AZOXYSTROBIN (229)

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EXPLANATION

Azoxystrobin (methyl (E)-2-[2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate) was first evaluated for toxicology and residues by the JMPR in 2008. The Meeting derived an ADI of 0.2 mg/kg bw per day and decided that an ARfD is unnecessary. The 2008 JMPR concluded that the residue definition for plant commodities for compliance with MRL values and for consumer risk assessments was parent azoxystrobin. Maximum residue levels, STMRs and STMR-Ps for 82 commodities or commodity groups were estimated. The compound was re-evaluated for residues by the JMPR in 2011 and 2012.

Azoxystrobin was listed by the Forty-fourth Session of the CCPR (2012) for the review of additional MRLs. The 2013 JMPR received GAP information and residue data in coffee beans, pulses, potatoes, barley, oats and sorghum.

RESIDUE ANALYSIS

Analytical methods

The Meeting received information on analytical methods for azoxystrobin residues in coffee beans (POPIT Met.029, PLARA 082 v.07), potatoes (RAM 305), pulses (RAM 305, RAM 243), cereal grain, straw and forage (RAM 305/03). The methods RAM 305, RAM 305/03 and RAM 243 were previously reported by the JMPR in 2008 and method POPIT MET.029 by JMPR in 2011. Method PLARA 082 v.07 is briefly described below and the recoveries are summarized in Table 1.

Method: PLARA 082 v.07
Reference: PLMV 027 039/2010
Commodity: Coffee bean
Analyte: Azoxystrobin, R230310
Determination: LC-MS/MS
LOQ: 0.01 mg/kg
Accuracy: The mean recovery in coffee was between 91–105 % at each fortification level.
Repeatability: The relative standard deviations (RSDs) of azoxystrobin recoveries at each fortification level and overall during method validation were all below 20 %.
Linearity: The linearity of detector response was confirmed by analysis of nine concentrations of standard solutions in the range 0.01 to 2.0 ng/mL of azoxystrobin with three injections for each concentration. Linearity of response was demonstrated with a correlation coefficient (R^2) of 0.9995.
Specificity: No interfering peaks were detected in control samples above the LOD.
Description: A sample of ground coffee beans (1 g) is extracted by shaking for 15 minutes with ethyl acetate (20 mL), ultrasonicating for 15 minutes and centrifuging. The extract is removed and the extraction repeated. The extracts from the two extractions are combined, an aliquot (3 mL) taken, evaporated to dryness and resuspended in 3 mL methanol/water (1:1 v/v) using vortex mixing. An aliquot (1 mL) of the resulting extract is taken, and mixed with 4 mL methanol/water (1:1 v/v) using a vortex mixer and then ultrasonicating for 15 minutes. This extract is analysed directly by LC-MS/MS with quantification by external standardisation.

Table 1 Recovery data for azoxystrobin in coffee (PLMV 027 039/2010)

Commodity	Fortification level (mg/kg)	Recovery (%)	No. of analyses (n)	Mean recovery (%)	RSD (%)	Range (%)
Coffee bean	0.01	96, 91, 95, 96, 98, 99	6	96	3	91–99
	0.1	105, 95, 92, 97,	7	97	5	91–105

Commodity	Fortification level (mg/kg)	Recovery (%)	No. of analyses (n)	Mean recovery (%)	RSD (%)	Range (%)
		94, 91, 101				
	Overall		13	96	4	91–105

USE PATTERN

The information available to the 2013 JMPR on registered uses of azoxystrobin is summarized in Table 2. Copies of labels including an English translation if appropriate were made available to the Meeting.

Table 2 Registered uses of azoxystrobin

Crop	Country	Form	Application		Spray			PHI, days	Remarks
			Method	Rate, kg ai/ha	Volume, L/ha	No	Interval, days		
Barley	USA	SE	Foliar spray	0.072–0.15		1	–		Early season [a]
Barley	USA	SE	Foliar spray	0.11–0.15		1	14		Main season [a] PHI 7 days minimum for forage/hay
Barley (foot rot/eyespot)	USA	SE	Foliar spray	0.15		1	14		PHI 7 days minimum for forage/hay
Coffee	Brazil	SC	Foliar spray [b]	0.10	400	3	60	30	
Coffee	Brazil	SC	Foliar spray [b]	0.15	400	2	90	30	
Coffee	Colombia	SC	Foliar spray	0.15	280–420	3	45	15	
Field bean	France	SC	Foliar spray	0.20	100–300	1–2		42	
Field bean	Germany	SC	Foliar spray	0.25	200–400	1–2	14–28	35	Appl. from BBCH [c] 13
Field pea, chickpeas	France	SC	Foliar spray	0.2–0.25	100–300	2	14	35	
Field pea	Germany	SC	Foliar spray	0.25	200–400	1–2	14–28	35	Appl. at BBCH 51–75
Lentil	France	SC	Foliar spray	0.2–0.25	100–300	2	14	28	
Lupin	France	SC	Foliar spray	0.20	100–300	1–2		42	
Lupin	Germany	SC	Foliar spray	0.25	200–400	1–2	14–28	35	Appl. from BBCH 13
Oats	USA	SE	Foliar spray	0.15		1	–		Early season [a]
Oats	USA	SE	Foliar spray	0.11–0.15		1	14	7	Main season [a] PHI 7 days minimum for forage/hay
Oats (foot rot/eyespot)	USA	SE	Foliar spray	0.15		1	14	7	PHI 7 days minimum for forage/hay
Potato	USA	SC	Post-harvest spray	0.49 g/100 kg tubers		1	–		

Crop	Country	Form	Application		Spray			PHI, days	Remarks
			Method	Rate, kg ai/ha	Volume, L/ha	No	Interval, days		
Sorghum	USA	SE	Foliar spray	0.11–0.28		2		14	Part of integrated diseases management

[a] A single early season application followed by a single application at 50% to full flag leaf emergence.

[b] Use of an adjuvant at 0.5% of the spray application volume is recommended.

[c] BBCH scale (http://www.pub.jki.bund.de)

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The Meeting received information on supervised field trials for azoxystrobin uses that produced residues on the following commodities:

Commodity	Group	Table No
Beans, dry	VD Pulses	3
Peas, dry	VD Pulses	4
Potato	VR Root and tuber vegetables	5
Barley	GC Cereal grains	6
Oat	GC Cereal grains	7
Sorghum	GC Cereal grains	8
Coffee beans	SB Seed for beverages and sweets	9
Bean fodder	AL Legume animal feed	10
Pea fodder (dry)	AL Legume animal feed	11
Pea vines (green)	AL Legume animal feed	12
Barley straw	AF Straw, fodder and forage of cereals	13
Barley hay	AF Straw, fodder and forage of cereals	14
Oat straw	AF Straw, fodder and forage of cereals	15
Oat hay	AF Straw, fodder and forage of cereals	16
Oat forage (green)	AF Straw, fodder and forage of cereals	17
Sorghum stover	AF Straw, fodder and forage of cereals	18
Sorghum forage (green)	AF Straw, fodder and forage of cereals	19

Conditions of the supervised residue trials were generally well reported in detailed field reports. If two field samples were taken or results of two replicate plots were submitted, the mean value was calculated. From two trials carried out side-by-side the higher residues were chosen and not the average.

Laboratory reports included method validation with procedural recoveries from spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analysis or duration of residue sample storage were also provided. Residue data are recorded unadjusted for recovery. When residues were not quantifiable they are shown in the tables as below the LOQ (e.g. < 0.01 mg/kg). When residues were not detectable, they are shown as n/d.

Residues and application rates have generally been rounded to two significant figures. Residue values from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels. Those results included in the evaluation are underlined.

Pulses

Beans, dry

Eleven independent supervised trials were conducted on dry beans in the UK, Italy and France in 1998–2005. Azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.20–0.25 kg ai/ha with a spray interval of 14 days. Applications were made between BBCH growth stages 61 and 87. Samples of dry bean seed were collected at normal commercial harvest at PHIs of 14–36 days. The analytical methods used were RAM 305/01, RAM 305/02 and RAM 305/03 with a validated limit of quantification of 0.01 mg/kg. Detailed trial summaries are presented in Table 3.

Table 3 Azoxystrobin residues in beans, dry

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage (BBCH)				
UK, 2005, Horsten, Nottinghamshire (Clipper)	0.2 0.2	2	61 79	30	Bean (dried)	< 0.01	05-0415, AF/8541/SY/1 Syngenta File No. SAN619/8116
UK, 2005, Draycott, Nottinghamshire (Quattro)	0.21 0.21	2	61 79	30 36	Bean (dried)	< 0.01 < 0.01	05-0415, AF/8541/SY/2 Syngenta File No. SAN619/8116
France North, 2005 Boce, Pays de la Loire (Castel)	0.13 0.2	2	62 87	26	Bean (dried)	< 0.01	05-0415, AF/8541/SY/4 Syngenta File No. SAN619/8116
Italy, 1998 Nogara (VR), Veneto (Etna, Borlotto)	0.25 0.25	2	61 75	73 (34) [a]	Dried seeds	< 0.01	RJ2845B, IT20-99-P301 Syngenta File No. ICI5504/0394
Italy, 1998 Moncestino (AL), Piemonte (Etna, Borlotto)	0.25 0.25	2	Beginning of flowering 79	30	Dried seeds	< 0.01	RJ2845B, IT20-99-P302 Syngenta File No. ICI5504/0394
Italy, 1999 Moncestino (AL), Piemonte (Etna)	0.25 0.25	2	55 65	28	Dried seeds	< 0.01	RJ2969B, IT30-99-P350 Syngenta File No. ICI5504/0408
Italy, 1999 Sant 'Antonio (RA), Emilia Romagna (Kirena)	0.25 0.25	2	79 79	14	Dried seeds	0.04	RJ2969B, IT20-99-P351 Syngenta File No. ICI5504/0408
France, 2005 Monteux, Provence-Alpes-Cote-d'Azur (Big Borloto)	0.21 0.2	2	69–71 75–77	30	Seed	< 0.01	05-0607, FR-FR-05-0482 Syngenta File No. SAN619/8117
France, 2005 Grisolles, Midi-Pyrenees (Linex)	0.2 0.2	2	62 76	31	Seed	< 0.01	05-0607, FR-FR-05-0483 Syngenta File No. SAN619/8117
France, 2005 Estillac, Aquitaine (Linex)	0.22 0.21	2	64 73–75	29	Seed	< 0.01	05-0607, FR-FR-05-0484 Syngenta File No. SAN619/8117
France, 2005 Marsillargues, Languedoc-Roussilon (Linex)	0.21 0.21	2	61 67	28	Seed	< 0.01	05-0607, FR-FR-05-0485 Syngenta File No. SAN619/8117

[a] Sample harvested partially dried from the field, drying was completed indoors for a further 39 days.

Peas, dry

Twenty independent supervised trials were conducted on dry peas in the UK and France in 1996–2004. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.20–0.25 kg ai/ha with a spray interval of 14 days. Applications were made between BBCH growth stages 61 and 77. Samples of dry pea seed were collected at normal commercial harvest at PHIs of 30–45 days. Several trials were conducted as decline trials. In these trials, peas are separated from the pods by hand, except where noted in the table. The analytical methods used were RAM 305/02, RAM 243/04 and RAM 243/05 with a validated limit of quantification of 0.01 mg/kg. Detailed trial summaries are presented in Table 4.

Table 4 Azoxystrobin residues in peas, dry

Country, year, location (variety)	Application			PHI,	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH	days			
France North, 1996	0.25	2	63–65	14	Seed	0.02	RJ2286B,
Grivesnes, Picardie	0.25		69–71	14	Seed	0.02	S101.96
Vining pea (Bonette)				14	Seed (mech. thresh)	0.1	Syngenta File No. ICI5504/1111
				14	Seed (mech. thresh)	0.09	
				38	Seed (mech. thresh)	0.06	
				38	Seed (mech. thresh)	0.07	
						mean 0.065	
France North, 1996	0.2	2	63–65	14	Seed	0.01	RJ2286B,
Grivesnes, Picardie	0.2		69–71	14	Seed	< 0.01	S101.96
Vining pea (Bonette)				14	Seed (mech. thresh)	0.07	Syngenta File No. ICI5504/1111
				14	Seed (mech. thresh)	0.06	
				38	Seed (mech. thresh)	0.01	
				38	Seed (mech. thresh)	0.04	
France North, 1996	0.25	2	63	14	Seed	0.08	RJ2286B,
Bayonvillers, Picardie	0.25		69–71	14	Seed	0.05	S102.96
Vining pea (Lynx)				14	Seed (mech. thresh)	0.16	Syngenta File No. ICI5504/1111
				14	Seed (mech. thresh)	0.12	
				42	Seed (mech. thresh)	0.02	
				42	Seed (mech. thresh)	0.01	
						mean 0.015	
France North, 1996	0.2	2	63	14	Seed	0.03	RJ2286B,
Bayonvillers, Picardie	0.2		69–71	14	Seed	0.04	S102.96
Vining pea (Lynx)				14	Seed (mech. thresh)	0.07	Syngenta File No. ICI5504/1111
				14	Seed (mech. thresh)	0.09	
				42	Seed (mech. thresh)	< 0.01	
				42	Seed (mech. thresh)	< 0.01	
France North, 1996, Tourny, Haute-Normandie	0.25	2	65	15	Seed	0.02	RJ2286B,
Vining pea (Mini)	0.25		69–71	15	Seed	0.02	S208.96
				15	Seed (mech. thresh)	0.06	Plot: 2
				15	Seed (mech. thresh)	0.06	Syngenta File No. ICI5504/1111
				30	Seed (mech. thresh)	0.03	
				30	Seed (mech. thresh)	0.02	
						mean 0.025	
France North, 1996, Tourny, Haute-Normandie Vining	0.2	2	65	15	Seed	< 0.01	RJ2286B
	0.2		69–71	15	Seed	< 0.01	S208.96
				15	Seed (mech. thresh)	0.03	Plot: 2

Country, year, location (variety)	Application			PHI,	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH	days			
pea (Mini)				15	Seed (mech. thresh)	0.04	Syngenta File No. ICI5504/1111
				30	Seed (mech. thresh)	0.01	
				30	Seed (mech. thresh)	0.01	
France North, 1997	0.25	2	62	14	Seed	0.01	RJ2548B,
Chaulnes, Picardie	0.25		71	14	Seed (mech. thresh)	0.06	S101.97
Vining pea (Novaroy)				40	Seed (mech. thresh)	0.01	Syngenta File No. ICI5504/1115
	0.2	2	62	14	Seed	0.01	
	0.2		71	14	Seed (mech. thresh)	0.06	
				40	Seed (mech. thresh)	< 0.01	
France North, 1997	0.25	2	65	15	Seed	0.01	RJ2548B,
Hennezis, Haute Normandie							
Vining pea (Camaro)	0.25		75	15	Seed (mech. thresh)	0.04	S205.97
				41	Seed	< 0.01	Syngenta File No. ICI5504/1115
	0.2	2	65	15	Seed	0.01	
	0.2		75	15	Seed (mech. thresh)	0.03	
				41	Seed	< 0.01	
UK, 1996,	0.25	2	62	15	Seed (mech. thresh)	0.05	RJ2390B, with Addendum 1
Asselby, East Yorkshire	0.25		64–72	15	Seed (mech. thresh)	0.06	AP/3248/ZE/1
Field pea (Solara)				42	Seed (mech. thresh)	< 0.01	Syngenta File No. ICI5504/1109
				42	Seed (mech. thresh)	< 0.01	
						mean < 0.01	
	0.2	2	62	15	Seed	< 0.01	
	0.2		64–72	15	Seed	< 0.01	
				15	Seed (mech. thresh)	0.04	
				15	Seed (mech. thresh)	0.05	
				42	Seed (mech. thresh)	< 0.01	
				42	Seed (mech. thresh)	< 0.01	
UK, 1997	0.25	2	62	14	Seed	< 0.01	RJ2521B
Melbourne, Derbyshire	0.25		67–72	14	Seed	< 0.01	AP/3783/ZE/1
Field pea (Alfetta)				14	Seed (mech. thresh)	0.03	Syngenta File No. ICI5504/1113
				14	Seed (mech. thresh)	0.03	
				45	Seed (mech. thresh)	< 0.01	
				45	Seed (mech. thresh)	< 0.01	
						mean < 0.01	
	0.2	2	62	14	Seed	< 0.01	
	0.2		67–72	14	Seed	< 0.01	
				14	Seed (mech. thresh)	0.03	
				14	Seed (mech. thresh)	0.02	
				45	Seed (mech. thresh)	< 0.01	
				45	Seed (mech. thresh)	< 0.01	
UK, 1997	0.25	2	62	14	Seed	0.01	RJ2521B,
Middleton on the Wolds, Yorkshire	0.25		67–75	14	Seed	< 0.01	AP/3783/ZE/2
Field pea (Grafilla)				14	Seed (mech. thresh)	0.02	Plot: 2
				14	Seed (mech. thresh)	0.02	Syngenta File No. ICI5504/1113
				44	Seed (mech. thresh)	< 0.01	
				44	Seed (mech. thresh)	< 0.01	
						mean < 0.01	
	0.2	2	62	14	Seed	0.01	

Country, year, location (variety)	Application			PHI,	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH	days			
	0.2		67–75	14	Seed	0.02	
				14	Seed (mech. thresh)	0.02	
				14	Seed (mech. thresh)	0.02	
				44	Seed (mech. thresh)	< 0.01	
				44	Seed (mech. thresh)	< 0.01	
UK, 2004	0.2	2	61–63	7	Seed	0.03	04-0422,
Birkin, Yorkshire	0.21		69–73	14	Seed	0.02	AF/8166/SY/1
Pea dry (Solara)				21	Seed	< 0.01	Syngenta File No. SAN619/7886
				30	Seed	< 0.01	
				43	Seed	0.01	
UK, 2004	0.19	2	61	14	Seed	0.02	04-0422,
Hunmanby, Yorkshire	0.21		67–71	21	Seed	< 0.01	AF/8166/SY/2
Pea dry (Samson)				30	Seed	< 0.01	Syngenta File No. SAN619/7886
				43	Seed	0.01	
France North, 2004	0.2	2	71	0-	Seed	< 0.01	04-0422,
Rouvres St Jean, Centre	0.2		75	0+	Seed	0.02	AF/8166/SY/3
Pea, dry (Canyon)				7	Seed	< 0.01	Syngenta File No. SAN619/7886
				14	Seed	0.01	
				21	Seed	< 0.01	
				30	Seed	0.01	
France North, 2004	0.2	2	63	0-	Seed	< 0.01	04-0422,
Montbellet, Bourgogne	0.2		75	0+	Seed	0.09	AF/8166/SY/4
Pea dry (Atos)				7	Seed	0.02	Syngenta File No. SAN619/7886
				14	Seed	< 0.01	
				21	Seed	0.07	
				30	Seed	0.02	
France South, 1996	0.25	2	65	13	Seed	0.01	RJ2286B,
Brie, Poitou-Charentes	0.25		69–71	13	Seed	0.02	S663.96
(Baccara)				36	Seed (mech. threshed)	0.01	Syngenta File No. ICI5504/1111
				36	Seed (mech. threshed)	0.02	
France South, 1996	0.2	2	65	13	Seed	< 0.01	
Brie, Poitou-Charentes	0.2		69–71	13	Seed	< 0.01	
(Baccara)				36	Seed (mech. threshed)	< 0.01	
				36	Seed (mech. threshed)	< 0.01	
France South,	0.25	2	65	13	Seed	0.01	RJ2286B,
1996	0.25		69–71	13	Seed	0.01	S669.96
Brie, Poitou-Charentes (Baccara)				35	Seed (mech. threshed)	0.01	Syngenta File No. ICI5504/1111
				35	Seed (mech. threshed)	< 0.01	
						mean 0.01	
France South,	0.2	2	65	13	Seed	0.01	
1996	0.2		69–71	13	Seed	0.01	
Brie, Poitou-Charentes (Baccara)				35	Seed (mech. threshed)	< 0.01	
				35	Seed (mech. threshed)	< 0.01	
France South, 1997	0.25	2	63	14	Seed	0.01	RJ2548B,
Chabournay, Poitou	0.25		65	44	Seed (mech. thresh)	< 0.01	S662.97

Country, year, location (variety)	Application			PHI,	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH	days			
Pea (Solara)	0.2	2	63	14	Seed	0.04	Syngenta File No. ICI5504/1115
	0.2		65	44	Seed (mech. thresh)	< 0.01	
France South, 1997	0.25	2	61	14	Seed	< 0.01	RJ2548B,
Vendeuvre du Poitou, Poitou	0.25		63	44	Seed (mech. thresh)	< 0.01	S663.97
(Baccara)				44	Seed (mech. thresh)	< 0.01	Syngenta File No. ICI5504/1115
France South,	0.2	2	61	0-	Seed	< 0.01	04-0421,
2004	0.2		72	0+	Seed	0.07	AF/8167/SY/1
Epennes, Pitou-Charentes				7	Seed	0.03	Syngenta File No. SAN619/7887
Pea dry (NC farm seed)				14	Seed	< 0.01	
				21	Seed	< 0.01	
				29	Seed	0.03	
France South, 2004	0.2	2	67	0-	Seed	< 0.01	04-0421,
Biziat, Rhone-Alpes	0.2		77	0+	Seed	0.05	AF/8167/SY/2
Pea dry (Atos)				7	Seed	0.01	Syngenta File No. SAN619/7887
				14	Seed	0.04	
				21	Seed	0.01	
				30	Seed	< 0.01	
France South,	0.2	2	61	7	Seed	0.01	04-0421,
2004, Finham, Midi	0.2		69–71	14	Seed	< 0.01	AF/8167/SY/3
Pyrenees				21	Seed	< 0.01	Syngenta File No. SAN619/7887
Pea, dry (Austin)				30	Seed	< 0.01	
France South, 2004,	0.2	2	61	7	Seed	0.02	04-0421,
Meauzac, Midi-Pyrenees	0.2		67–71	14	Seed	0.01	AF/8167/SY/4
Pea dry (Bacara)				21	Seed	0.01	Syngenta File No. SAN619/7887
				30	Seed	0.03	

Root and tuber vegetables

Potatoes

Trials have been conducted in the USA and Canada in 2009 to support the registered use pattern.

Five independent supervised trials were conducted. In each trial, azoxystrobin was applied once as an SC formulation containing 250 g ai/L at a rate of 0.44–0.50 g ai/100 kg tubers. In one trial, four different application methods were used, namely spray application to tubers falling from a conveyor belt, surface application, application inside a spray chamber and spray application on a brush table. All other trials used spray application to tubers falling from a conveyor belt or moving along a roller table. In one trial, a bulk sample was collected and processed to flakes, chips and wet peel. Potatoes from the residue trials were sampled after the test substance had dried (0 day). In three trials, additional treated samples were placed in typical potato storage conditions for up to 231 days to generate residue decline data. Samples were collected in duplicate.

Following collection, with the exception of the bulk sample for processing, the potato tubers were frozen and shipped to the laboratory for analysis. The bulk samples were stored at ambient temperature prior to shipment to the processing facility. Processed samples were frozen after collection. The analytical method used was RAM 305/03 with a validated limit of quantification of 0.01 mg/kg. The data are presented in Table 5.

Table 5 Azoxystrobin residues in potatoes after post-harvest treatment

Country, region, year (variety)	Application		PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	g ai/100 kg	Method				
USA, Idaho, 2009/2010 (Russet Burbank)	0.45	Conveyor belt	0	Tuber	4.2	TK0003297, 09-ID19, Syngenta File No. ICI5504_50552
			0	Tuber	3.4 mean 3.8	
			30	Stored tuber	1.5	
			30	Stored tuber	1.5	
			231	Stored tuber	0.75	
			231	Stored tuber	0.44	
	0.45	Surface	0 0	Tuber Tuber	1.2 1.1	
	0.44	Spray chamber	0 0	Tuber Tuber	3.6 3.5	
	0.45	Brush table	0 0	Tuber Tuber	2.3 2.2 mean 2.3	
USA, Main, 2009 (Frito Lay 1533)	0.50	Conveyor belt	0 0	Tuber Tuber	0.99 1.0 mean 1.0	TK0003297, 09-ME04, Syngenta File No. ICI5504_50552
Canada, 2010 (Ac Chaleur)	0.45	Roller table	0	Tuber	3.5	TK0003297, 09-ON14, Syngenta File No. ICI5504_50552 Samples were cut in half in the field before sending to the lab
			0	Tuber	3.7	
			14	Stored tuber	4.8	
			14	Stored tuber	4.5	
			31	Stored tuber	4.2	
			31	Stored tuber	4.1	
			59	Stored tuber	4.3	
			59	Stored tuber	4.3	
USA, Washington, 2009/2010 (Russet Burbank)	0.45	Conveyor belt	0	Tuber	2.3	TK0003297, 09-WA32, Syngenta File No. ICI5504_50552
			0	Tuber	2.2	
			13	Stored tuber	2.5	
			13	Stored tuber	1.6	
			32	Stored tuber	2.6	
			32	Stored tuber	1.6 mean 2.1	
			61	Stored tuber	1.5	
			61	Stored tuber	1.4	
USA, Wisconsin, 2009 (Russet Burbank)	0.46	Conveyor belt	0 0	Tuber Tuber	1.5 1.4 mean 1.5	TK0003297, 09-WI19, Syngenta File No. ICI5504_50552

Cereal grains

Barley

Trials have been conducted in the USA in 2009 and 2010 to support the registered use pattern. Seven independent supervised trials were conducted. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.15 kg ai/ha. Grain samples were harvested at 16–54 days after the final application. The analytical method RAM 305/03 was used. The residue data are summarized in Table 6.

Table 6 Azoxystrobin residues in barley

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Northwood, ND (Pinnacle)	0.15 0.15	2	BBCH 39 BBCH 71	33	Grain	< 0.01	T004408-08, C13-9062
				40	Grain	< 0.01	
				47	Grain	0.013	

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
				47	Grain	0.014 mean 0.014	
				54	Grain	< 0.01	
USA, 2009, Carrington, ND (Pinnacle)	0.15 0.15	2	BBCH 37 BBCH 69	48	Grain	0.033	T004408-08, C13-9065
				48	Grain	0.04 mean 0.037	
USA, 2009, Gann Valley, SD (Lacey)	0.15 0.15	2	BBCH 43–49 BBCH 71–73	33	Grain	0.021	T004408-08, C16-9064
				33	Grain	0.017 mean 0.019	
USA, 2009, Ault, CO (Moravian 37)	0.15 0.15	2	Feekes 10.3 Feekes 10.5	25	Grain	0.30	T004408-08, W12-9067
				25	Grain	0.32 mean 0.31	
USA, 2010, Suffolk, VA (Nomini)	0.15 0.15	2	BBCH 55 BBCH 71	30	Grain	0.19	T004408-08, E07-9061
				30	Grain	0.19 mean 0.19	
USA, 2010, Rupert, ID (Ida-Gold II)	0.15 0.15	2	BBCH 55–59 BBCH 85	16	Grain	0.058	T004408-08, W15-9070
				16	Grain	0.043 mean 0.05	
USA, 2010, Porterville, CA (UC937)	0.15 0.15	2	Feekes 10.5 Post Feekes 10.5	49	Grain	1.1	T004408-08, W32-9068
				49	Grain	0.88 mean 0.99	

Oats

Twelve independent supervised trials have been conducted in the USA in 2009 and 2010. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.15 kg ai/ha. Grain samples were harvested at 11–48 days after the final application. The analytical method RAM 305/03 was used. The residue data are shown in Table 7.

Table 7 Azoxystrobin residues in oats

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Geneva, MN (Morton)	0.15 0.15	2	Feekes 9 Feekes 10.5	48	Grain	0.026	T005494-08, C09-9084
				48	Grain	0.03 mean 0.028	
USA, 2009, Ayer, ND (Morton)	0.15 0.15	2	BBCH 52 BBCH 70	44	Grain	0.058	T005494-08, C12-9086
				44	Grain	0.058 mean 0.058	
USA, 2009, Gardner, ND (Morton)	0.15 0.15	2	BBCH 52 BBCH 70	11	Immature grain	0.25	T005494-08, C12-9087
				18	Immature grain	0.34	
				25	Grain	0.26	
				25	Grain	0.34 mean 0.28	
				32	Grain	0.23	
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 39 BBCH 71	33	Grain	0.024	T005494-08, C13-9083
				33	Grain	0.031 mean 0.028	
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 43 BBCH 75	28	Grain	0.043	T005494-08, C13-9088
				28	Grain	0.054 mean 0.049	
USA, 2009, Carrington, ND (Jerry)	0.15 0.15	2	BBCH 37 BBCH 69	39	Grain	0.057	T005494-08, C13-9091
				39	Grain	0.048 mean 0.053	
USA, 2009, White Lake, SD (Stallion)	0.15 0.15	2	BBCH 43 BBCH 71	36	Grain	0.014	T005494-08, C16-9090
				36	Grain	0.012 mean 0.013	
USA, 2009, Bagley,	0.15	2	14 days prior to	32	Grain	0.047	T005494-08,

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
IA (Reeves)	0.15		Feekes 10.5 Feekes 10.5	32	Grain	0.048 mean 0.048	C30-9085
USA, 2009, Germansville, PA (Armor)	0.15 0.15	2	Feekes 10.5 Feekes 10.5–11.1	28	Grain	0.62	T005494-08, E04-9081
				28	Grain	0.64 mean 0.63	
USA, 2009, Ault, CO (Jerry)	0.15 0.15	2	Feekes 10.2 Feekes 10.5	28	Grain	0.12	T005494-08, W12-9092
				28	Grain	0.11 mean 0.12	
USA, 2010, Elko, SC (Horizon 270)	0.15 0.15	2	Feekes 10 Feekes 10.3	44	Grain	0.06	T005494-08, E11-9082
				44	Grain	0.055 mean 0.06	
USA, 2010, Uvalde, TX (BOB)	0.15 0.15	2	BBCH 60 BBCH 71	35	Grain	0.12	T005494-08, W07-9089
				35	Grain	0.11 mean 0.12	

Sorghum

Twelve independent supervised trials were conducted in the US in 2004 to support the registered use pattern in the US. In each trial, azoxystrobin was applied three times as an SC formulation containing 250 g ai/L) at a rate of 0.28 kg ai/ha with a 7 day application interval. Grain samples were harvested at 14 and 21 days after the last application. The analytical method RAM 305/03 was used. The results are summarized in Table 8.

Table 8 Azoxystrobin residues in sorghum

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2004, York, NE (NC+ 6B50)	0.28 0.28 0.28	3	BBCH 87 BBCH 93 BBCH 93	0	Grain	2.1	T002036-03 NB-FR-04-5028
				0	Grain	1.9	
				3	Grain	2.5	
				3	Grain	2.3	
				7	Grain	1.6	
				7	Grain	1.3	
				14	Grain	1.7	
				14	Grain	1.6 mean 1.7	
				21	Grain	1.3	
				21	Grain	1.2	
USA, 2004, Grand Island, NE (NC+ 6B50)	0.28 0.28 0.28	3	BBCH 87 BBCH 87 BBCH 89	14	Grain	0.33	T002036-03, NB-FR-04-5033
				14	Grain	0.63 mean 0.48	
USA, 2004, Highland, KS (Asgrow 571)	0.29 0.28 0.27	3	Stage 7 Stage 7–8 Stage 8	14	Grain	1.7, 2.9	T002036-03, ND-FR-04-5027
				14	Grain	1.4, 1.5 mean 1.9	
USA, 2004, La Plata, MO (Pioneer 8500)	0.28 0.28 0.28	3	BBCH 79 BBCH 85 BBCH 89	17	Grain	1.1	T002036-03, ND-FR-04-5029
				17	Grain	1.4 mean 1.3	
USA, 2004, Wagner, SD (DeKalbDK28E)	0.28 0.28 0.28	3	BBCH 85–89 BBCH 86–89 BBCH 88–89	17	Grain	1.5	T002036-03, NF-FR-04-5030
				17	Grain	1.3 mean 1.4	
USA, 2004, Keensburg, CO (NC+ 4R48)	0.28 0.28 0.29	3	Soft dough Hard dough Hard dough	14	Grain	7.9	T002036-03, NM-FR-04-5035
				14	Grain	8.1 mean 8.0	
USA, 2004, St. Paul, TX (GA 697)	0.28 0.28 0.28	3	81 89 89	0	Grain	7.4	T002036-03, SA-FR-04-5031
				0	Grain	8.3	
				3	Grain	3.7	
				3	Grain	3.0	
				7	Grain	2.0	
				7	Grain	1.6	
				14	Grain	1.6	

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
				14	Grain	2.0 mean 1.8	
				21	Grain	1.3	
				21	Grain	1.3	
USA, 2004, Comache, OK (Garst 5515)	0.28 0.29 0.29	3	89 89 93	14	Grain	4.6	T002036-03, SC-FR-04-5032
				14	Grain	4.3 mean 4.5	
USA, 2004, Olton, TX (Cropland 414)	0.27 0.28 0.28	3	BBCH 89 BBCH 89 BBCH 89	13	Grain	2.3	T002036-03, SC-FR-04-5034
				13	Grain	2.3 mean 2.3	
USA, 2004, Pleasant Hill, NM (Pioneer 8505)	0.28 0.29 0.27	3	milk stage BBCH 89 dough stage	14	Grain	2.2	T002036-03, SC-FR-04-5036
				14	Grain	2.1 mean 2.2	
USA, 2004, Cheneyville, LA (Golden Acres 444E)	0.29 0.29 0.29	3	dough stage dough stage dough stage	14	Grain	3.0	T002036-03, SD-FR-04-5026
				14	Grain	2.5 mean 2.8	
USA, 2004, Elko, SC (K73-J6)	0.28 0.28 0.28	3	BBCH 85 BBCH 85 BBCH 85	14	Grain	1.3	T002036-03, SJ-FR-04-5025
				14	Grain	1.4 mean 1.4	

Seed for beverages and sweets

Coffee beans

Azoxystrobin residues in coffee were evaluated by the 2011 JMPR. Nineteen trials were conducted in Brazil. In four trials (2006/2007) azoxystrobin was applied three times at a rate of 0.15 kg ai/ha with a 60 days application interval. Beans were harvested at PHIs of 14, 21 and 30 days. In three trials (2002/2003) azoxystrobin was applied three times to parallel plots, to one plot at a rate of 0.1 kg ai/ha and to the second plot at a rate of 0.2 kg ai/ha, both with an application interval of 60 days. In six trials (WG formulation, 2010/2011) azoxystrobin was applied two times pre-flowering at the rate 0.05 kg ai/ha with 30 days interval and three times at the rate 0.12 kg ai/ha with a 60 day application interval. Beans were harvested at PHIs 21, 28 and 35 days. Adjuvant was added to all applications. In six trials (EC formulation, 2010/2011) azoxystrobin was applied two times pre-flowering at the rate 0.05 kg ai/ha with 30 days interval and three times at the rate 0.1 kg ai/ha with a 60 day application interval. Beans were harvested at PHIs 21, 28 and 35 days. The residue data were reported by the 2011 JMPR and were not repeated in this document.

New trials on coffee Arabica have been conducted in Colombia in 2010/2011 and in Guatemala and Brazil in 2011 to support the registered use pattern in Colombia. Seven independent supervised trials were conducted in which azoxystrobin was applied three times as an SC formulation containing 200 g ai/L at a rate of 0.15 kg ai/ha. In two trials, a 30 day interval between applications was used, and samples of beans collected at PHIs of 0, 14, 28 and 42 days. In five trials, an application interval of 41–48 days was used, and beans were harvested at a PHI of 14–15 days, or at intervals of 5, 10, 15, 20 and 25 days from the decline trial.

Following harvest, the coffee cherries were processed according to normal local practices to give dry bean samples which were shipped to the laboratory for analysis. The analytical methods used were PLARA 082 v.07 and RAM 305/3, both with validated limits of quantification of 0.01 mg/kg. The residues are summarized in Table 9.

Table 9 Azoxystrobin residues in coffee beans

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
Colombia, 2010 Pereira, Risaralda (Caturra)	0.15 0.15 0.15	3	77	0	Bean	< 0.01	RF 027 039 10B Trial: 1 Syngenta File No.
				14	Bean	n/d	
				28	Bean	n/d	

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
				42	Bean	< 0.01	CGA322704_10025
				56	Bean	n/d	
				70	Bean	< 0.01	
				84	Bean	< 0.01	
				98	Bean	n/d	
				112	Bean	n/d	
				126	Bean	n/d	
				140	Bean	n/d	
				154	Bean	n/d	
				168	Bean	n/d	
				182	Bean	n/d	
				196	Bean	n/d	
Colombia, 2010 Chinchina, Caldas (Caturra)	0.15 0.15 0.15	3	77	0	Bean	0.01	RF 027 039 10B Trial: 2 Syngenta File No. CGA322704_10025
				14	Bean	n/d	
				28	Bean	n/d	
				42	Bean	< 0.01	
				56	Bean	n/d	
				70	Bean	n/d	
				84	Bean	n/d	
				98	Bean	n/d	
				112	Bean	n/d	
				126	Bean	n/d	
				140	Bean	n/d	
				154	Bean	n/d	
				168	Bean	n/d	
				182	Bean	n/d	
				196	Bean	n/d	
Colombia, 2011 Santa Marta, Magdalena (Castillo)	0.15 0.15 0.15	3	75 77 81	15 15	Green bean Green bean	< 0.01 < 0.01	TK0046957 Trial: 1 Syngenta File No. A12910C_50004
Colombia, 2011 Santa Marta, Magdalena (Castillo)	0.15 0.15 0.15	3	75 77 81	5	Green bean	0.018	TK0046957 Trial: 2 Syngenta File No. A12910C_50004
				5	Green bean	0.019	
				10	Green bean	< 0.01	
				10	Green bean	< 0.01	
				15	Green bean	< 0.01	
				15	Green bean	< 0.01	
				20	Green bean	< 0.01	
				20	Green bean	< 0.01	
				25	Green bean	< 0.01	
				25	Green bean	< 0.01	
Guatemala, 2011 Santa Rosa (Bourbon)	0.15 0.15 0.15	3	75 81 85	14 14	Green bean Green bean	< 0.01 0.02 mean 0.015	TK0046957 Trial: 3 Syngenta File No. A12910C_50004
Brazil, 2012 Santo Antonio Do Jardim (Obatã)	0.15 0.15 0.15	3	77 80 85	14 14	Green bean Green bean	< 0.01 0.01 mean 0.01	TK0046957 Trial: 4 Syngenta File No. A12910C_50004
Brazil, 2012 Dois Corregos Coffee, Arabica (Tupi)	0.15 0.15 0.15	3	77 80 85	14 14	Green bean Green bean	< 0.01 0.01 mean 0.01	TK0046957 Trial: 5 Syngenta File No. A12910C_50004

n/d: not detected

Legume animal feeds

Bean fodder

Seven independent supervised trials were conducted on dry beans in the UK and France in 2005. Azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of about 0.20 kg ai/ha with a spray interval of 14 days. Applications were made between BBCH growth stages 61and 87. The analytical methods used were RAM 305/01, RAM 305/02 and RAM 305/03 with an LOQ of 0.01 mg/kg. Residue data are presented in Table 10.

Table 10 Azoxystrobin residues in bean fodder

Country, year, location (variety)	Application			PHI, Days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
UK, 2005 Horsten, Nottinghamshire (Clipper)	0.20 0.20	2	61 79	30	Remaining plant	< 0.01	05-0415, AF/8541/SY/1 Syngenta File No. SAN619/8116
UK, 2005 Draycott, Nottinghamshire (Quattro)	0.21 0.21	2	61 79	30 36	Remaining plant	0.07 0.10	05-0415, AF/8541/SY/2 Syngenta File No. SAN619/8116
France North, 2005 Boce, Pays de la Loire (Castel)	0.13 0.20	2	62 87	26	Remaining plant	0.55	05-0415, AF/8541/SY/4 Syngenta File No. SAN619/8116
France, 2005 Monteux, Provence-Alpes-Cote-d'Azur (Big Borloto)	0.21 0.20	2	69–71 75–77	30	Remaining plant	0.08	05-0607, FR-FR-05-0482 Syngenta File No. SAN619/8117
France, 2005 Marsillargues, Languedoc-Roussilon (Linex)	0.20 0.20	2	62 76	31	Remaining plant	0.03	05-0607, FR-FR-05-0483 Syngenta File No. SAN619/8117
France, 2005 Estillac, Aquitaine (Linex)	0.22 0.21	2	64 73–75	29	Remaining plant	0.25	05-0607, FR-FR-05-0484 Syngenta File No. SAN619/8117
France, 2005 Marsillargues, Languedoc-Roussilon (Linex)	0.21 0.21	2	61 67	28	Remaining plant	0.06	05-0607, FR-FR-05-0485 Syngenta File No. SAN619/8117

Pea fodder (dry)

Twenty independent supervised trials were conducted in the UK and France in 1996–2004 on peas. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.20–0.25 kg ai/ha with a spray interval of 14 days. Applications were made between BBCH growth stages 61and 77. Samples of dry pea seed were collected at normal commercial harvest at PHIs of 30–45 days. The remaining plant can be used as fodder (dry). The results are shown in Table 11. The analytical methods used were RAM 305/02, RAM 243/04 and RAM 243/05 with a validated limit of quantification of 0.01 mg/kg.

Table 11 Azoxystrobin residues in pea fodder (dry)

Country, year, location (variety)	Application			PHI, Days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
France North, 1996, Grivesnes, Picardie, Vining pea (Bonette)	0.25 0.25	2	63–65 69–71	38	Plant	3.7	RJ2286B, S101.96 Syngenta File No. ICI5504/1111
France North, 1996, Grivesnes, Picardie,	0.20 0.20	2	63–65 69–71	38	Plant	2.2	RJ2286B, S101.96

Country, year, location (variety)	Application			PHI, Days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
Vining pea (Bonette)							Syngenta File No. ICI5504/1111
France North, 1996, Bayonvillers, Picardie, Vining pea (Lynx)	0.25 0.25	2	63 69–71	42	Plant	7.2	RJ2286B, S102.96 Syngenta File No. ICI5504/1111
France North, 1996 Bayonvillers, Picardie, Vining pea (Lynx)	0.20 0.20	2	63 69–71	42	Plant	4.9	RJ2286B, S102.96 Syngenta File No. ICI5504/1111
France North, 1996, Tourny, Haute-Normandie, Vining pea (Mini)	0.25 0.25	2	65 69–71	30	Plant	3.9	RJ2286B, S208.96 Plot: 2 Syngenta File No. ICI5504/1111
France North, 1996, Tourny, Haute-Normandie, Vining pea (Mini)	0.20 0.20	2	65 69–71	30	Plant	2.5	RJ2286B, S208.96 Plot: 2 Syngenta File No. ICI5504/1111
France North, 1997, Chaulnes, Picardie, Vining pea (Novaroy)	0.25 0.25	2	62 71	40	Plant	2.0	RJ2548B, S101.97 Syngenta File No. ICI5504/1115
	0.20 0.20	2	62 71	40	Plant	1.4	
France North, 1997, Hennezis, Haute Normandie, Vining pea (Camaro)	0.25 0.25	2	65 75	41	Plant	1.4	RJ2548B, S205.97 Syngenta File No. ICI5504/1115
	0.20 0.20	2	65 75	41	Plant	1.4	
UK, 1996, Asselby, East Yorkshire, Field pea (Solara)	0.25 0.25	2	62 64–72	42	Plant	2.3	RJ2390B, with Addendum 1, AP/3248/ZE/1 Syngenta File No. ICI5504/1109
UK, 1996, Asselby, East Yorkshire, Field pea (Solara)	0.20 0.20	2	62 64–72	42	Whole plant	1.3	RJ2390B, with Addendum 1, AP/3248/ZE/1 Syngenta File No. ICI5504/1109
UK, 1997, Melbourne, Derbyshire, Field pea (Alfetta)	0.25 0.25	2	62 67–72	45	Plant	0.52	RJ2521B, AP/3783/ZE/1 Syngenta File No. ICI5504/1113
UK, 1997, Melbourne, Derbyshire, Field pea (Alfetta)	0.20 0.20	2	62 67–72	45	Whole plant	0.62	RJ2521B, AP/3783/ZE/1 Syngenta File No. ICI5504/1113
UK, 1997, Middleton on the Wolds, Yorkshire, Field pea (Grafilla)	0.25 0.25	2	62 67–75	44	Plant	0.56	RJ2521B, AP/3783/ZE/2 Plot: 2 Syngenta File No. ICI5504/1113
UK, 1997, Middleton on the Wolds, Yorkshire, Field pea (Grafilla)	0.20 0.20	2	62 67–75	44	Whole plant	0.63	RJ2521B, AP/3783/ZE/2 Plot: 2 Syngenta File No. ICI5504/1113
UK, 2004, Birkin, Yorkshire Pea dry (Solara)	0.20 0.21	2	61–63 69–73	43	Remaining Plant	1.0	04-0422, AF/8166/SY/1 Syngenta File No. SAN619/7886
UK, 2004, Hunmanby, Yorkshire, Pea dry	0.19 0.21	2	61 67–71	43	Remaining Plant	0.34	04-0422, AF/8166/SY/2

Country, year, location (variety)	Application			PHI, Days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
(Samson)							Syngenta File No. SAN619/7886
UK, 2004, Rouvres St Jean, Centre, Pea dry (Canyon)	0.20 0.20	2	71 75	30	Remaining Plant	4.8	04-0422, AF/8166/SY/3 Syngenta File No. SAN619/7886
France North, 2004, Montbellet, Bourgogne, Pea dry (Atos)	0.20 0.20	2	63 75	30	Remaining Plant	1.8	04-0422, AF/8166/SY/4 Syngenta File No. SAN619/7886
France South, 1996, Brie, Poitou-Charentes, Pea (Baccara)	0.25 0.25	2	65 69–71	36	Plant	3.6	RJ2286B S663.96 Syngenta File No. ICI5504/1111
France South, 1996, Brie, Poitou-Charentes, Pea (Baccara)	0.20 0.20	2	65 69–71	36	Plant	1.8	RJ2286B, S663.96 Syngenta File No. ICI5504/1111
France South, 1996, Brie, Poitou-Charentes, Pea (Baccara)	0.25 0.25	2	65 69–71	35	Plant	3.8	RJ2286B, S669.96 Syngenta File No. ICI5504/1111
France South, 1996, Brie, Poitou-Charentes, Pea (Baccara)	0.20 0.20	2	65 69–71	35	Plant	1.8	RJ2286B, S669.96 Syngenta File No. ICI5504/1111
France South, 1997, Chabournay, Poitou, Pea (Solara)	0.25 0.25	2	63 65	44	Plant	2.1	RJ2548B, S662.97 Syngenta File No. ICI5504/1115
France South, 1997, Chabournay, Poitou, Pea (Solara)	0.20 0.20	2	63 65	44	Plant	1.3	RJ2548B, S662.97 Syngenta File No. ICI5504/1115
France South, 1997, Vendeuvre du Poitou, Poitou, Pea (Baccara)	0.25 0.25	2	61 63	44	Plant	0.61	RJ2548B, S663.97 Syngenta File No. ICI5504/1115
France South, 1997, Vendeuvre du Poitou, Poitou, Pea (Baccara)	0.20 0.20	2	61 63	44	Plant	0.20	RJ2548B, S663.97 Syngenta File No. ICI5504/1115
France South, 2004, Epennes, Pitou-Charentes, Pea dry (NC farm seed)	0.20 0.20	2	61 72	29	Remaining Plant	1.8	04-0421, AF/8167/SY/1 Syngenta File No. SAN619/7887
France South, 2004, Biziat, Rhone-Alpes, Pea dry (Atos)	0.20 0.20	2	67 77	30	Remaining Plant	4.0	04-0421, AF/8167/SY/2 Syngenta File No. SAN619/7887
France South, 2004, Finham, Midi-Pyrenees, Pea dry (Austin)	0.20 0.20	2	61 69–71	30	Remaining Plant	1.6	04-0421, AF/8167/SY/3 Syngenta File No. SAN619/7887
France South, 2004, Meauzac, Midi-Pyrenees, Pea dry (Baccara)	0.20 0.20	2	61 67–71	30	Remaining Plant	18	04-0421, AF/8167/SY/4 Syngenta File No. SAN619/7887

Pea vines (green)

Twenty independent supervised trials were conducted in the UK and France in 1996–2004 on peas. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.20–0.25 kg ai/ha with a spray interval of 14 days. Applications were made between BBCH growth stages 61 and 77. Several trials were conducted as decline trials. The green plant (pea vines) can be used as animal feed. The analytical methods used were RAM 305/02, RAM 243/04 and RAM 243/05 with a validated limit of quantification of 0.01 mg/kg. The results are shown in Table 12.

Table 12 Azoxystrobin residues in pea vines (green)

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
France North, 1996, Grivesnes, Picardie Vining pea (Bonette)	0.25 0.25	2	63–65 69–71	0+	Plant	5.9	RJ2286B, S101.96, Syngenta File ICI5504/1111
				3	Plant	5.6	
				7	Plant	3.7	
				14	Plant	3.5	
France North, 1996, Grivesnes, Picardie Vining pea (Bonette)	0.20 0.20	2	63–65 69–71	0+	Plant	3.6	RJ2286B, S101.96, Syngenta File ICI5504/1111
				3	Plant	3.6	
				7	Plant	3.2	
				14	Plant	1.9	
France, North, 1996, Bayonvillers, Picardie Vining pea (Lynx)	0.25 0.25	2	63 69–71	0+	Plant	6.9	RJ2286B, S102.96, Syngenta File ICI5504/1111
				3	Plant	4.5	
				7	Plant	4.3	
				14	Plant	3.6	
France, North, 1996, Bayonvillers, Picardie Vining pea (Lynx)	0.20 0.20	2	63 69–71	0+	Plant	3.9	RJ2286B, S102.96, Syngenta File ICI5504/1111
				3	Plant	3.1	
				7	Plant	2.9	
				14	Plant	2.4	
France North, 1996, Tourny, Haute-Normandie Vining pea (Mini)	0.25 0.25	2	65 69–71	0+	Plant	8.9	RJ2286B, S208.96, Plot 2, Syngenta File ICI5504/1111
				2	Plant	3.3	
				7	Plant	1.2	
				15	Plant	2.1	
France North, 1996, Tourny, Haute-Normandie Vining pea (Mini)	0.20 0.20	2	65 69–71	0+	Plant	6.8	RJ2286B, S208.96, Plot 2, Syngenta File ICI5504/1111
				2	Plant	2.4	
				7	Plant	1.0	
				15	Plant	0.76	
France North, 1997, Chaulnes, Picardie Vining pea (Novaroy)	0.25 0.25	2	62 71	14	Plant	1.8	RJ2548B, S101.97, Syngenta File ICI5504/1115
	0.20 0.20	2	62 71	14	Plant	1.2	
France North, 1997, Hennezis, Haute Normandie Vining pea (Camaro)	0.25 0.25	2	65 75	15	Plant	1.3	RJ2548B, S205.97, Syngenta File ICI5504/1115
	0.20 0.20	2	65 75	15	Plant	1.1	
UK, 1996, Asselby, East Yorkshire Field pea (Solara)	0.25 0.25	2	62 64–72	0+	Plant	4.4	RJ2390B with Addendum 1, AP/3248/ZE/1, Syngenta File ICI5504/1109
				3	Plant	3.1	
				7	Plant	2.3	
				15	Plant	0.89	
UK, 1996, Asselby, East Yorkshire Field pea (Solara)	0.20 0.20	2	62 64–72	0+	Whole plant	3.3	RJ2390B with Addendum 1, AP/3248/ZE/1, Syngenta File ICI5504/1109
				3	Whole plant	2.4	
				7	Whole plant	1.6	
				15	Whole plant	0.70	
UK, 1997, Melbourne, Derbyshire Field pea (Alfetta)	0.25 0.25	2	62 67–72	0+	Plant	4.3	RJ2521B, AP/3783/ZE/1, Syngenta File ICI5504/1113
				3	Plant	0.89	
				7	Plant	0.70	
				14	Plant	0.83	
UK, 1997, Melbourne, Derbyshire Field pea (Alfetta)	0.20 0.20	2	62 67–72	0+	Whole plant	3.7	RJ2521B, AP/3783/ZE/1, Syngenta File ICI5504/1113
				3	Whole plant	0.54	
				7	Whole plant	0.45	
				14	Whole plant	0.73	

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
UK, 1997, Middleton on the Wolds, Yorkshire Field pea (Grafilla)	0.25 0.25	2	62 67–75	0+	Plant	3.6	RJ2521B, AP/3783/ZE/2, Plot 2, Syngenta File ICI5504/1113
				3	Plant	1.5	
				7	Plant	0.95	
				14	Plant	0.74	
UK, 1997, Middleton on the Wolds, Yorkshire Field pea (Grafilla)	0.20 0.20	2	62 67–75	0+	Whole plant	3.4	RJ2521B, AP/3783/ZE/2, Plot 2, Syngenta File ICI5504/1113
				3	Whole plant	1.2	
				7	Whole plant	0.79	
				14	Whole plant	0.75	
UK, 2004, Birkin, Yorkshire Pea dry (Solara)	0.20 0.21	2	61–63 69–73	0–	Whole plant	0.22	04-0422, AF/8166/SY/1, Syngenta File SAN619/7886
				0+	Whole plant	3.4	
				7	Remaining Plant	2.0	
				14	Remaining plant	3.1	
				21	Remaining plant	0.50	
UK, 2004, Hunmanby, Yorkshire Pea dry (Samson)	0.19 0.21	2	61 67–71	0–	Whole plant	0.12	04-0422, AF/8166/SY/2, Syngenta File SAN619/7886
				0+	Whole plant	4.1	
				7	Whole plant	1.4	
				14	Remaining plant	0.54	
				21	Remaining plant	0.16	
UK, 2004, Rouvres St Jean, Centre Pea dry (Canyon)	0.20 0.20	2	71 75	0–	Remaining plant	1.10	04-0422, AF/8166/SY/3, Syngenta File SAN619/7886
				0+	Remaining plant	2.8	
				7	Remaining plant	3.3	
				14	Remaining plant	3.6	
				21	Remaining plant	4.1	
				30	Remaining plant	4.8	
France North, 2004, Montbellet, Bourgogne Pea dry (Atos)	0.20 0.20	2	63 75	0–	Remaining plant	0.49	04-0422, AF/8166/SY/4, Syngenta File SAN619/7886
				0+	Remaining plant	4.1	
				7	Remaining plant	3.4	
				14	Remaining plant	1.8	
				21	Remaining plant	2.3	
France South, 1996, Brie, Poitou-Charentes Pea (Baccara)	0.25 0.25	2	65 69–71	0+	Plant	6.9	RJ2286B, S663.96, Syngenta File ICI5504/1111
				2	Plant	6.9	
				6	Plant	3.3	
				13	Plant	4.1	
				36	Plant	3.6	
France South, 1996, Brie, Poitou-Charentes Pea (Baccara)	0.20 0.20	2	65 69–71	0+	Plant	6.0	RJ2286B, S663.96, Syngenta File ICI5504/1111
				2	Plant	4.2	
				6	Plant	1.9	
				13	Plant	2.4	
France South, 1996, Brie, Poitou-Charentes Pea (Baccara)	0.25 0.25	2	65 69–71	0+	Plant	5.1	RJ2286B, S669.96, Syngenta File ICI5504/1111
				2	Plant	4.8	
				6	Plant	3.3	
				13	Plant	4.4	
France South, 1996, Brie, Poitou-Charentes Pea (Baccara)	0.20 0.20	2	65 69–71	0+	Plant	4.6	RJ2286B, S669.96, Syngenta File ICI5504/1111
				2	Plant	3.6	
				6	Plant	2.1	
				13	Plant	2.5	
France South, 2004, Epennes, Pitou-Charentes, Pea dry (NC farm seed)	0.20 0.20	2	61 72	0–	Remaining plant	0.32	04-0421, AF/8167/SY/1, Syngenta File SAN619/7887
				0+	Remaining plant	3.5	
				7	Remaining plant	4.9	
				14	Remaining plant	2.7	
				21	Remaining plant	3.6	
France South, 2004, Biziat, Rhone-Alpes Pea dry (Atos)	0.20 0.20	2	67 77	0-	Remaining plant	1.4	04-0421, AF/8167/SY/2, Syngenta File SAN619/7887
				0+	Remaining plant	4.1	
				7	Remaining plant	4.3	
				14	Remaining plant	5.8	
				21	Remaining plant	3.0	
France South, 2004,	0.20 0.20	2	61 69–71	0–	Whole plant	0.11	04-0421, AF/8167/SY/3,
				0+	Whole plant	2.1	

Country, year, location (variety)	Application			PHI, days	Commodity	Residue, mg/kg	Report, trial, remarks
	kg ai/ha	No	BBCH				
Finham, Midi-Pyrenees Pea dry (Austin)				7	Remaining plant	1.6	Syngenta File SAN619/7887
				14	Remaining plant	2.2	
				21	Remaining plant	2.6	
France South, 2004, Meauzac, Midi-Pyrenees Pea dry (Baccara)	0.20 0.20	2	61 67–71	0–	Whole plant	0.38	04-0421, AF/8167/SY/4, Syngenta File SAN619/7887
				0+	Whole plant	3.2	
				7	Remaining plant	2.9	
				14	Remaining plant	9.4	
				21	Remaining plant	6.4	

Straw, fodder (dry) and forage of cereal grains

Barley straw and fodder, dry

Trials have been conducted on barley in the USA in 2009 and 2010 to support the registered use pattern. Seven independent supervised trials were conducted. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.15 kg ai/ha. Straw samples were harvested at 16–54 days after the final application. Hay samples were harvested from separate plots at 0–21days after the final application. The analytical method RAM 305/03 was used. The residue data are shown in Tables 13 (straw) and 14 (hay).

Table 13 Azoxystrobin residues in barley straw

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Northwood, ND (Pinnacle)	0.15 0.15	2	BBCH 39 BBCH 71	33	Straw	0.18	T004408-08, C13-9062
				40	Straw	0.15	
				47	Straw	0.15	
				47	Straw	0.13	
				54	Straw	0.15	
USA, 2009, Carrington, ND (Pinnacle)	0.15 0.15	2	BBCH 37 BBCH 69	48	Straw	0.63	T004408-08, C13-9065
				48	Straw	0.76 mean 0.70	
USA, 2009, Gann Valley, SD (Lacey)	0.15 0.15	2	BBCH 43–49 BBCH 71–73	33	Straw	0.29	T004408-08, C16-9064
				33	Straw	0.26 mean 0.28	
USA, 2009, Ault, CO (Moravian 37)	0.15 0.15	2	Feekes 10.3 Feekes 10.5	25	Straw	3.8	T004408-08, W12-9067
				25	Straw	3.2 mean 3.5	
USA, 2010, Suffolk, VA (Nomini)	0.15 0.15	2	BBCH 55 BBCH 71	30	Straw	3.3	T004408-08, E07-9061
				30	Straw	3.3 mean 3.3	
USA, 2010, Rupert, ID (Ida-Gold II)	0.15 0.15	2	BBCH 55–59 BBCH 85	16	Straw	0.36	T004408-08, W15-9070
				16	Straw	0.35 mean 0.36	
USA, 2010, Porterville, CA (UC937)	0.15 0.15	2	Feekes 10.5 Post Feekes 10.5	49	Straw	2.5	T004408-08, W32-9068
				49	Straw	2.6 mean 2.6	

Table 14 Azoxystrobin residues in barley hay.

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Northwood, ND (Pinnacle)	0.15 0.15	2	BBCH 22 BBCH 52	0	Hay	6.9	T004408-08, C13-9062
				3	Hay	0.96	
				7	Hay	0.46	
				14	Hay	0.34	
				14	Hay	0.34	
				21	Hay	0.18	

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Carrington, ND (Pinnacle)	0.15 0.15	2	BBCH 16 BBCH 59	7	Hay	0.79	T004408-08, C13-9065
				7	Hay	0.69 mean 0.74	
				14	Hay	0.74	
				14	Hay	0.83 mean 0.76	
USA, 2009, Gann Valley, SD (Lacey)	0.15 0.15	2	BBCH 21–31 BBCH 43–49	7	Hay	0.91	T004408-08, C16-9064
				7	Hay	0.76 mean 0.84	
				15	Hay	0.29	
				15	Hay	0.30	
USA, 2009, Ault, CO (Moravian 37)	0.15 0.15	2	Feekes 5 Feekes 10	7	Hay	3.8	T004408-08, W12-9067
				7	Hay	3.5 mean 3.7	
				14	Hay	2.5	
				14	Hay	2.9	
USA, 2010, Suffolk, VA (Nomini)	0.15 0.15	2	Feekes 5 Feekes 5.2	7	Hay	3.7	T004408-08, E07-9061
				7	Hay	2.7 mean 3.2	
				14	Hay	1.6	
				14	Hay	1.6	
USA, 2010, Rupert, ID (Ida-Gold II)	0.15 0.15	2	BBCH 30 BBCH 55	7	Hay	0.69	T004408-08, W15-9070
				7	Hay	0.69 mean 0.69	
				14	Hay	0.27	
				14	Hay	0.31	
USA, 2010, Porterville, CA (UC937)	0.15 0.15	2	Feekes 5 Feekes 7	7	Hay	1.6	T004408-08, W32-9068
				7	Hay	2.6 mean 2.1	
				14	Hay	1.1	
				14	Hay	1.6	

Oats straw and fodder, dry

Twelve independent supervised trials have been conducted in the USA in 2009 and 2010. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.15 kg ai/ha. Straw samples were harvested at 11–48 days after the final application. Hay samples were harvested from separate plots at 0–21days after the final application. The analytical method RAM 305/03 was used. The results are summarized in Tables 15 (straw) and 16 (hay).

Table 15 Azoxystrobin residues in oats straw.

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Geneva, MN (Morton)	0.15 0.15	2	Feekes 9 Feekes 10.5	48	Straw	0.066	T005494-08, C09-9084
				48	Straw	0.11 mean 0.088	
USA, 2009, Ayr, ND (Morton)	0.15 0.15	2	BBCH 52 BBCH 70	44	Straw	0.40	T005494-08, C12-9086
				44	Straw	0.21 mean 0.31	
USA, 2009, Gardner, ND (Morton)	0.15 0.15	2	BBCH 52 BBCH 70	11	Straw	0.96	T005494-08, C12-9087
				18	Straw	0.87	
				25	Straw	1.3	
				25	Straw	1.2 mean 1.3	
				32	Straw	0.84	
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 39 BBCH 71	33	Straw	0.12	T005494-08, C13-9083
				33	Straw	0.18 mean 0.15	
USA, 2009,	0.15	2	BBCH 43	28	Straw	0.31	T005494-08,

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
Northwood, ND (Jerry)	0.15		BBCH 75	28	Straw	0.38 mean 0.35	C13-9088
USA, 2009, Carrington, ND (Jerry)	0.15 0.15	2	BBCH 37 BBCH 69	39 39	Straw Straw	0.68 0.55 mean 0.62	T005494-08, C13-9091
USA, 2009, White Lake, SD (Stallion)	0.15 0.15	2	BBCH 43 BBCH 71	36 36	Straw Straw	0.08 0.069 mean 0.075	T005494-08, C16-9090
USA, 2009, Bagley, IA (Reeves)	0.15 0.15	2	14 days prior to Feekes 10.5 Feekes 10.5	32 32	Straw Straw	0.053 0.094 mean 0.074	T005494-08, C30-9085
USA, 2009, Germansville, PA (Armor)	0.15 0.15	2	Feekes 10.5 Feekes 10.5–11.1	29 29	Straw Straw	0.78 0.61 mean 0.70	T005494-08, E04-9081
USA, 2009, Ault, CO (Jerry)	0.15 0.15	2	Feekes 10.2 Feekes 10.5	28 28	Straw Straw	0.83 0.93 mean 0.88	T005494-08, W12-9092
USA, 2010, Elko, SC (Horizon 270)	0.15 0.15	2	Feekes 10 Feekes 10.3	44 44	Straw Straw	0.60 0.85 mean 0.73	T005494-08, E11-9082
USA, 2010, Uvalde, TX (BOB)	0.15 0.15	2	BBCH 60 BBCH 71	35 35	Straw Straw	0.21 0.19 mean 0.20	T005494-08, W07-9089

Table 16 Azoxystrobin residues in oats hay

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Geneva, MN (Morton)	0.15 0.15	2	Feekes 5 Feekes 7	7 7 14 14	Hay Hay Hay Hay	0.37 0.17 mean 0.27 0.15 0.13	T005494-08, C09-9084
USA, 2009, Ayr, ND (Morton)	0.15 0.15	2	BBCH 31 BBCH 49	7 7 14 14	Hay Hay Hay Hay	3.0 3.0 mean 3.0 1.8 1.4	T005494-08, C12-9086
USA, 2009, Gardner, ND (Morton)	0.15 0.15	2	BBCH 31 BBCH 49	5 7 14 14 21	Hay Hay Hay Hay Hay	5.7 3.4 1.5 2.3 1.9	T005494-08, C12-9087
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 22 BBCH 55	7 7 14 14	Hay Hay Hay Hay	0.47 0.38 0.48 0.58 mean 0.53	T005494-08, C13-9083
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 30 BBCH 71	7 7 14 14	Hay Hay Hay Hay	2.6 1.7 mean 2.2 1.4 0.76	T005494-08, C13-9088
USA, 2009, Carrington, ND (Jerry)	0.15 0.15	2	BBCH 16 BBCH 55	7 7 14 14	Hay Hay Hay Hay	0.62 0.70 mean 0.66 0.55 0.64	T005494-08, C13-9091
USA, 2009, White	0.15	2	BBCH 23	6	Hay	3.1	T005494-08,

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
Lake, SD (Stallion)	0.15		BBCH 43	6	Hay	3.1 mean 3.1	C16-9090
				16	Hay	0.45	
				16	Hay	0.42	
USA, 2009, Bagley, IA (Reeves)	0.15 0.15	2	Feekes 5 14 days after Feekes 5	7	Hay	0.25	T005494-08, C30-9085
				7	Hay	0.15 mean 0.20	
				14	Hay	0.18	
				14	Hay	0.14	
USA, 2009, Germansville, PA (Armor)	0.15 0.15	2	Feekes 5 Feekes 7	7	Hay	0.91	T005494-08, E04-9081
				7	Hay	0.86 mean 0.89	
				14	Hay	0.56	
				14	Hay	0.59	
USA, 2009, Ault, CO (Jerry)	0.15 0.15	2	Feekes 5 Feekes 10	7	Hay	1.4	T005494-08, W12-9092
				7	Hay	0.77 mean 1.1	
				14	Hay	0.63	
				14	Hay	0.79	
USA, 2010, Elko, SC (Horizon 270)	0.15 0.15	2	Feekes 5 BBCH 32	7	Hay	3.2	T005494-08, E11-9082
				7	Hay	3.1 mean 3.2	
				14	Hay	1.5	
				14	Hay	1.2	
USA, 2010, Uvalde, TX (BOB)	0.15 0.15	2	BBCH 30 BBCH 33	7	Hay	0.93	T005494-08, W07-9089
				7	Hay	1.6 mean 1.3	
				14	Hay	0.50	
				14	Hay	0.60	

Oats forage (green)

Twelve independent supervised trials have been conducted in the USA in 2009 and 2010. In each trial, azoxystrobin was applied twice as an SC formulation containing 250 g ai/L at a rate of 0.15 kg ai/ha. Forage samples were harvested at 0–21days after the final application. The analytical method RAM 305/03 was used. The residue data are summarized in Table 17.

Table 17 Azoxystrobin residues in oats forage

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2009, Geneva, MN (Morton)	0.15 0.15	2	Feekes 5 Feekes 7	7	Forage	0.20	T005494-08, C09-9084
				7	Forage	0.20 mean 0.20	
				14	Forage	0.042	
				14	Forage	0.062	
USA, 2009, Ayr, ND (Morton)	0.15 0.15	2	BBCH 31 BBCH 49	7	Forage	0.92	T005494-08, C12-9086
				7	Forage	1.1 mean 1.0	
				14	Forage	0.70	
				14	Forage	0.80	
USA, 2009, Gardner, ND (Morton)	0.15 0.15	2	BBCH 31 BBCH 49	0	Forage	3.5	T005494-08, C12-9087
				3	Forage	2.8	
				7	Forage	1.6	
				14	Forage	0.66	
				14	Forage	0.68	
				21	Forage	1.1	
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 22 BBCH 55	7	Forage	0.23	T005494-08, C13-9083
				7	Forage	0.28 mean 0.26	

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
				14	Forage	0.21	
				14	Forage	0.20	
USA, 2009, Northwood, ND (Jerry)	0.15 0.15	2	BBCH 30 BBCH 71	7	Forage	1.4	T005494-08, C13-9088
				7	Forage	1.3 mean 1.4	
				14	Forage	1.0	
				14	Forage	0.92	
USA, 2009, Carrington, ND (Jerry)	0.15 0.15	2	BBCH 16 BBCH 55	7	Forage	0.42	T005494-08, C13-9091
				7	Forage	0.46 mean 0.44	
				14	Forage	0.34	
				14	Forage	0.28	
USA, 2009, White Lake, SD (Stallion)	0.15 0.15	2	BBCH 23 BBCH 43	6	Forage	0.70	T005494-08, C16-9090
				6	Forage	0.86 mean 0.78	
				16	Forage	0.16	
				16	Forage	0.20	
USA, 2009, Bagley, IA (Reeves)	0.15 0.15	2	Feekes 5 14 days after Feekes 5	7	Forage	0.11	T005494-08, C30-9085
				7	Forage	0.11 mean 0.11	
				14	Forage	0.067	
				14	Forage	0.064	
USA (1), 2009 (Armor)	0.15 0.15	2	Feekes 5 Feekes 7	7	Forage	0.53	T005494-08, E04-9081
				7	Forage	0.50 mean 0.52	
				14	Forage	0.21	
				14	Forage	0.18	
USA, 2009, Germansville, PA (Jerry)	0.15 0.15	2	Feekes 5 Feekes 10	7	Forage	1.1	T005494-08, W12-9092
				7	Forage	0.79 mean 0.95	
				14	Forage	0.58	
				14	Forage	0.57	
USA, 2010, Elko, SC (Horizon 270)	0.15 0.15	2	Feekes 5 BBCH 32	7	Forage	2.2	T005494-08, E11-9082
				7	Forage	1.8 mean 2.0	
				14	Forage	0.80	
				14	Forage	0.75	
USA, 2010, Uvalde, TX (BOB)	0.15 0.15	2	BBCH 30 BBCH 33	7	Forage	0.72	T005494-08, W07-9089
				7	Forage	1.0 mean 0.86	
				14	Forage	0.25	
				14	Forage	0.27	

Sorghum straw and fodder, dry

Twelve independent supervised trials were conducted in the US in 2004. In each trial, azoxystrobin was applied three times as an SC formulation containing 250 g ai/L) at a rate of 0.28 kg ai/ha with a 7 day application interval. Stover samples were harvested at 14 and 21 days after the last application. The analytical method RAM 305/03 was used. The results are summarized in Table 18.

Table 18 Azoxystrobin residues in sorghum stover

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
USA, 2004, York, NE (NC+ 6B50)	0.28 0.28 0.28	3	BBCH 87 BBCH 93 BBCH 93	0	Stover	6.4	T002036-03, NB-FR-04-5028
				0	Stover	7.2	
				3	Stover	5.9	
				3	Stover	4.7	
				7	Stover	4.5	

Country, year, location (variety)	Application			PHI, days	Commodity	Residues, mg/kg	Report, trial, remarks
	kg ai/ha	No	Growth stage				
				7	Stover	3.5	
				14	Stover	4.6	
				14	Stover	2.8	
				21	Stover	4.3	
				21	Stover	3.7 mean 4.0	
USA, 2004, Grand Island, NE (NC+ 6B50)	0.28 0.28 0.28	3	BBCH 87 BBCH 87 BBCH 89	14	Stover	1.6	T002036-03, NB-FR-04-5033
				14	Stover	3.1 mean 2.4	
USA, 2004, Highland, KS (Asgrow 571)	0.29 0.28 0.27	3	Stage 7 Stage 7–8 Stage 8	14	Stover	5.2, 8.7	T002036-03, ND-FR-04-5027
				14	Stover	1.9, 3.4 mean 4.8	
USA, 2004, La Plata, MO (Pioneer 8500)	0.28 0.28 0.28	3	BBCH 79 BBCH 85 BBCH 89	17	Stover	0.57	T002036-03, ND-FR-04-5029
				17	Stover	0.84 mean 0.71	
USA, 2004, Wagner, SD (DeKalb DK28E)	0.28 0.28 0.28	3	BBCH 85–89 BBCH 86–89 BBCH 88–89	17	Stover	6.3, 6.4	T002036-03, NF-FR-04-5030
				17	Stover	5.0, 3.5 mean 5.3	
USA, 2004, Keensburg, CO (NC+ 4R48)	0.28 0.28 0.29	3	Soft dough Hard dough Hard dough	14	Stover	3.0	T002036-03, NM-FR-04-5035
				14	Stover	4.3 mean 3.7	
USA, 2004, St. Paul, TX (GA 697)	0.28 0.28 0.28	3	81 89 89	0	Stover	21	T002036-03, SA-FR-04-5031
				0	Stover	17	
				3	Stover	1.0	
				3	Stover	2.5	
				7	Stover	0.22	
				7	Stover	0.41	
				14	Stover	0.33	
				14	Stover	0.45 mean 0.39	
				21	Stover	0.19	
				21	Stover	0.21	
USA, 2004, Comanche, OK (Garst 5515)	0.28 0.29 0.29	3	89 89 93	14	Stover	15	T002036-03, SC-FR-04-5032
				14	Stover	14 mean 14.5	
USA, 2004, Olton, TX (Cropland 414)	0.27 0.28 0.28	3	BBCH 89 BBCH 89 BBCH 89	13	Stover	5.7	T002036-03, SC-FR-04-5034
				13	Stover	3.2 mean 4.5	
USA, 2004, Pleasant Hill, NM (Pioneer 8505)	0.28 0.29 0.27	3	milk stage BBCH 89 dough stage	14	Stover	7.0	T002036-03, SC-FR-04-5036
				14	Stover	14 mean 10.5	
USA, 2004, Cheneyville, LA (Golden Acres 444E)	0.29 0.29 0.29	3	dough stage dough stage dough stage	14	Stover	2.1, 2.0	T002036-03, SD-FR-04-5026
				14	Stover	2.6, 3.5 mean 2.6	
USA, 2004, Elko, SC (K73-J6)	0.28 0.28 0.28	3	BBCH 85 BBCH 85 BBCH 85	14	Stover	0.43	T002036-03, SJ-FR-04-5025
				14	Stover	0.63 mean 0.53	

Sorghum forage (green)

Twelve independent supervised trials were conducted in the US in 2004. In each trial, azoxystrobin was applied three times as an SC formulation containing 250 g ai/L at a rate of 0.28 kg ai/ha with a 7 days application interval. Forage samples were taken at 0, 3, 7, 14 or 21 days after the final application. The analytical method RAM 305/03 was used. The results are summarized in Table 19.

Table 19 Azoxystrobin residues in sorghum forage.

Country, year,	Application	PHI,	Commodity	Residues,	Report, trial,

location (variety)	kg ai/ha	No	Growth stage	days		mg/kg	remarks
USA, 2004, York, NE (NC+ 6B50)	0.28 0.28	2	BBCH 51 BBCH 67	0	Forage	11	T002036-03, NB-FR-04-5028
				0	Forage	12	
				7	Forage	1.5	
				7	Forage	1.4 mean 1.5	
				14	Forage	0.32	
				14	Forage	0.48	
				21	Forage	0.45, 0.44	
				21	Forage	0.79, 0.81	
USA, 2004, York, NE (NC+ 6B50)	0.28 0.28 0.28	3	BBCH 87 BBCH 93 BBCH 93	3	Forage	1.8	T002036-03, NB-FR-04-5028
				3	Forage	1.4 mean 1.6	
USA, 2004, Grand Island, NE (NC+ 6B50)	0.28 0.28	2	BBCH 55 BBCH 71	14	Forage	0.14	T002036-03, NB-FR-04-5033
				14	Forage	0.35 mean 0.25	
USA, 2004, Highland, KS (Asgrow 571)	0.27 0.28	2	BBCH 65 BBCH 65-85	14	Forage	0.19, 0.17	T002036-03, ND-FR-04-5027
				14	Forage	0.40, 0.50 mean 0.32	
USA, 2004, La Plata, MO (Pioneer 8500)	0.27 0.29	2	BBCH 73 BBCH 77	15	Forage	0.26	T002036-03, ND-FR-04-5029
				15	Forage	0.28 mean 0.27	
USA, 2004, Wagner, SD (DeKalb DK28E)	0.28 0.27	2	BBCH 45 BBCH 55-65	13	Forage	4.0, 4.0	T002036-03, NF-FR-04-5030
				13	Forage	5.8, 8.5 mean 5.6	
USA, 2004, Keensburg, CO (NC+ 4R48)	0.28 0.28	2	flowering milk stage	14	Forage	2.9	T002036-03, NM-FR-04-5035
				14	Forage	0.94 mean 1.9	
USA, 2004, St. Paul, TX (GA 697)	0.28 0.28	2	65 75	0	Forage	9.0	T002036-03, SA-FR-04-5031
				0	Forage	12	
				3	Forage	12	
USA, 2004, St. Paul, TX (GA 697)	0.28 0.28 0.28	3	81 89 89	3	Forage	11	T002036-03, SA-FR-04-5031
				7	Forage	4.5	
				7	Forage	11	
				14	Forage	5.1	
				14	Forage	3.8	
				21	Forage	3.2, 2.7	
				21	Forage	1.5, 1.5	
USA, 2004, Comanche, OK (Garst 5515)	0.28 0.29	2	69 85	14	Forage	1.2	T002036-03, SC-FR-04-5032
				14	Forage	1.7 mean 1.5	
USA, 2004, Olton, TX (Cropland 414)	0.29 0.27	2	51 30 % bloom	14	Forage	1.9	T002036-03, SC-FR-04-5034
				14	Forage	1.4 mean 1.7	
USA, 2004, Pleasant Hill, NM (Pioneer 8505)	0.27 0.29	2	Early bloom 67	14	Forage	9.0	T002036-03, SC-FR-04-5036
				14	Forage	5.4 mean 7.2	
USA, 2004, Cheneyville, LA (Golden Acres 444E)	0.29 0.28	2	End of heading dough stage	14	Forage	1.8	T002036-03, SD-FR-04-5026
				14	Forage	1.4 mean 1.6	
USA, 2004, Elko, SC (K73-J6)	0.28 0.28	2	BBCH 41 BBCH 61	14	Forage	0.30, 0.41	T002036-03, SJ-FR-04-5025
				14	Forage	0.26, 0.17 mean 0.29	

FATES OF RESIDUES IN STORAGE AND PROCESSING

In processing-effect on the residue level

The Meeting received information on the fate of azoxystrobin residues during the processing of potatoes to flakes, chips and wet peel, sorghum to aspirated grain fractions and of green coffee to roasted and instant coffee. The information submitted on processing procedures is summarized below.

Potato

A processing study was carried out during 2009 on potatoes obtained from a trial conducted in Idaho, USA (Report No. TK0003297). One post-harvest application of azoxystrobin formulated as a 250 g ai/L SC was made to potato tubers at the rate of 0.45 g ai/100 kg. Potato tubers were sampled on day 0 after the applied spray had dried.

Potatoes were processed to flakes and wet peel as follows:

- Potatoes were washed and their specific gravity was determined. The potatoes were batch steam peeled, and then batch scrubbed. The potato peel was collected from the peeling and scrubbing process. The peeled potatoes were hand trimmed to remove additional peel, rot, green or damaged potatoes.
- The collected peel was hydraulically pressed, blended with the cut trim waste and a representative sample collected and frozen as the 'wet peel' sample.
- The peeled potatoes were cut into slabs and washed in cold tap water to remove free starch. The potato slabs were precooked at 70–77 °C for approximately 20 minutes, and then cooled to less than 32 °C for 20 minutes. The cooked potato slabs were steam-cooked at 94–100 °C for 40–42 minutes, mashed and then mixed with an emulsion of pre-weighed food additives. The cooked mash was fed into a drum dryer to dry the cooked mash into a thin sheet, and then broken into large flakes by hand. The flakes were uniformly milled into potato flakes in a hammer mill. The milled potato flakes were dried on a fluidized bed dryer before samples of 'potato flakes' were collected and frozen.

Potatoes were processed to chips (crisps) as follows:

- Washed potatoes were batch peeled and hand trimmed if necessary. The peeled potatoes were cut into thin slices (approximately 1.6 mm thick) and washed with hot water to remove free starch.
- The slices were drained and fried at approximately 163–191 °C in frying oil for approximately 120 seconds. The fried potato chips were drained and salted and samples of 'chips' then collected and frozen.

Samples of pre-processing potato tubers, wet peel, potato flakes and chips were analysed using method RAM 305/03. Samples were stored frozen for a maximum period of 7.3 months from sampling to analysis and residues in the processed products are deemed to be stable over the storage period. The results are summarized in Table 20.

Sorghum

A processing study was carried out in Texas, USA in 2004 (Report T002036-03, field test no SC-FR-04-534). Three applications with 0.27–0.28 kg ai/ha were made. Grain samples were taken 13 days after the last treatment. Samples were analysed by method RAM 305/3 (LOQ 0.01 mg/kg).

The aspirated grain fraction was generated as follows:

- After drying, the sample was placed in a dust generation room containing a holding bin, drag conveyors, and a bucket conveyor.
- As the sample was moved in the system, aspiration was used to remove light impurities (grain dust). The sample was moved for 120 minutes.

- The light impurities were classified by sieving. After classification of each sample, all material through the 2360 micron sieve was recombined to produce one aspirated grain fraction.

Coffee

A processing study was carried out during 2011 on coffee beans (Coffee Arabica, variety Bourbon) obtained from a trial conducted in Guatemala (Report TK0046957). Three applications of azoxystrobin formulated as a 200 g ai/L SC were applied to coffee plants at the rate of 750 g ai/ha (5 × rate). Applications were made at intervals of 42–44 days, and coffee cherries were harvested 14 days after the final application. Coffee cherries were pre-processed according to normal local practices to dry green beans (the raw agricultural commodity), and these were then processed to roasted coffee beans and instant coffee.

The coffee cherries were pre-processed to dry green coffee beans (RAC) as follows:

- The skin and some of the pulp of the coffee berry was removed by mechanically pressing the fruit through a screen in water batch, the remaining pulp was removed via a fermentation and washing process, and the bean then dried and the thin parchment layer remaining removed by hand.
- The process for producing dry green beans took 6–14 days.

Green coffee beans were processed to roasted and instant coffee as follows:

- Whole green coffee beans were aspirated to remove light impurities. The beans were roasted to a 'mild roast' using a modified table top roaster at a temperature of 199–216 °C for 10–30 minutes. Samples of dry roasted coffee beans were collected after cooling.
- Roasted coffee beans were ground using a disc mill and sifted using a sifter equipped with 18 and 36 mesh sieves. Material below the 18 mesh sieve but above the 36 mesh sieve was used for extraction. The ground coffee beans were extracted with water and steam in a pressurised extraction vessel. The exit temperature of the liquid extract was 129–163 °C. The extract was cooled to 13–24 °C in a heat exchanger. The extract was filtered through a 100 mesh screen, centrifuged and screened again using a 120 mesh screen. The resulting coffee extract was concentrated in a vacuum evaporator until the solids content was 15–30%, and then filtered through a 125 mesh screen. The resulting liquor extract was frozen dried and reduced to granules to form frozen dried (instant) coffee. Samples of instant coffee were collected for analysis.
- On completion of processing, samples of roasted coffee beans and instant coffee were frozen immediately and stored frozen before being shipped still frozen to the analytical laboratory.

Samples of dry green coffee beans, roasted coffee beans and instant coffee were analysed using method RAM 305/3. The validated limit of quantification was 0.01 mg/kg. Samples were stored frozen for a maximum period of 1.9 months from sampling to analysis and residues in the processed products are deemed to be stable over the storage period. The results are shown in Table 20. The processing factors are summarized in Table 21.

Table 20 Azoxystrobin residues in processed commodities of sorghum, potatoes and coffee

RAC, country, year	Application			PHI, Days	Commodity	Residues mg/kg	Report, Syngenta File
	Form	kg ai/ha	No				
Sorghum, USA, 2004, Olton, TX	SC	0.27 0.28 0.28	3	13	Grain Aspirated grain fraction	2.1 106	T002036-03, SC-FR-04-5034
Coffee, Guatemala, 2011	SC	0.75	3	14	Green beans (RAC) [a] Green beans (RAC) [b] Roasted beans Instant coffee	< 0.01, 0.016 < 0.01 0.01 0.017	TK0046957, A12910C_50004
Potatoes, USA, Idaho, 2009	SC	0.45 g ai/100 kg	1	0	Tuber (RAC) Flakes	0.94 < 0.01	TK0003297, ICI5504_50552

RAC, country, year	Application			PHI, Days	Commodity	Residues mg/kg	Report, Syngenta File
	Form	kg ai/ha	No				
					Chips Wet peel	0.011 0.85	

[a] Dry green coffee bean sample collected from the field.

[b] Dry green coffee bean sample collected from the bulk sample prior to processing.

Table 21 Summary of processing factors for azoxystrobin residues

RAC	Processed commodity	Calculated processing factors	Best estimate
Sorghum	Aspirated grain fraction	50	50
Potatoes	Flakes	< 0.011	< 0.011
	Chips	0.012	0.012
	Wet peel	0.904	0.904
Coffee	Roasted coffee beans	<1, (0.625) [a]	0.625
	Instant coffee	1.7, (1.06) [a]	1.06

[a] Calculation based on RAC with residues of 0.016 mg/kg

APPRAISAL

Azoxystrobin was first evaluated for toxicology and residues by the JMPR in 2008. The Meeting derived an ADI of 0–0.2 mg/kg bw per day, decided that an ARfD was unnecessary and concluded that the residue definition for plant and animal commodities for compliance with MRL values and for consumer risk assessment was parent azoxystrobin. The compound was re-evaluated for residues by the JMPR in 2011 and 2012.

Azoxystrobin was listed by the Forty-fourth Session of the CCPR for the review of additional MRLs by the JMPR in 2013. The Meeting received information on GAP and residue supervised trials data on pulses, potatoes, coffee beans, barley, oats and sorghum.

Methods of residue analysis

The Meeting received recovery data on analytical methods for coffee beans. After extraction with ethyl acetate, the residues were determined by LC-MS/MS with an LOQ of 0.01 mg/kg.

Results of supervised residue trials on crops

Most trial designs used replicate plots. If two field samples were taken or results of two replicate plots were submitted, the mean value was calculated. From two trials carried out side-by-side the higher residues was chosen.

Pulses

The 2008 JMPR estimated a maximum residue level for azoxystrobin in soya beans, dry of 0.5 mg/kg and an STMR of 0.06 mg/kg. The 2008 assessment based on the US GAP for soya beans at 6 × 0.28 kg ai/ha and a PHI of 14 days.

The use pattern in Germany for field peas, field beans and lupins is one to two applications at 0.25 kg ai/ha, with a spray interval of 14–28 days and a PHI of 35 days. The GAP in France is two foliar applications applied at 0.2–0.25 kg ai/ha with a spray interval of 14 days and a PHI of 35 days for dry peas (including chickpeas), 42 days for dry beans and lupins and 28 days for lentils.

Eight European trials (2 × UK, 4 × France, 2 × Italy) on dry beans were treated twice with 0.2–0.25 kg ai/ha. One additional French trial was treated with 0.13 + 0.2 kg ai/ha. The residues were in dry beans at PHIs of 26–36 days < 0.01 mg/kg (9).

Twenty trials were conducted on dry peas in the UK and in France matching the French and German GAPs. Azoxystrobin was applied twice at a rate of 0.2–0.25 kg ai/ha with a spray interval of 14 days. Samples of dry pea seed were collected at normal commercial harvest at PHIs of 30–45 days. If results of two replicate plots were submitted, the mean value was calculated. From two trials carried out side-by-side the higher residues were chosen for evaluation. The residues (n=20) were < 0.01 (8), 0.01 (5), 0.015, 0.015, 0.02, 0.025, 0.03, 0.03 and 0.065 mg/kg.

The Meeting estimated a maximum residue level of 0.07 mg/kg and an STMR 0.01 mg/kg for azoxystrobin residues in pulses, dry except soya beans.

Potato

The 2008 JMPR estimated a maximum residue level for azoxystrobin in root and tuber vegetables of 1 mg/kg, an STMR of 0.23 mg/kg and a highest residue of 0.45 mg/kg. The 2008 assessment based on the US GAP for root vegetables at 6 × 0.37 kg ai/ha.

Azoxystrobin is registered in the USA for one post-harvest application at 0.49 g ai/100 kg tubers. Six trials were submitted with one application of 0.44–0.50 g ai/100 kg tubers. Samples were taken directly after treatment. In three trials, stored tubers were analysed also (0–59; 0–61 and 0–231 days after treatment). The maximum residues from samples taken after treatment and after storage were 1.0, 1.5, 2.3, 2.3 and 3.8 mg/kg.

The current Meeting estimated for azoxystrobin residues in potato a maximum residue level of 7 mg/kg Po and an STMR of 2.3 mg/kg. The previous recommendation of 1 mg/kg azoxystrobin for root and tuber vegetables was withdrawn. For root and tuber vegetables, except potatoes, the Meeting confirmed the previous recommendation.

Barley and oats

The 2008 JMPR estimated a maximum residue level for azoxystrobin in barley and oats of 0.5 mg/kg and an STMR of 0.08 mg/kg based on the European GAP and residue data.

Azoxystrobin is registered in the USA in barley and oats as foliar spray with 2 × 0.15 kg ai/ha, a PHI in days for grain was not specified. The recommended use pattern is for a single early season application followed by a single application at 50% to full flag leaf emergence. New residue data were received for barley and oats.

On barley, seven independent supervised trials were conducted. In each trial, azoxystrobin was applied twice at a rate of 0.15 kg ai/ha. The residues in grains were 0.014, 0.019, 0.037, 0.05, 0.19, 0.31 and 0.99 mg/kg.

On oats, twelve supervised trials were submitted treated at a rate of 0.15 kg ai/ha. The residues in grains were 0.013, 0.028, 0.028, 0.028, 0.048, 0.049, 0.053, 0.058, 0.06, 0.12, 0.12 and 0.63 mg/kg.

The Meeting noted that the populations of azoxystrobin residues in grains of barley and oats have similar distributions and can be combined (n=19): 0.013, 0.014, 0.019, 0.028, 0.028, 0.028, 0.037, 0.048, 0.049, 0.05, 0.053, 0.058, 0.06, 0.12, 0.12, 0.19, 0.31, 0.63 and 0.99 mg/kg.

The current Meeting estimated a maximum residue level of 1.5 mg/kg for azoxystrobin residues in barley and oats to replace the previous recommendation (0.5 mg/kg). An STMR value of 0.05 mg/kg for was estimated.

Sorghum

The US GAP for sorghum is 2 × 0.28 kg ai/ha with a PHI of 14 days. Twelve independent supervised trials were conducted. In each trial, azoxystrobin was applied three times at a rate of 0.28 kg ai/ha with a 7-day application interval. The residues in grains were 0.48, 1.3, 1.4, 1.4, 1.7, 1.8, 1.9, 2.2, 2.3, 2.8, 4.5 and 8.0 mg/kg.

The Meeting estimated a maximum residue level of 10 mg/kg and an STMR of 1.85 mg/kg for azoxystrobin residues in sorghum grain.

Coffee beans

The 2011 JMPR estimated for azoxystrobin residues in coffee beans a maximum residue level of 0.02 mg/kg and an STMR of 0.01 mg/kg based on the Brazilian residue data and Brazilian GAP of 2 × 0.15 kg ai/ha (interval 90 days) or 3 × 0.1 kg ai/ha (interval 60 days) and a PHI of 30 days.

The GAP in Columbia is registered as 3 × 0.15 kg ai/ha (interval 45 days) and a PHI of 15 days. Seven new trials have been conducted in Brazil, Colombia and Guatemala in 2010/2011 to support the registered use pattern in Colombia. Azoxystrobin was applied three times at a rate of 0.15 kg ai/ha. The residues in green coffee beans were < 0.01 (4), 0.01, 0.01 and 0.015 mg/kg at a PHI of 14–15 days.

Four further Brazilian trials conducted in 2006/2007 and matching the Colombian GAP were reported by the 2011 JMPR (trials M06024, Roncato, 2008). After application of 3 × 0.15 kg ai/ha and a 14 day PHI, the azoxystrobin residues were < 0.01 mg/kg (4).

In total, the residues of azoxystrobin in green coffee beans matching Columbian GAP were, in rank order (n=11): < 0.01 (8), 0.01, 0.01 and 0.015 mg/kg.

Based on residues data matching Columbian GAP, 0.02 mg/kg were calculated as maximum residue level using the OECD MRL calculator. The Meeting noted that the calculated value is very close to the highest level of 0.015 mg/kg (mean of < 0.01 and 0.02 mg/kg from 2 replicated plots) and proposed rounding up to 0.03 mg/kg.

The current Meeting estimated a maximum residue level of 0.03 mg/kg and an STMR of 0.01 mg/kg for azoxystrobin residues in coffee beans to replace the previous recommendation.

Legume animal feeds

The use pattern in Germany for field peas, field beans and lupins is one to two applications at 0.25 kg ai/ha with a spray interval of 14–28 days. The GAP in France is for dry peas (including chickpeas), dry beans, lentils and lupins two foliar applications at 0.2–0.25 kg ai/ha with an interval of 14 days.

Pea hay or pea fodder (dry)

Twenty trials were conducted on dry peas in the UK and France matching the GAP of France and Germany. Azoxystrobin was applied twice at a rate of 0.2–0.25 kg ai/ha with a spray interval of 14 days. Samples of pea fodder were collected at normal commercial harvest, PHIs of 30–45 days.

Residues found, on fresh weight basis, were (n=20): 0.34, 0.61, 0.62, 0.63, 1.0, 1.4, 1.6, 1.8, 1.8, 2.0, 2.1, 2.3, 3.6, 3.7, 3.8, 3.9, 4.0, 4.8, 7.2 and 18 mg/kg.

The residue values, on dry weight basis, were (88% dry matter): 0.39, 0.69, 0.70, 0.72, 1.1, 1.6, 1.8, 2.0, 2.0, 2.3, 2.4, 2.6, 4.1, 4.2, 4.3, 4.4, 4.5, 5.5, 8.2 and 20 mg/kg.

The Meeting estimated a maximum residue level of 20 mg/kg for azoxystrobin residues in pea hay or fodder (dry) on dry weight basis. The estimated median and highest residue values were 1.9 mg/kg and 18 mg/kg on fresh weight basis or 2.35 mg/kg and 20 mg/kg, respectively on dry weight basis.

Pea vines (green)

Pea vines (green) aren't in international trade and an MRL is not necessary. Nevertheless, the commodity is used as animal feed and the estimation of an STMR and a highest residue values is requested.

In 18 trials conducted on peas in the UK and France matching the GAP of France and Germany for peas (dry), pea vines were sampled. Azoxystrobin was applied twice at a rate of 0.2–0.25 kg ai/ha with a spray interval of 14 days. The highest residue values of pea vines samples

collected at PHIs of 2 to 30 days after treatment were selected for the evaluation. The residues were on fresh weight basis (n=18): 0.89, 1.3, 1.4, 1.5, 1.8, 2.6, 3.1, 3.1, 3.3, 3.4, 4.1, 4.5, 4.8, 4.8, 4.9, 5.6, 5.8 and 9.4 mg/kg.

The Meeting estimated a median and a highest residue of 3.35 and 9.4 mg/kg (fresh weight) equivalent to 13.4 and 37.6 mg/kg (25% dry weight basis) for azoxystrobin residues in pea vines.

Straw and fodder (dry) of cereal grains

Based on GAP and residue data for barley, oats, rice, rye, triticale and wheat straw, the 2008 JMPR estimated a maximum residue level for straw and fodder of cereal grains, except maize of 15 mg/kg, an STMR of 1.7 mg/kg and a highest residue value of 11 mg/kg on dry weight basis.

Azoxystrobin is registered in the USA in barley and oats as foliar spray with 2 × 0.15 kg ai/ha and a 7-days PHI for forage and hay. New trials are available for barley straw, oats straw, barley hay and oats hay matching the US GAP. The straw samples were taken at grain harvest 16 – 49 days after treatment. Samples of hay were taken 6 - 7 days after treatment.

The residues in barley straw on fresh weight basis (n=7) were 0.18, 0.28, 0.36, 0.70, 2.6, 3.3 and 3.5 mg/kg; this is equivalent to 0.20, 0.31, 0.40, 0.79, 2.9, 3.7 and 3.9 mg/kg (dry weight, based on 89% dry matter).

The residues in oats straw on fresh weight basis (n=12) were: 0.074, 0.075, 0.088, 0.15, 0.30, 0.31, 0.35, 0.62, 0.70, 0.73, 0.88 and 1.3 mg/kg; this is equivalent to 0.082, 0.083, 0.098, 0.17, 0.33, 0.34, 0.39, 0.69, 0.78, 0.81, 0.98 and 1.4 mg/kg (dry weight, based on 90% dry matter).

The residues in barley hay on fresh weight basis (n=7) were: 0.46, 0.69, 0.76, 0.84, 2.1, 3.2 and 3.7 mg/kg; this is equivalent to 0.52, 0.78, 0.86, 0.95, 2.4, 3.6 and 4.2 mg/kg (dry weight, based on 88% dry matter).

The residues in oats hay on fresh weight basis (n=12) were: 0.20, 0.27, 0.53, 0.66, 0.89, 1.1, 1.3, 2.2, 3.0, 3.1, 3.2 and 3.4 mg/kg; this is equivalent to 0.22, 0.30, 0.59, 0.73, 0.99, 1.2, 1.4, 2.4, 3.3, 3.4, 3.6 and 3.8 mg/kg (dry weight, based on 90% dry matter).

The Meeting noted that the residues in straw and fodder of barley and oats resulting of azoxystrobin treatment according to US GAP were covered by the MRL recommendation of the 2008 JMPR for straw and fodder of cereal grains, except maize of 15 mg/kg (90% dry matter). The estimated median residue value was 1.5 mg/kg (fresh weight) equiv. to 1.7 mg/kg (dry weight) and the highest value 9.9 mg/kg (fresh weight) equiv. to 11 mg/kg (dry weight). A new estimation of a maximum residue level, a median and a highest residue was not necessary. Because residue data on sorghum show higher residues, the commodity "straw and fodder of cereal grains, except maize" should be revised to "Straw and fodder (dry) of cereal grains, except maize and sorghum". The previous recommendation for "Straw and fodder of cereal grains, except maize" should be withdrawn.

The US GAP for sorghum is 2 × 0.28 kg ai/ha with a PHI of 14 days. Twelve trials on sorghum stover, dry, matching the US GAP were submitted. The residues on fresh weight basis (n=12) were: 0.39, 0.53, 0.71, 2.4, 2.6, 3.7, 4.0, 4.5, 4.8, 5.3, 10.5 and 14.5 mg/kg; this is equivalent to 0.44, 0.60, 0.81, 2.7, 2.95, 4.2, 4.5, 5.1, 5.5, 6.0, 12 and 16 mg/kg (dry weight, based on 88% dry matter).

The Meeting estimated maximum residue level of 30 mg/kg for azoxystrobin residues in sorghum straw and fodder, dry on dry weight basis. The estimated median residue value was 3.85 mg/kg (fresh weight) equiv. to 4.35 mg/kg (dry weight) and the highest residue 14.5 mg/kg (fresh weight) equiv. to 16 mg/kg (dry weight).

Cereal forage (green)

Residue data were received for oat and sorghum forage (green). Because these aren't commodities in international trade, MRLs are not necessary. Nevertheless, the commodities are used as animal feed and the estimation of STMRs and highest residue values is requested.

Oats forage (green)

Azoxystrobin is registered in the USA in oats as foliar spray with 2 × 0.15 kg ai/ha and a 7-days PHI for forage and hay. Twelve trials are available for oats forage matching the US GAP. The residues on fresh weight basis (n=12) were: 0.11, 0.20, 0.26, 0.44, 0.52, 0.78, 0.86, 0.95, 1.0, 1.4, 1.6 and 2.0 mg/kg.

The 2008 JMPR estimated a median residue value of 1.7 mg/kg and a highest value of 4.0 mg/kg for oats forage (fresh weight). The current Meeting noted that the residues in oats forage resulting of azoxystrobin treatment according to US GAP are covered by the estimation of the 2008 JMPR.

Sorghum forage (green)

The US GAP for sorghum is 2 × 0.28 kg ai/ha with a PHI of 14 days for grain. Supervised residue trials conducted included residue data for forage from 3 to 21 days after treatment. The residues on fresh weight basis (n=14) were: 0.25, 0.27, 0.29, 0.32, 1.5, 1.5, 1.6, 1.6, 1.7, 1.9, 5.6, 7.2, 11 and 12 mg/kg.

The Meeting estimated a median and a highest residue value of 1.6 and 12 mg/kg (fresh weight) equivalent to 4.6 and 34 mg/kg (35% dry weight basis) for azoxystrobin residues in sorghum forage (green).

Fate of residues during processing

The Meeting received information on the fate of azoxystrobin residues during the processing of potatoes to flakes, chips and wet peel, sorghum to aspirated grain fractions and green coffee to roasted and instant coffee.

The processing factors obtained in the processing studies and estimated STMR-P values are summarized below.

Raw agricultural commodity (RAC)		Processed commodity		
Name	STMR, mg/kg	Name	Processing factor	STMR-P, mg/kg
Potato	2.3	Flakes	< 0.011	0.0253
		Chips	0.012	0.0276
		Wet peel	0.904	2.08
Barley	0.05	Barley malt	0.10 [a]	0.005
		Barley spent grain	0.15 [a]	0.0075
		Beer	0.03 [a]	0.0015
Sorghum	1.85	Aspirated grain fractions	50	92.5
Coffee beans, green	0.01	Roasted coffee beans	0.625	0.006
		Instant coffee	1.06	0.0106

[a] Estimated by JMPR in 2008

Farm animal dietary burden

The 2013 JMPR evaluated residues of azoxystrobin in the following animal feed items: pulses, potato, cereal grains (barley, oats, sorghum), legume animal feeds as well as straw, fodder and forage of cereal grains which are listed in the OECD feeding table.

Estimated maximum and mean dietary burdens of farm animals

Dietary burden calculations based on the feed items evaluated by the JMPR in 2008 and 2013 for beef cattle, dairy cattle, broilers and laying poultry as presented in Annex 6. The calculations were made according to the livestock diets, in the OECD table, from Australia, the EU, Japan and US-Canada. The following table below shows the values calculated by the 2008 JMPR and by the current Meeting.

	Livestock dietary burden, azoxystrobin, ppm of dry matter diet (calculation 2008/2013)							
	Japan		US-Canada		EU		Australia	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Beef cattle	-/0.96	-/0.96	34/17	15/12	55/61	19/25	58/72	32/51 [c]
Dairy cattle	-/16.3	-/2.97	33/30	16/12	72[a]/74	27[b]/29	39/45.5	20/20
Poultry – broiler	-/1.4	-/1.4	0.44/1.7	0.44/1.7	0.62/2.2	0.40/1.9	0.59/1.7	0.59/1.7
Poultry – layer	-/1.4	-/1.4	0.44/1.7	0.44/1.7	23[d]/21	9.1[e]/9.5	0.59/1.7	0.59/1.7

[a] Highest maximum beef or dairy cattle burden suitable for MRL estimates for mammalian meat, edible offal and milk

[b] Highest mean dairy cattle burden suitable for STMR estimates for milk

[c] Highest mean beef or dairy cattle burden suitable for STMR estimates for mammalian meat and edible offal

[d] Highest maximum poultry broiler or layer burden suitable for MRL estimates for poultry meat and eggs

[e] Highest mean poultry broiler or layer burden suitable for STMR estimates for poultry meat and eggs

Animal commodity residue levels

The Meeting noted that the new estimation did not result in a significant change of the dietary burdens of farm animals, except the mean burden for beef cattle what increased from 32 ppm in 2008 to 51 ppm in 2013 (factor 1.59).

The 2008 JMPR calculated for a dietary burden of 32 ppm mean residues of 0.013 mg/kg in liver, < 0.01 mg/kg in kidney and 0.01 mg/kg in fat. The estimated STMR values were 0.01 mg/kg for meat (fat) and edible offal from mammals other than marine mammals.

The table below shows the recalculation of the STMR values for meat (fat) and edible offal for mammals, other than marine mammals based on the results of the cattle feeding studies evaluated by the 2008 JMPR and the new dietary burden calculation.

	Mean estimated azoxystrobin concentrations (STMR, mg/kg)			
Beef cattle	Muscle	Liver	Kidney	Fat
Dietary burden (51 ppm)	< 0.01	0.02	< 0.01	0.015
Feeding level [25 ppm]	< 0.01	< 0.01	< 0.01	< 0.01
Feeding level [75 ppm]	< 0.01	0.03	0.01	0.02

The current Meeting calculated mean residues of 0.02 mg/kg in liver and < 0.01 mg/kg in kidney, < 0.01 mg/kg in muscle and 0.015 mg/kg in fat. The estimated STMR values were 0.02 mg/kg for edible offal (mammalian), 001 mg/kg for muscle and 0.015 mg/kg for fat.

The previous MRL recommendations for animal commodities and the STMRs for whole milk, milk fat, poultry meat (fat), poultry edible offal and eggs were maintained.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI assessment.

Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant and animal commodities: azoxystrobin.

The residue is fat-soluble.

CCN	Commodity name	MRL, mg/kg		STMR or STMR-P mg/kg
		Proposed	Previous	
GC 0640	Barley	1.5	0.5	0.05
SB 0716	Coffee beans	0.03	0.02	0.01
GC 0647	Oats	1.5	0.5	0.05
AL 0072	Pea hay or fodder (dry) [a]	20 [a]		1.9 [b]
VR 0589	Potato	7 Po		2.3 Po
VD 0070	Pulses, dry, except soya beans	0.07		0.01
VR 0075	Root and tuber vegetables	W	1	0.23
VR 0075	Root and tuber vegetables, except potato	1		0.23
GC 0651	Sorghum	10		1.85
AS 0651	Sorghum straw and fodder, dry	30 [a]		3.85 [b]
AS 0081	Straw and fodder of cereal grains, except maize and sorghum	15 [a]		1.5 [b]
AS 0081	Straw and fodder of cereal grains, except maize	W		

[a] Dry matter basis

[b] Fresh weight basis

Dietary intake only

CCN	Commodity name	Median/STMR or STMR-P, mg/kg	Highest residue, mg/kg
	Barley malt	0.005	
	Barley spent grain	0.0075	
	Beer	0.0015	
	Coffee beans, roasted	0.006	
	Instant coffee	0.0106	
MO 0105	Edible offal (Mammalian)	0.02	
MF 0100	Mammalian fats (except milk fats)	0.015	
MM 0095	Meat (from mammals other than marine mammals)	0.01 (muscle) 0.015 (fat)	
AL 0072	Pea hay or fodder (dry) [a]	1.9 [b]	18 [b]
AL 0528	Pea vines (green)	3.35 [b]	9.4 [b]
	Potato flakes	0.0253	
	Potato chips	0.0276	

CCN	Commodity name	Median/STMR or STMR-P, mg/kg	Highest residue, mg/kg
	Potato wet peel	2.08	
	Sorghum, aspirated grain fractions	92.5	
AF 0651	Sorghum forage (green)	1.6 [b]	12 [b]
AS 0651	Sorghum straw and fodder, dry	3.85 [b]	14.5 [b]

[b] Fresh weight basis

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Daily Intakes (IEDIs) of azoxystrobin were calculated for the 13 GEMS/Food cluster diets using STMRs and STMR-Ps estimated by the JMPR in 2008, 2011, 2012 and 2013. The results are shown in Annex 3 of the 2013 JMPR Report.

The ADI is 0–0.2 mg/kg bw and the calculated IEDIs were 2–10% of the maximum ADI. The Meeting concluded that the long-term intake of residues of azoxystrobin resulting from the uses considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The 2008 Meeting decided that an ARfD for azoxystrobin is unnecessary and concluded that the short-term intake of residues resulting from the use of azoxystrobin is unlikely to present a public health concern.

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