06 mg/kg. In watermelon pulp all residues were < 0.02(4) mg/kg.

GAP in Japan for protected watermelons is up to three applications at 0.45 kg ai/ha each and a PHI of one day. The residue trials from Japan were conducted with an application rate of 0.3 kg ai/ha, which did not correspond to the submitted GAP.

The Mann-Whitney-U test for melons and watermelons indicated that a similar distribution for melons and watermelons can be assumed. The combined residues for whole melons and watermelons were < 0.02(4), 0.02, 0.03, 0.05, 0.06, 0.06 mg/kg.

The Meeting decided to pool the data for melons and watermelons for mutual support and recommended a maximum residue level of 0.2 mg/kg for thiacloprid in melons and watermelons and an STMR of 0.02 mg/kg and HR value of 0.02 mg/kg for melon and watermelon pulp.

Squash, winter

GAP in Cyprus and the Netherlands for squash, field and glasshouse grown, is up to four applications at 0.014 kg ai/hL and a PHI of one to three days. This use corresponds to the GAP available for melons and watermelons in field. The Meeting concluded that the residue data for melon and watermelon can be extrapolated for use in winter squash.

Based on an extrapolation from melon and watermelon the Meeting recommends a maximum residue level of 0.2 mg/kg for thiacloprid in winter squash and an STMR of 0.02 mg/kg and HR value of 0.02 mg/kg for winter squash pulp.

Tomatoes

The Meeting received information on supervised residue trials on field and glasshouse grown tomatoes. Supervised trials were provided for field use from France and Italy and for glasshouse use from Germany, France, Japan and Spain. In addition, residue trials with drip application in glasshouse were conducted in Belgium and the Netherlands.

Supervised residue trials of field were conducted with two applications of 0.14 up to 0.22 kg ai/ha each and PHIs from zero to eight days. Corresponding GAPs from Greece and Slovenia were available with a PHI of three days. The residues for tomatoes from seven trials in Europe, matching the GAP (± 30%), in ranked order were: 0.02, 0.03, 0.03, 0.04, 0.05, 0.09 and 0.16 mg/kg.

For foliar use in glasshouses, data from eight supervised residue trials were provided corresponding to the GAP of the United Kingdom (three applications at 0.22 kg ai/ha each and a PHI of three days). The residues from protected tomatoes from eight trials in Europe matching the UK GAP (± 30%) in ranked order were: 0.07, 0.12, 0.12, 0.15, 0.18, 0.19, 0.25 and 0.29 mg/kg.

GAP in Japan for protected tomatoes is up to three applications with 0.23 kg ai/ha each and a PHI of one day. The residue trials from Japan were conducted with an application rate of 0.38 kg ai/ha, which does not correspond to the submitted GAP.

In the Netherlands drip application to glasshouse tomatoes is registered at an application rate of 0.0096 kg ai per 1000 plants and a PHI of three days. The corresponding residues from eight trials on protected tomatoes in Europe matching the GAP (± 30%) were: < 0.02(3), 0.02(3), 0.03 and 0.03 mg/kg.

Based on the glasshouse foliar spray GAP for tomatoes the Meeting recommended a maximum residue level of 0.5 mg/kg, an STMR value of 0.165 mg/kg and a HR value of 0.29 mg/kg for thiacloprid in tomatoes.

Peppers, sweet

Supervised residue field trials were provided from France, Italy and Spain. Data for glasshouse use as foliar spray was generated in France, the Netherlands and Spain. In addition, residue trials with drip application in glasshouse were conducted in Belgium and the Netherlands.

Supervised residue trials in field use with thiacloprid were conducted with two applications of 0.14 up to 0.22 kg ai/ha each and PHIs from zero to seven days. Corresponding GAPs from Greece and Slovenia are available with a PHI of three days. The residues for peppers from seven trials in Europe matching the GAP (± 30%) in ranked order were: 0.05, 0.06, 0.08, 0.1, 0.11, 0.21 and 0.45 mg/kg.

For the use as a foliar spray in glasshouse eight supervised residue trials were conducted, corresponding to the UK GAP (three applications at 0.22 kg ai/ha and a PHI of three days). The residues for protected peppers from eight trials in Europe matching GAP (± 30%) were: 0.07, 0.08, 0.1, 0.11, 0.33, 0.37, 0.37 and 0.38 mg/kg.

GAP in Japan for protected peppers is up to three applications with 0.23 kg ai/ha each and a PHI of one day. The residues from two supervised trials in Japan matching the GAP ±30% were 1.1 and 2.0 mg/kg. The Meeting compared the data sets for Japan and Europe using the Mann-Whitney-U test and decided that they belonged to different populations and could not be combined. Therefore only data from European trials was used for further evaluation.

In the Netherlands drip application in glasshouses is registered for peppers with an application rate of 0.0096 kg ai per 1000 plants and a PHI of three days. The corresponding residues from eight trials on protected peppers in Europe matching GAP (± 30%) were: 0.04, 0.04, 0.05(4), 0.06, 0.07 mg/kg.

For chili peppers GAPs are available, which correspond to the GAPs for sweet peppers. The Meeting concluded that an extrapolation of the data from sweet peppers to chili pepper is not possible, because of the different surface area to mass ratio for chili peppers, for which higher residues than in sweet peppers can be expected.

Based on the glasshouse foliar spray GAP for peppers the Meeting recommended a maximum residue level of 1 mg/kg, an STMR value of 0.22 mg/kg and a HR value of 0.38 mg/kg for thiacloprid in sweet peppers.

Eggplants

Field trials on protected aubergines were provided from Japan.

GAP in Japan for eggplants consists of up to three applications at 0.23 kg ai/ha each and a PHI of one day. The residues from two supervised trials in Japan matching the GAP (± 30%) were 0.28 and 0.38 mg/kg.

The Meeting received GAPs for eggplants from the Netherlands, Japan, the United Kingdom and various other countries corresponding to the GAO for field and glasshouse tomatoes. The treatment methods cover foliar spraying as well as drip application. The Meeting concluded that the residue data for tomatoes can be extrapolated to support the use in eggplants.

The Meeting compared the data sets eggplant from Japan and for protected tomatoes using the Mann-Whitney-U test and decided that they belonged to the same population and could be combined. The combined eggplant and protected tomato residues were: 0.07, 0.12, 0.12, 0.15, 0.18, 0.19, 0.25, 0.28, 0.29 and 0.38 mg/kg.

Based on an extrapolation from the critical glasshouse foliar spray GAP for tomatoes and residue trials for eggplants from Japan the Meeting recommended a maximum residue level of 0.7 mg/kg, an STMR value of 0.185 mg/kg and a HR value of 0.38 mg/kg for thiacloprid in eggplants.

Potatoes

The Meeting received information on supervised field trials on potatoes from Belgium, Brazil, France, Germany, Italy, Japan, Spain and the United Kingdom.

The 16 supervised trials available from Europe for potatoes were conducted with up to three applications at 0.096 kg ai/ha each and a PHI of 21 days. This corresponds to the GAP from Austria, Cyprus, Greece, Portugal, Romania, Spain and the United Kingdom. The residues in potato tuber were < 0.02(16) mg/kg.

GAP in Japan for potatoes is up to three applications with 0.23 kg ai/ha each and a PHI of seven days. The residues from two supervised trials in Japan matching GAP (± 30%) were: < 0.005 and < 0.005 mg/kg in the tubers.

In addition the Meeting received information from two supervised residue trials on potatoes from Brazil. The application rates were 0.14 and 0.29 kg ai/ha with a PHI of 21 days. No residue above the LOQ of 0.02 mg/kg was found in potato tubers.

The Meeting recommended a maximum residue level of 0.02 (*) mg/kg and an STMR value and HR value of 0 mg/kg for thiacloprid in potatoes.

Wheat

Field trials on wheat were provided from France and Germany.

Thiacloprid is registered for use on wheat in Romania and Lithuania. The application rates are 0.048 kg ai/ha and 0.034 kg ai/ha respectively with a PHI of 21 days for Lithuania and an undefined PHI for Romania. The Meeting received supervised residue trials on wheat with application rates of 0.05 up to 0.062 kg ai/ha, which corresponds to + 29% of the GAP. Residues in wheat grain were < 0.02 (5), 0.03 (3), 0.04 and 0.04 mg/kg.

The Meeting recommended a maximum residue level of 0.1 mg/kg, an STMR value of 0.025 mg/kg and a highest residue value of 0.04 mg/kg for thiacloprid in wheat grain.

Barley

The Meeting received information from supervised residue trials on barley from France and Germany.

Thiacloprid is registered for on barley in Romania. The application rate is 0.048 kg ai/ha with an undefined PHI. The Meeting received supervised residue trials on barley with application rates of 0.062 kg ai/ha, which corresponds to + 29% of the GAP. Residues in barley grain were < 0.02, 0.05, 0.06, 0.11 and 0.12 mg/kg.

The Meeting decided that there was insufficient data from which to recommend a maximum residue level for thiacloprid on barley.

Rice

Field trials on rice were provided from India and Japan. GAP in India for foliar spraying of rice is 0.12 kg ai/ha each and a PHI of 30 days. All supervised residue trials were performed, with application rates of 0.18 up to 0.36 kg ai/ha which were up to 3 × GAP. In addition, only the limit of detection of 0.001 mg/kg was reported for thiacloprid in rice. Nevertheless no residues above this LOD were detected in rice grain without husks or in the husks in any of the six supervised residue trials.

GAP in Japan for rice consists of up to three applications with 0.15 kg ai/ha without a PHI. In two residue trials with an application rate of 1.5 kg ai/ha no residue above the LOQ of 0.005 mg/kg could be detected in the grain after 117, and up to 152 days.

The Meeting concluded that the LOQ of the monitoring method (0.02 mg/kg) is an appropriate estimate for MRL values in rice.

The Meeting recommended a maximum residue level of 0.02 (*) mg/kg, an STMR value of 0 mg/kg and a highest residue of 0 mg/kg for thiacloprid in rice husks.

Maize

Field trials on maize were provided from France, Germany, Greece and Italy. In Europe GAP is available from Romania (an application rate of 0.048 kg ai/ha and no PHI). Eight supervised residue trials were conducted with two treatments of 0.075 kg ai/ha each and a PHI of 28 – 31 days. These trials did not match any of the GAPs provided to the Meeting.

The Meeting concluded that the residue data on maize was not sufficient for recommending MRL, STMR or HR values.

Tree nuts

The Meeting received information on supervised field trials on walnuts from Italy. GAP in Argentina, Chile, Italy and the United Kingdom consists of up to two applications at 0.0096 – 0.018 kg ai/hL and a PHI of 1 to 14 days. The four trials provided were performed at above GAP rate (0.03 kg ai/hL), but no residue could be detected in thenut kernel above the trial specific LOQ of 0.005 mg/kg.

Field trials were provided on almonds from USA.

GAP in Italy and the United Kingdom is up to two applications with 0.012 – 0.018 kg ai/hL and a PHI of 14 days. The residues for almond kernel from 14 trials in the USA matching the GAP (± 30%) were: < 0.01(13), 0.01 mg/kg.

Field trials were provided on pecan from USA.

GAP in Italy is up to 0.018 kg ai/hL and a PHI of 14 days. The residues for pecan kernel from 14 trials in USA matching the GAP (± 30%) were < 0.01(14) mg/kg.

Various GAPs in Germany, Italy and Turkey for tree nuts consist of up to two applications at rates of 0.0096 to 0.012 kg ai/hL each and a PHI of 21 days. The Meeting concluded that an extrapolation from almonds, walnuts and pecan to the whole group of tree nuts is possible. As thiacloprid is non-systemic, it was concluded that residues in nuts were comparable from different areas in the world. The combined thiacloprid residues in nuts were: < 0.01 (31), 0.01 mg/kg.

Because the analytical methods for enforcement are validated with a LOQ of 0.02 mg/kg, this value is used for the maximum residue level proposal for tree nuts.

The Meeting recommended a maximum residue level of 0.02 mg/kg and an STMR and HR value of 0.01 mg/kg for thiacloprid in tree nuts.

Oilseed rape and white mustard

Field trials on oilseed rape were provided from France, Hungary, Germany, Spain and Sweden.

Various GAPs in Czech Republic, Slovakia, Switzerland and the United Kingdom are up to two applications with 0.0096 up to 0.14 kg ai/ha. The residues in rapeseeds from 14 supervised trials matching the GAP ± 30% were < 0.02(3), 0.02, 0.03, 0.05, 0.06, 0.07(3), 0.09, 0.1, 0.22, 0.33 mg/kg.

The GAP in Czech Republic for white mustard is up to two applications with 0.096 kg ai/ha each and no PHI reported. The Meeting concluded that residue trials for rapeseed can be extrapolated to white mustard seed.

The Meeting recommended a maximum residue level of 0.5 mg/kg, an STMR value of 0.065 mg/kg and a HR value of 0.33 mg/kg for thiacloprid in rapeseed and white mustard seeds.

Cotton seeds

Field trials on cotton were provided from Greece, Spain and the USA.

For cotton, two sets of supervised residue trials from Europe and USA were made available. The trials conducted in the USA were analyzed using a total residue method measuring 6-CNA. In the European trials total thiacloprid residue, determined as 6-CNA, and thiacloprid only, were analyzed. This data shows clear differences in the residue levels. Therefore the Meeting concluded that the residue data from USA for cotton would not be considered for further evaluation. The residue trials from Europe were conducted with three applications of 0.096 kg ai/ha each and a PHI of 21 days. This use pattern corresponded to GAPs from Greece, Guatemala, Spain and Turkey. The residues in cotton seed from eight supervised trials matching the GAP (± 30%) were < 0.02(8) mg/kg.

The Meeting recommended a maximum residue level of 0.02 (*) mg/kg and an STMR and HR value of 0.02 mg/kg for thiacloprid in cotton seeds.

Sunflower seeds

The Meeting received information from one field trial on sunflowers from Hungary.

Registered uses of thiacloprid on sunflowers are available from Hungary and Slovakia. The application rates are 0.036–0.048 kg ai/ha and an undefined PHI and a PHI of 30 days, respectively. The one supervised trial on sunflowers (application rate of 0.097 kg ai/ha) did not correspond to any available GAP.

The Meeting concluded that the available residue data on sunflowers was not sufficient for a recommendation of MRL, STMR of HR values.

Green tea

Field trials on green tea were made available from Japan.

GAP in Japan for green tea is one applications at 0.6 kg ai/ha and a PHI of seven days. The residue trials from Japan were conducted with an application rate of 0.3 kg ai/ha, which did not correspond to the submitted GAP. The Meeting concluded that a recommendation of maximum residue levels for green tea was not possible.

Wheat forage

Field trials on wheat were provided from France and Germany.

Registered uses of thiacloprid on wheat are available from Romania and Lithuania. The application rates are 0.048 kg ai/ha and 0.034 kg ai/ha respectively with a PHI of 21 days for Lithuania and an undefined PHI for Romania. The Meeting received supervised residue trials on wheat with application rates of 0.05 up to 0.062 kg ai/ha, which corresponds to + 29% of the GAP. Residues in wheat forage were: 1.2, 1.2, <u>1.3</u>(3), <u>1.7</u>, 1.8, 1.8, 1.9 and 2.2 mg/kg.

The Meeting estimated an STMR value of 1.5 mg/kg and a highest residue value of 2.2 mg/kg for thiacloprid in wheat forage.

Wheat straw

Field trials on wheat straw were available from France and Germany.

Registered uses of thiacloprid on wheat straw are available from Romania and Lithuania with application rates of 0.048 kg ai/ha and 0.034 kg ai/ha respectively, with a PHI of 21 days for Lithuania and an undefined PHI for Romania. The Meeting received supervised residue trials on wheat with application rates of 0.05 up to 0.062 kg ai/ha, which corresponded to + 29% of the GAP. Residues in wheat straw were 0.06, 0.07, 0.07, 0.14, <u>0.53</u>, <u>0.89</u>, 0.97, 1.2, 1.6 and 1.7 mg/kg.

The Meeting estimated an STMR value of 0.71 mg/kg and a highest residue value of 1.7 mg/kg for thiacloprid in wheat straw.

Based on 88% dry weight matter the residues in wheat straw (dry matter) were 0.07, 0.08, 0.08, 0.16, 0.6, 1.0, 1.1, 1.3, 1.8, 1.9 mg/kg. The Meeting estimated a MRL of 5 mg/kg for wheat straw (dry matter based).

Almond hulls

Field trials on almonds were made available from the USA.

GAP in Italy and the United Kingdom is up to two applications with 0.012 – 0.018 kg ai/hL and a PHI of 1 to 14 days. The residues for almond hulls from 14 trials in the USA matching the European GAP (± 30%) were 0.99, 1.3, 1.4, 1.5, 1.8, 1.8, <u>2.0</u>, <u>2.1</u>, 3.2, 3.3, 3.3, 3.4, 4.5, 4.9 mg/kg.

The Meeting estimated an STMR value of 2.05 mg/kg and a highest residue of 4.9 mg/kg for thiacloprid in almond hulls (fresh weight).

Based on 90% dry weight matter the residues in almond hulls were 1.1, 1.4, 1.6, 1.7, 2.0, 2.0, 2.2, 2.3, 3.5, 3.6, 3.6, 3.7, 5.0 and 5.4 mg/kg. The Meeting estimated a MRL of 10 mg/kg for almond hulls (dry matter based).

Rape forage

The Meeting received information on supervised residue trials on oilseed rape from France, Hungary, Germany, Spain and Sweden.

Various GAPs in the Czech Republic, Slovakia, Switzerland and the United Kingdom consist of up to two applications at 0.0096 to 0.14 kg ai/ha with PHI between zero and 30 days. The residues in rape forage from 12 supervised trials matching the GAP (± 30%) were 1.0, 1.1(4), 1.2, 1.4, 1.5, 1.6, 1.7, 1.9 and 2.2 mg/kg.

The Meeting estimated an STMR value of 1.3 mg/kg and a highest residue of 2.2 mg/kg for thiacloprid in rape forage (fresh weight).

Cotton gin by-products

Field trials on cotton gin by-products were provided from Greece, Spain and the USA.

For cotton two sets of supervised residue trials from Europe and USA were made available. The residue trials conducted in the USA were analyzed using a total residue method measuring 6-CNA. In the European trials total thiacloprid residue, determined as 6-CNA, and thiacloprid only, were analyzed. Residues analyzed with the total residue method are much higher than thiacloprid only residues and can not be extrapolated to evaluate the residue situation. In the supervised residue trials according to the residue definition "thiacloprid only" no gin trash samples were analyzed. A recommendation for a STMR or highest residue value for cotton gin by-products was not possible.

Fate of residues during processing

Thiacloprid was generally stable to hydrolysis during pasteurization, baking and boiling conditions.

Information on the fate of thiacloprid residues during food processing was available for melons and watermelons, apples, peaches, cherries and tomatoes.

Calculated processing factors and the mean or best estimate are summarized in the following table.

Raw agricultural commodity (RAC)	Processed commodity	Calculated processing factor	Estimate of the processing factor
Apples	Apple, dried	0.3, 0.7	0.5
	Apple, juice	0.2, 0.29	0.25
	Apple, sauce	0.6, 0.86	0.73
	Apple, pomace dry	4.3, 8.7	6.5
Peaches without stone	Peach, preserve	0.22, 0.66, 0.66	0.66
Tomatoes	Tomatoes, peeled	0.25, 0.43	0.34
	Tomato, paste	2, 3.1	2.6
	Tomato, juice	0.42, 0.71	0.615
	Tomato, preserve	0.33, 0.71	0.52

For apples the estimated processing factors are applied to the STMR value of 0.11 mg/kg for pome fruits. The Meeting estimated STMR-P values for dried apple of 0.055 mg/kg, for apple juice of 0.0275 mg/kg, for apple sauce of 0.077 mg/kg and for apple pomace dry of 0.71 mg/kg.

For peaches the estimated processing factors are applied to the STMR value of 0.08 mg/kg for stone fruits. The Meeting estimated STMR-P values of 0.05 mg/kg for preserved peaches.

For cherries it was not possible to calculate processing factors as residues in the RAC were below the limit of quantification.

For tomatoes the estimated processing factors are applied to the STMR value of 0.165 mg/kg. The Meeting estimated STMR-P values for peeled tomatoes of 0.056 mg/kg, for tomato paste of 0.429 mg/kg, for tomato juice of 0.1 mg/kg and for tomato preserve of 0.086 mg/kg.

Farm animal dietary burden

The Meeting estimated the dietary burden of thiacloprid residues for ruminants based on STMR and highest residue values obtained from the submitted supervised residue trials. The diets are described in Appendix IX of the *FAO Manual* (FAO, 2002).

Estimated maximum dietary burden of farm animals

Crop	Residue (mg/kg)	Basis	Group	Dry matter (%)	Residue/ Dry matter (mg/kg)	Dietary content (%)			Residue contribution (mg/kg)		
						Beef cattle	Dairy cows	Poultry	Beef cattle	Dairy cows	Poultry
Apple, dry pomace	0.72	STMR-P	AB	100	0.72	*40*	*20*		0.29	0.14	0
Rape, forage	2.2	HR	AM	30	7.33	*30*	*30*		2.20	2.20	0
Cottonseed (meal)	0.02	HR	-	89	0.02			*20*	0.00	0.00	0.004
Wheat, forage	2.2	HR	AF	25	8.80	*25*	*50*		2.20	4.40	0
Wheat, grain	0.04	HR	GC	89	0.045	*5*		*80*	0.002	0.000	0.036
Total						*100*	*100*	*100*	4.7	6.7	0.04

Estimated median dietary burden of farm animals

Crop	Residue (mg/kg)	Basis	Group	Dry matter (%)	Residue/ Dry matter (mg/kg)	*Dietary content (%)*			Residue contribution (mg/kg)		
						Beef cattle	*Dairy cows*	*Poultry*	Beef cattle	Dairy cows	Poultry
Apple, dry pomace	0.72	STMR-P	AB	100	0.65	*40*	*20*		0.29	0.14	0
Rape, forage	1.3	STMR	AM	30	4.33	*30*	*30*		1.3	1.3	0
Cottonseed (meal)	0.02	STMR	-	89	0.02			*20*	0	0	0.004
Wheat, forage	1.5	STMR	AF	25	6.00	*25*	*50*		1.5	3	0
Wheat, grain	0.025	STMR	GC	89	0.03	*5*		*80*	0.001	0	0.022
Total						*100*	*100*	*100*	3.1	4.4	0.03

The dietary burdens of thiacloprid for estimation of MRL and STMR values for animal commodities are for beef cattle 4.7 and 3.1 mg/kg and for dairy cows 6.7 and 4.4 mg/kg respectively. For poultry a dietary burden of 0.04 and 0.03 mg/kg was calculated.

Farm animal feeding studies

The Meeting received animal feeding studies on ruminants. No study on poultry feeding was available.

Three groups of cows were dosed at levels equivalent to 2.1 (0.07 mg/kg bw) (1×), 6.2 (0.213 mg/kg bw) (3×) and 20.6 ppm (0.655 mg/kg bw) (10×) of thiacloprid in the diet together with a control group. On average from the cows treated at the 1× dose level, the liver contained the highest thiacloprid residue levels (0.10 mg/kg) followed by kidney (0.03 mg/kg), milk and muscle (0.02 mg/kg) and fat (0.01 mg/kg). Maximum levels for tissues were 0.02 mg/kg for fat, 0.02 mg/kg for muscle, 0.04 mg/kg for kidney and 0.11 mg/kg for liver.

In the second dose group thiacloprid residues increased to an average value of 0.04 mg/kg in milk and fat (highest value 0.04 mg/kg), 0.05 mg/kg in muscle (highest value 0.06 mg/kg), 0.1 mg/kg in kidney (highest value 0.11 mg/kg) and 0.29 mg/kg in liver (highest value 0.32 mg/kg). In the high dose group the residues found were 0.17 mg/kg in milk, 0.12 mg/kg in fat (highest value 0.16 mg/kg), 0.16 mg/kg in muscle (highest value 0.18 mg/kg), 0.27 mg/kg in kidney (highest value 0.32 mg/kg) and 0.94 mg/kg in liver (highest value 1.1 mg/kg).

A linear relation between the dose levels and the residue concentrations was observed.

In milk, residues reached a plateau level within five days and no accumulation was observed.

For poultry no feeding studies were provided. In the metabolism study based on a feeding level of 10 mg/kg bw (corresponding to 124 ppm in feed, based on dry weight) thiacloprid residues of 0.06 mg/kg in eggs, 0.03 mg/kg in muscle, 0.08 mg/kg in fat and 0.54 mg/kg in liver were found.

Animal commodity maximum residue levels

The dietary burden for beef and diary cattle was estimated at a maximum level 4.7 and 6.7 mg/kg respectively. The maximum residue level to be expected in tissues can be obtained from the results of feeding at a level of 6.2 ppm.

Dietary burden (mg/kg)[1]	Feeding level [ppm][2]	Thiacloprid residue level (mg/kg)[3]				
		Milk (mean)	Fat (high)	Muscle (high)	Liver (high)	Kidney (high)
MRL dairy cattle	(6.7) [6.2]	*(0.04)* *0.04*	*(0.04)* *0.04*	*(0.06)* *0.06*	*(0.32)* *0.34*	*(0.11)* *0.11*
		Milk (mean)	Fat (mean)	Muscle (mean)	Liver (mean)	Kidney (mean)
STMR dairy cattle	(4.4) [2.1,6.2]	*(0.02, 0.04)* *0.03*	*(0.02, 0.04)* *0.03*	*(0.02, 0.05)* *0.035*	*(0.1, 0.29)* *0.21*	*(0.04, 0.1)* *0.07*

1 In parentheses, estimated dietary burden

2 In square brackets, actual feeding level in transfer studies

3 Values in parentheses in italics are derived from the dietary burden, feeding levels and residue levels found in the transfer studies ´. "high" is the highest residue level in an individual tissue in the relevant feeding group. "mean" is the mean residue level in milk in the relevant feeding group.

The median dietary burdens were 3.1 mg/kg for beef cattle and 4.4 mg/kg for dairy cattle. The burden for dairy cows is between the dose levels of 2.1and 6.2 mg/kg of the animal feeding study. Therefore the mean value for each dose group and each commodity is taken for STMR estimation. The values are 0.03 mg/kg for milk, 0.03 mg/kg for mammalian fat, 0.035 mg/kg for mammalian meat and 0.21 mg/kg for edible offal, mammalian. For HR the calculated residues based on the maximum estimated dietary burden were 0.04 mg/kg for mammalian fat, 0.06 mg/kg for mammalian meat and 0.34 for mammalian edible offal.

Based on the highest residues found in the feeding study (3× dose) the Meeting estimated maximum residue levels of 0.1 mg/kg for mammalian meat and 0.5 mg/kg for mammalian edible offal. Based on the mean value the Meeting estimated a maximum residue level of 0.05 mg/kg for milk.

For poultry no feeding studies are available. When the calculated maximum dietary burden for poultry is extrapolated from the results of the poultry metabolism study the resulting residue levels are far below 0.01 mg/kg. The Meeting estimated an STMR value and a highest residue of 0 mg/kg for thiacloprid in poultry products.

The Meeting estimated a MRL of 0.02 (*) mg/kg for poultry meat, poultry edible offal and eggs.

RECOMMENDATIONS

The Meeting estimated the STMR, HR and MRL values shown below.

The definition for the residue in plant and animals (enforcement and risk assessment) is: *thiacloprid*.

The residue is not fat soluble.

Commodity		**MRL, mg/kg**		**HR, mg/kg**	**STMR or STMR-P, mg/kg**
CCN	**Name**	**New**	**Previous**		
AM 0660	Almond hulls	10		5.4	2.05
DF 0226	Apple, dried			0.19	0.055
JF 0226	Apple, juice				0.0275
FB0018	Berries and other small fruits except grapes	1		0.62	0.275
SO 0691	Cotton seed	0.02 (*)		0.02	0.02
VC 0424	Cucumbers	0.3		0.18	0.08
MO 0105	Edible offal, mammalian	0.5		0.34	0.21
VO 0440	Eggplants	0.7		0.38	0.185
PE 0112	Eggs	0.02 (*)		0	0
FI 0341	Kiwi fruits	0.2		0.1	0.02
MF 0100	Mammalian fats, except milk fats			0.04	0.03
MM 0095	Meat, mammalian	0.05		0.06	0.03
VC 0046	Melons	0.2		0.02	0.02
ML 0106	Milks	0.05		-	0.03
SO 0495	Oilseed rape	0.5		0.33	0.065
VO 0445	Pepper, sweet	1		0.38	0.22
FP 0009	Pome fruits	0.7		0.38	0.11
VR 0589	Potatoes	0.02 (*)		0	0
PM 0110	Poultry meat	0.02 (*)		0	0
PO 0111	Poultry, edible offal of	0.02 (*)		0	0
	Rape forage (fresh weight)			2.2	1.3
GC 0649	Rice	0.02 (*)		0	0
VC 4207	Squash, summer	0.3		0.18	0.08

VC 0431	Squash, winter	0.2		0.02	0.02
FS0012	Stone fruits	0.5		0.40	0.08
JF 0448	Tomato, juice				0.1
	Tomato, paste				0.429
	Tomato, peeled				0.056
VO 0448	Tomatoes	0.5		0.29	0.165
TN 0085	Treenuts	0.02		0.01	0.01
VC 0432	Watermelons	0.2		0.02	0.02
GC 0654	Wheat	0.1		0.04	0.025
	Wheat, forage	-		2.2	1.5
AS 0654	Wheat, straw	5		1.7 (fresh matter)	0.71 (fresh matter)
SO 0485	White mustard	0.5		0.33	0.065

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Daily Intakes (IEDI) of thiacloprid based on 13 GEMS/Food regional diets were in the range of 1–10% of the maximum ADI of 0.01 mg/kg bw. The Meeting concluded that the long-term intake of residues of thiacloprid from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short Term Intake (IESTI) of thiacloprid on the basis of the recommendations made by the JMPR represented 0–90% of the ARfD (0.03 mg/kg bw) for children and 0–30% for the general population. The Meeting concluded that the short-term intake of residues of thiacloprid resulting from uses that have been considered by the JMPR is unlikely to present a public health concern.

REFERENCES

Document No.Author, Date, Title, Institute, Report Reference, GLP/Non-GLP.

THIA06-004, Anderson, C.; Weber, H. and Bornatsch, W., 1998, [Methylene-^{14}C]YRC 2894: Absorption, distribution, excretion, and metabolism in the lactating goat, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4372, Edition Number: M-002130-01-1, Date: 1998-06-24, GLP, unpublished

THIA06-164, Anon., 1996, Thiacloprid residues on sweet pepper - inhouse results, Bayer CropScience, Tokio 1996

THIA06-135, Anon., 1997, Thiacloprid residues on apples - inhouse results, Bayer CropScience, Tokio 1997

THIA06-140, Anon., 2001, Thiacloprid residues on eggplant - official parent and amide, Bayer CropScience, Tokio, 2001

THIA06-139, Anon., 2003, Thiacloprid residues on cherries - official parent and amide, Bayer CropScience, Tokio, 2003

THIA06-165, Anon., 1996a, Thiacloprid residues on sweet pepper - inhouse results, Bayer CropScience, Tokio 1996

THIA06-166, Anon., 1996b, Thiacloprid residues on sweet pepper - inhouse results, Bayer CropScience, Tokio 1996

THIA06-167, Anon., 1996c, Thiacloprid residues on sweet pepper - inhouse results, Bayer CropScience, Tokio 1996

THIA06-172, Anon., 1996d, Thiacloprid residues on strawberries - inhouse results, Bayer CropScience, Tokio 1996

THIA06-173, Anon., 1996e, Thiacloprid residues on strawberries - inhouse results, Bayer CropScience, Tokio 1996

THIA06-174, Anon., 1996f, Thiacloprid residues on strawberries - inhouse results, Bayer CropScience, Tokio 1996

THIA06-175, Anon., 1996g, Thiacloprid residues on strawberries - inhouse results, Bayer CropScience, Tokio 1996

THIA06-136, Anon., 1997a, Thiacloprid residues on apples - inhouse amide results, Bayer CropScience, Tokio 1997

THIA06-179, Anon., 1997aa, Thiacloprid residues on tomatoes - inhouse results, Bayer CropScience, Tokio 1997

THIA06-180, Anon., 1997ab, Thiacloprid residues on ume plums - inhouse results, Bayer CropScience, Tokio 1997

THIA06-181, Anon., 1997ac, Thiacloprid residues on ume plums - inhouse results, Bayer CropScience, Tokio 1997

THIA06-182, Anon., 1997ad, Thiacloprid residues on ume plums - inhouse results, Bayer CropScience, Tokio 1997

THIA06-183, Anon., 1997ae, Thiacloprid residues on ume plums - inhouse results, Bayer CropScience, Tokio 1997

THIA06-137, Anon., 1997b, Thiacloprid residues on apples - oficial results, Bayer CropScience, Tokio 1997

THIA06-138, Anon., 1997c, Thiacloprid residues on apples - official amide results, Bayer CropScience, Tokio 1997

THIA06-148, Anon., 1997d, Thiacloprid residues on melons - inhouse results, Bayer CropScience, Tokio 1997

THIA06-149, Anon., 1997e, Thiacloprid residues on melons - inhouse amide results, Bayer CropScience, Tokio 1997

THIA06-150, Anon., 1997f, Thiacloprid residues on melons - oficial results, Bayer CropScience, Tokio 1997

THIA06-151, Anon., 1997g, Thiacloprid residues on melons - official amide results, Bayer CropScience, Tokio 1997

THIA06-152, Anon., 1997h, Thiacloprid residues on peach - inhouse results, Bayer CropScience, Tokio 1997

THIA06-153, Anon., 1997i, Thiacloprid residues on peach - inhouse amide results, Bayer CropScience, Tokio 1997

THIA06-154, Anon., 1997j, Thiacloprid residues on peach - oficial results, Bayer CropScience, Tokio 1997

THIA06-155, Anon., 1997k, Thiacloprid residues on peach - official amide results, Bayer CropScience, Tokio 1997

THIA06-156, Anon., 1997l, Thiacloprid residues on pear - inhouse results, Bayer CropScience, Tokio 1997

THIA06-157, Anon., 1997m, Thiacloprid residues on pear - inhouse amide results, Bayer CropScience, Tokio 1997

THIA06-158, Anon., 1997n, Thiacloprid residues on pear - oficial results, Bayer CropScience, Tokio 1997

THIA06-159, Anon., 1997o, Thiacloprid residues on pear - official amide results, Bayer CropScience, Tokio 1997

THIA06-160, Anon., 1997p, Thiacloprid residues on potato - inhouse results, Bayer CropScience, Tokio 1997

THIA06-161, Anon., 1997q, Thiacloprid residues on potato - inhouse results, Bayer CropScience, Tokio 1997

THIA06-162, Anon., 1997r, Thiacloprid residues on potato - inhouse results, Bayer CropScience, Tokio 1997

THIA06-163, Anon., 1997s, Thiacloprid residues on potato - inhouse results, Bayer CropScience, Tokio 1997

THIA06-168, Anon., 1997t, Thiacloprid residues on rice - inhouse results, Bayer CropScience, Tokio 1997

THIA06-169, Anon., 1997u, Thiacloprid residues on rice - inhouse results, Bayer CropScience, Tokio 1997

THIA06-170, Anon., 1997v, Thiacloprid residues on rice - inhouse results, Bayer CropScience, Tokio 1997

THIA06-171, Anon., 1997w, Thiacloprid residues on rice - inhouse results, Bayer CropScience, Tokio 1997

THIA06-176, Anon., 1997x, Thiacloprid residues on tomatoes - inhouse results, Bayer CropScience, Tokio 1997

THIA06-177, Anon., 1997y, Thiacloprid residues on tomatoes - inhouse results, Bayer CropScience, Tokio 1997

THIA06-178, Anon., 1997z, Thiacloprid residues on tomatoes - inhouse results, Bayer CropScience, Tokio 1997

THIA06-141, Anon., 2001a, Thiacloprid residues on eggplant - official parent and amide, Bayer CropScience, Tokio, 2001

THIA06-146, Anon., 2001a, Thiacloprid residues on Japanese apricot - official parent and amide, Bayer CropScience, Tokio, 2001

THIA06-147, Anon., 2001b, Thiacloprid residues on Japanese apricot - inhouse parent and amide, Bayer CropScience, Tokio, 2001

THIA06-038, Anon., 2002, Report on the project studies on the residues of Calypso 240 SC (Thiacloprid) in/on paddy, Bidhan Chandra Krishi Viswavidyalaya Pesticide Residue Laboratory, Mohanpur, West Bengal, Bayer CropScience AG, Report No.: India-Rice-2002, Edition Number: M-26353

THIA06-142, Anon., 2002a, Thiacloprid residues on grapes, large - inhouse results, Bayer CropScience, Tokio 2002

THIA06-143, Anon., 2002b, Thiacloprid residues on grapes, large - official results, Bayer CropScience, Tokio 2002

THIA06-144, Anon., 2002c, Thiacloprid residues on grapes, small - official parent and amide, Bayer CropScience, Tokio, 2002

THIA06-145, Anon., 2002d, Thiacloprid residues on grapes, small - inhouse parent and amide, Bayer CropScience, Tokio, 2002

THIA06-184, Anon., 2002f, Thiacloprid residues on watermelon - official parent and amide, Bayer CropScience, Tokio, 2002

THIA06-185, Anon., 2002g, Thiacloprid residues on watermelon - inhouse parent and amide, Bayer CropScience, Tokio, 2002

THIA06-007, Babczinski, P., 1997, Metabolism of YRC 2894 in tomatoes, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4118, Edition Number: M-000673-01-1, Date: 1997-08-15, GLP, unpublished

THIA06-029, Babczinski, P., 1997a, Radiovalidation of YRC 2894 total residue method for cotton seed and gin trash, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4297, Edition Number: M-021473-01-1, Method Report No.: PF4297, Date: 11.12.1997, GLP, unpublished

THIA06-009, Babczinski, P., 1998, Metabolism of YRC 2894 in cotton, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4256, Edition Number: M-001443-01-1, Date: 1998-03-16, GLP, unpublished

THIA06-026, Ballesteros, C. and Meilland - Berthier, I., 2004, Modification M001 of the residue analytical method 00548 for the determination of residues of YRC 2894 in zuccini and pepper by HPLC with electrospray MS/MS-detection. method no.00548/M001, Bayer CropScience, Lyon, France, Bayer CropScience AG, Report No.

THIA06-027, Ballesteros, C. and Meilland - Berthier, I., 2005, Supplement E006 to the residue analytical method 00548/M001 for the determination of residues of YRC 2894 in plants by HPLC with electrospray MS/MS detection, Bayer CropScience, Lyon, France, Bayer CropScience AG, Report No.: 00548/M001/E006, Edition Numb

THIA06-039, Baravelli, P. L., 2003, Decline curve of thiacloprid active ingredient in walnut after one application with the calypso formulation, AgriParadigma, Italy, Bayer CropScience AG, Report No.: AGRI012/03DEC, Edition Number: M-088081-01-1, Date: 02.12.2003, Non GLP, unpublished

THIA06-025, Billian, P. and Schoening, R., 2003, Validation of the supplement E004 of the analytical method 00548 for the determination of residues of thiacloprid (YRC 2894) in/on plant materials by HPLC-MS/MS, Bayer CropScience AG, Report No.: 00548/E004, Edition Number: M-104531-01-1, Method Report No

THIA06-068, Billian, P. and Schoening, R., 2003, Determination of residues of YRC 2894 in/on sweet cherry following spray application of YRC 2894 480 SC in the field in Germany and Northern France, Bayer CropScience AG, Report No.: RA-2030/02, Edition Number: M-110757-01-1, Date: 10.09.2003, GLP, unpubl

THIA06-072, Billian, P. and Schoening, R., 2003a, Determination of residues of YRC 2894 in/on plum following spray application of YRC 2894 480 SC in the field in Northern France, Bayer CropScience AG, Report No.: RA-2080/02, Edition Number: M-103707-01-1, Date: 13.08.2003, GLP, unpublished

THIA06-080, Billian, P. and Schoening, R., 2003b, Determination of residues of YRC 2894 in/on strawberry following spray application of YRC 2894 480 SC in the greenhouse in Germany, Italy, Spain, the Netherlands and Southern France, Bayer CropScience AG, Report No.: RA-2081/02, Edition Number: M-104912-0

THIA06-084, Billian, P. and Schoening, R., 2003c, Determination of residues of YRC 2894 in/on raspberry following spray application of YRC 2894 480 SC in the field in Germany and Great Britain, Bayer CropScience AG, Report No.: RA-2082/02, Edition Number: M-115998-01-1, Date: 15.09.2003, GLP, unpublished

THIA06-120, Billian, P. and Schoening, R., 2003d, Determination of residues of YRC 2894 in/on rape following spray application of Calypso 240 OD in the field in Germany, Northern France and Sweden, Bayer CropScience AG, Report No.: RA-2025/02, Edition Number: M-110617-01-1, Date: 30.06.2003, GLP, unpubli

THIA06-122, Billian, P. and Schoening, R., 2003e, Determination of residues of YRC 2894 in/on rape following spray application of Calypso 240 OD in the field in Southern France and Spain, Bayer CropScience AG, Report No.: RA-2026/02, Edition Number: M-108111-01-1, Date: 18.06.2003, GLP, unpublished

THIA06-010, Bongartz, R. and Neumann, B., 2001, Metabolism of [pyridinyl-^{14}C-methyl]YRC2894 in spring wheat, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: MR-046/01, Edition Number: M-035182-01-1, Date: 2001-09-21, GLP, unpublished

THIA06-003, Brumhard, B., 1998, Hydrolysis of YRC 2894 in sterile aqueous buffer solutions, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4338, Edition Number: M-001109-01-1, Date: 1998-02-16, GLP, unpublished

THIA06-012, Clark, T. and Babczinski, P., 1998, Confined rotational crop study with YRC 2894, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4351, Edition Number: M-001542-01-1, Date: 1998-03-27, GLP, unpublished

THIA06-006, Clark, T. and Bornatsch, W., 1997, Metabolism of [pyridinyl-^{14}C -methyl]YRC 2894 in apples, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4306, Edition Number: M-000686-01-1, Date: 1997-10-02, GLP, unpublished

THIA06-047, Clay, S., 2002, Thiacloprid on Lemon Samples, Hill Laboratories, Hamilton, New Zealand, Bayer CropScience AG, Report No.: LabGLP24, Report includes Trial Nos.: R-091-01-PF, Edition Number: M-261169-01-1, Date: 17.12.2002, Non GLP, unpublished

THIA06-036, Clay, S., 2003, Thiacloprid on Kiwifruit, Hill Laboratories, Hamilton, New Zealand, Bayer CropScience AG, Report No.: LabGLP75, Edition Number: M-261169-01-1, Date: 09.10.2003, Non GLP, unpublished

THIA06-085, Clay, S., 2003a, Thiacloprid on Kiwifruit, Hill Laboratories, Hamilton, New Zealand, Bayer CropScience AG, Report No.: LabGLP75, Edition Number: M-261169-01-1, Date: 09.10.2003, Non GLP, unpublished

THIA06-086, Clay, S., 2004, Determination of thiacloprid residues in kiwifruit, Hill Laboratories, Hamilton, New Zealand, Bayer CropScience AG, Report No.: LabGLP104, Edition Number: M-261172-01-1, Date: 05.05.2004

THIA06-030, DeHaan, R. A., 1999, An analytical method for the determination of YRC 2894 residues in plant matrices, Bayer Corporation, Stilwell, KS, USA, Bayer CropScience AG, Report No.: 108450, Edition Number: M-009618-01-1, Date: 17.03.1999, GLP, unpublished

THIA06-116, Diot, R., 2005, Determination of the residues of YRC 2894 (thiacloprid) and deltamethrin in/on corn after spraying of Proteus (110 OD) in the field in northern France and Germany, Bayer CropScience , Lyon, France, Bayer CropScience AG, Report No.: RA-2512/04, Edition Num

THIA06-117, Diot, R., 2005a, Determination of the residues of YRC 2894 (Thiacloprid) and deltamethrin in/on corn after spraying of Proteus (110 OD) in the field in southern France, Spain, Italy and Greece, Bayer CropScience , Lyon, France, Bayer CropScience AG, Report No.: RA-2511/04

THIA06-071, Dorschner, K. W., 2002, Thiacloprid: Magnitude of the residue on sweet cherry, Rutgers, The State University of New Jersey, North Brunswick, NJ, USA, Bayer CropScience AG, Report No.: 200540, Edition Number: M-088976-01-1, Date: 18.12.2002, GLP, unpublished

THIA06-077, Dorschner, K. W., 2002a, Thiacloprid: Magnitude of the residue on plum, Rutgers, The State University of New Jersey, North Brunswick, NJ, USA, Bayer CropScience AG, Report No.: 200509, Edition Number: M-088965-01-1, Date: 18.12.2002, GLP, unpublished

THIA06-112, Eberhardt, R. and Schoening, R., 2001, Determination of residues of YRC 2894 on spring wheat after spray application of YRC 2894 480 SC in the field in Germany and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2120/00, Edition Number: M-081927-01-1, Date: 05.11.20

THIA06-114, Eberhardt, R. and Schoening, R., 2002, Determination of residues of YRC 2894 in/on spring barley after spray application of YRC 2894 480 SC in the field in Germany and Northern France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2122/00, Edition Number: M-056032-01-1, D

THIA06-037, Fukuda, T., 1998, Residues of thiacloprid in green tea, Nihon Bayer Agrochem K. K., Yuki, Japan, Bayer CropScience AG, Report No.: NR98020, Edition Number: M-003954-01-1, Date: 28.04.1998, Non GLP, unpublished

THIA06-058, Garbers, H. V., 2000, Determination of thiacloprid residues in apples, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1493265/T390, Edition Number: M-038003-01-1, Date: 11.09.2000, GLP, unpublished

THIA06-002, Goehrt, A., 1995, Crystal structure analysis of YRC 2894, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PC1935, Edition Number: M-002079-01-2, Date: 24.01.1995, Non GLP, unpublished

THIA06-055, Harbin, A. M., 1999, YRC 2894 480SC and 70WG - Magnitude of the residue on pome fruit (Apple/pear), Bayer Corporation, Kansas City, MO, USA, Bayer CropScience AG, Report No.: 108812, Edition Number: M-009903-01-1, Date: 11.03.1999, GLP, unpublished

THIA06-033, Harbin, A. M., 2004, Calypso 480 SC and Calypso 70 WG - Magnitude of the residue in/on almonds and pecans (crop group 14 - tree nuts), Bayer CropScience, Stilwell, KS, USA, Bayer CropScience AG, Report No.: 110307, Edition Number: M-128884-01-1, Date: 12.11.2004 GLP, unpubli

THIA06-070, Heinemann, O. and Schoening, R., 2000, Determination of residues of YRC 2894 480 SC in/on sweet cherry in the field following spray application in Italy and Spain, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2071/99, Edition Number: M-023604-01-1, Date: 17.02.2000, GLP,

THIA06-083, Heinemann, O. and Schoening, R., 2002, Determination of residues of YRC 2894 480 SC in/on raspberry after spray application in the field in Germany and Great Britain, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2133/01, Edition Number: M-065413-01-1, Date: 23.05.2002, G

THIA06-011, Hellpointner, E., 1998b, Photolysis of YRC 2894 on soil, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4333, Edition Number: M-001245-01-1, Date: 1998-02-26, GLP, unpublished

THIA06-125, Koch, A., 1999, YRC 2894 480 SC/YRC2894 70WG - Magnitude of the residues in cotton, Bayer Corporation, Stilwell, KS, USA. , Bayer CropScience AG, Report No.: 109011, Edition Number: M-009862-01-1, Date: 23.03.1999, GLP, unpublished

THIA06-008, Koester, J., 1997, Translocation of [pyridinyl-^{14}C -methyl]YRC 2894 in tomato plants, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4278, Edition Number: M-000671-01-1, Date: 1997-08-19, GLP, unpublished

THIA06-001, Krohn, J., 1996, Physical and chemical properties of YRC 2894, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PC1418, Edition Number: M-000646-01-1, Date: 09.07.1996, GLP, unpublished

THIA06-045, Lancas, F. M., 1998, YRC 2894; 480 SC; mandarin/lemon; Brazil; BBA, Universidade de Sao Paulo, Sao Carlos, Brazil, Bayer CropScience AG, Report No.: M-005338-01-2, Report includes Trial Nos.: BRA-RE-062-98, Edition Number: M-005338-01-2, Date: 25.11.1998, Non GLP, unpublishe

THIA06-046, Lancas, F. M., 1998a, YRC 2894; 480 SC; mandarin/lemon; Brazil; BBA, Universidade de Sao Paulo, Sao Carlos, Brazil, Bayer CropScience AG, Report No.: M-005340-01-2, Report includes Trial Nos.: BRA-RE-061-98, Edition Number: M-005340-01-2, Date: 25.11.1998, Non GLP, unpublishe

THIA06-087, Lancas, F. M., 1998b, YRC 2894; 480 SC; onion; Brazil; BBA, Universidade de Sao Paulo, Sao Carlos, Brazil, Bayer CropScience AG, Report No.: M-005335-01-2, Edition Number: M-005335-01-2 Date: 25.11.1998, Non GLP, unpublished

THIA06-088, Lancas, F. M., 1998c, YRC 2894; 480 SC; garlic; Brazil; BBA, Universidade de Sao Paulo, Sao Carlos, Brazil, Bayer CropScience AG, Report No.: M-005328-01-2, Edition Number: M-005328-01-2 Date: 25.11.1998, Non GLP, unpublished

THIA06-111, Lancas, F. M., 1998d, YRC 2894; 480 SC; potato; Brazil; BBA, Universidade de Sao Paulo, Sao Carlos, Brazil, Bayer CropScience AG, Report No.: RE-059/98, Edition Number: M-005331-01-2, Date: 25.11.1998 Non GLP, unpublished

THIA06-032, Moore, S. M., 2002, An analytical method for the determination of YRC 2894, amide-YRC-2894, 4- hydroxy YRC2894 amide, YRC 2894 sodium sulfonate residues in various plant matrices by LC-MS/MS, Bayer Corporation, Stilwell, KS, USA, Bayer CropScience AG, Report No.: 110879, Edi

THIA06-034, Orosz, F., 2000, Method validation for determination of thiacloprid (YRC 2894) residues in rape seed by GC/MS, Plant Health and Soil Conservation Station, Kaposvár, Hungary, Bayer CropScience AG, Report No.: 00-BAY-AA-14-04-V, Edition Number: M-047645-01-1, Date: 20.11.20

THIA06-035, Orosz, F., 2000a, Method validation for determination of thiacloprid (YRC 2894) residues in sunflower seed by GC/MS, Plant Health and Soil Conservation Station, Kaposvár, Hungary, Bayer CropScience AG, Report No.: 00-BAY-AA-14-05-V, Edition Number: M-047662-01-1, Date: 20.

THIA06-118, Orosz, F., 2000b, Residue study with thiacloprid (YRC 2894) in rape (treatment with Calypso 480 SC, Hungary - season 2000), Plant Health and Conservation Station, Kaposvár, Hungary, Bayer CropScience AG, Report No.: 00-BAY-AA-14-04, Edition Number: M-044105-01-1, Date: 20.

THIA06-126, Orosz, F., 2000c, Residue study with thiacloprid (YRC 2894) in sunflower (treatment with Calypso 480 SC, Hungary - season 2000), Plant Health and Conservation Station, Kaposvár, Hungary, Bayer CropScience AG, Report No.: 00-BAY-AA-14-05, Edition Number: M-044114-01-1, Date

THIA06-031, Perez, R., 1999, Independent laboratory validation of analytical method 108450 for the determination of total residues of YRC 2894 in cotton and cotton processed products, ADPEN Laboratories Inc., Jacksonville, FL, USA, Bayer CropScience AG, Report No.: 108831, Edition Nu

THIA06-013, Placke, F. J., 1996, Residue analytical method for the determination of YRC 2894 residues in plant materials by HPLC, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00419, Edition Number: M-010844-01-1, Method Report No.: MR-295/96, Date: 29.04.1996, GLP, un

THIA06-042, Placke, F. J., 1997, Storage stability of YRC 2894 residues in crops during freezer storage, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: MR-1026/97, Edition Number: M-000994-01-1 Date: 09.12.1997, GLP, unpublished

THIA06-049, Placke, F. J., 1997a, Determination of residues of YRC 2894 480 SC following spray application on apple in Great Britain, Belgium and the Federal Republic of Germany, Bayer AG, Leverkusen, Germany Bayer CropScience AG, Report No.: RA-2062/95, Edition Number: M-000922-01-1, Dat

THIA06-050, Placke, F. J., 1997b, Determination of residues of YRC 2894 480 SC following spray application in the field on apple in Great Britain, Netherlands and the Federal Republic of Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2114/96, Edition Number:

THIA06-052, Placke, F. J., 1997c, Determination of residues of YRC 2894 480 SC following spray application on apple in Spain an Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2063/95, Edition Number: M-000919-01-1, Date: 12.11.1997, GLP, unpublished

THIA06-053, Placke, F. J., 1997d, Determination of residues of YRC 2894, 480 SC following spray application in the field on apple in Spain, Italy and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2115/96, Edition Number: M-000913-01-1, Date: 05.11.1997, GLP, THIA06-064, Placke, F. J., 1997e, Determination of residues of YRC 2894 480 SC following spray application on peach in Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2064/95, Edition Number: M-000958-01-1, Date: 12.11.1997, GLP, unpublished

THIA06-065, Placke, F. J., 1997f, Determination of residues of YRC 2894 480 SC following spray application in the field on peaches in Spain, France and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2121/96, Edition Number: M-000955-01-1, Date: 18.11.1997, GLP

THIA06-091, Placke, F. J., 1997g, Determination of residues of YRC 2894 480 SC following spray application on cucumber in Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2066/95, Edition Number: M-000932-01-1, Date: 20.02.1997, GLP, unpublished

THIA06-092, Placke, F. J., 1997h, Determination of residues of YRC 2894 480 SC following spray application in the field on cucumber in Spain an Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2116/96, Edition Number: M-000930-01-1, Date: 23.10.1997, GLP, unpubli

THIA06-093, Placke, F. J., 1997i, Determination of residues of YRC 2894 480 SC following spray application in the greenhouse on cucumber in Spain, France, Greece, and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2117/96, Edition Number: M-000927-01-1, Date: 2

THIA06-094, Placke, F. J., 1997j, Determination of residues of YRC 2894 480 SC following spray application on watermelon and melon in Greece, Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2061/95, Edition Number: M-000961-01-1, Date: 03.11.1997, GLP,

THIA06-095, Placke, F. J., 1997k, Determination of residues of YRC 2894 480 SC following spray application in the field on watermelon and melon in Greece, Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2118/96, Edition Number: M-000972-01-1, Date: 02.

THIA06-097, Placke, F. J., 1997l, Determination of residues of YRC 2894 480 SC following spray application on tomato in Italy and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2068/95, Edition Number: M-000966-01-1, Date: 05.03.1997, GLP, unpublished

THIA06-098, Placke, F. J., 1997m, Determination of residues of YRC 2894 480 SC following spray application on tomato in Spain and the Federal Republic of Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2067/95, Edition Number: M-000969-01-1, Date: 23.02.1997,

THIA06-099, Placke, F. J., 1997n, Determination of residues of YRC 2894 480 SC following spray application in the field on tomato in France and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2122/96, Edition Number: M-000987-01-1, Date: 03.12.1997, GLP, unpubli

THIA06-100, Placke, F. J., 1997o, Determination of residues of YRC 2894 480 SC following spray application in the greenhouse on Tomato in Spain, France and the Federal Republic of Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2123/96, Edition Number: M-00096

THIA06-103, Placke, F. J., 1997p, Determination of residues of YRC 2894 480 SC following spray application on pepper in Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2070/95, Edition Number: M-000950-01-1, Date: 26.03.1997, GLP, unpublished

THIA06-104, Placke, F. J., 1997q, Determination of residues of YRC 2894 480 SC following spray application on pepper in Spain and Netherlands, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2069/95, Edition Number: M-000953-01-1, Date: 12.03.1997, GLP, unpublished

THIA06-105, Placke, F. J., 1997r, Determination of residues of YRC 2894 480 SC following spray application in the field on peppers in Spain, France and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2119/96, Edition Number: M-000947-01-1, Date: 10.11.1997, GLP,

THIA06-106, Placke, F. J., 1997s, Determination of residues of YRC 2894 480 SC following spray application in the Greenhouse on Peppers in Spain an France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2120/96, Edition Number: M-000940-01-1, Date: 10.11.1997, GLP, un

THIA06-128, Placke, F. J., 1997t, Determination of residues of YRC 2894 480 SC following spray application on apple (fruit, juice, pomace, sauce, fruit washed, fruit dried) in Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-3063/95, Edition Number: M-000975-01-1

THIA06-129, Placke, F. J., 1997u, Determination of residues of YRC 2894 480 SC following spray application on apple (fruit, juice, pomace, sauce, washed, fruit, dried) in the Federal Republic of Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-3062/95, Edition

THIA06-130, Placke, F. J., 1997v, Determination of residues of YRC 2894 480 SC following spray application on peach (fruit, fruit washed, preserve) in Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-3064/95, Edition Number: M-000983-01-1, Date: 12.11.1997, GLP,

THIA06-131, Placke, F. J., 1997w, Determination of residues of YRC 2894 480 SC following spray application in the filed on peach (fruit, fruit washed, preserve) in Italy and Spain, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-3121/96, Edition Number: M-000981-01-1, THIA06-133, Placke, F. J., 1997x, Determination of residues of YRC 2894 480 SC following spray application on tomato (fruit, juice, paste, preserve, fruit washed, fruit peeled) in Spain and the Federal Republic of Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: R

THIA06-015, Placke, F. J., 1998, Amendment E001 of the residue analytical method 00419 for the determination of YRC 2894 residues in plant materials, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00419/E001, Edition Number: M-010852-01-1, Method Report No.: MR-414/98,

THIA06-017, Placke, F. J., 1998a, Residue analytical method for the determination of YRC 2894 residues in animal matrices by HPLC-UV, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00519, Edition Number: M-010862-01-1, Method Report No.: MR-337/98, Date: 22.04.1998, GLP

THIA06-134, Placke, F. J., 1998b, YRC 2894 - A 28 day dairy cattle feeding study, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: MR-369/98, Edition Number: M-002153-01-1, Date: 26.06.1998 GLP, unpublished

THIA06-127, Riegner, K., 1998, Aqueous hydrolysis of YRC 2894 under conditions of processing studies, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4364, Edition Number: M-002136-01-1 Date: 29.05.1998, GLP, unpublished

THIA06-186, Schoening, R., 2004, Determination of Residues of Thiacloprid and Deltamethrin in/on Spring Wheat and Winter Wheat Following Spray Application of Proteus 110 OD in the Field in Germany and Northern France, Bayer CropScience AG, Report No.: RA-2177/02, Edition Number: MO-04-010525, Date: 06.10.2004, GLP, unpublished

THIA06-019, Schoening, R., 1998, Residue analytical method 00548 for the determination of residues of YRC 2894 in/on plant materials by HPLC with Electrospray and MS/MS - detection, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00548, Edition Number: M-010883-01-1, Met

THIA06-040, Schoening, R., 1998a, Residue analytical method for the determination of YRC 2894 residues in animal material by LC-MS/MS, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00490, Edition Number: M-010868-01-1, Method Report No.: MR-354/98, Date: 13.05.1998, GL

THIA06-041, Schoening, R., 1998b, Residue analytical method for the determination of YRC 2894 total residues in animal material by GC-MSD, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00491, Edition Number: M-010877-01-1, Method Report No.: MR-374/98, Date: 18.06.1998,

THIA06-028, Schoening, R., 1999, Residue analytical method 00588 for the determination of YRC 2894 total residue in plant matrices, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00588, Edition Number: M-023878-01-1, Method Report No.: MR-339/99, Date: 03.12.1999, GLP,

THIA06-066, Schoening, R., 1999a, Determination of residues of YRC 2894 480 SC following spray application in the field on sweet and sour cherry in Germany, Benelux and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2070/98, Edition Number: M-010700-01-1, Date

THIA06-069, Schoening, R., 1999b, Determination of residues of YRC 2894 480 SC following spray application in the field on sweet cherry in Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2071/98, Edition Number: M-010673-01-1, Date: 03.05.1999, GLP, unpublished

THIA06-101, Schoening, R., 1999c, Determination of residues of YRC 2894 480 SC following drip irrigation in the greenhouse on pepper and tomato in Benelux, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2072/98, Edition Number: M-019570-01-1, Date: 02.11.1999, GLP, u

THIA06-043, Schoening, R., 2000, Storage stability of YRC 2894 residues in crops during freezer storage, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: MR-114/00, Edition Number: M-026241-01-1 Date: 15.11.2000, GLP, unpublished

THIA06-079, Schoening, R., 2000a, Determination of residues of YRC 2894 480 SC (A. S. Thiacloprid) in/on strawberry in the field in Germany, France and Great Britain, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2006/99, Edition Number: M-029242-01-1, Date: 28.03.20

THIA06-089, Schoening, R., 2000a, Determination of residues of YRC 2894 480 SC (a.s. thiacloprid) in/on cucumber in the greenhouse in Germany, Netherlands and Belgium, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2134/99, Edition Number: M-043880-01-1, Date: 03.08.2

THIA06-102, Schoening, R., 2000b, Determination of residues of YRC 2894 (480 SC, A.S. Thiacloprid) in/on pepper and tomato in the greenhouse in Netherlands and Belgium, Bayer AG, Leverkusen, Germany Bayer CropScience AG, Report No.: RA-2072/99, Edition Number: M-039214-01-1, Date: 28.06.2

THIA06-107, Schoening, R., 2000c, Determination of residues of YRC 2894 (480 SC) following spray application in the field on potato in Germany and North France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2150/97, Edition Number: M-022813-01-1, Date: 01.02.2000, GL

THIA06-108, Schoening, R., 2000d, Determination of residues of YRC 2894 480 SC (A.S. YRC 2894) on potato following spray application in the field in Germany, Great Britain, France and Belgium, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2068/98, Edition Number: M-0

THIA06-109, Schoening, R., 2000e, Determination of residues of YRC 2894 (480 SC) following spray application in the field on potato in Spain and Italy, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2151/97, Edition Number: M-022617-01-1, Date: 01.02.2000, GLP, unpubl

THIA06-110, Schoening, R., 2000f, Determination of residues of YRC 2894 (480 SC) on potato in the field in Spain, Italy and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2069/98, Edition Number: M-023572-01-1, Date: 10.02.2000, GLP, unpublished

THIA06-023, Schoening, R., 2001, Supplement E002 of the residue analytical method 00548 for the determination of residues of YRC 2894 in plant materials by HPLC with electrospray MS/MS-detection, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00548/E002, Edition Number:

THIA06-051, Schoening, R., 2001a, Determination of residues of YRC 2894 480 SC following spray application in the field on apple in France (North), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2111/00, Edition Number: M-080245-01-1, Date: 23.10.2001, GLP, unpublish

THIA06-054, Schoening, R., 2001b, Determination of residues of YRC 2894 480 SC following spray application in the field on apple in France (South), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2112/00, Edition Number: M-075119-01-1, Date: 27.09.2001, GLP, unpublishe

THIA06-063, Schoening, R., 2001c, Determination of residues of YRC 2894 480 SC following spray application in the field on peach in France (South), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2113/00, Edition Number: M-077085-01-1, Date: 01.10.2001, GLP, unpublishe

THIA06-073, Schoening, R., 2001d, Determination of residues of YRC 2894 on plum after spray application of YRC 2894 480 SC in the field in Germany and France (North), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2126/00, Edition Number: M-089903-01-1, Date: 17.12.20

THIA06-115, Schoening, R., 2001e, Determination of residues of YRC 2894 on barley after spray application of YRC 2894 480 SC in the field in France (south), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2123/00, Edition Number: M-089143-01-1, Date: 11.12.2001, GLP, u

THIA06-024, Schoening, R., 2002, Supplement E003 of the residue analytical method 00548 for the determination of residues of YRC 2894 in plant materials by HPLC with electrospray MS/MS-detection, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00548/E003, Edition Number:

THIA06-074, Schoening, R., 2002a, Determination of residues of YRC 2894 480 SC (A.S. YRC 2894) in/on plum following spray application in the field in Germany, Bayer CropScience AG, Report No.: RA-2120/01, Edition Number: M-073425-01-1, Date: 05.12.2002, GLP, unpublished

THIA06-075, Schoening, R., 2002b, Determination of residues of YRC 2894 480 SC (A.S. YRC 2894) in/on plum following spray application in the field in France (South), Bayer CropScience AG, Report No.: RA-2121/01, Edition Number: M-073458-01-1, Date: 05.12.2002, GLP, unpublished

THIA06-076, Schoening, R., 2002c, Determination of residues of YRC 2894 on plum after spray application of YRC 2894 80 SC in the field in Spain and France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2127/00, Edition Number: M-035900-01-1, Date: 12.02.2002, GLP,

THIA06-082, Schoening, R., 2002d, Determination of residues of YRC 2894 (480 SC) in/on red currant and black currant following spray application in the field in Belgium, Great Britain and Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2111/01, Edition Number:

THIA06-119, Schoening, R., 2002e, Determination of residues of YRC 2894 (240 OS) in/on winter rape following spray application in the field in France (North) and Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2171/01, Edition Number: M-053894-01-1, Date: 22.0

THIA06-121, Schoening, R., 2002f, Determination of residues of YRC 2894 (240 OS) in/on winter rape following spray application in the field in Spain and Southern France, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2172/01, Edition Number: M-053924-01-1, Date: 28.03

THIA06-187, Schoening, R., 2004a, Determination of Residues of YRC 2894 and Deltamethrin in/on Spring Wheat and Winter Wheat Following Spray Application of Proteus 110 OD in the Field in Germany and Northern France, Bayer CropScience AG, Report No.: RA-2178/02, Edition Number: MO-04-010536, Date: 06.10.2004, GLP, unpublished

THIA06-020, Schoening, R., 2005, Determination of residues of thiacloprid after application of Calypso (480 SC) in/on onion in Germany, Bayer CropScience AG, Report No.: MR-068/05, Edition Number: M-252576-01-1, Date: 06.06.2005, Non GLP, unpublished

THIA06-021, Schoening, R., 2005a, Determination of residues of thiacloprid after application of Calypso (480 SC) in/on leek in Germany, Bayer CropScience AG, Report No.: MR-185/04, Edition Number: M-252578-01-1, Date: 06.06.2005, Non GLP, unpublished

THIA06-044, Schoening, R., 2005a, Storage stability of YRC 2894 in/on potato (tuber), tobacco (leaf, dry), wheat (straw), rape (seed), pea (pea with pod) and currant (fruit) for 24 months, Bayer CropScience AG, Report No.: MR-073/03, Edition Number: M-252414-01-1, Date: 01.06.2005, GLP, u

THIA06-090, Schoening, R., 2005a, Determination of residues of Thiacloprid after application of Calypso (480 SC) in/on cucumber in Germany, Bayer CropScience AG, Report No.: MR-067/05, Edition Number: M-252962-01-1 Date: 17.06.2005, GLP, unpublished

THIA06-078, Schoening, R. and Nuesslein, F., 2001, Determination of residues of YRC 2894 480 SC following spray application in the field on strawberry in Belgium, France (North), Great Britain and Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2053/00, Edition Number: M-04205

THIA06-081, Schoening, R. and Nuesslein, F., 2001a, Determination of residues of YRC 2894 on red and black currant following spray application of YRC 2894 480 SC in the field in Belgium, Great Britain and Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2054/00, Edition Number:

THIA06-096, Schoening, R. and Nuesslein, F., 2001b, Determination of residues of YRC 2894 on melon following spray application of YRC 2894 480 SC in the field in France (South), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2115/00, Edition Number: M-087877-01-1, Date: 03.12.2001, GLP

THIA06-067, Schoening, R. and Sur, R., 2000, Determination of residues of YRC 2894 480 SC in/on sour cherry in the field following spray application in Germany, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2070/99, Edition Number: M-023995-01-1, Date: 15.02.2000, GLP, unpublis

THIA06-123, Schoening, R. and Sur, R., 2000a, Determination of residues of YRC 2894 (480 SC) on cotton after spray application in the field in Spain and Greece, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2115/97, Edition Number: M-021336-01-1, Date: 02.02.2000, GLP, unpublish

THIA06-124, Schoening, R. and Sur, R., 2000b, Determination of residues of YRC 2894 in/on cotton after three spray applications of YRC 2894 480 SC in the field in Spain and Greece, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2073/98, Edition Number: M-024052-01-1, Date: 22.02.

THIA06-132, Schoening, R. and Sur, R., 2000c, Determination of residues of YRC 2894 480 SC in/on sour cherry in the field following spray application in Germany (fruit, fruit-washed, fruit-stoned, preserve, washing water), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-3070/99, E

THIA06-113, Schoening, R. and Sur, R., 2001, Determination of residues of YRC 2894 in/on winter wheat after spray application of YRC 2894 480 SC in France (South), Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: RA-2121/00, Edition Number: M-090057-01-1, Date: 17.12.2001, GLP, unpub

THIA06-022, Sur, R., 2000, Supplement E001 to residue method 00548 for the determination of the insecticide YRC 2894 (thiaclopride) in/on strawberry and tomato including processed products, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: 00548/E001, Edition Number

THIA06-059, Tancred, S., 1999, Determination of thiacloprid residues in apple fruit following ten application of YRC 2894 480 SC as dilute sprays, Bayer Australia Ltd., Pymble, Australia, Bayer CropScience AG, Report No.: EMH453/99, Edition Number: M-037947-02-1, Date: 13.10.1999, Amen

THIA06-062, Tancred, S., 2001, Contract trail to determine thiacloprid residues in pear fruit following four early, four late or eight total applications of YRC 2894 480 SC, applied as dilute sprays to Packham pears Bayer Australia Ltd., Pymble, Australia, Bayer CropScience AG, Report

THIA06-016, Weber, H., 1998, Independent laboratory validation (ILV) of Bayer methods 00419 and 00419/E001 for the determination of the residues of YRC 2894 in plant material, Dr. Specht & Partner, Chemische Laboratorien GmbH, Hamburg, Germany, Bayer CropScience AG, Report No.: BAY-9

THIA06-018, Weber, H., 1998a, Independent laboratory validation (ILV) of BAYER method 00519 for the determination of the residues of YRC 2894 in animal matrices, Dr. Specht & Partner, Chemische Laboratorien GmbH, Hamburg, Germany, Bayer CropScience AG, Report No.: BAY-9802V, Edition N

THIA06-005, Weber, H.; Printz, H.and Klempner, A., 1998, [Methylene-^{14}C]YRC 2894 Absorption, distribution, excretion and metabolism in laying hens, Bayer AG, Leverkusen, Germany, Bayer CropScience AG, Report No.: PF4347, Edition Number: M-002160-02-1, Date: 1998-06-26, Amended: 1999-03-15, GLP, unpublished

THIA06-014, Zyl, P. F. C. Van, 2000, Determination of thiachloprid residues in citrus, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1494225/T423, Edition Number: M-048686-02-1, Date: 15.09.2000, Amended: 20.10.2000, Non GLP, unpublished

THIA06-048, Zyl, P. F. C. van, 2000a, Determination of thiachloprid residues in citrus, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1494225/T423, Report includes Trial Nos.: SAF-00-00914, Edition Number: M-048686-02-1, Date: 15.09.2000, Am

THIA06-056, Zyl, P. F. C. Van, 2000b, Determination of thiachloprid residues in apples, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1493281/T392, Edition Number: M-038463-01-1, Date: 30.08.2000, Non GLP, unpublished

THIA06-057, Zyl, P. F. C. Van, 2000c, Determination of thiachloprid residues in apples, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1493257/T389, Edition Number: M-038487-01-1, Date: 30.08.2000, Non GLP, unpublished

THIA06-060, Zyl, P. F. C. Van, 2000d, Determination of thiachloprid residues in pears, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1502352/T465, Edition Number: M-038574-01-1, Date: 19.09.2000, Non GLP, unpublished

THIA06-061, Zyl, P. F. C. Van, 2000e, Determination of thiachloprid residues in pears, South African Bureau of Standards, Pretoria, South Africa, Bayer CropScience AG, Report No.: 5438/1502361/T466, Edition Number: M-038630-01-1, Date: 15.09.2000, Non GLP, unpublished

CROSS REFERENCES

Author	**Code**	**Year**
Anderson, C.; Weber, H. and Bornatsch, W.	THIA06-004	1998
Anon.	THIA06-164	1996
Anon.	THIA06-135	1997
Anon.	THIA06-140	2001
Anon.	THIA06-139	2003
Anon.	THIA06-165	1996a
Anon.	THIA06-166	1996b
Anon.	THIA06-167	1996c
Anon.	THIA06-172	1996d
Anon.	THIA06-173	1996e
Anon.	THIA06-174	1996f
Anon.	THIA06-175	1996g
Anon.	THIA06-136	1997a
Anon.	THIA06-179	1997aa
Anon.	THIA06-180	1997ab
Anon.	THIA06-181	1997ac
Anon.	THIA06-182	1997ad
Anon.	THIA06-183	1997ae
Anon.	THIA06-137	1997b
Anon.	THIA06-138	1997c
Anon.	THIA06-148	1997d
Anon.	THIA06-149	1997e
Anon.	THIA06-150	1997f
Anon.	THIA06-151	1997g
Anon.	THIA06-152	1997h
Anon.	THIA06-153	1997i
Anon.	THIA06-154	1997j
Anon.	THIA06-155	1997k
Anon.	THIA06-156	1997l
Anon.	THIA06-157	1997m
Anon.	THIA06-158	1997n
Anon.	THIA06-159	1997o
Anon.	THIA06-160	1997p
Anon.	THIA06-161	1997q
Anon.	THIA06-162	1997r
Anon.	THIA06-163	1997s
Anon.	THIA06-168	1997t
Anon.	THIA06-169	1997u
Anon.	THIA06-170	1997v
Anon.	THIA06-171	1997w
Anon.	THIA06-176	1997x
Anon.	THIA06-177	1997y
Anon.	THIA06-178	1997z
Anon.	THIA06-141	2001a
Anon.	THIA06-146	2001a
Anon.	THIA06-147	2001b
Anon.	THIA06-038	2002
Anon.	THIA06-142	2002a
Anon.	THIA06-143	2002b
Anon.	THIA06-144	2002c

Author	Code	Year
Anon.	THIA06-145	2002d
Anon.	THIA06-184	2002f
Anon.	THIA06-185	2002g
Babczinski, P.	THIA06-007	1997
Babczinski, P.	THIA06-029	1997a
Babczinski, P.	THIA06-009	1998
Ballesteros, C. and Meilland - Berthier, I.	THIA06-026	2004
Ballesteros, C. and Meilland - Berthier, I.	THIA06-027	2005
Baravelli, P. L.	THIA06-039	2003
Billian, P. and Schoening, R.	THIA06-025	2003
Billian, P. and Schoening, R.	THIA06-068	2003
Billian, P. and Schoening, R.	THIA06-072	2003a
Billian, P. and Schoening, R.	THIA06-080	2003b
Billian, P. and Schoening, R.	THIA06-084	2003c
Billian, P. and Schoening, R.	THIA06-120	2003d
Billian, P. and Schoening, R.	THIA06-122	2003e
Bongartz, R. and Neumann, B.	THIA06-010	2001
Brumhard, B.	THIA06-003	1998
Clark, T. and Babczinski, P.	THIA06-012	1998
Clark, T. and Bornatsch, W.	THIA06-006	1997
Clay, S.	THIA06-047	2002
Clay, S.	THIA06-036	2003
Clay, S.	THIA06-085	2003a
Clay, S.	THIA06-086	2004
DeHaan, R. A.	THIA06-030	1999
Diot, R.	THIA06-116	2005
Diot, R.	THIA06-117	2005a
Dorschner, K. W.	THIA06-071	2002
Dorschner, K. W.	THIA06-077	2002a
Eberhardt, R. and Schoening, R.	THIA06-112	2001
Eberhardt, R. and Schoening, R.	THIA06-114	2002
Fukuda, T.	THIA06-037	1998
Garbers, H. V.	THIA06-058	2000
Goehrt, A.	THIA06-002	1995
Harbin, A. M.	THIA06-055	1999
Harbin, A. M.	THIA06-033	2004
Heinemann, O. and Schoening, R.	THIA06-070	2000
Heinemann, O. and Schoening, R.	THIA06-083	2002
Hellpointner, E.	THIA06-011	1998b
Koch, A.	THIA06-125	1999
Koester, J.	THIA06-008	1997
Krohn, J.	THIA06-001	1996
Lancas, F. M.	THIA06-045	1998
Lancas, F. M.	THIA06-046	1998a
Lancas, F. M.	THIA06-087	1998b
Lancas, F. M.	THIA06-088	1998c
Lancas, F. M.	THIA06-111	1998d
Moore, S. M.	THIA06-032	2002
Orosz, F.	THIA06-034	2000
Orosz, F.	THIA06-035	2000a
Orosz, F.	THIA06-118	2000b
Orosz, F.	THIA06-126	2000c
Perez, R.	THIA06-031	1999
Placke, F. J.	THIA06-013	1996
Placke, F. J.	THIA06-042	1997
Placke, F. J.	THIA06-049	1997a
Placke, F. J.	THIA06-050	1997b
Placke, F. J.	THIA06-052	1997c
Placke, F. J.	THIA06-053	1997d
Placke, F. J.	THIA06-064	1997e
Placke, F. J.	THIA06-065	1997f

Author	Code	Year
Placke, F. J.	THIA06-091	1997g
Placke, F. J.	THIA06-092	1997h
Placke, F. J.	THIA06-093	1997i
Placke, F. J.	THIA06-094	1997j
Placke, F. J.	THIA06-095	1997k
Placke, F. J.	THIA06-097	1997l
Placke, F. J.	THIA06-098	1997m
Placke, F. J.	THIA06-099	1997n
Placke, F. J.	THIA06-100	1997o
Placke, F. J.	THIA06-103	1997p
Placke, F. J.	THIA06-104	1997q
Placke, F. J.	THIA06-105	1997r
Placke, F. J.	THIA06-106	1997s
Placke, F. J.	THIA06-128	1997t
Placke, F. J.	THIA06-129	1997u
Placke, F. J.	THIA06-130	1997v
Placke, F. J.	THIA06-131	1997w
Placke, F. J.	THIA06-133	1997x
Placke, F. J.	THIA06-015	1998
Placke, F. J.	THIA06-017	1998a
Placke, F. J.	THIA06-134	1998b
Riegner, K.	THIA06-127	1998
Schoening, R.	THIA06-186	2004
Schoening, R.	THIA06-019	1998
Schoening, R.	THIA06-040	1998a
Schoening, R.	THIA06-041	1998b
Schoening, R.	THIA06-028	1999
Schoening, R.	THIA06-066	1999a
Schoening, R.	THIA06-069	1999b
Schoening, R.	THIA06-101	1999c
Schoening, R.	THIA06-043	2000
Schoening, R.	THIA06-079	2000a
Schoening, R.	THIA06-089	2000a
Schoening, R.	THIA06-102	2000b
Schoening, R.	THIA06-107	2000c
Schoening, R.	THIA06-108	2000d
Schoening, R.	THIA06-109	2000e
Schoening, R.	THIA06-110	2000f
Schoening, R.	THIA06-023	2001
Schoening, R.	THIA06-051	2001a
Schoening, R.	THIA06-054	2001b
Schoening, R.	THIA06-063	2001c
Schoening, R.	THIA06-073	2001d
Schoening, R.	THIA06-115	2001e
Schoening, R.	THIA06-024	2002
Schoening, R.	THIA06-074	2002a
Schoening, R.	THIA06-075	2002b
Schoening, R.	THIA06-076	2002c
Schoening, R.	THIA06-082	2002d
Schoening, R.	THIA06-119	2002e
Schoening, R.	THIA06-121	2002f
Schoening, R.	THIA06-187	2004a
Schoening, R.	THIA06-020	2005
Schoening, R.	THIA06-021	2005a
Schoening, R.	THIA06-044	2005a
Schoening, R.	THIA06-090	2005a
Schoening, R. and Nuesslein, F.	THIA06-078	2001
Schoening, R. and Nuesslein, F.	THIA06-081	2001a
Schoening, R. and Nuesslein, F.	THIA06-096	2001b
Schoening, R. and Sur, R.	THIA06-067	2000
Schoening, R. and Sur, R.	THIA06-123	2000a

Author	Code	Year
Schoening, R. and Sur, R.	THIA06-124	2000b
Schoening, R. and Sur, R.	THIA06-132	2000c
Schoening, R. and Sur, R.	THIA06-113	2001
Sur, R.	THIA06-022	2000
Tancred, S.	THIA06-059	1999
Tancred, S.	THIA06-062	2001
Weber, H.	THIA06-016	1998
Weber, H.	THIA06-018	1998a
Weber, H.; Printz, H.and Klempner, A.	THIA06-005	1998
Zyl, P. F. C. Van	THIA06-014	2000
Zyl, P. F. C. van	THIA06-048	2000a
Zyl, P. F. C. Van	THIA06-056	2000b
Zyl, P. F. C. Van	THIA06-057	2000c
Zyl, P. F. C. Van	THIA06-060	2000d
Zyl, P. F. C. Van	THIA06-061	2000e