TEBUCONAZOLE (189)

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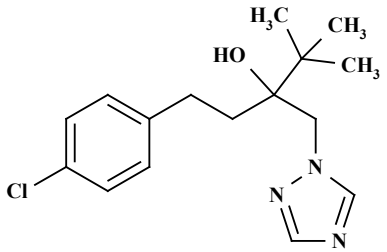
EXPLANATION

Tebuconazole is a broad-spectrum triazole fungicide used as a seed dressing and foliar spray to control a wide range of diseases such as rusts, smuts, bunt, powdery mildew, leaf spots, and blights. The compound was last evaluated for residues in 2008 and for toxicology in 2010, the latter within the periodic review program, when an ADI of 0–0.03 mg/kg bw and a ARfD of 0.3 mg/kg bw were established. Tebuconazole was scheduled for periodic review for residues at the present Meeting, when data on metabolism in animals and plants, field rotational crops studies, environmental fate, methods of residue analysis, storage stability studies, GAP information, supervised trials on a variety of crops, processing studies, and animal feeding studies were submitted by the manufacturer. Additional GAP information was provided by Japan.

IDENTITY

Common name: Tebuconazole
Chemical name:
IUPAC: (RS)-1-p-chloro-phenyl-4,4-dimethyl-3-(1H-1,2,4-triazol-1-ylmethyl)-pentan-3-ol (ISO)
CA (index): 1*H*-1,2,4-Triazole -1-ethanol, α-[2-(4-chlorophenyl)ethyl]-α-(1,1-dimethylethyl)-, (±)-
CAS number: 107534-96-3
Molecular formula: $C_{16}H_{22}ClN_3O$
Structural formula:



Molecular mass: 307.8 g/mol

Batch	Purity
920508ELB01:	99.9%
840309ELB05:	99.5%
APF13028500:	99.5%
KRJ300682:	99.1%
816096833:	98.1%
278879046:	97.6%
910419ELB06:	95.6%
910718ELB01:	99.7%
K6-4-9109:	96.5%
012/1998 (Technical):	99.5%

Physical and chemical properties

Physical state and colour:	active substance, pure: colourless crystals active substance as manufactured: yellowish crystalline powder	Schneider, 2005a
Odour:	active substance, pure: no characteristic odour active substance as manufactured: weak characteristic odour	Schneider, 2005b
Melting point:	105 °C 104 °C pure 102 °C technical	Krohn, 1993a Smeykal 2007
Relative density:	1.25 g/cm³ at 26 °C	Weber, 1987
Vapour pressure:	balance method: 1.3×10^{-6} Pa at 20 °C (extrapolated) 3.1×10^{-6} Pa at 25 °C (extrapolated) gas saturation method 1.7×10^{-6} Pa at 20 °C (extrapolated) 3.9×10^{-6} Pa at 25 °C (extrapolated)	Weber, 1988 Krohn, 1993b
Volatility:	Henry's law constant at 20 °C (calculated): 1×10^{-5} Pa m^3 mol^{-1}	Krohn, 1988a
Solubility in water:	0.036 g/L at 20 °C The solubility is not influenced by the pH in the range between pH 5 and pH 9.	Krohn, 1995
Solubility in organic solvents:	n-hexane 0.08 g/L at 20 °C polyethylene glycol (PEG) 46 g/L at 20 °C toluene 57 g/L at 20 °C acetonitrile 89 g/L at 20 °C 1-octanol 96 g/L at 20 °C 2-propanol 99 g/L at 20 °C PEG + ethanol 1 : 1 140 g/L at 20 °C acetone > 200 g/L at 20 °C dichloromethane > 200 g/L at 20 °C dimethylformamide > 200 g/L at 20 °C dimethylsulfoxide > 200 g/L at 20 °C n-heptane 0.9 g/L at 20 °C xylene 51 g/L at 20 °C 2-propanol 112 g/L at 20 °C ethyl acetate 249 g/L at 20 °C acetone > 250 g/L at 20 °C dichloroethane 260 g/L at 20 °C	Krohn, 1988b Eyrich &Bogdoll, 2007a
Dissociation constant:	Tebuconazole is a very weak base which can only be completely protonised in non-aqueous systems in the presence of very strong acids. It is not possible to specify a pK value for water.	Placke, 1987
Partition coefficient n-octanol/water:	P_{OW} = 5000; log P_{OW} = 3.70 at 20 °C P_{OW} = 1259; log P_{OW} = 3.10 at 25 °C	Krohn, 1988 Eyrich & Bogdoll, 2007b
Hydrolysis rate:	Stable in pH 5, 7 and 9 sterile, aqueous phosphate buffers, in the dark at 25 °C. No degradation was observed over a 28 days period. Material balance ranged from 97.3% to 106.9% Stable in pH 4, 7 and 9 in the dark at 25 °C with a half life of > 1 year.	Coffman + Sietsema, 1984 Wiche + Bogdoll, 2007
Photo-chemical degradation:	Stable at pH 7, photolysis products were not observed after 30 days of irradiation.	Coody, 1987

Formulations

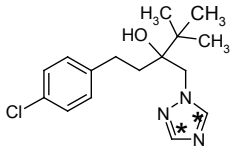
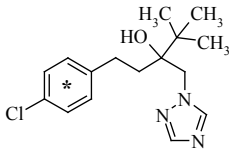
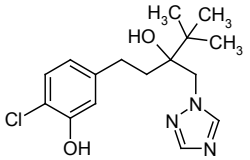
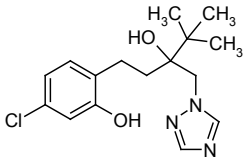
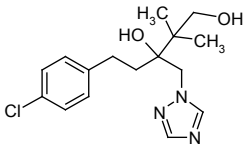
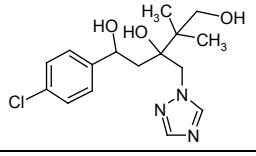
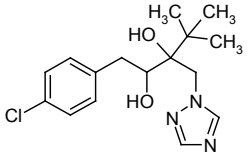
WG 25: 250 g/kg tebuconazole
WP 25 : 250 g/kg tebuconazole
EC 250: 250 g/L tebuconazole
EC 200: 200 g/L tebuconazole
EW 250: 250 g/L tebuconazole

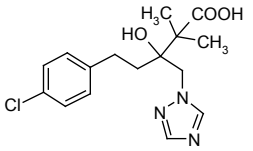
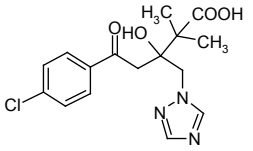
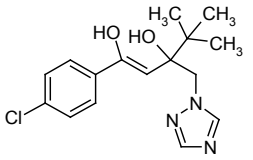
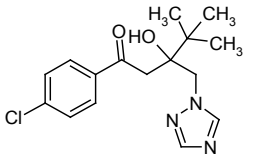
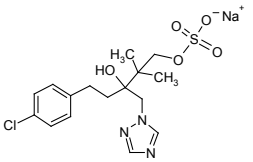
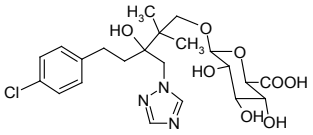
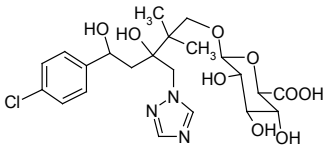
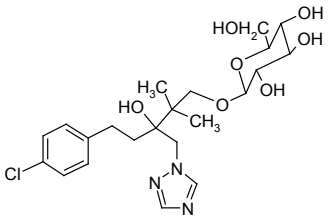
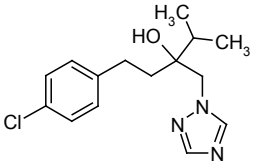
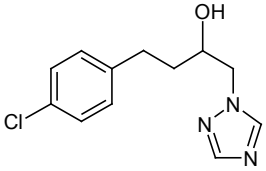
SC 430: 430 g/L tebuconazole
SE 043: 43 g/L tebuconazole
SC 300: 200 g/L tebuconazole and 100 g/L trifloxystrobin
WG 75: 500 g/kg tebuconazole and 250 g/kg trifloxystrobin
EC 375: 250 g/L tebuconazole and 125 g/L triadimenol
EC 300: 225 g/L tebuconazole and 75 g/L triadimenol
EC 250: 125 g/L tebuconazole and 125 g/L prothioconazole
SC 416.7: 66.7 g/L tebuconazole and 350 g/L fenhexamid

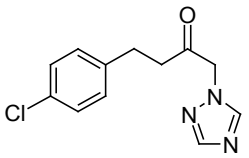
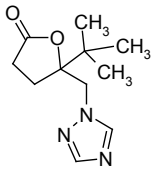
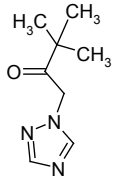
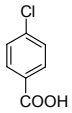
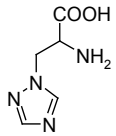
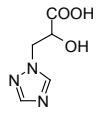
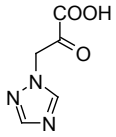
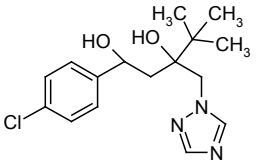
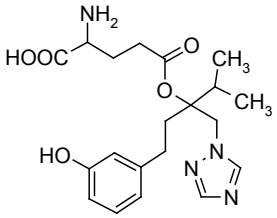
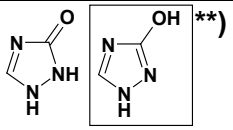
METABOLISM AND ENVIRONMENTAL FATE

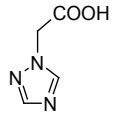
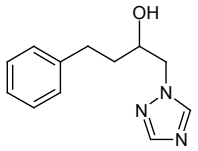
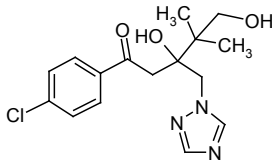
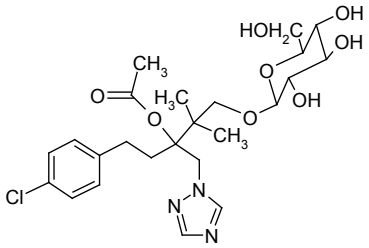
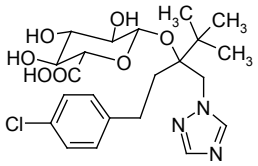
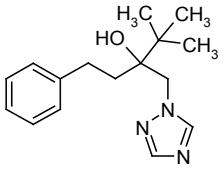
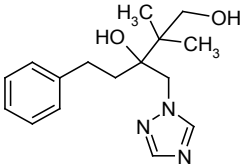
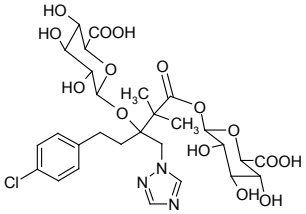
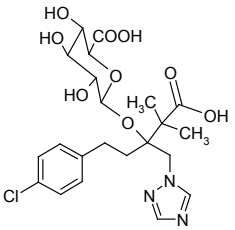
Livestock metabolism studies were conducted in the lactating goat as a model for ruminants, with [phenyl-UL-^{14}C] and [triazolyl-3,5-^{14}C]tebuconazole and in laying hens with [phenyl-UL-^{14}C] tebuconazole (Table 1). Table 1 shows the metabolites found in the studies.

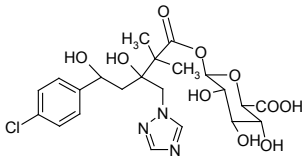
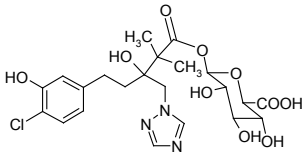
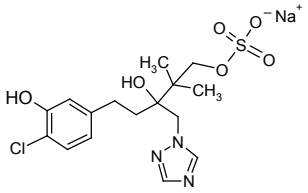
Table 1 Metabolites of tebuconazole in animals, plants and soil

No.	Name	Structure	Occurrence
	[triazolyl-3,5-^{14}C]tebuconazole [triazole-3,5-^{14}C]tebuconazole (> 99%, specific radioactivity 2.22 MBq/mg)		[Used in the metabolism studies]
	[Phenyl-UL-^{14}C]tebuconazole [Chlorophenyl-UL-^{14}C]tebuconazole (> 98%, specific radioactivity 3.12 MBq/mg)		[Used in the metabolism studies]
M01	Tebuconazole-m-hydroxy Hydroxyphenyl analogue		Plants Soil
M02	Tebuconazole-o-hydroxy		Animals
M03	Tebuconazole-1-hydroxy		Plants Animals Water
M04	Tebuconazole-1,5-dihydroxy		Animals
M05	Tebuconazole-4-hydroxy		Plant Soil

No.	Name	Structure	Occurrence
M06	Tebuconazole-carboxylic acid t-Butyl acid tebuconazole		Animals
M07	Tebuconazole-5-ketocarboxylic acid		Animals
M08	Tebuconazole-5-enol		Soil
M09	Tebuconazole-5-keto		Plant Soil
M10	Tebuconazole-1-hydroxysulfate tebuconazole sulfate conjugate t-butylhydroxy tebuconazole sulfate		Animals
M11	Tebuconazole-1-OH-glucuronide hydroxy tebuconazole glucuronide		Animals
M12	Tebuconazole-1,5-di-OH-glucuronide		Animals
M13	Tebuconazole-1-OH-glucoside hydroxy tebuconazole glucoside (A and B)		Plant
M14	Tebuconazole-desmethyl is opropyl tebuconazole		Animals
M15	Tebuconazole-desbutyl		Soil Water

No.	Name	Structure	Occurrence
M16	Tebuconazole-ketodesbutyl		Soil
M17	Tebuconazole-lactone		Soil Water
M18	Tebuconazole-triazole-pinacoline		Soil
M19	4-chlorobenzoic acid p-chlorobenzoic acid		Plants
M20	Triazole alanine / TA Triazolylalanine		Plants Soil
M21	Triazole lactic acid		Plants
M22	Triazole pyruvic acid		Soil
M24	Tebuconazole-5-hydroxy Benzylic hydroxy tebuconazole		Animal
M26	1,2,4-Triazole / 1,2,4-T "free triazole"		Plants, Animals Soil
M28	Tebuconazole-deschloro-OH-glutamate Dechlorinated isopropyl hydroxy tebuconazole glutamine		Plant
M29	1,2-dihydro-1,2,4-triazolone , THS2447 **) 1,2-Dihydro-1,2,4-triazolone is the tautomer of hydroxy-triazole, it is the predominant form under most conditions.		Soil

No.	Name	Structure	Occurrence
M30	Triazole acetic acid / TAA Triazolyl acetic acid		Plants Soil
M31	Tebuconazole-deschloro-desbutyl Dechlorinated HWG 3877		Plant
M32	Tebuconazole-1-hydroxy-5-keto Hydroxy SN 3678-7/B		Plant
M33	tebuconazole-3-acetoxy-1-OH-glucoside Acetylated hydroxy tebuconazole glucoside		Plant
M34	Tebuconazole-glucuronide		Animal
M35	Tebuconazole-deschloro dechlorinated tebuconazole		Soil
M36	tebuconazole-deschloro-1-hydroxy dechlorinated alcohol of tebuconazole		Soil
M37	Tebuconazole-carboxylic acid bis-glucuronide		Animal
M38	Tebuconazole-glucuronide-carboxylic acid		Animal

No.	Name	Structure	Occurrence
M39	Tebuconazole-1,5-dihydroxy-glucuronide dihydroxy tebuconazole glucuronide(3A)		Animal
M40	Tebuconazole-m-hydroxy-1-hydroxy glucuronide dihydroxy tebuconazole glucuronides(3B)		Animal
M41	Tebuconazole- m-hydroxy-1-hydroxy-sulfate dihydroxy tebuconazole sulfate		Animal

Goat

The metabolism of [phenyl-UL-^{14}C]tebuconazole was investigated in a lactating goat (Lee and Wood, 1990). A dose of 15.0 mg/kg body weight was administered orally via gelatine capsules to one lactating goat (40 kg bw at first dosing) on three consecutive days in time intervals of 24 hours. Milk was collected every morning and evening and stored frozen until analysis. The goat was sacrificed 2 h after the final dosage, and samples from the edible tissues kidney, liver, muscle, and fat were taken for analysis. Aliquots of each tissue and milk were assayed for radioactive residues by combustion, and the radioactivity of the trapped CO_2 was measured by liquid scintillation counting (LSC). Metabolites were extracted from milk and edible tissues with methanol and the remaining solids extracted with methanol under reflux. Tissue extracts were hydrolysed with 1 N HCl and extracted with ethyl acetate. Additionally, liver and kidney extracts were treated with β-glucuronidase. Metabolite identification was based on co-chromatography with authentic reference substances using TLC, HPLC, and/or GC/MS.

The radioactive residues were almost quantitatively extracted from milk and edible tissues (more than 93% of the recovered radioactivity, TRR). Methanol reflux of the solids remaining after extraction released additional radioactivity that was not further analysed. The highest tebuconazole equivalents levels were found in liver and kidney and the compound was metabolised extensively in the goat (Table 2). With the exception of liver, only low amounts of the parent compound were detected in the edible tissues and milk. The predominant residues in all cases were the conjugates of tebuconazole-1-hydroxy (M03-conjugates), representing 92.8% TRR in kidney. Tebuconazole-1-hydroxy accounted for 21.4% TRR in muscle. Unextracted residues accounted for a maximum of 6.9% TRR in milk (< 0.01 mg/kg).

Table 2 Quantitative distribution of metabolites in the edible tissues and in milk after administration of [phenyl-UL-^{14}C]tebuconazole to a lactating goat

	Liver		Kidney		Fat		Muscle		Milk	
Metabolite	% TRR [a]	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/L
Tebuconazole	12.4	0.64	2.5	0.10	9.5	0.01	---	---	13.6	< 0.01
M03	15.3	0.79	2.3	0.09	12.5	0.02	21.4	0.01	22.2	0.01
M03-conjugates	67.9	3.52	92.8	3.68	68.1	0.10	67.6	0.03	49.4	0.02
MeOH reflux	1.8	0.09	1.8	0.07	7.0	0.01	11.0	< 0.01	7.9	< 0.01
Not extracted	2.6	0.14	0.6	0.02	3.0	0.01	---	---	6.9	< 0.01
Total	100	5.19	100	3.96	100	0.15	100	0.05	100	0.04

[a] TRR= total recovered residues; M03= tebuconazole-1-hydroxy

Two non-pregnant lactating goats (*Capra hircus*, alpine × nubian cross, weight 26.3 kg and 30.8 kg, respectively) were orally dosed with [triazole-3,5-^{14}C]tebuconazole (16.0 mCi/mmole) in gelatine capsules at a rate of 3.0 mg/kg bw for 3 consecutive days (Beedle and Ying, 2002). Each animal was milked twice daily, once approximately 30 minutes before dosing and again 5 to 12 hours after dosing. The goats were sacrificed approximately two hours after the third dose. Milk from the afternoon and the following day were combined to form one sample. Fat (composite of omental, renal, subcutaneous), kidney (both), liver (entire), and muscle (composite of loin, round, and flank) were collected. Analogue tissues from the two animals were combined, homogenized and frozen for analysis. Aliquots of milk and tissues were radioassayed by incineration and LSC.

Tissue samples were extracted with methanol and cleaned up in a C-18 solid phase extraction (SPE). A component from the extract was isolated by HPLC, hydrolysed with hydrochloric acid and the reaction product extracted with ethyl acetate. Another component was subjected to enzymatic hydrolysis. Fat samples were extracted with n-hexane, the extracts partitioned with acetonitrile and processed in C-18 SPE; the hexane extracted solids were extracted with methanol. Aliquots of day-1 milk were blended with methanol, homogenized and centrifuged. Sample extracts were analysed by HPLC/radioactivity, TLC/phosphor imager and LC-MS/MS (positive electrospray).

The distribution of radioactivity among metabolites in the edible tissues and in milk is summarized in Table 3. Residues of unchanged parent were highest in fat and liver, with 18% and 15%, respectively of the total radioactive residues (TRR). The main metabolites are tebuconazole-1-OH-glucuronide (M11) and tebuconazole-glucuronide (M34), the latter formed by esterification of the hydroxy group of the parent with glucuronic acid and only found in kidney and liver. Milk contained also a polar component (# 1) with 12% of the TRR (0.001 mg/L). As this component has chromatographic properties similar to those of 1,2,4-Triazole , its concentration was re-calculated to be 0.25 µg/L considering the molecular masses of parent and 1,2,4-Triazole (M26).

Table 3 Quantitative distribution of metabolites in the edible tissues and in milk after administration of [triazole-3,5-^{14}C]tebuconazole to a lactating goat

	Liver		Kidney		Fat		Muscle		Milk [b]	
Metabolite	% TRR [a]	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/L
Tebuconazole	15	0.28	3	0.07	18	0.02	5	0.001	7	0.001
M11	55	1.05	54	1.09	63	0.06	77	0.021	46	0.005
M34	17	0.33	36	0.72						
Total identified	87	1.66	93	1.88	81	0.08	82	0.022	53	0.006
Not identified	#1: 5	0.1	#1: 5	0.09	#1: 4	< 0.01	#1: 2	< 0.001	#1: 12	0.001
Not identified	#5: < 1	< 0.01			#3: 2	< 0.01	#2: 2	< 0.001	#2: 6	0.001
Not identified	#6: 4	0.07			#4: 2	< 0.01	#3: 4	0.001	#3: 4	< 0.001
Not identified	#7: < 1	0.02			#6: 2	< 0.01			#4:3	< 0.001
Not identified									#7: 3	< 0.001
Not identified									#8:9	0.001
Hexane extract	--		--		7	0.007	--		--	
Acetonitrile partition of hexane extract	--		--		20	0.019	--		--	
MeOH extract	93	1.76	98	1.98	70	0.067	89	0.024	92	0.010
MeOH reflux	5	0.09	--		--		--		--	
Specified loss	1	0.02								
Not extracted	2	0.14	2	0.03	2	< 0.01	11	0.003	8	0.001
Total	100	1.90	100	2.01	100	0.095	100	0.027	100	0.011

[a] TRR= total radioactivity residues;

[b] Average of values for milk from day-1 (0.011 mg/kg) and day-2 (0.009 mg/kg), only milk from day-1 was processed, component #1 (in report coded as M1-1) had chromatographic properties similar to those of 1,2,4-Triazole (M26); M11= tebuconazole-1-OH-glucuronide; M34=tebuconazole-glucuronide

Poultry

The metabolism of [phenyl-UL-^{14}C]tebuconazole after oral administration was investigated in laying hens (5 animals) dosed with 10 mg/kg bw in gelatine capsules for three consecutive days (Lee *et al*., 1991). The animals were sacrificed 0.5 hours after the final dose, and tissue samples taken for

analysis. Eggs were sampled over the whole testing period. Samples of tissues and eggs were combusted, and the radioactivity of the trapped CO_2 measured by LSC. Metabolites were extracted from tissues and composite sample of eggs and metabolite identification was conducted by HPLC, TLC and mass spectral analysis. Quantification of metabolites was based on the recovered radioactivity only. No exact relationship between the percentages of metabolites and the TRR of the composite samples can be established from the report.

The mean TRR were higher in liver and kidney (Table 4). Tebuconazole was moderately metabolised in the hens. Unchanged parent compound amounted from 28.3 to 87.3% TRR. Tebuconazole-1-hydroxy (M03) was detected in all tissues and eggs and tebuconazole-carboxylic acid (M06) and tebuconazole-1-hydroxysulfate (M10) were only detected in liver and kidney.

Table 4 Quantitative distribution of metabolites in the edible tissues and eggs after administration of [phenyl-UL-^{14}C]tebuconazole to laying hens in% of the recovered radioactivity (%TRR)

Metabolite	Liver	Kidney	Gizzard	Heart	Fat	Skin	Muscle	Eggs
TRR [mg/kg] [a]	8.29	6.42	2.09	1.77	1.27	0.50	0.44	0.15
Tebuconazole	33.0	42.3	87.3	64.2	75.4	69.0	61.4	28.3
M03	21.9	9.5	8.4	26.8	10.3	19.2	29.4	56.5
M06	12.6	23.1	---	---	---	---	---	---
M10	21.2	12.8	---	---	---	---	---	---
Unknown 1–3	---	---	---	---	4.7	5.2	4.5	8.1
Sum identified	88.7	87.7	95.7	91.0	85.7	88.2	90.8	84.8
Unidentified	---	---	---	---	4.7	5.2	4.5	8.1
Origin	7.1	9.1	0.3	0.4	0.2	0.5	0.2	---
Hexane-soluble	---	---	0.2	0.5	6.8	4.6	1.8	---
Water-soluble	---	---	1.6	4.4	---	---	1.4	---
Unextracted	4.2	3.2	na	3.7	2.7	1.5	1.4	1.8
Total% recovered	100	100	97.8	100	100	100	100	100

[a] Arithmetic mean of 5 individual samples. M03= tebuconazole-1-hydroxy; M06= tebuconazole-carboxylic acid; M10= tebuconazole-1-hydroxysulfate

The absorption, distribution and metabolism of [phenyl-UL-^{14}C]tebuconazole were investigated in laying hens by Ecker and Weber (1991). A dose of 10 mg/kg body weight (corresponding to a dietary burden of approx. 100 mg/kg feed) was administered orally as a suspension in 0.5% aqueous gum tragacanth via gavage to laying hens (approx. 1.5 kg bw at first dosing) on three consecutive days. The hens were sacrificed approximately 3.5 h after the final dosage. Samples of tissues and eggs were combusted and the radioactivity of the trapped CO_2 measured by LSC. Metabolites were extracted from the edible tissues and eggs, the extracts were radioassayed and metabolite identification made by HPLC and by NMR-spectroscopic techniques.

A total of 84.2% of the administered dose was recovered during the experiment, from which 80.3% in the excreta (mainly with the biliary-faecal fraction), 3.6% in tissues and organs and 0.30% in eggs. The plasma curve showed a broad maximum with a peak level of 1.87 µg/mL at 3 hours after the third application. Radioactivity was eliminated from the plasma with a terminal half-life of about 4.8 hours for the time period from 8 to 24 hours after the last administration. Twenty-four hours after the last administration, the plasma concentration had declined to a mean value of 0.042 µg/mL.

The highest TRR were found in liver and kidney (Table 5). In liver and kidney, the parent compound accounted for about 4 and 2% of TRR, respectively, with tebuconazole 1-hydroxysulfate (M10) being the main metabolite found. Unchanged parent compound amounted to 30% TRR in muscle and 52.9%TRR in eggs, with tebuconazole-1-hydroxy (M03) being the major residue.

Table 5 Quantitative distribution of metabolites in the edible tissues and eggs after administration of [phenyl-UL-^{14}C]tebuconazole to laying hens

Metabolite	Muscle				Fat		Skin		Liver		Kidney		Egg	
	breast		thigh											
	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
Tebuconazole	19.2	0.08	37.6	0.20	110.7	4.94	81.6	1.26	3.8	0.44	2.1	0.21	52.9	0.45
M03	22.2	0.09	27.4	0.15	6.0	0.27	14.7	0.23	6.5	0.76	2.5	0.25	31.6	0.27
M06	---	---	---	---	---	---	5.9	0.09	9.5	1.10	23.5	2.38	---	---
M10	9.7	0.04	3.7	0.02	---	---	---	---	67.0	7.79	45.2	4.58	4.5	0.04
Unknown 1	---	---	---	---	---	---	---	---	---	---	3.7	0.37	---	---
Unknown 2	---	---	---	---	---	---	---	---	---	---	7.3	0.74	---	---
Unknown 3	10.6	0.04	6.3	0.03	---	---	---	---	4.9	0.57	---	---	---	---
Unknown 4	---	---	---	---	---	---	---	---	---	---	2.3	0.23	---	---
Unknown 5	---	---	4.1	0.02	---	---	---	---	---	---	---	---	---	---
Unknown 6	---	---	5.9	0.03	---	---	---	---	---	---	---	---	---	---
Conjugates	25.7	0.10	14.6	0.08	---	---	---	---	---	---	---	---	---	---
Unidentified	10.6	0.04	16.3	0.09	---	---	---	---	4.9	0.57	13.3	1.34	---	---
Not analysed	0.1	< 0.01	1.2	< 0.01	0.7	0.03	---	---	---	---	---	---	---	---
Extracted	87.5	0.35	100.8	0.53	117.4	5.23	102.3	1.58	91.7	10.66	87.0	8.76	89.0	0.76
Unextracted	4.0	0.02	3.0	0.02	0.5	0.02	2.0	0.03	1.7	0.20	2.9	0.29	16.0	0.14
Total recov.[a]	91.5	0.37	103.8	0.55	117.9	5.25	104.3	1.61	93.4	10.86	88.5	9.05	105.0	0.90

[a] Arithmetic mean of 5 individual samples; M03= tebuconazole-1-hydroxy; M06= tebuconazole-carboxylic acid; M10= tebuconazole-1-hydroxysulfate

Ten leghorn laying hens, average weight 1.55 kg, were dosed orally via capsules using a pilling gun with [triazole-3,5-$^{14}C_2$]tebuconazole (19.4 mCi/mmole) at a rate of 2.0 mg/kg bw (equivalent to 30 mg/kg in the feed) on each of 3 consecutive days (Beedle and Ying, 2002). The animals were sacrificed approximately 30 minutes after the third dose. The eggs collected on each of the three days had the shells removed and discarded, and the content of the eggs were composited and weighed. The corresponding tissues from all animals were composited, frozen and homogenized using dry ice and stored frozen. Aliquots of the tissues and eggs were radioassayed, aliquots of liver and muscle were extracted with methanol and cleaned-up in C-18 SPE; dried solids were radioassayed. In liver, a component (L-1) was separated by semi-prep. HPLC, hydrolysed with hydrochloric acid and the reaction product partitioned with ethyl acetate; another component (L-2) was subjected to enzymatic hydrolysis (ß-glucuronidase incubated for 16 h. at 37 °C. Fat and egg were extracted with hexane, partitioned against acetonitrile following by C-18 SPE. A polar component from the egg and fat acetonitrile phases were isolated by C-18 and cation exchange chromatography and derivatised with dansyl chloride. Distribution of radioactivity was investigated on TLC and LC/MS was performed for confirmation of chemical identity of metabolites using an electrospray interface.

The residues found in tissues and eggs are summarised in Table 6. TRR was higher in liver (3.72 mg/kg tebuconazole equ.) and it ranged from 0.037 to 0.162 mg/kg in eggs. Between 72 and 95% of the TRR were identified. The major radioactive residue in all tissues, except liver, was tebuconazole. Major metabolites included oxidation products of tebuconazole, tebuconazole-hydroxy (*M03*) and tebuconazole-carboxylic acid (*M06*). Glucuronic acid and sulfate conjugates of these metabolites were also identified. A polar substance, presumably 1,2,4-Triazole (*M26*), was detected as a minor component (11–14% of the TRR) in muscle and eggs.

Table 6 Quantitative distribution of metabolites in the edible tissues and eggs after administration of [triazole-3,5-$^{14}C_2$]tebuconazole to laying hens at 30 ppm

Metabolite	Liver		Fat		Muscle		Egg –day-1		Egg –day-2		Egg –day-3	
	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
TRR(mg/kg)	3.72		0.295		0.179		0.037		0.162		0.150	
Tebuconazole	16.3	0.606	65.4	0.193	53.4	0.096	42.1	0.016	38.6	0.062	31.4	0.047
M03	19	0.706	21.1	0.062	24.9	0.045	32.9	0.012	32.1	0.052	27.3	0.041
M06	22.4	0.833										
M11	3.5	0.130										

Metabolite	Liver		Fat		Muscle		Egg –day-1		Egg –day-2		Egg –day-3	
	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
M37	7.4	0.276										
M26					11.2	0.020	13	0.005	14.1	0.023	13.9	0.021
M10	26.4	0.982										
Unknown 1	1.7	0.065	1.2	0.003	1.5	0.003	6.1	0.002	1.8	0.003	2.1	0.003
Unknown 2	2	0.073	2.6	0.008	1	0.002	2	0.001	3.4	0.006	10.9	0.016
			2.2	0.006	2.1	0.004			8.3	0.013	7.7	0.012
			3.6	0.011	3.5	0.006					1.6	0.002
Unidentified	4		10		9		8		13		2 25	0.003
Not analysed	--		3				2		1		1	
Extracted	99		99		98		98		97		98	
Unextracted	1		1		2		2		2		2	
Total recovered	100		100		100		100		100		100	

M03 = tebuconazole-1-hydroxy; M06:tebuconazole-carboxylic acid,M11:tebuconazole-1-OH-glucuronide;
M37:tebuconazole- carboxylic acid glucuronide; M26= 1,2,4-Triazole ; M10= tebuconazole-1-hydroxysulfate

Figure 1 shows a proposed metabolic pathway of tebuconazole in goat and hens

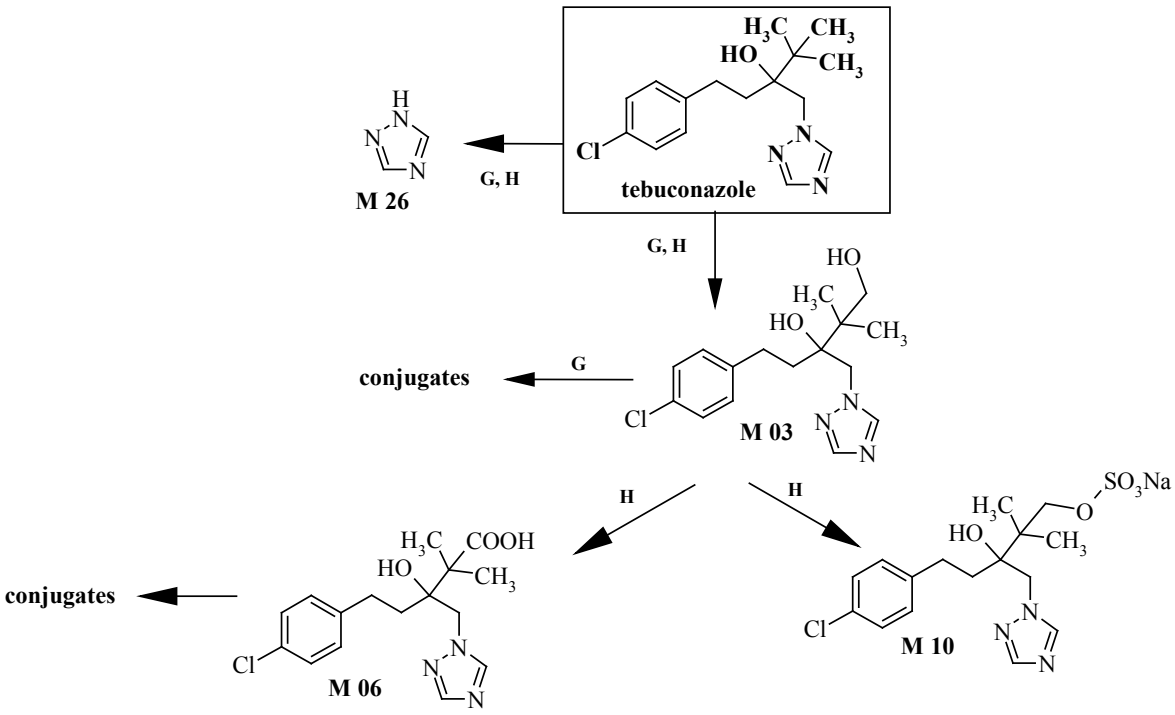


Figure 1 Proposed metabolic (biotransformation) pathway of tebuconazole in livestock (lactating goat and laying hen). G: goat, H: hen. M03: tebuconazole-1-hydroxy; M06: tebuconazole-carboxylic acid; M10:tebuconazole-1-hydroxysulfate; M26:1,2,4-Triazole

Plant metabolism

Wheat

The translocation and metabolism of [triazole-3,5-^{14}C]tebuconazole was investigated in wheat after seed treatment (Leimkuehler *et al*., 1985). The test compound was applied in an acetone solution to wheat seeds at a rate of approximately 11 g/100 kg seed. The seeds were planted in a sandy loam at a planting rate of approximately 70 kg seed/ha (40 seeds per testing area) and the wheat grown to maturity in a greenhouse. Samples of green forage were taken at the boot stage of growth (38 days after planting), and grain and straw were harvested at the time of maturity (66 days after planting).

Additionally, samples of soil were taken. Aliquots of soil, green forage, grain, straw, roots, and chaff were assayed for radioactive residues by combustion; the radioactivity of the trapped carbon dioxide was measured by liquid scintillation counting. Straw and roots were homogenised and extracted with suitable organic solvents; the remaining filter cake was subjected to hydrolysis with enzymes and acid reflux. The identification and quantification of tebuconazole and its metabolites was achieved by TLC and HPLC.

Residues of tebuconazole, calculated as parent compound equivalents, are shown in Table 7. Straw contained the highest percentage of the applied radioactivity in the plant. About 11% of the applied radioactivity was translocated from the treated seeds to green forage. Further growth of the wheat resulted in translocation of an additional 13% of the applied radioactivity for a total uptake of about 24% in mature wheat.

Table 7 Residues in wheat and soil after seed treatment with [triazole-3,5-^{14}C]tebuconazole

Commodity	Weight at sampling, kg	TRR, mg/kg tebuconazole equiv.	µg, tebuconazole equiv.	% of dose [a]
Green forage	0.09	0.030	2.7	1.6 [b]/10.7[c]
Mature wheat				24
Straw	0.29	0.100	29.0	17.1
Grain	0.20	0.020	4.0	2.4
Chaff	0.08	0.040	1.6	0.9
Roots	0.04	0.160	6.4	3.8
Soil	20.80	0.006	124.8	73.4
Total	---	---	168.5	99.1

[a] based on the total applied (170 µg); [b] sampling of 6 plants weighted to represent 40 plants; [c] in 40 plants

Most of the radioactivity was found in the organic extracts from straw and roots, with tebuconazole accounting for 25.0% of the radioactivity in straw and 76.0% in roots (Table 8). Tebuconazole-1-hydroxy (M03) was identified in straw. Treatment of a polar component with glucosidase released some free tebuconazole-1-hydroxy, characterising it as a glucoside conjugate. Four minor substances, amounting between 0.3 and 5.4% of the organo-soluble radioactivity in roots, remained unidentified.

Table 8 Distribution of active substance and metabolites in wheat after seed treatment with [triazole-3,5-^{14}C]tebuconazole in% of the organo-soluble residues

Metabolite	Straw % of organo-soluble	Roots % of organo-soluble
Tebuconazole	25.0	76.0
M03	14.5	---
Unknown 1	---	5.4
Unknown 2	---	1.0
Unknown 3	---	3.8
Unknown 4	---	0.3
Origin	14.5	13.5
Total	54.0	100.0

M03: tebuconazole-1-hydroxy

The metabolism of [triazole-3,5-^{14}C]tebuconazole was investigated in wheat after spray application during the boot stage of growth at a rate of 0.5 kg ai/ha, corresponding to the 2-fold single field rate (Leimkuehler *et al*., 1987). The plants were grown to maturity in a greenhouse and samples of green forage taken from 0 to 28 days after treatment. The sample taken at harvest (50 days after treatment) was divided into straw, chaff, and grain. Aliquots of green forage, grain, straw, and chaff were assayed for radioactive residues by combustion, measuring the trapped CO_2 by LSC. Green forage, straw, and chaff were homogenised and extracted with methanol. Wheat grain was extracted with methanol and subsequently partitioned between dichloromethane/acetonitrile. The filter cake was refluxed in 1N HCl, and the radioactivity released was combined with the water-soluble radioactivity

from the methanol extract. An additional grain sample was divided into starch, gluten, and hulls for analysis. The identification and quantification of tebuconazole and its metabolites was achieved by TLC, HPLC and GC/MS).

The total radioactive residue (TRR) in green forage amounted from 9.8 to 28.0 mg/kg over the whole sampling period (Table 9). Unchanged parent compound was always the predominant residue; bound residues increased over time to 3.3% of the TRR at day 28 after treatment.

Table 9 Residues in wheat green forage after spray application of [triazole-3,5-^{14}C]tebuconazole

	Days post treatment									
	0		7		14		21		28	
Compound	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
TRR (mg/kg)	28.0		17.0		16.3		9.8		20.0	
Tebuconazole	89.1	24.9	92.9	15.8	89.1	14.5	122.9	12.0	87.3	17.5
Origin	1.4	0.4	1.8	0.31	2.3	0.37	5.0	0.49	5.1	1.0
Bound residues	0.16	0.04	1.0	0.17	1.7	0.28	4.0	0.39	3.3	0.66
Total recovery	90.6	25.4	95.8	16.3	93.1	15.2	131.9 [a]	12.9	95.7	19.1

[a] exaggerated recovery claimed to be due to sample inhomogeneity.

At maturity most of the radioactivity was found in the wheat straw (Table 10). The radioactivity in the mature grain represented 1.2% of the TRR in the whole-wheat plant and tebuconazole accounted for 6.0% TRR, while the major component was identified as triazole alanine (M20). Analysis of the different wheat grain fractions revealed that the major part of the TRR (74.0% of the recovered radioactivity) was in starch, followed by the gluten (14%) and the hulls (12%).

Table 10 Residues in mature wheat (50 days post-treatment) after [triazole-3,5-^{14}C]tebuconazole application

	Straw		Chaff		Grain	
Compound	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg
TRR (%)	37.0		3.8		0.5	
Tebuconazole	95.1	35.2	69.6	2.6	6.0	0.03
M20	---	---	---	---	80.0	0.40
M30	---	---	---	---	13.0	0.07
Origin	5.6	2.1	11.1	0.42	---	---
Bound residues	5.0	1.9	44.0	1.7	1.0	< 0.01[a]
Total recovery	105.7	39.1	124.5	4.7	100.0	0.5

[a] after refluxing with 1N HCl; M20= triazole alanine; M30= triazole acetic acid

Peanuts

The metabolism of [triazole-3,5-^{14}C]tebuconazole was investigated in peanuts following 3 spray applications of 0.25 kg ai/ha (corresponding to the maximum field rate) at 14 day intervals (Smyser and Halpin, 1990). The plants were grown to maturity in a greenhouse, harvested 7 weeks after the last application and divided into foliage, immature nuts, and mature nuts. Samples were assayed for radioactive residues by combustion; radioactivity of the trapped CO_2 was measured by LSC. Peanut meal was extracted with hexane, the defatted meal extracted with methanol and methanol:water and the remaining solids refluxed with 1N HCl. The combined filtrates were concentrated to water, and partitioned into chloroform. The aqueous phase was applied to an activated Baker cartridge and eluted with water and methanol. Peanut shells were extracted according to the peanut meal method subsequent to the hexane extraction. The residue from the aqueous methanol reflux was refluxed again with 6N HCl. Foliage was extracted according to the peanut meal method subsequent to the hexane extraction, the aqueous phase applied to a silica RP-2 column and the eluted refluxed with 1N HCl. The identification and quantification of tebuconazole and its metabolites was achieved by TLC, HPLC and GC/MS.

Foliage had the highest residue level, followed by the nuts and shells (Table 11). The major residue was tebuconazole found in the foliage and to a lesser extent in the shells. Release of

tebuconazole-1-hydroxy (M03) after refluxing with 1N HCl indicated conjugation in foliage and shells. Triazole alanine (M20), triazole lactic acid (M21), and 1,2,4-Triazole (M26) were identified in the nuts (aqueous phase). Actual residue levels of these compounds based on their molecular weight were 0.33 mg/kg (triazole alanine), 0.06 mg/kg (triazole lactic acid), and 0.03 mg/kg (1,2,4-Triazole).

Table 11 Distribution of active substance and metabolites in peanuts after spray application of [triazole-3,5-^{14}C]tebuconazole

Commodity	Foliage		Nuts		Shells	
Metabolite	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR
TRR (mg/kg)	29.2		1.19		0.16	
Tebuconazole	17.6	60.3	---	---	0.03	16.6
M03	4.6	15.6	---	---	0.006	3.6
M20	---	---	0.64	54.1	0.004	2.8
M21	---	---	0.12	9.9	---	---
M26	---	---	0.12	10.5	---	---
Total identified	22.2	75.9	0.88	74.5	0.04	23.0
Other / diffuse [a]	4.1	14.1	0.37	31.3	0.03	20.0
Aqueous unidentified	1.9	6.6	---	---	0.05	33.1 [2]
Organic unidentified	---	---	0.02	1.7	---	---
Reflux released unidentified	---	---	0.10	8.3	0.01	9.1
Total unidentified	6.0	20.7	0.49	41.3	0.10	62.2
not extracted / bound	1.9	6.6	0.008	0.7	0.03	21.2
total	30.1	103.2	1.39	116.5	0.17	106.3

[a] Includes TLC origin, radioactivity not in discrete fractions and clean-up losses. [2] Includes wash water from sample clean-up and diffuse radioactivity from HPLC run. M03= tebuconazole-1-hydroxy; M20= triazole alanine; M21= triazole lactic acid; M26=1,2,4-Triazole

Using the same study design as previously described, Smyser *et al*. (1989) investigated the metabolism of [phenyl-UL-^{14}C]tebuconazole in peanuts. Foliage had the highest residue level, followed by shells and nuts (Table 12). Tebuconazole-1-hydroxy was identified in foliage and shells. The lipid fraction of the nuts contained 39.5% TRR. Hydrolysis of the defatted meal with HCl released additional 43.4% TRR.

Table 12 Distribution of active substance and metabolites in peanuts after spray application of [phenyl-UL-^{14}C]tebuconazole

	Foliage		Nuts		Shells	
Metabolite	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR
TRR = mg/kg	22.6		0.09		0.27	
Tebuconazole	14.5	64.1	---	---	0.04	14.4
M03	3.2	14.2	---	---	0.01	3.5
Lipid fraction	---	---	0.04	39.5	---	---
1N HCl released	---	---	0.03	36.4	0.02	7.7
6N HCl released	---	---	0.006	7.0	0.01	5.4
Unknown A	---	---	---	---	0.007	2.5
Unknown B	---	---	---	---	0.004	1.4
Total identified	17.7	78.3	---	---	0.05	17.9
Other / diffuse [a]	4.3	19.0	---	---	0.03	12.6
Aqueous unidentified	0.97	4.3	---	---	0.05	17.6
Total unidentified	5.3	23.3	0.076	82.9	0.13	42.7
Not extracted / bound	1.3	5.9	0.003	2.9	0.07	25.6
Total recovery	24.3	107.6	0.08	85.8	0.25	90.8

M03= tebuconazole-1-hydroxy;

[a] Includes TLC origin, radioactivity not in discrete fractions and clean-up losses.

In another study, [Phenyl-UL-^{14}C]tebuconazole was applied seven times as a WG formulation to peanut plants at 0.6 kg ai/ha at 14 day intervals (Minor *et al*., 1991). The plants were grown under field conditions, moved into a greenhouse in the last phase of the study and harvested 14 weeks after the final application. Five soil core samples were taken and combined. Aliquots of forage, shells, and

kernels were assayed for radioactive residues by combustion and radioactivity of the trapped CO_2 measured by LSC. Soil was extracted with methanol:water under reflux, and partitioned with methylene chloride. Peanut forage and shells were extracted with methanol:water, and partitioned against ethyl acetate; the aqueous phase and the solids were submitted to acid hydrolysis. Peanut kernels were extracted with acetone:water and partitioned against methylene chloride; the aqueous fraction refluxed with 1N HCl and the solids extracted with hexane and partitioned with acetonitrile; the hexane phase was refluxed with KOH, partitioned with hexane, acidified and again partitioned with hexane; the solids were extracted with chloroform:methanol and subjected to acid hydrolysis. To characterize residues in peanut oil, kernels were refluxed overnight with hexane, the solids retained for acid hydrolysis and the hexane extract partitioned with acetonitrile; the hexane fraction was evaporated and the oily residue saponified with KOH; the hydrolysate was partitioned with hexane and back to acetonitrile; the solids were refluxed with HCl. The identification and quantification of tebuconazole and its metabolites was achieved by TLC, HPLC, GC/MS and LC/MS.

Table 13 shows the distribution of the radioactivity in peanut plant, with forage accounting for 98% TRR in the plant. Tebuconazole was the major residue found, in addition to tebuconazole-1-hydroxy (M03) and tebuconazole-m-hydroxy (M01).

Table 13 Distribution of active substance and metabolites in peanuts after spray application of [phenyl-UL-^{14}C]tebuconazole

	Foliage		Nuts		Shells	
Metabolite	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR
TRR	110	98	0.55	<1	17.7	2
Tebuconazole	77.0	70	0.11	19	10.2	58
M03	8.2	7.4			0.78	4.4
M01	1.3	1.2			0.2	1.1
Total identified	86.5	78.6	0.11	19	11.2	63
Organosoluble		13		9		10
aqueous		3		34		5
Lipid fraction				30		
Unextracted solids		6		8		22
Total extracted		100.6		100		100

M03: tebuconazole-1-hydroxy; M01: tebuconazole-m-hydroxy.

Grapes

The metabolism of [phenyl-UL-^{14}C]tebuconazole, formulated as a WP formulation, was investigated in protected grapes following one spray application at 0.280 kg ai/ha (Pither and Johnston, 1988). Samples of grapes were taken at 0 to 28 days after treatment, rinsed with ethanol:dichloromethane, homogenised in methanol and the residues separated using a water/dichloromethane partition. The solids remaining after extraction were refluxed in either methanol 1N HCl or 5% NaOH. Polar compounds suspected of being conjugates were treated with cellulase and β-glucosidase. The identification of tebuconazole and its metabolites was achieved by TLC, HPLC and spectroscopic methods.

TRR declined throughout the course of the study and the majority of the recovered residue (> 90% TRR) was identified as tebuconazole (Table 14). There was evidence of small amounts of cellulose conjugation, but no further metabolites were detected. Only small amounts of organo-soluble and water-soluble radioactivity remained unidentified.

Table 14 Distribution of active substance and radioactive fractions in grapes after spray application of [phenyl-UL-^{14}C]tebuconazole

Compound / fraction	0		3		7		14		21		28	
	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR	mg/kg	% TRR
Tebuconazole	6.84	99.1	7.86	99.5	3.90	97.6	6.39	95.4	2.75	91.8	2.11	91.9
Unidentified organo-soluble	0.06	0.8	---	---	---	---	---	---	0.03	1.1	0.01	0.5
Unidentified water-soluble	---	---	< 0.01	0.1	0.04	0.9	0.12	1.8 [1]	0.17	5.7	0.14	6.2
Unextractable (bound)	< 0.01	0.1	0.03	0.4	0.06	1.5	0.19	2.8	0.04	1.4	0.03	1.4
Total identified	6.84	99.1	7.86	99.5	3.90	97.6	6.39	95.4	2.75	91.8	2.11	91.9
Total recovery	6.9	100	7.9	100	4.0	100	6.7	100	3.0	100	2.3	100

The proposed metabolic pathway of tebuconazole in plants is given in Figure 2.

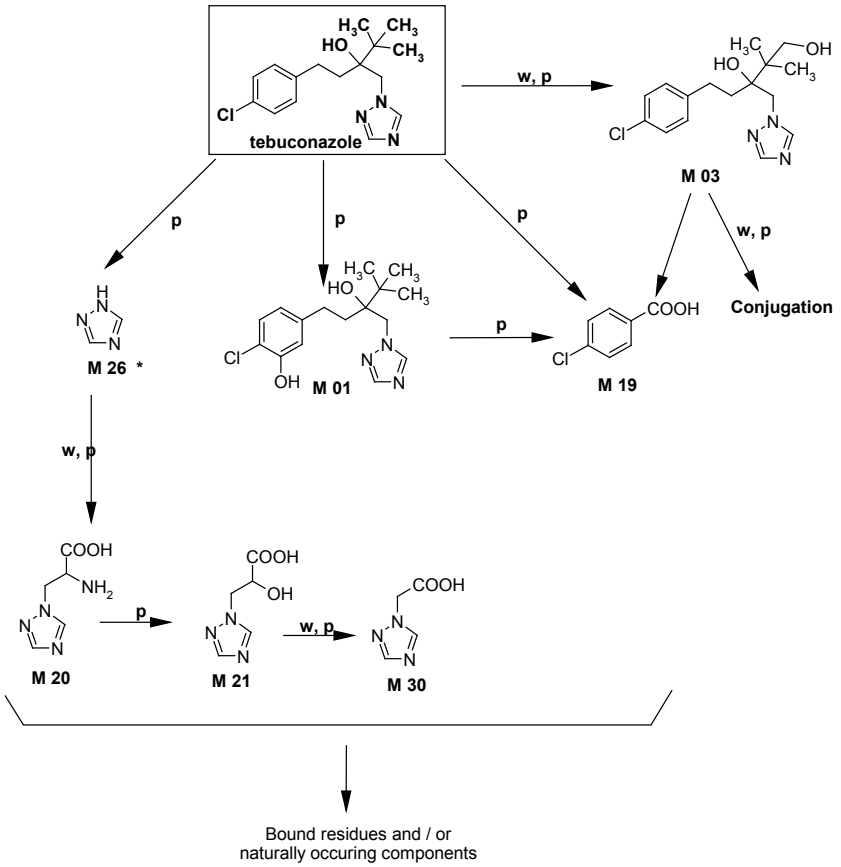


Figure 2 Proposed metabolic pathway of tebuconazole in plants. w = wheat, p = peanut, * postulated intermediate in wheat. M01: tebuconazole - m-hydroxy; M21:Triazole lactic acid; M03: tebuconazole-1-hydroxy; M26:1,2,4-Triazole; M19:4-Chlorobenzoic acid; M30:Triazole acetic acid; M20:Triazole alanine

Environmental fate in soil

Degradation under aerobic conditions

Lee and Hanna-Bey (1987) investigated the route of degradation of [phenyl-UL-^{14}C]tebuconazole and [triazole-UL-^{14}C]tebuconazole in sandy loam soil (organic matter: 1.8%, organic carbon 0.95%

sand 54%, silt 37%, clay 9.0% pH 4.5, particle density 2.6 g/mL) under laboratory conditions according to EPA Pesticide Assessment Guidelines. The application rate was 10 mg/kg, corresponding to 13 kg ai/ha or 35 times the approved maximum use rate, considering a soil depth of 5 cm and a soil particle density of 2.6 g/mL.

The test substance dissolved in acetone was applied to 50 g of soil in a series of incubation flasks. All incubation flasks were covered with aluminium foil to exclude light and maintained at 23 °C ± 2 throughout the study. The soil moisture content was maintained at 75% of 1/3 bar. Air was drawn through the system under slight vacuum. The air entered the system through a jar containing a layer of water in order to humidify it and to prevent drying of the soil. Each soil flask was connected to an effluent trap containing KOH-solution to absorb CO_2. Duplicate flasks containing treated soil were sampled periodically. Liquid samples were measured by LSC after extraction with an organic solvent. Soil samples were analysed by determining the radioactivity after drying and incinerating in a combustion automat. The bound residues from the last sampling interval were fractioned into humin, humic acid and fulvic acid. Measurements of tebuconazole and metabolites were performed by TLC/radiochromatographic scanning or by LSC or HPLC/UV. Aliquots of the $^{14}CO_2$- trapping solutions were radioassayed by LSC.

The data presented in Table 15 indicates a half-life of tebuconazole in [phenyl-UL-^{14}C]tebuconazole treated soil longer than 1 year. Degradation occurs principally by binding to the organic components of the soil, humin, humic acid and fulvic acid. Data from the [triazole-UL-^{14}C]tebuconazole treatment show similar behaviour, with $^{14}CO_2$ accounted for < 0.1% and tebuconazole accounting for 98.1, 89.4 and 85% of radioactivity after 30 and 58 days, respectively. Unextracted residues increase from 1.3% at day 0 to 14% of radioactivity at day 58.

Table 15 Distribution of radioactivity in aerobic soil after treatment with [phenyl-UL-^{14}C]tebuconazole [a]

Fraction	Day 0	Day 7	Day 14	Day 28	Day 56	Day 84	Day 112	6 months	12months
Volatile ^{14}C (CO_2)		0%	0%	0.1%	0.2%	0.4%	0.4%	0.7%	0.3%
Extractable									
Tebuconazole	98.3%	90.9%	88.7%	88.8%	83.9%	86.1%	82.0%	78.8%	67.4%
Unknown	-	-	-	-	-	-	-	2.6%	2.1%
TLC-origin (polar)	0.9%	0.5%	0.7%	0.4%	0.6%	0.9%	0.8%	0.9%	1.1%
Unextracted [b]	0.8%	8.6%	10.6%	10.7%	15.3%	12.6%	16.2%	17.0%	29.1%[2]
Fulvic acid fraction									7.1%
Humic acid fraction									9.9%
Humin									12.1%

[a] Values represent the mean of two replicate soil samples.

[b] Unextractable (bound residues) were fractionated using sodium hydroxide to dissolve fulvic and humic acid fractions and separate them from humin fraction. Humic acid fraction was separated from fulvic acid fraction by precipitation with hydrochloric acid at pH 1

Table 16 Application rates and incubation intervals in test system

Batch	1	2	3	4	5	6	7	8	9	10	11	12
Soil	Nisse (manure-treated) – silt loam, 22.1% sand, 58.1% silt, 19.8% clay; 0.8% OC, pH 6						Höfchen – silt, 20.5% sand, 78.3% silt, 1.2% clay; 2.6% OC, pH 5.4					
Radiolabel	phenyl	triazole	phenyl	triazole	phenyl	triazole	phenyl	triazole	phenyl	triazole	phenyl	triazole
Application of test substance per batch [mg/100g]												
Pre-treatment							3×1[a]	3×1[a]	3×1[a]	3×1[a]	3×1[a]	3×1[a]
Unlabelled	1	1	1	1	1	1	1	1	1	1	1	1
Labelled	0.096	0.112	0.096	0.112	0.096	0.112	0.096	0.112	0.096	0.112	0.096	0.112
Total	1.1	1.1	1.1	1.1	1.1	1.1	4.1	4.1	4.1	4.1	4.1	4.1
Rate g/ha [b]	825	825	825	825	825	825	3075	3075	3075	3075	3075	3075
Incubation period [d]	123	123	299	299	433	433	123 +66 [a]	123 +66 [a]	299 +66 [a]	299 +66 [a]	433 +66 [a]	433 +66 [a]

[a] soil was treated with 1 mg of tebuconazole per 100 g of soil at intervals of 4 weeks ending with the third application 10 days before test begin

[b] considering a soil layer of 5 cm and a soil density of 1.5 g/mL, the target application rate of 375 g/ha corresponds to 0.5 mg tebuconazole per kg soil.

The soil was transferred into centrifuge beakers and extracted in four steps with different solvents and mixtures of solvents including water, methanol, ethylacetate and ammonia solution. The extracts were combined, treated with water and extracted twice with chloroform. Soil extracts were applied to silica gel plates together with reference substances and visualized by autoradiography using an X-ray film.

Soil Höfchen showed a considerably lower degradation capacity. Relative to the applied amount of radioactive parent compound, 66–75% of unchanged parent compound were recovered after 123 days of incubation. In the case of soil Nisse the corresponding figures were 57% and 47%. 1,2,4-Triazole (M26) and possibly a mixture of Tebuconazole-5-keto (or its tautomer tebuconazole-5-enol) (M09 resp. M08) and tebuconazole-4-hydroxy (M05) were identified as soil metabolites. Total mineralization of the ^{14}C-radioactivity was more pronounced in the case of phenyl-labelling. The distribution of radioactivity is presented in Table 17.

Table 17 Distribution of radiocarbon in soil (in percent of applied radioactivity)

Distribution [%]	Batch no.											
	1	2	3	4	5	6	7	8	9	10	11	12
	Nisse (manure-treated)						Höfchen					
	phen	triaz	phen	triaz	phen	triaz	phen	triaz	phen	triaz	phen	triaz
$^{14}CO_2$	11.1	0.3	28.4	1.3	32.2	0.7	0.8	< 0.1	0.1	2.1	1.4	0.5
Extractable	62.2	67.9	43.6	57.0	34.2	52.7	81.1	76.7	82.6	76.9	79.4	73.4
Non-extractable	15.7	14.4	17.7	21.9	21.7	25.5	9.6	5.9	5.2	4.8	7.2	7.7
Total	89.0	82.6	89.7	80.1	88.1	78.9	91.5	82.6	87.9	83.8	88.0	81.6
Tebuconazole	56.8	54.6	36.7	43.7	29.6	41.9	75.0	66.3	74.1	66.1	69.3	61.9
Metabolites [a]	2.0	2.0	2.1	1.2	1.4	1.3	3.2	2.6	4.4	4.1	4.4	4.8
1,2,4-Triazole		5.9		2.8		3.8		< 0.1		0.1		< 0.1
Unknown	1.4	2.3	1.9	5.9	1.7	2.0	1.9	2.7	2.1	2.3	0.6	3.4

[a] possibly a mixture of Tebuconazole-5-keto, M09, (or its tautomer tebuconazole-5-enol, M08) and tebuconazole-4-hydroxy, M05, identity not confirmed by independent synthesis.

In a study conducted by Fritz and Brauner (1989), a total of 10 incubation vessels for the manure-treated soil Nisse were prepared using two test substances with labelling in the triazole and in the phenyl moiety, different incubation intervals and different application rates (Table 18). The experiments were conducted in a greenhouse and temporarily in glass-roofed open-air grounds. The calculated amount of test substance was suspended in 30 mL water, treated in an ultrasonic bath and added to 2.5 kg of the prepared moist soil in a mixing bowl. The soil sample was thoroughly mixed and placed on top of the sand bedding. In case of test variants 4, 5, 9 and 10 the 2.5 kg portion of soil was directly put on top of the quartz sand bedding before the test solution was uniformly applied onto the soil surface. Parts of the soils were kept under crop cover during the incubation interval. For this purpose, grass was sown after application. The batches were incubated in the greenhouse from November to March and in the glass-covered open-air grounds from April to October. The temperature in the greenhouse was ≥ 16 °C. Additional lighting was installed to support crop growth. Soil moisture was controlled by water filter candles installed in the soil and connected to a reservoir of water. Gras was cut, dried and stored in a freezer until processing.

Table 18 Application rates and incubation intervals in test system 2 (manure-treated soil Nisse)

Batch No.	1	2	3	4	5	6	7	8	9	10
Radiolabelled	phenyl					triazole				
Used [mg/2.5kg]	0.51	0.69	0.71	0.69	0.69	0.54	1.16	1.10	1.16	1.16
Unlabelled used [mg/2.5kg]	--	4.41	19..41	4.41	4.41	--	4.22	19.22	4.22	4.22
Total used [mg/2.5kg]	0.51	5.1	20.12	5.1	5.1	0.54	5.38	20.32	5.38	5.38
Multiple of 375g/ha [a]	0.4×	4×	16×	4×	4×	0.4×	4×	16×	4×	4×
Grass cover	yes	no	yes	yes	no	yes	no	yes	yes	no
Application type	incorporated	incorporated	incorporated	on surface	on surface	incorporated	incorporated	incorporated	on surface	on surface
Incubation period [d]	291	372	329	393	374	299	318	378	337	325

[a] considering a soil layer of 5 cm and a soil density of 1.5 g/mL, the target application rate of 375 g/ha corresponds to 0.5 mg tebuconazole per kg soil

The soil was extracted in several steps using water, methanol and ammonia (in the case of Trials 1 and 6 using ethylacetate instead of ammonia), combined and re-extracted with chloroform. The cut grass and the roots where extracted (Trials 1 and 6) or treated with liquid nitrogen, homogenized in an Ultra-Turrax and extracted. Extracts were investigated by TLC. Unextracted radioactivity was determined by LSC after combustion in an oxidizer. Radioactivity present in the extracted soil and in solid residues from the processing was measured by LSC after combustion in an oxidizer.

Table 19 shows that increasing rates of application led to lower rates of degradation. When the test substance was applied at 0.4 fold of the target use of 375 g/ha and distributed in the soil (Trials 1 and 6) only 2 to 3% of parent could be detected after an incubation interval of 291 to 299 days. Under otherwise identical conditions, 21 to 26% of parent were found in the soil at the 12 to 13 fold of the target after a period of 329 to 378 days (Trials 3 and 8). Comparison of the results from Trials 2 and 7 with incubation in uncropped soil with those from batches 5 and 10 in cropped soil shows the stimulating effect of vegetation on degradation.

Table 19 Distribution of radiocarbon in soil, roots and grass (in percent of applied radioactivity)

Distribution	Batch no.									
	1	2	3	4	5	6	7	8	9	10
[%]	phenyl					triazole				
Grass (extract + non-extracted)	2.4	-	5.8	13.9	-	30.8	-	33.2	23.8	-
Roots (extract + non-extracted)	1.4	-	3.8	5.8	-	4.6	-	2.6	7.8	-
Soil non-extracted	36.5	30.5	21.4	23.5	26.6	51.7	47.3	23.7	22.4	37.3
Soil extracted	4.1	11.4	36.3	23.4	43.0	10.6	28.4	30.4	28.3	51.8
Total [a]	44.4	41.9	67.3	66.6	69.6	97.7	75.7	89.9	82.3	89.1
Tebuconazole	2.3	6.1	26.0	14.1	20.8	2.6	9.0	21.0	15.3	28.9
1,2,4-Triazole (M26)						4.5	9.0	0.9	4.0	7.1
Metabolites [b]	0.5	1.6	5.3	3.6	7.5	0.4	2.1	5.3	3.4	4.3
Triazole-pinacoline [c]									0.6	0.4
HWG1608-lactone (M17)										0.1
unknown	1.1	1.3	4.8	2.7	9.0	2.0	5.5	3.0	5.0	5.6
losses at processing	0.2	2.4	0.2	3.0	5.7	1.1	2.8	0.2		5.4

[a] recovery of radioactivity not necessarily 100% because test system is not closed to the atmosphere

[b] possibly a mixture of tebuconazole -5-keto (or its tautomer tebuconazole-5-enol) (M09 resp. M08) and tebuconazole-4-hydroxy (M05)

[c] tebuconazole-triazole-pinacoline (M18)

Experiment on the degradation of tebuconazole on soil surfaces left in natural condition, under the influence of artificial and natural light was conducted by Fritz & Brauner (1989) using [triazole-UL-^{14}C]tebuconazole and unlabelled tebuconazole in sandy loam (BBA 2.2, Speyer, Germany) and silt soil (Höfchen, Germany). The conditions of the experiments are shown in Table 20.

Table 20 Application rates and incubation with UL-^{14}C-triazole-tebuconazole

Soil	Speyer BBA 2.2	Höfchen
Amount of soil	450 g	907 g
Amount of unlabelled substance	0.625 mg	1.470 mg
Amount of labelled substance	1.944 mg	1.690 mg
Total amount	2.569 mg	3.160 mg
Rate [a]	4.3 kg/ha	2.6 kg/ha
Application type	mixing	
Incubation period [d]	67 / 73	86
Incubation type	treated soil was spread out as a thin layer on a 30 × 30cm aluminium foil, covered by quartz glass, sporadically moistened and exposed to natural light	

[a] considering a soil layer of 5 cm and a soil density of 1.5 g/mL, the target use of 375 g/ha corresponds to 0.5 mg tebuconazole per kg of soil. Rates are highly exaggerated in order to yield degradates at measurable concentrations

Soils were extracted in water and organic solvents and the extracts analysed by TLC and measured by LSC after combustion; 67.8 and 77.7% of the applied radioactivity was extracted from the Speyer and Höfchen soil, respectively, after an incubation interval of 70 or 86 days; 14.1% and 12.5%, respectively were found to be non-extracted. Losses accounted for 8.1% or 9.8%, respectively, probably due to mineralization to carbon dioxide.

Several metabolites were isolated from the TLC plates, whose chemical structure was elucidated by GC/MS, TLC and or NMR: 1,2,4-Triazole (M26), tebuconazole-5-enol (M08), Tebuconazole-5-keto (M09), tebuconazole-4-hydroxy (M05), tebuconazole-triazole-pinacoline (M18), tebuconazole-lactone (M17), tebuconazole-desbutyl (M15) and tebuconazole-keto-desbutyl (M16). The proposed metabolic pathway of tebuconazole in soil shown in Figure 4.

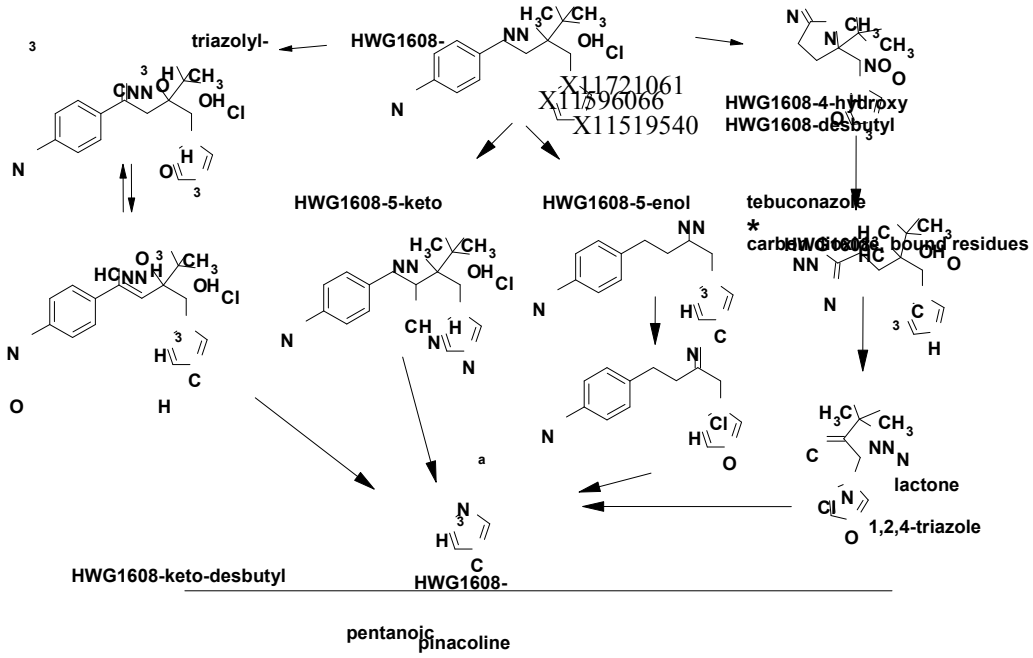


Figure 4 Metabolic pathway for the aerobic degradation in soil of tebuconazole

[a] no conclusive spectroscopic evidence whether tebuconazole-5-enol (*M08*) or its tautomer Tebuconazole-5-keto *(M09*) is formed

[b]hydrolysis of tebuconazole-lactone (*M17*) to tebuconazole-pentanoic acid (*M25*) occurrs at higher pH values. Tebuconazole-pentanoic acid was identified in natural water under light exposure

Degradation in soil – field studies

Seven soil dissipation studies with tebuconazole carried out in Europe were submitted and are summarize in Table 21.

Table 21 Dissipation of tebuconazole in field studies conducted in Europe

Test site	Soil	pH/Org. C (%)	Soil surface or crop	kg ai/ha	Samples/data points	DT_{50}, days[a]	Correlation coefficient R^2	Reference
Germany	loamy sand	6.7	Bare	0.375	24/22	91.6	64.1%	Anon. 1989
Italy	weak loamy sand	7.7/0.38	Bare	0.3	18/18	34.5	92.1%	Sommer, 1997
France	loamy silt	7.7/0.71	bare	0.3	22/22	19.9	97.6%	
UK	sandy clay loam	7.6/1.3	spring barley grass	0.4	22/10	77	94%	Schramel, 2001
France	silt sand	7.0/1.1	spring barley grass	0.4	20/9	57	98%	
Germany	silt loam	6.4/0.8	Spring barley grass	0.4	20/9	36	94%	
Germany	sandy loam	6.5/1.2	Spring barley grass	0.4	22/10	58	88%	

[a] calculated according to non-linear first-order kinetics

Soil dissipation studies with tebuconazole were carried out under field conditions in North America at different soil types, location and application rates (Table 22). DT_{50} ranged from 8 to 912 days.

Table 22 Characteristics of test sites and application in USA and Canada

Test site	Soil type (0–15 cm)	pH value/ org. C [%]	Particle < 2 µ,%	kg ai/ha	DT_{50}, days	Correlation coefficient R^2	Reference/ Report
USA, Indiana	sandy loam	5.6/0.35	74.0	1.751	45.5	0.9941	Pither, 1988 MR96779
USA, Texas	sandy clay loam	7.8/0.52	62.0		167	0.4017	
USA, Kansas	silty clay	5.0/1.04	4.0		161	0.7042	
USA, Florida	sand	6.3/0.58	92.0		91.0	0.8103	
USA, Minnesota	sandy loam	7.8/2.03	69	5.604	8[a]	0.836	Denhart *et al*., 1993a; MR103240
					461[b]	0.2629	Kelley and Clay, 1997; MR103240-4
USA, California	sandy loam	6.7/0.35	58	5.604	101.4/275.4[c]	0.7499/ 0.3153[3]	Denhart *et al*., 1993b; MR103242
USA, Georgia	sand	7.0/0.52	90.7	3 x 0.280, 1 x 0.673	349.4	0.852	Veladez *et al*., 1994a; MR106446
USA, North Carolina	sand	5.2/0.46	94.7	2 x 0.280, 1 x 0.538, 1 x 0.773	178.8	0.915	Veladez *et al*., 1994b; MR106447
USA, North Carolina	sand	5.2/0.46	94.7	2 x 0.852, 1 x 0.841	330	0.583	
USA, California	sandy loam	7.8/0.16	53.2	0.139, 2 x 0.231, 0.191, 0.177, 2 x 0.168, 0.127	177	0.86	McKelvey *et al*., 1996a; BR106956
USA, California	sandy loam	6.0/0.67	71.2	8 x 0.139	857	0.49	McKelvey *et al*., 1996b; BR106957
USA, Wisconsin	sandy loam	5.5/0.53	77.2	0.841, 1.682, 0.841	216.3	0.929	Nonne *et al*., 1996; BR107332
USA, New York	loamy sand	6.4/2.05	78.8	3 x 1.491, 0.762	> 650	0.1344	Wood, 1999; 107910
Canada, Ontario	loam	7.1/2.09	40.0	0.250	51	0.95936	Pither *et al*.,

Test site	Soil type (0–15 cm)	pH value/ org. C [%]	Particle < 2 µ,%	kg ai/ha	DT_{50}, days	Correlation coefficient R^2	Reference/ Report
Canada, Ontario	silty clay	7.3/2.96	1.6		109	0.43223	MR98312
Canada, Manitoba	silty clay	-/3.48	3.2		119	0.28363	
Portage, Manitoba	silty clay loam	-/2.03	14.6		128	0.88705	
Canada, Manitoba	sandy loam	8.0/1.72	61.2	0.100	plot 1: 129.2 plot 2: 132.6	plot 1: 0.7372 plot 2: 0.5745	Philpot *et al*., 1998; 107933
Canada, Ontario	loam	7.8/1.97	36.0	6 x 0.250	0-15cm soil: plot 1: 278 plot 2: 205 0-45cm soil: plot 1: 410 plot 2: 236	0-15cm soil: plot 1: 0.91 plot 2: 0.81 0-45cm soil: plot 1: 0.54 plot 2: 0.74	Yen, 1996; BR107528
Canada, Saskatchewan	clay loam	7.6/2.20	24.8	2 x 0.125	0-45cm soil: plot 1: 707 plot 2: 912	0-45cm soil: plot 1: 0.64 plot 2: 0.33	

[a] The half-life, calculated from 0 to 28 days after application, was 8 days. Variability in samples taken at later intervals was the reason for calculating the half-life to 28 days after application

[b] The half-life of tebuconazole in Minnesota soil was recalculated based on evaluation of the data after excluding data from a few of the early intervals

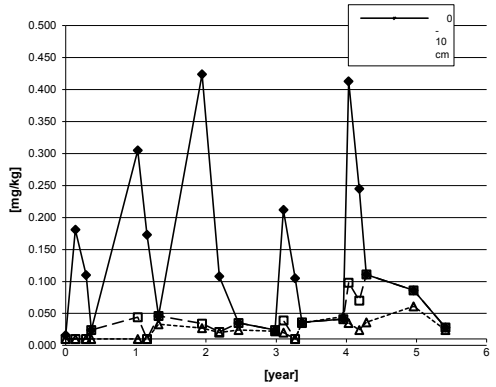
[c] bi-phasic dissipation: 1st phase (0 to 182 days): DT_{50}: 101.4 days, r^2: 0.7499, 2nd phase (182 to 546 days): DT50: 275.4 days, r^2: 0.3153

Long-term field studies

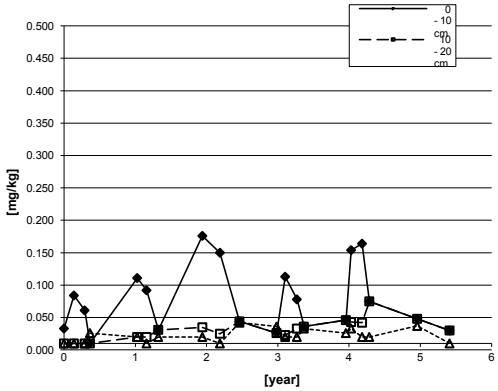
Allmendinger (1992) studied the behaviour of tebuconazole in winter barley and soil (silty and sandy loam) during a three-year long-term trial at two locations in Germany. The product was applied annually to the crop twice at 0.375 kg ai/ha. In both soils, residues of tebuconazole in the upper 10 cm soil layer decreased from 0.16 mg/kg in the first and second year to 0.12 mg/kg in the third year.

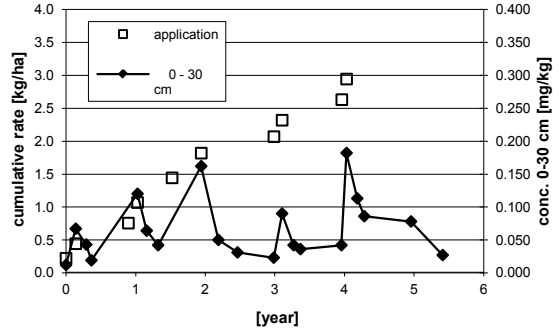
A five-year long-term trial (1991-1996) was conducted in Germany with wheat and oilseed rape treated annually at a rate of 2 × 0.225 to 2 × 0.375 kg ai/ha, using four soil types in four different locations (Allmendinger, 1996). Figure 5 illustrate the results obtained in one of the locations. The concentrations in the soil layers 0–10 cm, 10–20 cm and 20-30 cm as well as the average concentrations in the upper layer 0–30 cm are presented. Results for deeper soil layers are not included as the concentrations determined for the layer 30–40 cm were below or just in the range of the LOQ.

Burscheid: bare soil



cropped soil





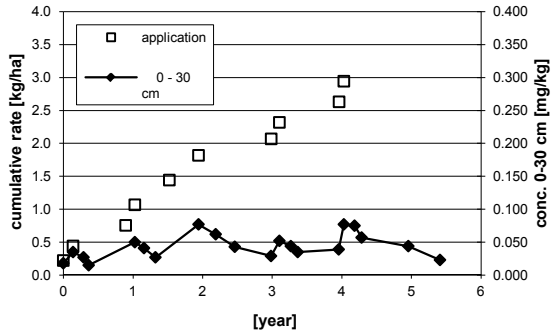
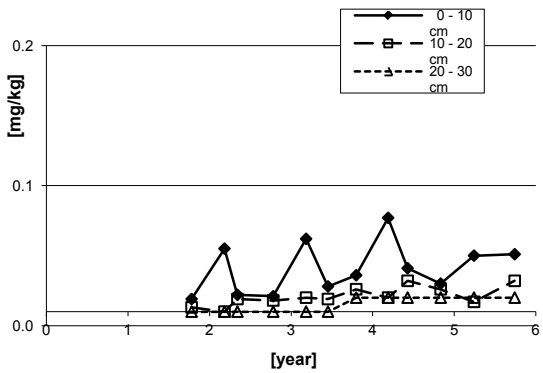


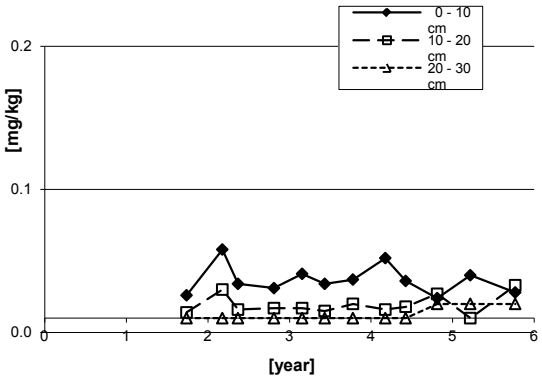
Figure 5 Concentration of tebuconazole in the upper soil layers and cumulative application rates as a function of time (soil Burscheid)

Heinemann (1998) conducted a six-year long-term trial (1991 to 1997) in Great Britain for the determination of residues of tebuconazole on soil (stony sandy clay loam and sandy loam) from winter wheat treated at 0.25 kg ai/ha. The concentrations in the soil layers 0–10 cm, 10–20 cm and 20–30 cm as well as the average concentrations in the upper layer 0–30 cm are presented graphically in Figure 6.

Elm Farm, Thursten, Suffolk (GB)



Wellesbourne, Warwick (GB)



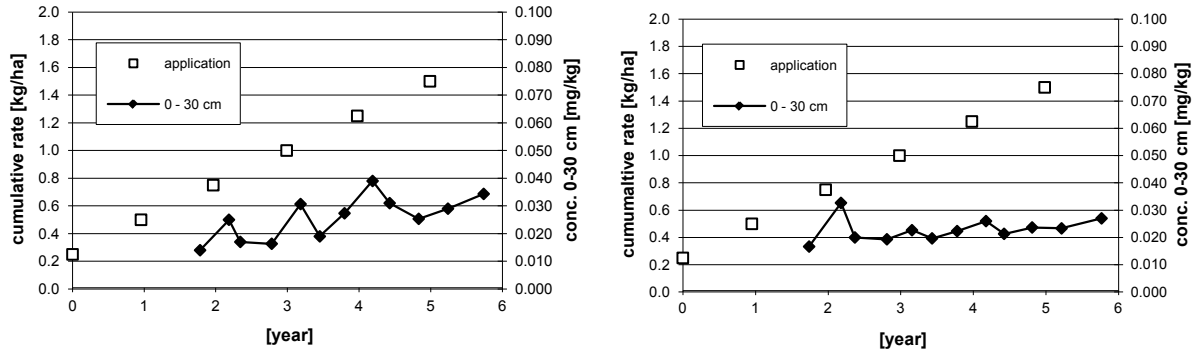


Figure 6 Concentration of tebuconazole in the upper soil layers and cumulative application rates as a function of time

In another five-year long-term trial (1991 to 1996) conducted in the United Kingdom (Allmendinger, 1997, revised 1998), winter wheat was treated at 2 × 0.25 kg ai/ha in sandy silt and sandy loam soils. Allmendinger and Heinemann (1999) reported a six-year long-term trial (1990 to 1996) for the determination of residues of tebuconazole in sandy loam soil in two locations in the United Kingdom, after winter wheat was treated 3 times at 0.25 kg ai/ha. From long-term field accumulation trials it becomes evident that the concentrations in the 0–30 cm layers do not show an upwards trend from the second year onwards. A comparison of the results from the studies conducted in England with application rates increased from 1 L to 3 L product per ha (approx. 250 to 750 g ai/ha) shows that a plateau concentration will be reached in all cases in the third year. A reduction of the microbial activity to degrade tebuconazole in soil at the higher application rates occurs, if at all, only to a limited extent.

Lee (2007) reported a terrestrial field dissipation study (2000 to 2003) of tebuconazole in Canadian loam soil from wheat treated once per year at 0.375 kg ai/ha. The concentrations in the soil layer 0–15 cm are presented in Figure 7 for bare soil and cropped soil.

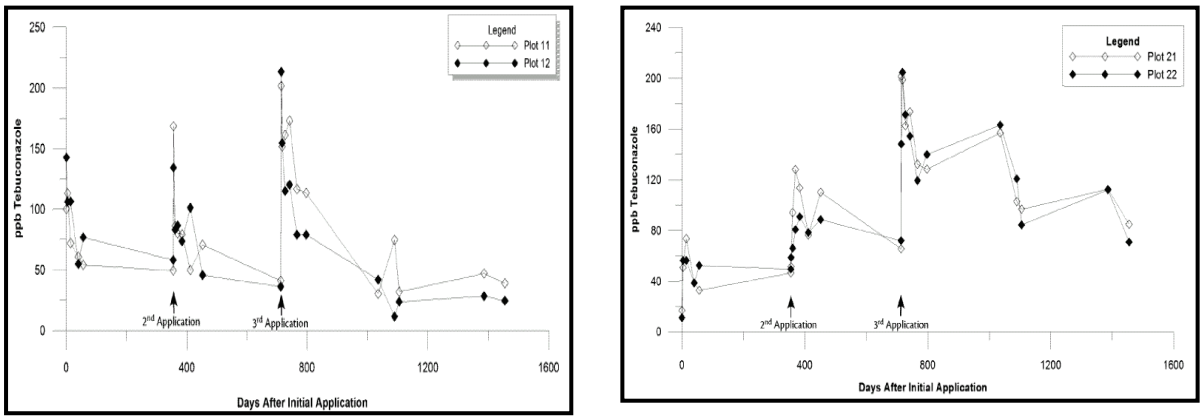


Figure 7 Concentration of tebuconazole determined from surface (0–15 cm) soil sampled from bare ground (left) and cropped plots

In bare soil plots, residues peaked after each application, followed by an initial rapid decline reaching a plateau where additional decline was significantly slower. The most significant period of decline occurs within 100 days of application. Peak residues averaged 207 µg/kg following the third application, and at day 1455, 15% of the residues were still detectable on average; although residues observed from day 1035 to day 1455 do not appear to differ significantly. On the bare soil plots there

was no indication of accumulation. In the plots with cropped soil, residues generally peaked within 14 days of application; however in the first two years of the study, it is difficult to discern a pattern of degradation. In the final two years of the study, days 714 through 1455, the degradation is more apparent but slower than that seen in the bare ground plots with a plateau of residues reached after > 300 days following the final application.

Rotational crop

Confined Rotational Crops

The metabolism of tebuconazole (WG formulation) was investigated in the rotational crops kale, red beet, and spring wheat after application of [triazole-3,5-^{14}C]tebuconazole (Leimkuehler *et al*., 1993) and [phenyl-UL-^{14}C]tebuconazole (Leimkuehler *et al*., 1992). The crops were grown in a galvanised planting container (1.85 m^2) in a greenhouse, and the test compound was applied as a foliar spray to the target crop (wheat) at a rate of 0.50 kg ai/ha or 0.56 kg ai/ha at the boot stage of growth. After the wheat was harvested, the soil was re-treated with radiolabelled dosing solution identical to the solution that was used to treat the target crop. The total amount applied corresponded to twice the recommended field rate. The radioactivity was incorporated into the top layer of the soil. After ageing for 30 days, the first set of rotational crops were planted in the tub (immediate planting) followed by an intermediate and a final planting. The chronologies of rotational crops in both studies are shown in Table 23.

Table 23 Chronology of rotational crop studies with [triazole-3,5-^{14}C]tebuconazole and [phenyl-UL-^{14}C]tebuconazole

		[triazole-3,5-^{14}C]tebuconazole		[phenyl-UL-^{14}C]tebuconazole	
Action taken	Crop	Days post-treatment	Days from planting to harvest	Days post-treatment	Days from planting to harvest
Application	soil	0	--	0	--
Planting	first rotation	29	--	30	--
Harvest	wheat forage	70	41	80	50
Harvest	kale	87	58	64	34
Harvest	beet tops, roots	87	58	135	105
Harvest	wheat straw, heads	122	93	135	105
Planting	second rotation	122	--	135	--
Harvest	wheat forage	165	43	190	54
Harvest	kale	207	85	190	54
Harvest	beet tops, roots	207	85	224	88
Harvest	wheat straw, heads	207	85	224	88
Planting	third rotation	273	--	273	--
Harvest	wheat forage	303	30	328	55
Harvest	kale	333	60	343	70
Harvest	wheat straw, heads	372	99	405	132
Harvest	beet tops, roots	380	107	378	105

Soil core samples were taken at planting and harvest; immature wheat (green forage) was sampled 3–4 weeks after planting; kale (plant without roots), beets (tops and beets), and the remaining wheat (straw, grain and chaff) were harvested at maturity. All plant tissues, except grain, were prepared for analysis by chopping with dry ice. Grain was pulverised with a mortar into a fine powder. Soil was extracted with methanol, and plant samples were extracted twice with methanol:water. Wheat grain was additionally extracted by refluxing in 1N HCl. The radioactivity of all extracts was determined by LSC; solid samples were combusted and trapped CO_2 radioactivity measured by LSC. Subsequent partition, cation or anion exchange chromatography, derivatisation, TLC and/or HPLC purification and/or analysis were carried out for each matrix material.

Table 24 and 25 shows the ^{14}C-residue levels as tebuconazole equivalents found in soil at the various planting intervals and before the soil treatment with both labelled tebuconazole. The methanol extracted radioactivity was almost exclusively tebuconazole.

Table 24 Distribution of radioactive residues in soil in extractable and bound fractions ([triazole-3,5-^{14}C]tebuconazole)

Interval (at planting)	Tebuconazole equ., mg/kg	Methanol extract,% TRR	Bound, % TRR	Total, % TRR	Tebuconazole,%
Harvest of wheat	0.20				
0 (soil treatment)	1.50	94.4	5.6	100.0	93.3
29	0.52	84.0	16.0	100.0	83.2
122	0.29	35.5	64.5	100.0	31.9
273	0.16	12.0	88.0	100.0	na

Table 25 Distribution of radioactive residues in soil in extractable and bound fractions ([phenyl-UL-^{14}C]tebuconazole)

Interval (at planting)	Tebuconazole equ., mg/kg	Methanol-extract,% TRR	Bound,% TRR	Total,% TRR	Tebuconazole,%
Day 0 (soil treatment)	0.343				
30	0.240	85.9	14.1	100.0	> 95[a]
136	0.200	47.1	52.9	100.0	
273	0.178	43.7	56.3	100.0	

[a] Analysed by TLC, no individual values given in the report.

Table 26 shows that the residues from the [triazole-3,5-^{14}C]tebuconazole treatment were most concentrated in crops from the 122-day post-treatment planting interval, mainly on wheat grain; the 273-days post-treatment interval crops still contained higher residue levels than those determined for the 29-days interval. Results from the phenyl-UL-^{14}C]tebuconazole study indicate that the residues declined during the study period, and were most concentrated in crops from the 30-day post-treatment planting interval, with the maximum residue being 0.548 mg/kg in wheat straw. The highest residue in wheat grain and beet roots was found in the 136-days interval.

Table 26 Total radioactive residue (TRR), in mg/kg tebuconazole equiv., in rotational crops after soil treatment with [triazole-3,5-^{14}C]tebuconazole

	[triazole-3,5-^{14}C]tebuconazole			phenyl-UL-^{14}C]tebuconazole		
	29 day re-plant	122 day re-plant	273 day re-plant	30 day re-plant	136 day re-plant	273 day re-plant
Wheat forage	1.2	5.4	1.4	0.189	0.107	0.057
Wheat grain	3.8	35.4	7.6	0.041	0.078	0.021
Wheat straw	1.1	4.2	2.6	0.548	0.345	0.117
Wheat chaff	---	15.0	6.0	0.108	0.110	0.042
Kale	0.3	2.7	2.0	0.106	0.045	0.015
Beet tops	0.2	1.3	1.0	0.041	0.042	0.020
Beet roots	0.2	0.8	0.9	0.034	0.049	0.014

The majority of the radioactivity was found in the aqueous fraction of the matrix extracts from the [triazole-3,5-^{14}C]tebuconazole study (Table 27). No significant organo-soluble radioactivity was present in wheat grain at any interval. Tebuconazole was extensively metabolised, with low amounts of the unchanged parent compound detected (Table 28). The major metabolites detected in the crops were triazole alanine (M20), triazole lactic acid (M21), and triazole acetic acid (M30). Up to 4.3% of the radioactivity remained unidentified, comprising in total 11 substances detected in the various organic extracts. Re-analysis of soil and crop samples after 800 to 1155 days of frozen storage revealed no significant qualitative or quantitative changes in metabolites.

Table 27 Distribution of radioactive residues between the organic, aqueous, and bound fraction in rotational crops after soil treatment with [triazole-3,5-^{14}C]tebuconazole

Crop	Fraction	Percent of radioactivity recovered		
		29-day	122-day	273-day
Wheat, forage	organic	22.9	8.1	2.1
	aqueous	68.5	87.5	94.3
	bound	8.6	4.4	3.6
Wheat, grain	organic	0.4	---	0.2
	aqueous	76.4	> 100.0	87.9
	bound	23.2	---	11.9
Wheat, straw	organic	19.2	1.0	1.4
	aqueous	51.1	86.0	88.3
	bound	29.7	13.0	10.3
Kale	organic	20.7	0.6	0.9
	aqueous	70.7	94.8	96.4
	bound	8.6	4.6	2.7
Beet, tops	organic	15.2	2.0	1.0
	aqueous	69.4	85.0	79.0
	bound	15.4	13.0	20.0
Beet, roots	organic	5.6	2.3	2.8
	aqueous	88.6	87.7	85.7
	bound	5.8	10.0	11.5

Table 28 Quantitative distribution of metabolites in rotational crops (values are given in % of the total recovered radioactivity at harvest) after application of [triazole-3,5-^{14}C]tebuconazole

Crop	Re-plant [days]	Substance / Fraction									Total
		Tebuconazole	M03	M20	M21	M26	M30	Diffuse [c]	Unkn.[d]	Bound	
Wheat, forage	29 [a]	na	na	na	na	na	na	na	na	na	na
	122	na [b]	na[b]	28.5	n. d.	n. d.	50.8	16.0	na[b]	4.7	100
	273[a]	na	na	na	na	na	na	na	na	na	n.a.
Wheat, grain	29	na[b]	na[b]	52.9	n. d.	n. d.	42.0	3.8	na[b]	1.3	100
	122	na[b]	na[b]	71.0	n. d.	n. d.	25.7	3.1	na[b]	0.2	100
	273	na[b]	na[b]	59.0	n. d.	n. d.	36.2	4.1	na[b]	0.7	100
Wheat, straw	29	4.3	7.9	4.9	28.4	n. d.	18.9	13.9	0.6	21.1	100
	122	na[b]	na[b]	24.1	26.6	n. d.	25.0	10.3	na[b]	14.0	100
	273	na[b]	na[b]	15.7	52.0	n. d.	16.2	10.5	na[b]	5.7	100
Beet, top	29	7.2	1.1	19.5	20.5	n. d.	6.8	23.5	4.3	17.1	100
	122	na[b]	na[b]	21.6	49.1	n. d.	7.2	7.9	na[b]	14.2	100
	273	na[b]	na[b]	20.6	34.4	n. d.	4.8	12.9	na[b]	27.4	100
Beet, root	29	4.8	0.4	58.0	n. d.	6.8	n. d.	15.7	1.5	12.8	100
	122	na[b]	na[b]	54.8	1.7	14.8	5.1	13.5	na[b]	7.2	100
	273	na[b]	na[b]	52.2	2.5	16.8	3.3	18.0	na[b]	7.2	100
Kale	29	15.0	0.4	56.2	n. d.	n. d.	3.3	8.8	4.0	12.3	100
	122	na[b]	na[b]	78.5	n. d.	n. d.	9.5	7.2	na[b]	4.8	100
	273	na[b]	na[b]	85.5	n. d.	n. d.	5.8	5.7	na[b]	3.0	100

[a] Samples not available (lost)

[b] nb - Not analysed due to low level of radioactivity in organic extracts

[c] Including not analysed radioactivity in organic fractions

[d] A total of 11 unidentified compounds in various organic extracts. n. d.: not detected; n.a.: not analysed; M03: tebuconazole-1-hydroxy; M20: triazole alanine; M21: triazole lactic acid; M26: 1,2,3 triazole; M30: triazole acetic acid.

Table 29 presents the distribution of radioactivity in the fractions from rotational crops from soils treated with [phenyl-UL-^{14}C]tebuconazole. Residues in the organo and water-soluble fractions were < 0.1 mg/kg tebuconazole equ. Bound residues were ≤ 0.06 mg/kg in all crop intervals except 30 days wheat straw (0.114 mg/kg). The 30-days post-treatment crops exhibited the only significant concentration of organo-soluble radioactivity, shown to exclusively tebuconazole in all crops except wheat straw, where tebuconazole-1-hydroxy (M03) was detected. The aqueous soluble radioactivity in

wheat straw consisted of a group of polar materials associated with the matrix, which did not resemble tebuconazole in nature.

Table 29 Quantitative distribution of metabolites in rotational crops (values are given in mg/kg tebuconazole equivalents) after application of [phenyl-UL-^{14}C]tebuconazole

Crop	Re-plant [days]	Substance / fraction									Total
		Tebuconazole	M03	Org.[a]	U1	U2	Diff.[b]	Aqu.[c]	Refl.[d]	Bound	
Wheat, forage	30	na[e]	na[e]	0.082	na[e]	na[e]	na[e]	0.063	0.023	0.021	0.189
	136	na[e]	na[e]	0.028	na[e]	na[e]	na[e]	0.045	0.019	0.015	0.107
	273	0.005	n. d.	---	n. d.	n. d.	0.018	0.020	0.008	0.006	0.057
Wheat, grain	30	na[e]	na[e]	0.002	na[e]	na[e]	na[e]	0.022	0.014	0.003	0.041
	136	na[e]	na[e]	n.a.[5]	na[e]	na[e]	na[e]	na[e]	na[e]	na[e]	---
	273	na[e]	na[e]	n.a.[5]	na[e]	na[e]	na[e]	0.014	0.006	0.001	0.021
Wheat, chaff	30	na[e]	na[e]	0.034	na[e]	na[e]	na[e]	0.041	0.018	0.015	0.108
	136	na[e]	na[e]	0.007	na[e]	na[e]	na[e]	0.056	0.026	0.021	0.110
	273	na[e]	na[e]	0.013	na[e]	na[e]	na[e]	0.014	0.009	0.006	0.042
Wheat, straw	30	0.058	0.028	---	0.020	0.018	0.079	0.181	0.050	0.114	0.548
	136	0.040	n. d.	---	n. d.	n. d.	0.066	0.120	0.060	0.059	0.345
	273	0.009	n. d.	---	n. d.	n. d.	0.018	0.025	0.015	0.050	0.117
Beet, top	30	0.005	n. d.	---	n. d.	n. d.	0.008	0.022	0.003	0.003	0.041
	136	na[e]	na[e]	0.017	na[e]	na[e]	na[e]	0.020	0.001	0.004	0.042
	273	na[e]	na[e]	0.006	na[e]	na[e]	na[e]	0.011	< 0.001	0.002	0.020
Beet, root	30	0.011	n. d.	---	n. d.	n. d.	0.005	0.005	0.004	0.008	0.034
	136	0.017	n. d.	---	n. d.	n. d.	0.008	0.002	0.004	0.018	0.049
	273	na[e]	na[e]	0.007	na[e]	na[e]	na[e]	0.003	0.001	0.002	0.014
Kale	30	0.048	n. d.	---	n. d.	n. d.	0.018	0.024	0.008	0.008	0.106
	136	0.016	n. d.	---	n. d.	n. d.	0.007	0.013	0.005	0.004	0.045
	273	na[e]	na[e]	0.007	na[e]	na[e]	na[e]	0.006	0.001	0.001	0.015

[a] Organic extracts not analysed by HPLC

[b] Diffuse radioactivity not in discrete fractions

[c] Aqueous extracts not analysed

[d] Released after refluxing with 1N HCl

[e] Not analysed due to low level of radioactivity in organic extracts

[f] n. d.: not detected; U1, U2 are unknown metabolites

In another study, [phenyl-UL-^{14}C]tebuconazole was incorporated into the top layer of a sandy loam soil at a rate of 2.5 kg ai/ha, ten-fold the recommended single field rate (Lin *et al*., 1995). Spring wheat was planted at 32 and 152 days following application (Table 30), the wheat sampled at 7–8 weeks after planting and harvested at maturity, when it was separated into straw, chaff, and grain. Additionally, six to ten soil core samples were taken at application, planting, and all harvest intervals. The wheat tissues were ground with liquid nitrogen and stored deep-frozen until analysis. The wheat matrices were extracted twice with methanol:water and the remaining solids were acid and base refluxed. All extracts were partitioned with ethyl acetate and soil was extracted with methanol. The radioactivity of all extracts was determined by LSC; solid samples were combusted and the radioactivity of the trapped CO_2 measured by LSC. Metabolites were identified by LC-MS.

Table 30 Chronology of rotational crop study with [phenyl-UL-^{14}C]tebuconazole

Action taken	Crop	Days post-treatment	Days from planting to harvest
Application (soil)	soil	--	--
Planting (immediate)	wheat	32	0
Harvest	wheat forage	87	55
Harvest	wheat, harvest	143	111
Planting (intermediate)	wheat	152	0
Harvest	wheat forage	201	49
Harvest	wheat, harvest	244	92

Tebuconazole equivalent residues were mostly concentrated in crops from the 32-day post-treatment planting interval, with the maximum residue being in wheat straw (Table 31). Radioactive residues declined significantly 152 days post-treatment in all tissues. The methanol-extracted radioactivity in soil at all sampling intervals was predominantly tebuconazole, representing > 84% of the soil radioactive residue (Table 32).

Table 31 Total radioactive residues in rotational wheat tissues

	Tebuconazole equivalents [mg/kg]	
	32 day re-plant	152 day re-plant
Wheat straw	6.291	3.856
Wheat chaff	1.608	1.144
Wheat grain	0.260	0.075
Wheat forage	0.674	0.358

Table 32 Tebuconazole residues in soil treated with [phenyl-UL-^{14}C]tebuconazole

Interval (at planting)	Days post application	Total residues		Tebuconazole	
		[mg/kg]	% extract.	% of total	[mg/kg]
Soil treatment	0	0.780	92.7	90.0	0.709
Post application	4	1.278	na	na	na
Wheat planting	32	0.989	89.2	85.7	0.848
Forage sampling	87	1.041	97.3	92.1	0.960
Harvest	143	0.848	95.3	90.7	0.769
Wheat planting	151	0.784	92.7	88.3	0.692
Forage planting	201	0.702	94.9	92.6	0.650
Harvest	243	0.752	87.1	83.8	0.630

Tebuconazole was the major residues in all tissues (Table 34). Concentrations of the 11 identified, or tentatively identified, metabolites ranged from 0.009 to 1.05 mg/kg. The residue profiles in chaff were similar to those in straw but at lower concentrations. The majority of radioactive residues in grain were very polar and consisted of many minor peaks, which could not be identified.

Table 34 Quantitative distribution of metabolites in rotational wheat (values are given in mg/kg tebuconazole equivalents) after application of [phenyl-UL-^{14}C]tebuconazole

Substance/ fraction	Wheat forage		Wheat grain		Wheat straw		Wheat chaff	
	32 days	152 days	32 days	152 days	32 days	152 days	32 days	152 days
Tebuconazole	0.362	0.221	0.007	0.004	2.271	0.408	0.375	0.116
M03	---	---	---	---	0.102	0.103	---	---
M05 [k, l]	0.013	0.009	---	---	0.374 [a]	0.149 [a]	0.097	0.093
M09 [k]	0.012	0.010	---	---	0.136 [b]	0.059 [b]	0.048	0.038
M32 [k]	---	---	---	---			---	---
M13 [k, m]	n. d.	0.037	---	---	1.05 [a]	0.58 [a]	---	---
M28 [k]	---	---	---	---	0.089	0.111	0.062 [h]	0.101 [h]
M31 [k]	---	---	---	---	0.037	0.063	---	---
M33 [k]	0.086	0.030	---	---	0.596	0.684	0.133	0.148
Tebuconazole conjug.	---	---	---	---	0.356	0.119	0.105	0.128
Total identified	0.473	0.307	0.007	0.004	5.011	2.276	1.110	0.751
Unknown	0.165 [d]	0.023 [e]	0.241 [f]	0.062 [g]	1.157 [c]	1.274 [c]	0.445 [i]	0.264 [j]
Bound	0.035	0.029	0.009	0.009	0.123	0.308	0.053	0.055
Total	0.674	0.358	0.260	0.075	6.291	3.856	1.608	1.144

[a] Consisting of two fractions each

[b] Not resolved

[c] Consisting of approx. 25 substances/fractions

[d] Consisting of 10 substances / fractions

[e] Consisting of 2 substances / fractions

[f] Consisting of 18substances / fractions

[g] Consisting of 9 substances / fractions

[h] Including M13 and M31

[i] Consisting of 6 substances / fractions

[j] Consisting of 9 substances / fractions

[k] Tentatively identified

[l] Consisting of two substances (tebuconazole-4—hydroxy-A + B)

[m] Consisting of two substances (tebuconazole-1-OH-glucoside-A + B)

The proposed metabolic pathway of tebuconazole in rotational crops is shown in Figure 8.

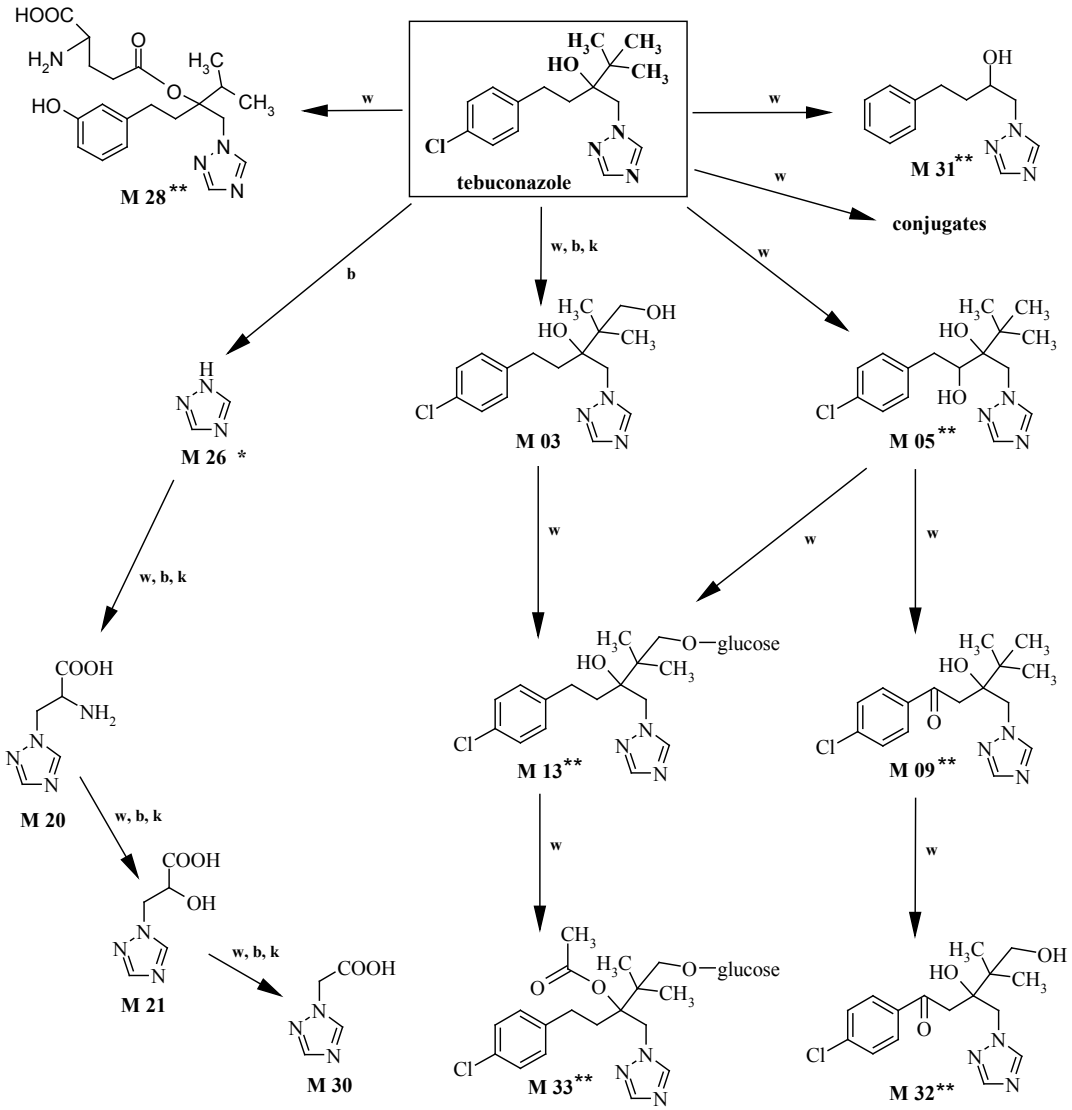


Figure 8 Metabolic pathway of tebuconazole in rotational crops; w = wheat, b = beet, k = kale, * postulated intermediate in wheat and kale; ** tentatively identified in wheat. M03:tebuconazole-1-hydroxy; M26:1,2,4-Triazole ; M05: tebuconazole-4-hydroxy A + B); M28: tebuconazole-deschloro-OH-glutamate[1]; M09 Tebuconazole-5-keto; M30:Triazole acetic; acid; M13:tebuconazole-1-OH-glucoside (A + B); M31:tebuconazole-deschloro-desbutyl; M20:Triazole alanine; M32: tebuconazole-1-hydroxy-5-keto; M21:Triazole lactic acid; M33: tebuconazole-3- acetoxy-1-OH-glucoside

Field rotational crop

Four field rotational crop studies were conducted with tebuconazole in 1989 in winter wheat (Anon, 1992a, b, c & d). In three trials, an EC formulation of tebuconazole was sprayed once onto the bare soil at a rate of 0.5 kg ai/ha and wheat was sown approximately 30 days after application. In the fourth trial (Anon, 1992a; No. 0441-89), the product was applied at the same rate and after harvest, the field was re-planted with winter wheat again. Samples of soil were taken immediately after application and one (or two) months thereafter. Samples of green material were taken 210 to 371 days after application, whereas grain and straw were sampled at maturity (302 to 449 days after application).

Table 35 presents the residue levels found in rotational wheat and soil. Tebuconazole residues were only detected in the upper soil layers (0–10 cm). The lower soil residues in trial No. 0441-89 can be explained by the timing of application: the wheat plants already covered the soil, and only low amounts of the spray solution could have reached the ground. With the exception of one sample of green material, residues in all other samples were below the limit of quantification (0.05 mg/kg).

Table 35 Residues of tebuconazole in winter wheat after soil application in Germany (1989) at 0.5 kg ai/ha

Portion analysed	PHI [days]	tebuconazole [mg/kg]	Report No
soil 0-10 cm	0 63	< 0.05 0.09	0441-89
soil 10-20 cm	63	< 0.05	
soil 20-30 cm	63	< 0.05	
green material	342 371	< 0.05 < 0.05	
grain	449	< 0.05	
straw	449	< 0.05	
soil 0-10 cm	0 30	0.45 0.16	0442-89
soil 10-20 cm	30	< 0.05	
soil 20-30 cm	30	< 0.05	
green material	210 241	< 0.05 < 0.05	
grain	302	< 0.05	
straw	302	< 0.05	
soil 0-10 cm	0 29	0.39 0.47	0443-89
soil 10-20 cm	29	< 0.05	
soil 20-30 cm	29	< 0.05	
green material	210 240	< 0.05 0.14	
grain	348	< 0.05	
straw	348	< 0.05	
soil 0-10 cm	0 28	0.36 0.24	0444-89
soil 10-20 cm	28	< 0.05	
soil 20-30 cm	28	< 0.05	
green material	210 240	< 0.05 < 0.05	
grain	348	< 0.05	
straw	348	< 0.05	

Field rotational crop studies were conducted with tebuconazole at two sites in the USA to determine the residue levels of tebuconazole in field rotational crops planted at the 30 and 120 day plant-back intervals following treatment of the soil with seven applications (7 days interval) of EC tebuconazole at 0.25 kg ai/ha (Leslie, 1988). At intervals of 30 and 120 days post-treatment spinach (leafy vegetable), wheat or sorghum (cereals) and turnip (root crop) were planted and grown to maturity. Residues of tebuconazole were determined on each mature crop, in green forage of wheat and sorghum sampled 45 days after sowing, and in soil samples taken at time of treatment, planting

and harvest. Tebuconazole residues ranged between < 0.01 and 0.04 mg/kg in plant matrices (Table 36).

Table 36 Residues of tebuconazole in rotational crops after soil application in USA, using 7 applications at 0.25 kg ai/ha

Crop, state	Portion analysed	Plant back interval [days]	Planting to sampling interval [days]	Tebuconazole (mg/kg)	Experiment No.
Wheat, Indiana	grain straw	32 32	276 276	0.01 0.03	HIN-H8002-87R
Sorghum, Kansas	forage grain straw	33 33 33	45 140 140	0.01 0.03 0.04	STF-H008-87R
Spinach, Indiana	leaves	31	56	0.02	HIN-H8011-87R
Spinach, Kansas	leaves	33	119	0.02	STF-H8017-87R
Turnip, Indiana	tops roots	31 31	56 56	0.02 0.01	HIN-8020-87R
Turnip, Indiana	tops roots	33 33	65 65	0.03 0.03	STF-H8026-87R
Wheat, Indiana	forage grain straw	126 126 126	45 87 87	0.05 0.01 0.11	HIN-H8003-87R
Sorghum, Kansas	grain straw	124 124	121 121	0.01 0.02	STF-H8009-87R
Spinach, Kansas	leaves	124	70	0.02	STF-H8018-87R
Turnip, Indiana	roots	126	67	0.01	HIN-H8021-87R
Turnip, Indiana	tops roots	124 124	73 73	< 0.01 0.02	STF-H8027-87R

Field trials were conducted in 20 locations in USA in 1997/1998 to evaluate tebuconazole residues in rotational soya beans following a single treatment of wheat with tebuconazole at 0.126 kg ai/ha (Grace, 2000). At about 35 days after application, the wheat was destroyed and soya beans were planted-back into the same plots. Tebuconazole residues in soya bean forage and seed was < 0.01 mg/kg in all samples. Residues in hay were between < 0.02 and 0.042 mg/kg (Table 37).

Table 37 Residues of tebuconazole in rotational soya bean after application to target crop wheat in USA using 1 application of 432 SC formulation

State	Crop Variety	Application kg ai/ha	Application kg ai /hL	Portion analysed	DALT (days)	Tebuconazole (mg/kg)	Trial No.
Minnesota	Wheat, winter Seward	0.127	0.0765				108904 851-FR027-97
	Soya bean, Pioneer 9294			forage	60	< 0.01	
				hay	75	0.042	
				seed	158	< 0.01	
Iowa	Wheat, winter, Bintee VI	0.126	0.0613				108904 857-FR034-97R
	Soya bean, Kennedy			forage	64	< 0.01	
				hay	85	< 0.02	
				seed	125	< 0.01	
Illinois	Wheat, winter Clark	0.126	0.0945				108904 853-FR029-97R
	Soya bean, V397RR			forage	73	< 0.01	
				hay	106	< 0.02	
				seed	149	< 0.01	
Illinois	Wheat, winter, Sawyer	0.126	0.0745				108904 853-FR028-97R
	Soya bean, Asgrow G3301			forage	70	< 0.01	
				hay	87	< 0.02	
				seed	145	< 0.01	
Nebraska	Wheat, winter, Jagger	0.120	0.0903				108904 SNE-FR024-97R
	Soya bean, Pioneer 9294RR			forage	61	< 0.01	
				hay	95	< 0.02	
				seed	172	< 0.01	
Louisiana	Wheat, winter, Coker 9835	0.127	0.0890				108904 355-FR021-97R
	Soya bean, Hartz 5088RR			forage	58	< 0.01	
				hay	87	< 0.02	

State	Crop Variety	Application kg ai/ha	Application kg ai /hL	Portion analysed	DALT (days)	Tebuconazole (mg/kg)	Trial No.
				seed	172	< 0.01	
Arkansas	Wheat, winter, Coker 9543	0.127	0.101				108904 354-FR020-97R
	Soya bean, Helena AG6101			forage	75	< 0.01	
				hay	92	< 0.02	
				seed	178	< 0.01	
Georgia	Wheat, winter, GA Dozier	0.127	0.118				108904 TGA-FR017-97R
	Soya bean, DPL 105			hay	136	< 0.02	
				seed	172	< 0.01	
Iowa	Wheat, winter, Pioneer	0.127	0.0732				108904 857-FR036-97D GLP: yes 1997
	Soya bean, Pioneer 9294			forage	73 80 87 94	< 0.01 < 0.01 < 0.01 < 0.01	
				hay	87 94 101 108	< 0.02 < 0.02 < 0.02 < 0.02	
				seed	148 156 160 170	< 0.01 < 0.01 < 0.01 < 0.01	
Minnesota	Wheat, winter, Seward	0.127	0.0765				108904 851-FR026-87R
	Soya bean, Pioneer 9294			forage	60	< 0.01	
				hay	75	< 0.02	
				seed	158	< 0.01	
North Carolina	Wheat, winter, 55-555	0.128	0.0726				108904 351-FR018-97R
	Soya bean, Agri Pro HY663			forage	63	< 0.01	
				hay	97	< 0.02	
				seed	196	< 0.01	
Iowa	Wheat, winter, Arapaho	0.127	0.0732				108904 857-FR035-97D
	Soya bean Pioneer 9294			forage	73 80 87 94	< 0.01 < 0.01 < 0.01 < 0.01	
				hay	87 94 101 108	< 0.02 < 0.02 < 0.02 < 0.02	
				seed	148 156 160 170	< 0.01 < 0.01 < 0.01 < 0.01	
Minnesota	Wheat, winter, Seward	0.127	0.0765				108904 851-FR025-97R
	Soya bean, Pioneer 9294			forage	60	< 0.01	
				hay	75	< 0.02	
				seed	158	< 0.01	
Mississippi	Wheat, winter, Pioneer 2684	0.138	0.120				108904 BMS-FR019-97R
	Soya bean, Asgrow 5801RR			forage	78	< 0.01	
				hay	111	< 0.02	
				seed	191	< 0.01	
Ohio	Wheat, winter, Freedom	0.127	0.0694				108904 855-FR032-97R
	Soya bean, GL 3630			forage	58	< 0.01	
				hay	92	< 0.02	
				seed	176	< 0.01	
Kansas	Wheat, winter Karl 92	0.126	0.132				108904 STF-FR023-97R
	Soya bean, Asgrow			forage	70	< 0.01	
				hay	90	< 0.02	
				seed	162	< 0.01	

State	Crop Variety	Application kg ai/ha	Application kg ai /hL	Portion analysed	DALT (days)	Tebuconazole (mg/kg)	Trial No.
Ohio	Wheat, winter, Freedom	0.127	0.0694				108904 855-FR033-97R
	Soya bean, Asgrow A3704			forage	64	< 0.01	
				hay	92	< 0.02	
				seed	177	< 0.01	
Michigan	Wheat, winter, Lowell White	0.126	0.0849				108904 855-FR031-97R
	Soya bean, Pioneer 9273			forage hay seed	80 98 172	< 0.01 < 0.02 < 0.01	
Indiana	Wheat, winter, Pioneer 2510	0.126	0.0725				108904 853-FR030-97
	Soya bean, Asgrow AG3001			forage hay seed	72 86 153	< 0.01 < 0.02 < 0.01	
Indiana	Wheat, winter, Cardinal	0.128	0.0823				108904 HIN-FR022-97R
	Soya bean, Asgrow 3001RR			forage hay seed	62 81 151	< 0.01 < 0.02 < 0.01	

METHODS OF RESIDUE ANALYSIS

Plant commodities

Enforcement method

The applicability of the multiresidue method DFG S19 for the determination of the residues of tebuconazole in tomato, orange, onion, cauliflower, wheat grain and rape seeds was tested (Steinhauer, 2002) (enforcement method 00086/M044). The sample is extracted with acetone/water, residues partitioned in ethyl acetate/cyclohexane and sodium chloride, the organic phase cleaned by gel permeation chromatography (GPC) on Bio Beads S-X3 polystyrene gel and tebuconazole analysed by GC/MSD. For orange and onion an additional clean-up on a silica gel SPE was conducted. For rape seeds, samples were previously mixed with acetone and acetonitrile with synthetic calcium silicate. LOQ and LOD were 0.02 and 0.004 mg/kg, respectively, for all crops. The results of the validation are shown in Table 38.

Table 38 Validation results for tebuconazole using method DFG S19

Matrix	Fortification level, mg/kg	n	Mean recovery,%	RSD,%
Tomato	0.02	5	104	3.6
	0.2	5	101	6.0
Orange	0.02	5	114	3.9
	0.2	5	103	5.3
Orange*	0.02	3	109	2.8
	0.2	3	103	4.6
Onion	0.02	5	112	4.6
	0.2	5	108	6.5
Onion*	0.02	3	103	3.9
	0.2	3	99	2.0
Cauliflower	0.02	5	98	3.2
	0.2	5	93	5.3
Wheat	0.02	5	99	5.8
	0.2	5	88	9.4
Rape seeds	0.02	5	82	10
	0.2	5	77	8.4

* with additional clean-up on a silica gel SPE

An independent laboratory validation of the enforcement method 00086/M044 was conducted with wheat grain, tomato, cauliflower and onion fortified at 0.02 mg/kg and 0.20 mg/kg (n=5). Residues were determined by GC-MS ion trap (Dorn, 2002). The average recoveries were in the range of 70 to 110% and the RSD were ≤ 20%. LOQ and LOD were 0.02 and 0.002 mg/kg, respectively.

Specialized methods

In Method 00005 (Brennecke, 1987) tebuconazole is extracted from grapes, must and wine with acetone and dichloromethane and the residues determined GC/thermionic nitrogen-phosphorus detector (TID). LOQ is 0.02 mg/kg.

In Method 00007 (Maasfeld, 1987), tebuconazole is extracted from plant material and soil with acetone or acetone/water mixtures. After filtration, the extracts are shaken with dichloromethane, cleaned up by silica gel SPE and residues analysed by GC/TID. Modification M007 of this method was performed to reduce the time and cost of analysis by decreasing the volumes of sample and solvent and validate additional matrices (Maasfeld, 1988; Weber, 1989; Allmendinger, 1989). Another modification (M035) was made to analyse peanut and peanut products (Minor, 1992). Peanut shells are first finely ground and then subjected to an overnight reflux in acetone/water (3:1). The resultant acetone/water extract is saturated with sodium chloride, and residue is partitioned into dichloromethane. Refined and crude peanut oil are extracted with hexane followed by partitioning into acetonitrile. Soapstock is extracted with ethyl acetate, partitioned against 1N aqueous HCl and water, and purified using a hexane/acetonitrile clean-up. With the exception of peanut shells, all plant extracts are purified using GPC and silica gel SPE. Peanut shell extracts are subjected to an acetone precipitation procedure. With the exception of peanut oil, extracts are further purified using either an SPS HPLC column or a C-18 Bond Elut® column prior to GC/NPD. LOQ of method 00007 and its modification is 0.05 mg/kg.

In Method 00112 (Brennecke, 1989), samples of a wide range of crops are extracted with organic solvents, clean-up with a pre-packed silica gel column and residues determined by GC/NPD. Modification M001 of this method includes a reduction of sample weight and determination using HPLC-ESI-MS/MS (MRM mode) instead of GC-NPD (Brennecke, R. 1998; 00112/M001, 00112/M001/E008). For tebuconazole the transition m/z = 308 to m/z = 70 was used for quantitation. In the control samples no blank values exceeding 19% of the LOQ were found. The detector response was linear over the range from 0.02 to 0.50 mg/L. Due to matrix effects, matrix-matched standards were used for quantitation. LOQ of method 0012 and its modification is 0.02 mg/kg.

In Method 00134, samples of cereals and cereal materials are extracted with acetone-water mixtures, the extract evaporated to the aqueous phase, and residues extracted by SPE with an n-hexane/ethyl acetate mixture (Allmendinger, H. 1989). The extracts are purified first by chromatography on a basic aluminium oxide column which separates the active substances into a tridemorph fraction and a tebuconazole/triadimenol fraction. Tridemorph residues are measured without further purification by GC/MSD. The tebuconazole/triadimenol fraction is purified in a second stage by chromatography on silica gel and residues determined by GC/TID. LOQ is 0.05 mg/kg.

In Method 00181, samples are extracted with organic solvents (acetonitrile, acetone), concentration to the aqueous remainder, and cleaned up with silica gel (Allmendinger, 1991-00181, 00181/E005; Brennecke, R. 1992-00181/E013; Bachmann, 1994-00181/E021; Allmendinger, 1997-00181/E026). Residues are determined by GC/TID or GC/MSD in the single ion monitoring mode. LOQ is 0.05 mg/kg with some exceptions.

In Method 00249, sample clean-up is performed by a laboratory robot system (Brennecke, 1991-00249, 00249/E002, 00249/E003, 00249/E004, 00249/E005; Brennecke, 1993-00249/E006, 00249/E007, 00249/E009). Samples are extracted with acetone, the extract filtered and concentrated until the residue is almost aqueous, which is brought up to a defined volume with acetone. Aqueous samples are directly transferred to the robot for clean-up with diatomaceous earth and column chromatography on silica gel. Residues are analysed by GC/NPD. A modification of this method was developed for the analysis of tebuconazole in peach preserve and jam, and plum pulp, preserve, and

dry fruit by first stirring the sample with water and then extract with acetone (Brennecke, 1992-00249/M001; Brennecke, 1993-00249/M001/E008). Another modification of the same method was developed for the analysis of tebuconazole in apple sauce, pomace and dry fruit Brennecke (1993; 00249/M003). Samples are mixed with water and extracted with acetone. Prior to extraction, the pomace and dried fruit mixtures are adjusted to pH 9, filtrated and the filtrate adjusted to pH 4–5. Another modification (M004) was performed to prevent the partial loss of target analytes in ripe fruits and inclusion of a new sample material. An oily residue was determined in the aqueous residue which did not dissolve after adding acetone and rinsing and which partly deposited on the walls of the glass vessels. This oily residue is dissolved in dichloromethane instead of acetone. LOQ of method 00249 and its modifications is 0.02 mg/kg.

Method 00268 was developed for the determination of tebuconazole and other active substance in cereals (Allmendinger, 1992). Samples are extracted with acetone or an acetone/water mixture, concentrated to the aqueous remainder and the extract cleaned up by RP-18 SPE. Residues are determined by GC/MSD in the single ion monitoring mode. In some cases (e.g., grain), a thermionic nitrogen-phosphorous detector (TID) is also applicable. The blank values of all measured control samples were at or well below 30% of the LOQ (0.05 mg/kg).

Method 00348 was developed to analyse tebuconazole (and other fungicidal active substances) in grape and grape processed products (Brennecke, 1995). After extraction with acetone or acetone-water mixtures, the sample is cleaned-up with diatomaceous earth followed by silica gel and activated charcoal-silica gel (coupled mini columns). LOQ is 0.02 mg/kg except in raisin and dried pomace (0.05 mg/kg).

In Method 00462 (Allmendinger, 1997; Allmendinger, 1998, 00462/E001), the sample is extracted with acetonitrile:water, filtered and residues determined directly by LC/MS/MS (electrospray-interface). For quantification, internal standards are added post-column by a second HPLC-instrument. The blank values for all control samples were below 20% of the LOQ for tebuconazole.

In a modification of Method 0462, a clean-up step (extraction on Chem-Elut®) was included before the LC/MS/MS analysis and post-column injected internal standards was replaced by external standard (Allmendinger, 1998-00462/M002; Allmendinger & Heinemann, 1998-00462/M002/E002; Preu, 2000-00462/M002/E003; Preu, 2001-00462/M002/E005; Preu, 2002-00462/M002/E006 and E007). In a few control samples of oat grain and straw and wheat grain, interferences of up to 0.02 mg/kg were detected. Another modification of this method includes cleaned up by a Chem-Elut and a silica gel column (Heinemann, 1999-00462/M003; Preu, 2000-00462/M003/E004; Preu, 2002-00462/M003/E010). Other modifications to Method 00462 were necessary for the analysis of tebuconazole in samples of high fat content (Preu, 2001-00462/M004; Heinemann, 2002a-00462/M006). Samples are extracted with acetonitrile/water, the raw extract partitioned against n-hexane and clean up on a column filled with diatomaceous earth. The main modifications in M007 of method 00462 (Heinemann, 2002b), includes an aliquotation step during extraction to decrease interference and substitution of Chem-Elut cartridges, which were no longer available, by Chromabond XTR cartridges. LOQ of method 00462 and its modification is 0.05 mg/kg.

In method 00765/M001 (Billan, 2003), tebuconazole and the other analytes are extracted with acetonitrile/water in a microwave oven twice, and subjected to HPLC-MS/MS. Blank values and interferences in control samples were well below 30% of the LOQ (0.05 mg/kg). Matrix-matched standards for quantitation of residue samples should be used.

In Method 00839, samples are extracted from plant materials using a mixture of acetonitrile/water (Nuesslein, 2004; Zimmer, 2004). After filtration and concentration to the aqueous remainder, the acidified crude extract is purified on a Chem-Elut® -cartridge, solving (partitioning) the analytes in a mixture of cyclohexane/ethyl acetate and residues quantified LC/ MS/MS-detection using internal labelled standards. LOQ was 0.01 mg/kg for grain and 0.02 mg/kg for the other matrix.

The analytical method 00984 was developed for the determination of tebuconazole and other actives and metabolite residues in/on plant materials (Diot, 2007). Residues of tebuconazole are

extracted by two successive extractions using a high speed blender with a mixture of acetonitrile/water (80/20, v/v), centrifuged, internal standard added and residues analysed by LC/MS/MS. Quantitation used internal stable labelled standards, with a LOQ of 0.01 mg/kg (0.05 mg/kg for wheat straw) can be achieved using MRM transitions. In the modification M001 of this method, the extracts are diluted ten times under basic conditions by adding the internal standards and analysed by LC/MS/MS (Schoening, 2007). LOQ for tebuconazole is 0.01 mg/kg in all matrices tested.

In Method 01013, the sample is extracted with acetonitrile/water, the extracted filtered, stable isotopically labelled analytes are added and residues analysed LC-MS/MS (Brumhard & Stuke, 2007). LOQ was 0.01 mg/kg in all matrices tested. Results of all method validations are shown in Table 39.

Table 39 Validation data for analytical methods for the determination of residues of tebuconazole in food of plant origin

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
Brennecke, 1987 *00005*	Grapes	0.02	96	89-101	no data	4
		0.20	98	95-99	no data	4
		2.0	92	87-99	no data	5
	Must	0.02	89	89, 89	--	2
		0.2	94	92, 96	--	2
	Wine	0.02	91	90, 93	--	2
		0.2	96	96, 97	--	2
Maasfeld, 1987 *00007*	Banana, pulp	0.05	103	97, 108	--	2
		0.50	92	85, 98	--	2
	Banana, peel	0.05	102	98, 106	--	2
		0.50	98	97, 98	--	2
		5.0	86	85, 87	--	2
	Barley, green material	0.05	99	99, 100	--	2
		0.50	94	90, 99	--	2
		5.0	101	101, 102	--	2
	Barley, straw	0.05	90	87, 94	--	2
		0.50	95	89, 101	--	2
	Barley, grain	0.05	99	99, 99	--	2
		0.50	100	97, 103	--	2
	Grape, fruit	0.05	98	96, 100	--	2
		0.50	91	89, 94	--	2
		5.0	95	93, 98	--	2
	Grape, must	0.05	101	97, 106	--	2
		0.50	93	90, 96	--	2
	Grape, wine	0.05	104	99, 109	--	2
		0.50	100	100, 101	--	2
	Oat, green material	0.05	94	93, 94	--	2
		0.50	95	91, 99	--	2
		5.0	103	100, 106	--	2
	Oat, straw	0.05	98	96, 100	--	2
		0.50	92	86, 99	--	2
	Oat, grain	0.05	100	96, 103	--	2
		0.50	92	89, 96	--	2
	Peanut, kernel	0.05	84	82, 87	--	2
		0.50	98	95, 101	--	2
	Peanut, pod	0.05	99	97, 101	--	2
		0.50	103	102, 104	--	2
		5.0	96	94, 98	--	2
	Rye, green material	0.05	94	91, 98	--	2
		0.50	93	91, 95	--	2
		5.0	97	94, 100	--	2
	Rye, straw	0.05	97	97, 98	--	2
		0.50	83	78, 87	--	2
Maasfeld, 1987 *00007*	Banana, pulp	0.05	103	97, 108	--	2
		0.50	92	85, 98	--	2
	Rye, grain	0.05	90	89, 92	--	2
		0.50	94	94, 94	--	2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Wheat, green material	0.05	96	95, 97	--	2
		0.50	97	93, 102	--	2
		5.0	99	97, 100	--	2
	Wheat, straw	0.05	80	78, 81	--	2
		0.50	100	99, 101	--	2
	Wheat, grain	0.05	96	90, 102	--	2
		0.50	98	97, 98	--	2
Maasfeld, 1988 *00007/M007*	Barley, straw	0.05	93	91, 94	--	2
		0.50	87	87	--	1
	Barley, grain	0.05	104	103, 104	--	2
		0.05	98	97, 99	--	2
		0.50	98	97, 99	--	2
	Oats, green material	0.05	98	93-102	no data	6
	Oats, straw	0.05	100	88-119	no data	4
	Oats, grain	0.05	92	88-96	no data	6
	Rye, green material	0.05	94	93, 96	--	2
	Rye, straw	0.05	102	96, 108	--	2
	Rye, grain	0.05	90	88, 92	--	2
	Wheat, green material	0.05	92	92, 92	--	2
		0.05	95	90, 100	--	2
		0.50	90	88, 92	--	2
		0.50	94	91, 98	--	2
		5.0	88	87, 88	--	2
		5.0	89	88, 90	--	2
	Wheat, straw	0.05	100	98, 103	--	2
		0.05	98	97, 100	--	2
		0.50	95	91, 100	--	2
		0.50	93	89, 97	--	2
	Wheat, grain	0.05	100	99, 101	--	2
		0.05	105	105, 105	--	2
		0.50	101	100, 102	--	2
	Rape, green material	0.05	96	90, 103	--	2
		5.0	91	91, 91	--	2
	Rape, husk	0.05	93	88, 98	--	2
		0.50	94	89, 100	--	2
	Rape, grain	0.05	100	91, 109	--	2
		0.05	97	95, 99	--	2
		0.50	100	93, 107	--	2
Weber, 1989 *00007/M007/E005*	Barley, green material	0.05	86	86	--	1
	Barley, ear	0.05	107	107	--	1
Allmendinger, 1989 *00007/M007/E013*	Apricot, fruit	0.05	93	90, 96	--	2
		0.50	90	88, 92	--	2
	Peach, fruit	0.05	98	96, 99	--	2
	Plum, fruit	0.05	86	81, 90	--	2
		0.50	93	89, 96	--	2
Minor, 1992 *00007/M035*	Peanut, meat	0.05	118	118	--	1
		0.05	108	108	--	1
	Peanut, refined oil	0.05	80	80	--	1
		0.05	94	94	--	1
	Peanut, crude oil	0.05	90	90	--	1
		0.05	82	82	--	1
	Peanut, meal	0.05	86	86	--	1
		0.05	98	98	--	1
	Peanut, soapstock	0.05	86	86	--	1
	Peanut,dry hay	5	98	98	--	1
		5	82	82	--	1
	Peanut, shells	0.1	95	80, 109	--	2
		0.1	92	82, 101	--	2
Brennecke, 1989 *00112*	Aubergine	0.02	100	94, 107	--	2
		0.50	95	95, 96	--	2
		5.0	96	91, 101	--	2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Cucumber	0.02	93	90, 95	--	2
		0.50	101	100, 102	--	2
		5.0	96	95, 98	--	2
	Field bean, green material	0.02	106	104, 108	--	2
		0.50	105	101, 108	--	2
		5.0	93	89, 96	--	2
	Field bean, green beans	0.02	94	83-106	no data	4
		0.50	102	100, 104	--	2
		5.0	91	87, 94	--	2
	Field bean, dry beans	0.02	88	82-94	no data	4
		0.50	102	97, 107	--	2
		5.0	99	98, 100	--	2
	Field bean, straw	0.02	104	103,105	--	2
		0.50	90	87, 92	--	2
		5.0	100	93, 107	--	2
	Grape fruit	0.02	90	88-93	--	2
		0.50	95	94-95	--	2
		5.0	96	95-97	--	2
	Grape must	0.02 mg/L	94	89-99	no data	4
		0.20 mg/L	96	92-99	no data	4
		2.0 mg/L	94	93-95	--	2
	Grape wine	0.02 mg/L	92	88-96	no data	4
		0.20 mg/L	99	96-103	no data	4
		2.0 mg/L	100	100	--	2
	Leek	0.02	85	82, 88	--	2
		0.05	100	97, 103	--	2
		0.50	96	94, 98	--	2
		5.0	98	97, 99	--	2
	Pea, green material	0.02	84	82, 85	--	2
		0.05	83	79, 86	--	2
		0.50	96	93-99	no data	4
		5.0	93	86-100	no data	4
	Pea, green pea	0.02	95	85-101	no data	4
		0.50	88	86, 89	--	2
	Pea, dry pea	0.02	85	79-95	no data	4
		0.50	97	95, 98	--	2
	Pea, straw	0.05	100	99, 101	--	2
		0.50	95	93, 96	--	2
		5.0	89	89, 89	--	2
	Pepper	0.02	95	95, 96	--	2
		0.50	87	83, 91	--	2
		5.0	83	82, 85	--	2
	Tomato	0.02	96	95-97	--	2
		0.50	98	96-100	--	2
		5.0	98	95-100	--	2
Brennecke, 1998 *00112/M001*	Black currant, fruit	0.02	99	90-110	10.1	3
		0.20	92	82-98	9.3	3
		2.0	103	94-109	7.7	3
	Cucumber, fruit	0.02	89	85-93	4.5	3
		0.20	87	85-89	2.3	3
		2.0	92	89-97	4.7	3
	Gooseberry, fruit	0.02	86	76-93	10.2	3
		0.20	96	94-97	1.6	3
		2.0	94	84-102	9.7	3
	Red pepper, fruit	0.02	94	91-98	3.8	3
		0.20	79	75-85	6.5	3
		2.0	99	95-106	6.4	3
	Tomato, fruit	0.02	90	88-93	2.9	3
		0.20	89	84-97	7.9	3
		2.0	93	91-94	1.9	3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
Brennecke, 1998 *00112/M001/E008*	Blackberry, fruit	0.02	110	103-114	5.5	3
		0.20	109	109-110	0.5	3
		2.0	105	103-108	2.4	3
	Lettuce, head	0.02	95	93-99	3.4	3
		0.20	111	109-112	1.4	3
		2.0	105	104-105	0.6	3
	Melon, fruit	0.02	106	104-112	3.2	5
		0.2	106	104-108	1.4	5
		2.0	94	92-96	2.2	3
		2.0	102	101-103	1.0	3
	Melon, peel	0.02	105	100-114	7.4	3
		0.02	104	101-107	2.9	3
		0.20	97	95-101	3.3	3
		2.0	109	108-109	0.5	3
	Melon, pulp	0.02	105	104-106	1.0	3
		0.20	103	100-107	3.7	3
Brennecke, 1998 *00112/M001/ E008*	Onion, bulb	0.02	108	99-114	5.8	5
		0.20	100	92-107	7.6	3
		2.0	106	100-110	5.0	3
	Onion, green material	0.02	111	108-114	2.8	3
		0.20	101	93-112	9.6	3
		2.0	101	99-102	1.7	3
	Red pepper, fruit	0.02	91	89-93	2.2	3
		0.20	98	98-99	0.6	3
		2.0	103	101-106	2.4	3
	Strawberry, fruit	0.02	109	107-111	1.9	3
		0.20	111	110-112	0.9	3
		2.0	106	105-107	0.9	3
	Washing water (from lettuce)	0.02	92	90-93	1.7	3
		0.20	97	95-100	2.7	3
		2.0	100	95-103	4.2	3
Allmendinger, 1989 *00134*	Wheat green material	0.05	93	89-96	--	2
		0.50	93	90-96	--	2
		5.0	94	93-94	--	2
	Wheat grain	0.05	89	85-92	--	2
		0.50	93	91-95	--	2
	Wheat straw	0.05	93	93	--	2
		0.50	103	101-105	--	2
		5.0	109	108-110	--	2
	Barley green material	0.05	97	92-102	--	2
		0.50	92	91-92	--	2
		5.0	98	97-98	--	2
	Barley grain	0.05	81	75-86	--	2
		0.50	78	73-82	--	2
	Barley straw	0.05	99	93-104	--	2
		0.50	90	88-91	--	2
		5.0	104	101-107	--	2
Allmendinger, 1991 *00181*	Barley green material	0.05	76	75, 77	--	2
		0.50	84	82, 85	--	2
		5.0	98	96, 100	--	2
	Barley grain	0.05	86	85, 86	--	2
		0.50	87	85, 88	--	2
	Barley straw	0.05	91	88, 93	--	2
		0.50	83	83, 83	--	2
	Oat green material	0.05	85	85, 85	--	2
		0.50	79	75, 82	--	2
		5.0	77	76, 77	--	2
	Oat grain	0.05	74	72, 75	--	2
		0.50	79	72, 85	--	2
	Oat straw	0.05	90	83, 97	--	2
		0.50	93	91, 95	--	2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
Allmendinger, 1991 *00181*	Rye green material	0.05	90	88, 91	--	2
		0.50	90	89, 91	--	2
		5.0	94	91, 96	--	2
	Rye grain	0.05	86	80, 92	--	2
		0.50	88	84, 91	--	2
	Rye straw	0.05	89	84, 94	--	2
		0.50	86	81, 90	--	2
	Grape fruit	0.02	87	85, 89	--	2
		0.20	82	74, 88	--	2
		2.0	96	92, 100	--	2
	Grape must	0.02	83	81, 85	--	2
		0.20	84	83, 85	--	2
		2.0	83	83, 83	--	2
	Grape wine	0.02	92	89, 94	--	2
		0.20	98	94, 101	--	2
		2.0	102	102, 102	--	2
	Wheat green material	0.05	95	91, 98	--	2
		0.50	94	88, 98	--	2
		5.0	97	96, 97	--	2
	Wheat grain	0.05	83	82, 84	--	2
		0.50	89	88, 90	--	2
	Wheat straw	0.05	93	92, 94	--	2
		0.50	94	93, 94	--	2
	Field bean, green material	0.05	93	92, 94	--	2
		0.50	89	87, 90	--	2
		5.0	82	80, 84	--	2
	Field bean, green beans	0.05	91	85, 97	--	2
		0.50	95	93, 97	--	2
	Field bean, dry beans	0.05	83	82, 83	--	2
		0.50	92	87, 96	--	2
	Apple, fruit	0.05	93	91, 94	--	2
		0.50	93	92, 93	--	2
	Apricot, fruit	0.05	93	90, 96	--	2
		0.50	90	88, 92	--	2
	Cauliflower, head	0.05	88	84, 91	--	2
		0.50	85	85, 85	--	2
	Pea, green material	0.05	95	93, 97	--	2
		0.50	88	84, 91	--	2
		5.0	89	88, 89	--	2
	Pea, green	0.05	79	75, 82	--	2
		0.50	87	86, 88	--	2
	Pea, green	0.05	85	81, 88	--	2
		0.50	80	76, 84	--	2
Allmendinger, 1991 *00181*	Maize, green material	0.05	85	83, 86	--	2
		0.50	98	96, 99	--	2
		5.0	104	103, 104	--	2
	Maize, grain	0.05	104	104, 104	--	2
		0.50	102	101, 103	--	2
	Maize, straw	0.05	96	94, 97	--	2
		0.50	100	99, 101	--	2
	Nectarine, fruit	0.05	88	80, 95	--	2
		0.50	90	88, 91	--	2
	Peach, fruit	0.05	98	96, 99	--	2
	Plum, fruit	0.05	91	90, 91	--	2
		0.50	93	89, 96	--	2
	Leek, stem	0.05	90	89, 90	--	2
	Rape, green material	0.05	107	104, 109	--	2
		0.50	92	85, 98	--	2
		5.0	92	89, 94	--	2
	Rape, seed	0.05	103	102, 103	--	2
		0.50	100	94, 105	--	2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	Recovery,% range	RSD,%	N
	Rape, straw	0.05 0.50	92 93	90, 93 92, 93	-- --	2 2
	Rape, oil	0.05 0.50	89 99	87, 90 97, 100	-- --	2 2
	Brussels sprouts, head	0.05 0.50	85 88	82, 87 79, 96	-- --	2 2
	Asparagus, stem	0.05	81	74-87	6.9	6
	Tea, leaf	0.05 0.50 5.0	98 89 92	88-106 81-96 88-96	9.4 7.3 3.8	3 4 4
	White cabbage, head	0.05 0.50	94 92	83, 105 88, 96	-- --	2 2
Allmendinger, 1991 *00181/E005*	Artichoke	0.05 0.50	90 82	87-94 74-90	4.0 9.8	3 3
	Pear, fruit	0.05 0.50	87 95	79-92 86-101	8.1 8.4	3 3
	Melon, fruit pulp	0.05 0.50	77 90	76-80 82-95	3.0 7.6	3 3
	Melon, peel	0.05 0.50	90 95	82-94 92-97	7.4 2.7	3 3
	Lettuce, head	0.05 0.50	89 95	85-92 87-100	4.0 7.2	3 3
	Onion, bulb	0.05 0.50	97 87	96-98 84-89	1.2 2.9	3 3
Brennecke, 1992 *00181/E013*	Barley, green material	0.05 0.50	85 88	84, 86 85, 91	-- --	2 2
	Barley, grain	0.05 0.50	97 99	95, 99 98, 99	-- --	2 2
	Barley, straw	0.05 0.50	69 82	64, 74 80, 84	-- --	2 2
Bachmann, 1994 00181/E021	Grape, fruit	0.02 0.20 2.00	96 97 86	94; 97 95; 99 85; 87	-- -- --	2 2 2
	Grape, must	0.02 0.20	89 85	87; 90 84; 86	-- --	2 2
	Grape, wine	0.02 0.20	92 92	91; 92 91; 92	-- --	2 2
Allmendinger, 1997 *00181/E026*	Sweet cherry, fruit	0.05 0.50	94 84	78-113 83, 85	18.1 --	4 2
Brennecke, 1991 *00249*	Grape, fruit	0.02 0.50 5.0	96 95 85	90-103 91-98 83-86	6.8 4.0 1.8	3 3 3
	Grape, must	0.02 0.50	82 91	78-87 85-94	5.8 5.7	3 3
	Grape, wine	0.02 0.50	98 86	95-103 85-88	4.5 1.8	3 3
	Peach, fruit	0.02 0.50 5.0	90 92 93	83-103 80-100 91-96	12.2 11.4 2.8	3 3 3
	Peach, juice	0.02 0.50	97 98	93-102 95-102	4.7 3.6	3 3
	Sweet pepper, fruit	0.02 0.50 5.0	94 92 83	91-99 87-96 80-85	4.9 4.9 3.0	3 3 3
	Tomato, fruit	0.02 0.50 5.0	99 94 91	95-102 88-100 91	3.6 6.4 0	3 3 3
	Zucchini, fruit	0.02 0.50 5.0	87 102 87	82-90 99-109 85-88	5.0 5.6 1.8	3 3 3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
Brennecke, 1992 *00249/E002*	Plum, fruit	0.02 0.50 5.00	79 87 83	73-84 83-92 79-87	7.1 5.5 4.2	3 3 4
Brennecke, 1992 *00249/E003*	Melon, fruit	0.02 0.50 5.0	84 94 85	83-87 92, 96 81-88	2.7 -- 4.2	3 2 3
	Melon, peel	0.02 0.50 5.0	86 92 79	80-89 91, 92 78-81	5.8 -- 1.9	3 2 3
Brennecke, 1992 *00249/E004*	Cherry, fruit	0.02 0.50 5.0	84 81 78	80-92 77-87 76-81	8.3 6.8 3.4	3 3 3
Brennecke, 1992 *00249/E005*	Apricot, fruit	0.02 0.50 5.0	95 95 84	92-97 87-104 82-86	2.8 9.0 2.5	3 3 3
Brennecke, 1993 *00249/E006*	Apple, fruit	0.02 0.50 5.00	82 93 89	77-86 90-95 88-89	5.6 2.7 0.7	3 3 3
Brennecke, 1993 *00249/E007*	Pear, fruit	0.02 0.50 5.00	94 96 89	82-102 93-100 82-96	11.3 3.7 7.9	3 3 3
Brennecke, 1993 *00249/E009*	Apple, juice	0.02 0.20	85 94	81-90 91-95	5.4 2.5	3 3
Brennecke, 1992 *00249/M001*	Peach, jam	0.02 0.50	105 88	102-106 85-91	2.2 3.5	3 3
	Peach, preserve	0.02 0.50	84 101	77-88 95-105	7.0 5.1	3 3
Brennecke, 1993 *00249/M001/E008*	Plum, pulp	0.02 0.50	91 93	84-98 81-100	7.8 11.5	3 3
	Plum, preserve	0.02 0.50	77 88	74-79 77-97	3.4 11.5	3 3
	Plum, dry fruit	0.02 0.50	95 89	92, 98 86-91	-- 3.0	2 3
Brennecke, 1993 *00249/M003*	Apple, sauce	0.02 0.20	74 79	70-84 77-82	9.0 3.4	4 3
	Apple, pomace	0.02	76	72-79	4.6	3
	Apple, dry fruit	0.02 0.20	72 72	69, 75 69-75	-- 4.2	2 3
Brennecke, 1993 *00249/M004*	Cucumber, fruit	0.02 0.50	80 83	77-85 73-94	5.5 12.6	3 3
	Sweet pepper, fruit	0.02 0.50	89 76	89 72-78	0 4.3	3 3
	Tomato, fruit	0.02 0.50	81 76	76-86 73-80	6.2 4.7	2 3
Allmendinger, 1992 *00268*	Barley, green material	0.05 0.05 0.50 5.0	96 90 90 83	95-98 81-96 83-95 71-93	1.8 9.0 6.8 13.5	3 3 3 3
	Barley, straw	0.05 0.05 0.50 5.0	86 103 102 100	84-88 97-106 100-107 99-100	2.4 4.8 3.9 0.6	3 3 3 3
	Barley, grain	0.05 0.05 0.50	91 94 98	84-97 85-107 93-101	7.2 12.1 4.5	3 3 3
	Rye, green material	0.05 0.50 5.0	77 77 83	75-81 73-81 76-90	4.2 5.2 8.5	3 3 3
	Rye, straw	0.05 0.50 5.0	89 85 85	81-103 78-90 79-91	13.7 7.2 7.1	3 3 3
	Rye, grain	0.05 0.50	84 88	82-87 75-99	3.4 13.8	3 3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Wheat, green material	0.05	94	87-106	11.1	3
		0.50	79	73-83	6.9	3
		5.0	96	91-104	7.3	3
	Wheat, straw	0.05	92	90-95	2.9	3
		0.50	84	77-89	7.6	3
		5.0	94	84-108	13.3	3
	Wheat, grain	0.05	98	96-101	2.6	3
		0.50	88	80-100	12.3	3
Brennecke, 1995 *00348*	Table grape, fruit	0.02	99	97-100	1.8	3
		0.20	108	102-113	5.2	3
		2.0	103	94-108	7.8	3
	Wine grape, bunch segment	0.02	98	88-103	8.6	3
		0.20	102	96-105	5.1	3
		2.0	99	97-101	2.0	3
	Must	0.02	88	82-93	6.4	3
		0.20	92	83-99	8.8	3
	Wine	0.02	85	82-89	4.1	3
		0.20	98	97-99	1.0	3
	Grape juice	0.02	87	85-88	1.8	3
		0.20	106	104-109	2.4	3
	Pomace, wet	0.02	98	94-102	4.1	3
		0.20	90	86-94	4.4	3
	Pomace, dried	0.05	78	75-81	3.9	3
		0.50	89	87-93	3.6	3
	Raisin	0.05	106	99-118	9.6	3
		0.50	107	101-112	5.2	3
Allmendinger 1997 *00462*	Apple, fruit	0.05	94	92-95	1.8	3
		0.50	95	93-96	1.6	3
		5.0	92	90-95	2.7	3
	Asparagus	0.05	85	81-87	4.1	3
		0.50	91	87-94	3.9	3
	Blackcurrant, fruit	0.05	98	97-99	1.0	3
		0.50	96	94-98	2.2	3
	Barley, grain	0.05	94	90-98	4.3	3
		0.50	97	96-98	1.0	3
		5.0	88	87-91	2.6	3
	Brussels sprouts, rose	0.05	82	80-83	2.1	3
		0.50	83	81-85	2.4	3
		5.0	90	89-91	1.1	3
	Carrot, root	0.05	85	85-85	0.0	3
		0.50	90	89-91	1.1	3
	Cucumber, fruit	0.05	104	102-105	1.5	3
		0.50	99	97-101	2.1	3
	Field bean, bean with pod	0.05	92	88-97	5.2	3
		0.50	83	82-86	2.8	3
	Field bean, dry seed	0.05	92	86-97	6.0	3
	Gooseberry, fruit	0.05	97	94-99	2.7	3
		0.50	95	94-95	0.6	3
	Grape, berry	0.05	95	90-98	4.6	3
		0.50	99	98-101	1.5	3
		5.0	97	96-98	1.0	3
	Grape, must	0.05	106	102-110	3.8	3
		0.50	98	96-100	2.1	3
	Grape, wine	0.05	108	107-109	1.1	3
		0.50	102	100-104	2.1	3
	Leek, stem	0.05	92	89-93	2.5	3
		0.50	95	93-96	1.6	3
	Melon, peel	0.05	101	99-102	1.5	3
		0.50	100	99-100	0.6	3
	Melon, pulp	0.05	109	103-118	7.3	3
		0.50	106	105-107	0.9	3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Pepper, fruit	0.05 0.50	100 99	98-102 97-100	2.1 1.8	3 3
	Peach, fruit	0.05 0.50 5.0	96 95 93	92-100 93-98 89-96	4.2 2.6 3.9	3 3 3
Allmendinger 1997 *00462*	Plum, fruit	0.05 0.50 5.0	117 99 91	111-126 94-106 88-94	6.6 6.2 3.3	3 3 3
	Rice, rest of plant	0.05 0.50 5.0	92 87 89	92-93 85-89 88-91	0.6 2.4 1.7	3 3 3
	Rice, grain	0.05 0.50	97 96	94-99 93-99	2.7 3.2	3 3
	Round cabbage, head	0.05 0.50	93 94	88-97 93-95	4.9 1.1	3 3
	Rutabaga, body	0.05 0.50	85 93	79-94 90-94	9.3 2.5	3 3
	Rutabaga, leaf	0.05 0.50	88 94	86-90 92-95	2.3 1.6	3 3
	Savoy cabbage, head	0.05 0.50 5.0	98 94 89	95-102 93-95 85-92	3.7 1.2 4.0	3 3 3
	Savoy cabbage, cooking liquid	0.05	102	101-102	0.6	3
	Tomato, fruit	0.05 0.50 5.0	117 99 90	116-118 97-100 89-91	0.9 1.7 1.1	3 3 3
	Tomato, preserve	0.05 0.50	100 99	98-103 98-101	2.5 1.5	3 3
	Tomato, juice	0.05 0.50	99 98	96-101 96-99	2.7 1.8	3 3
	Tomato, puree	0.05 0.50 5.0	94 93 92	93-96 91-95 89-94	1.6 2.3 3.1	3 3 3
	Zucchini, fruit	0.05 0.50	102 98	99-104 96-101	2.5 2.6	3 3
Allmendinger, 1998 *00462/E001*	Citrus, fruit	0.05 0.50	79 79	79 79	-- --	1 1
	Citrus, pulp	0.05 0.50 5.0	83 89 95	70-89 86-97 95	13.2 7.2 --	3 4 1
	Citrus, peel	0.05 0.50 5.0	77 80 85	73-84 72-88 81-93	6.7 8.6 7.8	4 5 3
	Citrus, jam	0.05 0.50 5.0	81 89 89	78-86 82-94 88, 90	5.4 7.2 --	3 3 2
	Citrus, juice	0.05 0.50	103 87	89-113 81-97	12.0 10.3	3 3
Allmendinger, 1998 *00462/M002*	Wheat, green material	0.05 0.50 5.0	84 81 90	66-94 60-92 89, 91	18.9 22.1 --	3 3 2
	Wheat, straw	0.05 0.50 5.0	84 75 69	77-88 72-80 66-72	7.0 5.8 --	3 3 2
	Wheat, grain	0.05 0.50	87 82	77-98 71-87	9.9 8.8	4 4
	Tobacco, green leaves	0.05 0.50 5.0	99 95 95	94, 104 93, 97 94, 95	-- -- --	2 2 2
	Tobacco, dry leaves	0.10 1.0	102 99	101, 102 95, 102	-- --	2 2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
		10	102	98, 105	--	2
Allmendinger, Heinemann, 1998 *00462/M002/E002*	Asparagus, green material	0.05	103	98, 107	--	2
		0.50	99	98, 100	--	2
		5.0	94	94, 94	--	2
	Asparagus, stem	0.05	92	86-98	6.6	3
		0.50	95	93, 96	--	2
	Carrot, root	0.05	90	88, 91	--	2
		0.50	92	86-97	5.3	4
	Carrot, green material	0.05	92	87, 96	--	2
		0.50	93	82-104	9.8	4
		5.0	83	82, 84	--	2
	Cauliflower, plant	0.05	98	97-99	1.2	3
		0.50	99	97, 100	--	2
		5.0	95	94, 95	--	2
	Cauliflower, head	0.05	96	94-98	2.1	3
		0.50	94	94, 94	--	2
		5.0	94	93, 94	--	2
	Cherry, fruit	0.05	94	90-99	5.0	3
		0.50	92	88-95	4.1	3
		5.0	96	95, 96	--	2
	Cucumber, fruit	0.05	101	100, 102	--	2
		0.50	100	98-102	2.1	3
		5.0	100	99, 100	--	2
	Field bean, bean incl. pod	0.05	99	95, 103	--	2
		0.50	97	96-98	1.2	3
		5.0	97	96, 98	--	2
	Field bean, dry seed	0.05	101	98, 104	--	2
		0.50	97	95, 99	--	2
	Grape, fruit	0.05	88	78-102	9.0	7
		0.50	87	76-94	8.1	7
		5.0	77	76, 77	--	2
	Melon, peel	0.05	101	98, 104	--	2
		0.50	99	97, 100	--	2
		5.0	93	88-95	3.6	4
	Melon, pulp	0.05	102	102, 102	--	2
		0.50	100	99, 101	--	2
	Onion, green material	0.05	101	96-104	4.3	3
		0.50	99	97-101	2.0	3
		5.0	98	96, 99	--	2
	Onion, bulb	0.05	98	95-100	2.4	4
		0.5	96	91-99	3.6	4
	Pepper, fruit	0.05	100	97-102	2.1	5
		0.50	97	92-99	3.2	5
		5.0	92	92, 92	--	2
	Plum, fruit	0.05	88	84-90	3.3	4
		0.50	90	90-90	0.0	3
		5.0	92	90, 93	--	2
	Rice, green material	0.05	95	92, 98	--	2
		0.50	96	84-108	10.8	4
		5.0	90	89, 90	--	2
	Rice, grain	0.05	92	90, 94	--	2
		0.50	91	88-93	2.4	4
	Rice, straw	0.05	96	92, 99	--	2
		0.50	91	90, 92	--	2
		5.0	91	89, 92	--	2
		10	89	88, 89	--	2
	Tomato, fruit	0.05	95	86-100	5.7	8
		0.50	93	86-97	4.4	7
		5.0	85	84, 86	--	2
	Tomato, juice	0.05	93	92, 94	--	2
		0.50	94	93, 95	--	2

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Tomato, puree	0.05	99	97, 100	--	2
		0.50	96	95, 96	--	2
		5.0	93	92, 93	--	2
	Zucchini, fruit	0.05	101	100, 101	--	2
		0.50	96	95, 96	--	2
		5.0	97	96, 97	--	2
Preu, 2000 *00462/M002/E003*	Pear, fruit	0.05	98	96-101	2.2	5
		0.50	98	95-100	2.0	5
		5.0	96	92-98	3.0	5
	Banana, fruit	0.01	90	86-94	3.2	5
		0.05	88	86-89	1.6	5
		0.50	91	85-94	3.9	5
		5.0	94	88-102	5.7	5
	Banana, pulp	0.01	91	84-95	4.8	5
		0.05	91	82-95	5.8	5
		0.50	96	93-98	2.4	5
		5.0	98	92-103	4.7	5
	Banana, peel	0.01	103	99-106	2.9	4
		0.05	102	96-107	4.0	5
		0.50	101	90-120	11.8	5
		5.0	95	88-101	4.9	5
	Elderberry, berry	0.05	106	100-113	4.4	5
		0.50	101	96-106	3.7	5
		5.0	101	98-105	2.8	5
	Elderberry, cluster of berries	0.05	108	103-117	5.4	5
		0.50	100	96-105	4.1	5
		5.0	105	98-115	6.1	5
Preu, 2001 *00462/M002/E005*	Brussels sprouts, sprouts	0.05	87	84-89	3.0	3
		0.50	91	89-95	3.5	3
	Nectarine, fruit	0.05	92	89-96	4.1	3
		0.50	96	94-98	2.2	3
	Peach, fruit	0.05	94	89-99	4.0	5
		0.50	88	78-98	8.0	5
	Sugar beet, leaf	0.05	93	91-94	1.6	3
		0.50	98	97-99	1.2	3
	Sugar beet, body	0.05	94	93-95	1.2	3
		0.50	91	89-93	2.3	3
	Wheat, grain	0.05	86	74-92	8.0	5
		0.50	83	75-91	7.7	5
Preu, 2002 *00462/M002/E006*	Broccoli, inflorescence	0.05	94	93-96	1.4	5
		0.50	100	96-102	2.5	5
Preu, 2002 *00462/M002/E007*	Barley, brewer´s malt	0.02	90	86-92	3.8	3
		0.20	90	88-91	1.9	3
	Barley, malt sprouts	0.02	98	96-99	1.6	3
		0.20	98	97-99	1.2	3
	Corn, cob without husks	0.05	92	92-93	0.6	3
		0.50	96	95-97	1.0	3
	Corn, kernel	0.05	94	92-96	2.2	3
		0.50	99	98-99	0.6	3
	Corn, whole plant without roots	0.05	95	91-97	3.4	3
		0.50	97	97-98	0.6	3
Heinemann, 1999 *00462/M003*	Hops, green umbel	0.05	94	88-98	3.8	5
		0.50	95	87-99	4.4	5
		5.0	107	97-113	5.1	5
	Hops, dried umbel	0.05	84	80-90	4.2	5
		0.50	81	78-83	2.2	5
		5.0	106	103-109	2.2	5
Preu, 2000 *00462/M003/E004*	Beer	0.05	98	97-100	1.2	5
		0.50	91	88-94	2.4	5
	Draff (Brewer´s grain)	0.05	100	97-103	2.6	5
		0.50	96	92-101	4.1	5

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	Recovery,% range	RSD,%	N
	Yeast	0.05 0.50	93 96	89-98 91-99	4.4 3.5	5 5
Preu, 2002 *00462/M003/E010*	Brewer´s grain	0.02 0.20	103 103	103-104 102-105	0.6 1.5	3 3
	Beer	0.02 0.20	100 106	100-101 105-108	0.6 1.6	3 3
	Brewer´s Yeast	0.05 0.50	100 106	97-102 104-107	2.5 1.4	3 3
Preu, 2001 *00462/M004*	Olive, fruit	0.05 0.50	78 81	77-79 81-82	1.3 0.7	3 3
	Rape seed, green material	0.05 0.50	86 86	83-88 82-90	2.3 3.6	5 5
	Rape seed, seed	0.05 0.50	77 74	76-79 70-76	2.0 3.2	5 5
Heinemann, 2002 *00462/M006*	Rape, seed	0.02 0.20	82 83	81-84 81-85	1.6 1.8	5 5
	Rape, straw	0.02 0.20	97 97	92-100 94-101	3.1 3.1	5 5
	Rape, pod	0.02 0.20	85 89	73-98 84-94	11.2 5.1	5 5
	Rape, oil	0.02 0.20	95 96	93-99 94-99	2.7 2.1	5 5
Heinemann, 2002 *00462/M007*	Artichoke, head	0.05 0.50	95 101	94-96 96-105	0.9 3.6	5 5
	Apple, fruit	0.05 0.50	98 98	92-102 91-100	4.1 3.9	5 5
	Honey	0.05 0.50	98 98	92-101 94-100	3.7 2.4	5 5
	Red cabbage, head	0.05 0.50	98 95	96-100 88-100	1.7 5.0	5 5
	Round cabbage, head	0.05 0.50	100 97	98-102 94-100	1.6 2.5	5 5
	Leek, shoot	0.05 0.50	101 96	99-106 91-98	2.9 3.3	5 5
	Kidney bean, bean with pod	0.05 0.50	98 98	94-101 96-99	3.2 1.2	5 5
	Kidney bean, preserve	0.05 0.50	98 98	92-102 96-99	4.0 1.2	5 5
	Papaya, fruit	0.05 0.50	97 97	93-101 94-99	3.3 2.1	5 5
Billian, 2003 *00765/M001*	Brussels sprouts	0.05 0.50	87 84	80-89 76-91	4.5 6.5	5 5
	Cabbage, red	0.05 0.50	104 101	99-112 100-101	6.7 0.6	3 3
	Cabbage, white	0.05 0.50	103 99	98-110 98-100	5.9 1.0	3 3
	Carrot	0.05 0.50	97 99	96-99 97-100	1.8 1.6	3 3
	Kidney bean	0.05 0.50	84 93	77-87 92-98	4.7 7.0	5 5
	Leek	0.05 0.50	98 96	97-101 95-97	2.4 1.0	3 3
Nuesslein, 2004 *00839*	Wheat, green material	0.02 0.20	93 110	91-94 107-114	1.6 3.5	3 3
	Wheat, straw	0.02 0.20	98 102	89-108 95-108	9.7 6.5	3 3
	Wheat, grain	0.01 0.20	87 96	80-95 87-104	6.6 6.6	5 5
	Barley, green material	0.02 0.20	96 97	86-102 96-97	9.1 0.6	3 3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
	Barley, straw	0.02	84	78-91	7.7	3
		0.20	102	93-114	10.4	3
	Barley, grain	0.01	100	91-106	7.9	3
	Rye, green material	0.02	92	91-93	1.3	3
		0.20	98	97-99	1.0	3
	Rye, straw	0.02	81	74-90	9.9	3
		0.20	96	91-102	5.7	3
	Rye, grain	0.01	105	89-114	13.0	3
Zimmer, 2004 *00839*/E001	Apple, fruit	0.02	80	77-82	3.3	3
		0.20	72	71-74	2.4	3
		2.0	97	89-109	10.7	3
	Broccoli, plant	0.02	94	90-96	3.7	3
		0.20	94	92-98	3.4	3
		2.0	99	96-105	5.0	3
	Broccoli, curd	0.02	83	74-88	9.2	3
		0.20	90	85-95	5.6	3
		2.0	97	93-104	6.6	3
	Brussels sprouts	0.02	90	84-94	5.9	3
		0.20	85	82-89	4.1	3
		2.0	93	92-94	1.1	3
	Cauliflower, plant	0.02	97	96-99	1.6	3
		0.20	98	96-101	2.7	3
		2.0	97	92-102	5.2	3
	Cauliflower, curd	0.02	93	88-98	5.4	3
		0.20	93	90-95	3.1	3
		2.0	95	89-103	7.6	3
	Cherry, fruit	0.02	87	84-89	3.0	3
		0.20	102	101-104	1.5	3
		2.0	104	98-114	8.6	3
	Cucumber, fruit	0.02	84	80-90	6.1	3
		0.20	93	92-94	1.2	3
		2.0	93	83-100	9.4	3
	Grape, bunch	0.02	90	74-113	17.4	5
		0.20	94	89-102	5.5	5
		2.0	93	92-93	0.6	3
	Kidney bean, with pod	0.02	88	78-94	10.1	3
		0.20	86	81-92	6.4	3
		2.0	95	92-101	5.5	3
	Melon, fruit	0.02	74	71-76	3.9	3
		0.20	92	87-96	4.9	3
		2.0	90	84-94	5.9	3
	Onion, bulb	0.02	93	87-97	5.9	3
		0.20	98	77-115	19.8	3
		2.0	100	97-104	3.8	3
	Peach, fruit	0.02	79	73-83	6.7	3
		0.20	91	86-97	6.3	3
		2.0	92	87-96	4.2	6
	Pear, fruit	0.02	94	88-99	5.9	3
		0.20	93	86-101	8.0	3
		2.0	90	88-92	2.3	3
	Pepper, fruit	0.02	93	89-96	3.8	3
		0.20	86	80-91	6.4	3
		2.0	94	92-96	2.2	3
	Plum, fruit	0.02	94	81-107	13.8	3
		0.20	93	89-97	4.4	3
		2.0	97	89-104	7.8	3
	Strawberry, fruit	0.02	88	82-93	6.4	3
		0.20	81	61-96	22.3	3
		2.0	87	82-90	4.8	3
	Tomato, fruit	0.02	94	85-101	8.7	3
		0.20	89	85-97	7.5	3
		2.0	92	87-97	5.4	3

Reference	Matrix	Fortification level, mg/kg	Recovery,% mean	range	RSD,%	N
Diot, 2007 *00984*	Lettuce, head	0.01 0.10	91 100	86-103 95-103	7.7 3.0	5 5
	Rape, seed	0.01 0.10	78 94	74-83 90-101	4.2 5.2	5 5
	Wheat, grain	0.01 0.10	109 105	98-116 91-117	7.1 9.2	5 5
	Wheat, straw	0.05 0.50	85 87	79-92 86-89	6.3 1.5	5 5
	Orange, fruit	0.01 0.10	93 93	90-96 90-96	3.0 2.3	5 5
Diot, 2007 *00984* Confirmatory MRM	Lettuce, head	0.01 0.10	95 103	92-100 98-110	3.6 4.2	5 5
	Rape, seed	0.01 0.10	79 102	77-80 98-108	1.7 4.6	5 5
	Wheat, grain	0.01 0.10	101 112	95-107 100-124	5.4 7.8	5 5
	Wheat, straw	0.05 0.50	85 95	81-90 93-97	4.1 1.9	5 5
	Orange, fruit	0.01 0.10	91 100	87-93 96-104	2.6 3.0	5 5
Schoening, 2007 *00984/M001*	Cabbage, head	0.01 0.10	85 77	83-88 73-82	2.9 5.8	3 3
	Cabbage, cooking water	0.01 0.10	90 82	87-94 75-88	4.2 8.0	3 3
Brumhard & Stuke, 2007 *01013* 1st MRM	Citrus, fruit	0.01 0.10	103 96	98-106 90-101	3.0 4.2	5 5
	Pea, fruit	0.01 0.10	105 102	100-108 98-104	3.4 2.6	5 5
	Rape, seed	0.01 0.10	102 95	97-112 92-99	5.8 2.8	5 5
	Wheat, grain	0.01 0.10	101 100	96-104 99-102	3.9 1.2	5 5
	Corn, green material	0.01 0.10	111 101	104-118 97-105	5.0 3.2	5 5
Brumhard & Stuke, 2007 *01013* Conf. MRM	Citrus, fruit	0.01 0.10	95 94	82-106 88-101	9.1 5.4	5 5
	Pea, fruit	0.01 0.10	103 95	96-118 93-99	8.5 2.4	5 5
	Rape, seed	0.01 0.10	115 106	109-125 98-116	5.4 6.8	5 5
	Wheat, grain	0.01 0.10	97 92	88-110 90-95	11.0 2.1	5 5
	Corn, green material	0.01 0.10	117 103	100-143 98-110	13.6 4.9	5 5

Animal matrices

In Mobay Method 97468, residues of tebuconazole and its metabolite M03 (tebuconazole-1-hydroxy) were extracted from the samples with methanol or methanol/hexane mixtures (Leimkuehler *et al*., 1988). After filtration and dichloromethane/water partitioning, the organic extracts were hydrolysed with HCl, purified by GPC and subjected to a combination of silica and florisil or HPLC column purifications. Tebuconazole was measured directly by GC-NPD, tebuconazole-1-hydroxy was derivatised to a monosilyl ether before quantitation by GC-NPD. The results are shown in Table 40.

Table 40 Results of validation of Mobay method 97468 for in bovine and poultry tissues, milk and eggs

Sample	Fortification level , mg/kg	Tebuconazole Recovery,% Range (n)	Tebuconazole Recovery,% Mean	Tebuconazole RSD,%	Tebuconazole-1-hydroxy Recovery,% Range (n)	Tebuconazole-1-hydroxy Recovery,% Mean	Tebuconazole-1-hydroxy RSD,%
Bovine							
Liver	0.1	45-76 (4)	63	13	50-91 (4)	57	37
	0.05	96, 76	86	14	42-100 (4)	71	30
Kidney	0.1	65-104 (4)	85	17	90, 134	112	31
	0.05	90-130 (3)	116	23	42-60 (3)	54	10
Muscle	0.05	62-106 (4)	88	19	70-120 (4)	95	24
Fat	0.05	66, 94	80	20	60-78 (3)	67	9
	0.5	72, 79	76	5			
Milk	0.05	62, 92	77	21	77-102 (4)	87	13
	0.01	50-140 (13)	89	24	30-60 (10)	45	13
Poultry							
Liver	0.1	61-70 (4)	64	4	32-34 (3)	32	1
	0.05	104, 106	102	1	27, 28	27	1
Muscle	0.05	72-98 (3)	86	13	72-80 (3)	77	4
Fat	0.05	70-92 (3)	81	11	52-58 (3)	56	3
Skin	0.05	62-126 (3)	100	34	58-68 (3)	65	6
Eggs	0.1	66-121 (3)	101	31	30-94 (4)	50	30
	0.05	84, 130	107	32	36, 54	45	13
	0.025	80-120 (3)	95	22	-	-	-
	0.01	130 (2)	130	-	50, 180	115	91

Attempts were made to validate Mobay method 97468 on beef liver (Erhardt-Zabik *et al*., 1990). It was determined that a fresh HCl solution should be made prior to hydrolysis of the extract as incomplete hydrolysis resulted in exceptionally dirty samples which altered the equilibrium time required between each sample when run on the GPC. Samples were loaded onto the GPC by alternating solvent filled loops between every two samples. After recalibration of the GPC column with ^{14}C labelled material, recoveries at 0.15 mg/kg (n = 2) were 88–102% for tebuconazole and 79–97% for tebuconazole-1-hydroxy. At 0.3 mg/kg level, recoveries were 91–103% and 89–98%, respectively.

In Method 101316 (Gronberg *et al*., 1991), the matrices are extracted with methanol and acetonitrile and the extracted metabolite was hydrolysed by an overnight acidic reflux. After hydrolysis, residues are separated by GPC, hexane/acetonitrile partitioning and HPLC using both RP and semipermeable surface columns. Tebuconazole and a t-butyldimethylsilane derivative of the 1-hydroxy metabolite were analysed by GC/NPD. Results of the validation are shown in Table 41. LOQ for tebuconazole and the metabolite in cattle and poultry tissues and eggs was 0.1 mg/kg, and 0.05 mg/kg in milk. GC-MSD using SIM was used for the confirmatory analysis procedure.

Table 41 Validation of method 101316

Matrix	Fortification level, mg/kg	Tebuconazole,%	Tebuconazol-1-hydroxy,%
Bovine			
Liver	0.1	89, 91	72, 78
Kidney	0.1	76, 78	77, 89
Muscle	0.1	91, 101	89, 81
Fat	0.1	91, 84	87, 78
Milk	0.1	94, 101	102, 102
	0.05	105, 106	83, 93
Poultry			
Liver	0.1	98, 90	95, 86, 117
Muscle	0.1	116, 113	114, 94
Fat	0.1	87, 89	74, 92
Skin	0.1	96, 106	95, 95
Egss	0.1	87, 91	86, 71

An ILV of the analytical method 101316 was conducted by Krolski & Bosnak (1991). Recoveries from liver samples using the method as initially supplied were unacceptable for both tebuconazole and M03 at 0.10 mg/kg level. After several adjustments in the method, e.g. change of the GPC solvent system, adjustment of amounts of solvents used for partitioning following GPC, and elimination the GPC step for milk, the validation was performed successfully, with recoveries of tebuconazole from liver ranged from 71 to 82% at 0.10 mg/kg and from 93 to 117% at 0.50 mg/kg. Recoveries of M03 from liver ranged from 89 to 109% at 0.10 mg/kg and from 92 to 95% at 0.50 mg/kg. Recoveries of tebuconazole from milk ranged from 91 to 107% at 0.10 mg/kg and from 86 to 94% at 0.50 mg/kg. Recoveries of M03 from milk ranged from 82 to 103% at 0.10 mg/kg and from 84 to 92% at 0.50 mg/kg.

Stability of residues in stored analytical samples

Untreated samples of peach, prune, grape, apple, cherry, wheat (forage, grain, straw, flour, bran), peanut (nutmeat, oil), and raisin were homogenised and fortified individually with tebuconazole at 1.0 mg/kg, with two samples per matrix plus one control (Conrath and Williams, 1993 Add.2; Williams, 1994; Lemke, 1996). With each analysis set concurrent recovery samples, fortified at 0.5 and 1.0 mg/kg, were analysed to monitor method performance. Samples were held in frozen storage at a temperature range of -10 °C to -24 °C (typically -20 °C) for approximately up to 30 months. The results are shown in Table 42.

Table 42 Storage stability of tebuconazole in plant matrices (% remaining)

Crop / matrix	Storage time (months)					
	6	12	18	24	30	63
Peaches	93	99	93	96	98	n.a.
Prunes	102	96	94	93	90	n.a.
Grapes	92	98	96	90	88	n.a.
Apples	92	101	101	87	85	n.a.
Cherries	92	89	90	91	90	n.a.
Wheat forage	108	92	96	99	102	100
Wheat grain	87	92	78	76	91	68
Wheat straw	101	94	90	92	86	88
Peanut meat	100	93	95	90	94	84
Wheat flour	94	90	90	110	n.a.	n.a.
Wheat bran	68	100	86	112	n.a.	n.a.
Peanut oil	80	92	87	94	n.a.	n.a.
Raisin	82	100	97	111	n.a.	n.a.

The stability of [phenyl-UL-^{14}C]tebuconazole, tebuconazole-1-hydroxy (M03) in the livestock metabolism studies, in chicken tissues held in frozen storage was investigated by Howard and Lee (1988). All tissues were stored frozen at approximately -10 °C for up to one year. Sub-samples were extracted and analysed at 1, 3, 6, and 12-month intervals. The results are shown in Table 43.

Table 43 Storage stability of tebuconazole and tebuconazole-1-hydroxy (M03) in chicken tissues

Storage time (months)	% of total organosoluble radioactivity							
	Liver		Kidney		Muscle		Fat	
	Tebuconazole	M03	Tebuconazole	M03	Tebuconazole	M03	Tebuconazole	M03
1	29.4	19.5	33.0	7.4	60.2	28.9	78.8	10.8
3	26.9	19.4	49.2	8.9	58.6	28.8	75.6	10.4
6	33.0	24.0	41.6	10.9	53.2	24.7	77.8	11.5
12	12.9	14.5	60.6	10.4	66.7	30.8	77.8	9.2

M03= tebuconazole-1-hydroxy

In a stability study involving poultry matrices, conducted concurrently with the feeding study, five replicates of each, liver, muscle, fat, skin, and eggs were fortified at approximately 1.0 mg/kg of ^{14}C tebuconazole and tebuconazole-1-hydroxy and samples stored in a freezer at -24 °C (Mathew *et*

al., 1991). From 94.5 to 100% of the initial residues remained after 23 weeks of storage. In a similar study conducted in bovine tissues (liver, kidney; muscle and fat) and milk, from 99 to 118% of the initial residues remained after 24 weeks of storage (Chopade and Fitzpatrick, 1991). Another study conducted with ^{14}C labelled compounds, residues of tebuconazole and its hydroxy metabolite were 86 to 101% of the initial concentration in eggs and milk after 12 months of storage at -24 °C (Duah and Hagen; 1991).

USE PATTERN

Tebuconazole is used for foliar application and seed dressing in many crops. Use patterns from countries worldwide that are relevant for this evaluation are presented in Table 45.

Table 45 Use patterns of tebuconazole

Crop	Country	Formulation	Application							PHI (days)
			kg ai/ha			kg ai/hL			No.	
Apple	*France*	WG 250 g/kg						0.0075	n.s.	21
Apple	*Greece*	EW 250 g/L	0.100	-	0.250	0.0100	-	0.0125	2	35
Apple	*Greece*	WG 250 g/kg	0.100	-	0.250	0.0100	-	0.0125	2	35
Apple	*Hungary*	WG 250 g/kg			0.125				max. 4	28
Apple	*Italy*	SE 43 g/L	0.138	-	0.225	0.0099	-	0.0125	max. 4	30
Apple	*Italy*	WG 250 g/kg	0.140	-	0.225	0.0100	-	0.0125	max. 4	30
Apple	*Portugal*	WG 250 g/kg				0.0075	-	0.0100	max. 4	21
Apple	*Spain*	WG 250 g/kg	Total max. 1.125			0.01	-	0.0188	max. 4	14
Apricot	*Czech Republic*	EW 250 g/L	0.187	-	0.250				max. 3	7
Apricot	*France*	WG 250 g/kg						0.0125	1-2	7
Apricot	*Hungary*	EW 250 g/L	0.187	-	0.250				1-3	14
Apricot	*Hungary*	WG 250 g/kg	0.187	-	0.250				1-3	14
Apricot	*Italy*	SE 43 g/L	0.150	-	0.277	0.0125	-	0.0185	1-2	7
Apricot	*Spain*	WG 250 g/kg				0.0125	-	0.025	max. 4	7
Apricot	*USA*	WG 450 g/kg	0.126	-	0.252				*	0
Artichoke	*Italy*	SE 43 g/L			0.125			0.0125	max. 4	7
Artichoke	*Italy*	WG 250 g/kg	0.100	-	0.125			0.0125	max. 4	7
Artichoke	*Peru*	WP 250 g/kg			0.125				n.s.	7
Artichoke	*Peru*	SC 416.7 g/L	0.067	-	0.100				n.s.	3
Aubergine/ eggplant	*Brazil*	EC 200 g/L			0.200				max. 4	7
Banana	*Australia*	SC 430 g/L			0.099				max. 6	1
Banana	*Brazil*	EC 200 g/L			0.100				max. 5	5
Banana	*Colombia*	EW 250 g/L			0.100				n.s.	0
Banana	*Costa Rica/others*	EW 250 g/L			0.100				max. 8	0
Banana	*Ecuador*	EC 300 g/L			0.1125				n.s.	0
Banana	*Ecuador*	EW 250 g/L			0.100				6-8	0
Banana	*Mexico*	EW 250 g/L			0.100				max. 8	0
Banana	*USA*	WG 450 g/kg			0.101				max. 5	0
Barley	*Austria*	EW 250 g/L	0.250	-	0.3125				1	35
Barley	*Austria*	EC 250 g/L			0.125				2	appl. BBCH 61
Barley	*Belgium*	EW 250 g/L	0.250	-	0.375				1	appl. BBCH 69

Crop	Country	Formulation	Application					PHI (days)
			kg ai/ha			kg ai/hL	No.	
Barley	*Czech Republic*	EW 250 g/L	0.187	-	0.250		1	35
Barley	*Denmark*	EC 250 g/L	0.05	-	0.250		max. 2	42
Barley	*France*	EW 250 g/L			0.250		2	28
Barley	*Germany*	EW 250 g/L			0.3125		max. 2	35
Barley	*Hungary*	EW 250 g/L			0.250		2	30
Barley	*Ireland*	EW 250 g/L			0.250		1-2	appl. before milky ripe
Barley	*Italy*	SE 43 g/L			0.215		1	appl. BBCH 69
Barley	*Italy*	WG 250 g/kg			0.250		1	appl. BBCH 69
Barley	*Portugal*	EW 250 g/L			0.250		1-2	35
Barley	*Spain*	EW 250 g/L			0.250		n.s.	35
Barley	*United Kingdom*	EW 250 g/L			0.250		1-2	appl. before milky ripe
Bean (dry)	Brazil	EC 200 g/L	0.150	-	0.200		max. 3	14
Bean (dry)	Brazil	SC 200 g/L	0.120	-	0.150		max. 3	15
Bean (dry)	Brazil	WP 250 g/kg	0.187	-	0.250		1-2	14
Bean (dry)	USA	SC 432 g/L	0.126	-	0.189		2-3	14
Broccoli	Belgium	WG 750 g/kg			0.200		1-2	21
Broccoli	Germany	EW 250 g/L			0.250		max. 2	21
Broccoli	Ireland	WG 750 g/kg			0.200		max. 2	21
Broccoli	Netherlands	EC 250 g/L			0.250		max. 3	21
Broccoli	Netherlands	SC 430 g/L			0.258		max. 3	21
Broccoli	United Kingdom	WG 750 g/kg			0.200		max. 2	21
Brussels sprouts	Belgium	EW 250 g/L			0.125		max. 3	21
Brussels sprouts	Germany	EW 250 g/L			0.250		max. 3	21
Brussels sprouts	Netherlands	SC 430 g/L			0.258		max. 3	21
Brussels sprouts	Netherlands	WG 250 g/kg			0.300		max. 3	21
Cabbage, head	Austria	EW 250 g/L			0.250		max. 3	21
Cabbage, head	Belgium	EW 250 g/L			0.125		max. 3	21
Cabbage, head	Belgium	WG 750 g/kg			0.200		max. 2	21
Cabbage, head	Germany	EW 250 g/L			0.250		max. 3	21
Cabbage, head	Ireland	EW 250 g/L			0.250		max. 3	21
Cabbage, head	Ireland	WG 750 g/kg			0.200		max. 3	21
Cabbage, head	Netherlands	EC 250 g/L			0.250		max. 3	21
Cabbage, head	Netherlands	SC 430 g/L			0.258		max. 3	21
Cabbage, head	United Kingdom	EW 250 g/L			0.250		max. 3	21
Cabbage, head	United Kingdom	WG 750 g/kg			0.200		max. 3	21
Carrot	Brazil	EC 200 g/L			0.200		max. 4	14
Carrot	Brazil	SC 200 g/L			0.150		max. 4	14
Carrot	Austria	EW 250 g/L			0.250		max. 3	21
Carrot	Belgium	EW 250 g/L			0.250		max. 3	21
Carrot	Germany	EW 250 g/L			0.250		max. 3	21
Carrot	Ireland	EW 250 g/L			0.250		max. 3	21
Carrot	Netherlands	EC 250 g/L			0.250		max. 3	21
Carrot	Netherlands	SC 430 g/L			0.258		max. 3	21
Carrot	Switzerland	EW 250 g/L			0.250		max. 3	21
Carrot	United Kingdom	EW 250 g/L			0.250		max. 3	21
Cauliflower	Austria	EW 250 g/L			0.250		max. 2	21
Cauliflower	Belgium	EW 250 g/L			0.125		3	21
Cauliflower	Belgium	EW 250 g/L	0.250	-	0.125		2	21

Crop	Country	Formulation	Application						PHI (days)
			kg ai/ha			kg ai/hL		No.	
Cauliflower	Belgium	WG 750 g/kg			0.200			1-2	21
Cauliflower	France	EW 250 g/L			0.250			max. 3	21
Cauliflower	Germany	EW 250 g/L			0.250			max. 2	21
Cauliflower	Ireland	WG 750 g/kg			0.200			max. 2	21
Cauliflower	Netherlands	EC 250 g/L			0.250			max. 3	21
Cauliflower	Netherlands	SC 430 g/L			0.258			max. 3	21
Cauliflower	United Kingdom	WG 750 g/kg			0.200			max. 2	21
Cherry	Belgium	EW 250 g/L			0.125		0.0125	max. 2	7
Cherry	*Czech Republic*	EW 250 g/L	0.187	-	0.250			max. 2	7
Cherry	*France*	WG 250 g/kg					0.0188	max. 2	7
Cherry	*Hungary*	EW 250 g/L	0.187	-	0.250			1-4	14
Cherry	*Hungary*	WG 250 g/kg	0.187	-	0.250			1-3	14
Cherry	*Italy*	SE 43 g/L			0.278	0.0125	- 0.0185	1-2	7
Cherry	*Italy*	WG 250 g/kg	0.150	-	0.281	0.0125	- 0.0188	1-2	7
Cherry	*Netherlands*	SC 430 g/L					0.0129	max. 3	7
Cherry	*Poland*	EW 250 g/L			0.1875			2-3	7
Cherry	*Spain*	WG 250 g/kg				0.0125	- 0.0188	max. 3	7
Cherry	*USA*	WG 500 g/kg	0.070	-	0.140			max. 4	1
Cherry	*USA*	WG 450 g/kg	0.126	-	0.252			*	0
Citrus	*Brazil*	EC 200 g/L				0.015		2	20
Citrus	*Brazil*	SC 200 g/L			0.160	0.006	- 0.008	3	20
Citrus	*South Africa*	EW 250 g/L					0.02	2	175
Citrus	*Spain*	EW 250 g/L					0.1	1	
Coffee	*Brazil*	EC 200 g/L			0.200			max. 5	30
Coffee	*Brazil*	WP 250 g/kg			0.250			1-3	30
Cotton	Brazil	EC 200 g/L			0.150			max. 3	30
Cotton	Brazil	SC 200 g/L	0.120	-	0.150	Normally 3 applications			21
Cotton	USA	SC 432 g/L	0.189	-	0.252			*	30
Cucumber	Brazil	EC 200 g/L			0.200			max. 4	5
Cucumber	Italy	SE 43 g/L			0.125		0.0125	max. 4	3
Cucumber	Italy	WG 250 g/kg	0.100	-	0.125		0.0125	max. 4	3
Cucumber	Switzerland	WG 750 g/kg			0.200		0.02	max. 3	3
Elderberry	Austria	EW 250 g/L			0.375		0.0375	max. 3	24
Garlic	*Brazil*	EC 200 g/L			0.200			max. 4	14
Garlic	*Brazil*	SC 200 g/L	0.100	-	0.150			3	14
Garlic	*Brazil*	WP 250 g/kg			0.250			max. 4	14
Garlic	*France*	EW 250 g/L			0.250			max. 2	21
Garlic	*Italy*	SE 43 g/L			0.249			2	21
Garlic	*Spain*	EW 250 g/L			0.500			1	appl. after seeding
Garlic	*Spain*	EW 250 g/L			0.250			max. 2	21
Grape	*Austria*	WG 750 g/kg			0.090		0.009	max. 3	28
Grape	*Brazil*	EC 200 g/L				0.015	- 0.025	3-4	14
Grape	*Brazil*	WP 250 g/kg					0.025	n.s.	14
Grape	*France*	EW 250 g/L	0.075	-	0.100			3	14
Grape	*Greece*	EW 250 g/L	0.080	-	0.100		0.010	max. 2	21
Grape	*Greece*	WG 250 g/kg	0.080	-	0.100		0.010	max. 2	21

Crop	Country	Formulation	Application									PHI (days)
			kg ai/ha			kg ai/hL			No.	
Grape	*Hungary*	EW 250 g/L			0.100				3-4	35
Grape	*Italy*	SE 43 g/L			0.100			0.010	max. 4	14
Grape	*Italy*	WG 250 g/kg			0.100			0.010	max. 4	14
Grape	*Portugal*	EW 250 g/L			0.100			0.01	3	7
Grape	*Portugal*	WG 250 g/kg			0.100			0.01	3	7
Grape	*Spain*	EW 250 g/L				0.01	-	0.025	n.s.	21
Grape	Spain	WG 250 g/kg				0.01	-	0.025	n.s.	21
Grape	USA	WG 500 g/kg	0.0525	-	0.126				max. 6	14
Grape	USA	WG 450 g/kg			0.126				max. 8	14
Hops	Czech Republic	EW 250 g/L			0.5625 0.3750 0.1875			0.0187	2 3 6	21
Leek	Austria	EW 250 g/L			0.250				max. 3	14
Leek	Belgium	EW 250 g/L			0.250				max. 3	14
Leek	France	EW 250 g/L			0.250				max. 3	14
Leek	Germany	EW 250 g/L			0.250				max. 3	14
Leek	Ireland	EW 250 g/L			0.250				max. 3	14
Leek	Netherlands	EC 250 g/L			0.250				max. 3	14
Leek	Netherlands	SC 430 g/L			0.258				max. 3	14
Leek	Netherlands	WG 250 g/kg			0.300				max. 3	14
Leek	Switzerland	EW 250 g/L			0.250				max. 3	21
Leek	United Kingdom	EW 250 g/L			0.250				max. 3	14
Maize / Corn	Brazil	EC 200 g/L			0.200				max. 3	15
Maize / Corn	USA	SC 432 g/L	0.126	-	0.189				*	36
Mango	Brazil	EC 200 g/L	0.200	-	0.400			0.02	max. 3	20
Mango	Brazil	SC 200 g/L			0.120			0.006	1-3	20
Melon	Brazil	EC 200 g/L			0.200				max. 3	14
Melon	Brazil	SC 200 g/L			0.150				max. 4	14
Melon	Brazil	WP 250 g/kg			0.250				n.s.	14
Melon	Italy	SE 43 g/L			0.125			0.0125	max. 4	7
Melon	Italy	WG 250 g/kg	0.100	-	0.125			0.0125	max. 4	7
Oilseed rape	Austria	EW 250 g/L	0.250	-	0.375				1	56
Oilseed rape	Czech Republic	EW 250 g/L	0.250	-	0.375				max. 2	56
Oilseed rape	Denmark	EC 250 g/L	0.125	-	0.250				1-2	n.s.
Oilseed rape	Germany	EW 250 g/L	0.250	-	0.375				1-2	56
Oilseed rape	Netherlands	EC 250 g/L			0.250				max. 2	56
Oilseed rape	Netherlands	SC 430 g/L			0.258				max. 2	56
Oilseed rape	Poland	EW 250 g/L	0.250	-	0.3125				1-2	35 (appl. BBCH 65)
Olive	Spain	EW 250 g/L						0.015	1	appl. before flowering
Onion	*Austria*	EW 250 g/L			0.250				max. 2	21
Onion	*Brazil*	EC 200 g/L			0.200				max. 4	14
Onion	*Brazil*	SC 200 g/L			0.150				3	14
Onion	*Brazil*	WP 250 g/kg			0.250				max. 4	14
Onion	*Germany*	EW 250 g/L			0.250				max. 2	21
Onion	*Spain*	EW 250 g/L			0.500				1	appl. after sowing
Papaya	*Australia*	SC 430 g/L			0.125				max. 6	3
Papaya	*Brazil*	EC 200 g/L			0.200				max. 6	7
Passionfruit	*Brazil*	EC 200 g/L						0.020	max. 3	7
Passionfruit	*Brazil*	SC 200 g/L			0.120			0.024	max. 4	7
Peach	*Czech Republic*	EW 250 g/L	0.187	-	0.250				max. 3	7

Crop	Country	Formulation	Application								PHI (days)
			kg ai/ha			kg ai/hL			No.		
Peach	*France*	WG 250 g/kg						0.0125	1-2		7
Peach, nectarine	*Greece*	EW 250 g/L	0.187	-	0.250	0.0125	-	0.0187	max. 2		7
Peach, nectarine	*Greece*	WG 250 g/kg	0.187	-	0.250	0.0125	-	0.0187	max. 2		7
Peach, nectarine	*Italy*	WG 250 g/kg	0.150	-	0.281	0.0125	-	0.0175	1-2		7
Peach	*Hungary*	EW 250 g/L	0.187	-	0.250				1-3		14
Peach	*Hungary*	WG 250 g/kg	0.187	-	0.250				1-3		14
Peach, nectarine	*Italy*	SE 43 g/L	0.125	-	0.277	0.0125	-	0.0185	1-2		7
Peach, nectarine	*Italy*	WG 250 g/kg	0.125	-	0.281	0.0125	-	0.0175	1-2		7
Peach, nectarine	*Spain*	WG 250 g/kg				0.0125	-	0.025	max. 4		7
Peach, nectarine	*USA*	WG 450 g/kg	0.126	-	0.252				*		0
Peanut	*Brazil*	EC 200 g/L			0.100				max. 4		30
Peanut	*Brazil*	WP 250 g/kg			0.125				n.s.		30
Peanut	*USA*	SC 432 g/L			0.227				4		14
Peanut	*USA*	SC 500 g/L	0.064	-	0.128				4		14
Pear	*Hungary*	WG 250 g/kg			0.125				max. 4		28
Pear	*Italy*	SE 43 g/L	0.138	-	0.296	0.0099	-	0.0185	max. 4		15
Pear	*Italy*	WG 250 g/kg	0.140	-	0.300	0.0100	-	0.0188	max. 4		15
Pear	*France*	WG 250 g/kg						0.0075	n.s.		21
Pear	*Portugal*	WG 250 g/kg				0.0075	-	0.0188	max. 4		21
Pear	*Spain*	WG 250 g/kg			0.281	0.01	-	0.0188	max. 4		14
Pear	*USA*	WG 500 g/kg	0.07	-	0.105				*		75
Pear	*USA*	WG 450 g/kg	0.126	-	0.252				*		75
Plum	*Czech Republic*	EW 250 g/L	0.187	-	0.250				max. 2		7
Plum	*France*	WG 250 g/kg						0.015	max. 3		7
Plum	Hungary	EW 250 g/L	0.019	-	0.250				1-3		14
Plum	Italy	SE 43 g/L	0.125	-	0.277	0.0125	-	0.0185	1-2		7
Plum	Italy	WG 250 g/kg	0.125	-	0.281	0.0125	-	0.0188	1-2		7
Plum	Netherlands	SC 430 g/L						0.0129	max. 3		7
Plum	Netherlands	WG 250 g/kg						0.0125	max. 3		7
Plum	*Poland*	EW 250 g/L			0.1875				2		7
Plum	*Spain*	WG 250 g/kg			0.281	0.0125	-	0.0188	max. 3		7
Plum	*USA*	WG 450 g/kg	0.126	-	0.252				*		0
Plum	*USA*	WG 500 g/kg	0.070	-	0.140				max. 4		1
Rice	Brazil	EC 200 g/L			0.150				max. 2		35
Rice	Brazil	SC 200 g/L	0.100	-	0.150				1-2		35
Rice	Spain	EW 250 g/L			0.250				n.s.		35
Rye	Austria	EW 250 g/L	0.250	-	0.3125				1		35
Rye	France	EW 250 g/L			0.250				max. 2		28
Rye	Germany	EW 250 g/L			0.250				1-2		35

Crop	Country	Formulation	Application					PHI (days)
			kg ai/ha			kg ai/hL	No.	
Rye	Ireland	EW 250 g/L			0.250		1-2	appl. before milky ripe
Rye	Switzerland	EW 250 g/L	0.187	-	0.250		1	appl. BBCH 61
Rye	United Kingdom	EW 250 g/L			0.250		1-2	appl. before milky ripe
Soya bean	Brazil	EC 200 g/L	0.060	-	0.150		max. 3	30
Soya bean	*Brazil*	SC 200 g/L	0.080	-	0.120		2	30
Soya bean	*USA*	SC 432 g/L	0.094	-	0.126		max. 3	21
Sweet corn	*USA*	SC 432 g/L	0.126	-	0.189		*	7
Sweet pepper	*Brazil*	EC 200 g/L			0.200		max. 4	7
Sweet pepper	*Italy*	SE 43 g/L			0.125	0.0125	max. 4	3
Sweet pepper	*Italy*	WG 250 g/kg	0.100	-	0.125	0.0125	max. 4	3
Sweet pepper	*Spain*	WG 250 g/kg			0.200	0.0125 - 0.025	max. 3	7
Tomato	*Brazil*	EC 200 g/L			0.200	0.020	max. 5	7
Tomato	*Brazil*	SC 200 g/L			0.150		3	7
Tomato	*Brazil*	WP 250 g/kg	0.187	-	0.250	0.0187 - 0.025	max. 4	7
Tomato	*Italy*	SE 43 g/L			0.125	0.0125	max. 4	3
Tomato	*Italy*	WG 250 g/kg	0.100	-	0.125	0.0125	max. 4	3
Tomato	*Spain*	WG 250 g/kg				0.0125 - 0.0250	max. 3	3
Tree nuts	Italy	SE 43 g/L	0.181	-	0.226	0.015	2	appl. until end of flowering
Tree nuts	USA	SC 432 g/L	0.126	-	0.252		*	appl. before shucks begin to split
Tree nuts	USA	WG 450 g/kg			0.252		max. 4	35
Tree nuts	USA	WG 500 g/kg	0.070	-	0.140		max. 4	60
Zucchini	Italy	SE 43 g/L			0.125	0.0125	max. 4	3
Zucchini	Italy	WG 250 g/kg	0.100	-	0.125	0.0125	max. 4	3
Watermelon	Brazil	EC 200 g/L			0.200		max. 4	14
Watermelon	Brazil	SC 200 g/L			0.150		max. 4	14
Watermelon	Italy	SE 43 g/L			0.125	0.0125	max. 4	7
Watermelon	Italy	WG 250 g/L	0.100	-	0.125	0.0125	max. 4	7
Wheat	Austria	EC 250 g/L			0.125		1-2	35
Wheat	Austria	EW 250 g/L			0.250		1	35
Wheat	Belgium	EW 250 g/L			0.250		1	appl. BBCH 59
Wheat	Brazil	EC 200 g/L	0.120	-	0.150		max. 3	35
Wheat	Brazil	SC 200 g/L	0.120	-	0.150		max. 3	35
Wheat	Brazil	WP 250 g/kg			0.1875		n.s.	35
Wheat	Canada	SC 432 g/L	0.095	-	0.126		1	36
Wheat	Czech Republic	EW 250 g/L			0.250		1	35
Wheat	France	EW 250 g/L			0.250		max. 2	28
Wheat	Germany	EW 250 g/L			0.250		1-2	35
Wheat	Hungary	EW 250 g/L			0.250		2	30
Wheat	Ireland	EW 250 g/L			0.250		1-2	appl. before milky ripe
Wheat	Italy	EW 250 g/L			0.250		1	appl. BBCH 69
Wheat	Italy	SE 43 g/L			0.215		1	appl. BBCH 69
Wheat	Italy	WG 250 g/kg			0.250		1	appl. BBCH 69
Wheat	*Portugal*	EW 250 g/L			0.250		1-2	35
Wheat	*Spain*	EW 250 g/L			0.250		n.s.	35
Wheat	Switzerland	EW 250 g/L	0.187	-	0.250		1	appl. BBCH 61

Crop	Country	Formulation	Application				PHI (days)
			kg ai/ha		kg ai/hL	No.	
Wheat	United Kingdom	EW 250 g/L		0.250		1-2	appl. before milky ripe
Wheat	USA	SC 432 g/L		0.126		1	30

*apple and pear, WG 500: max. 385 g/ha/season; apple and pear WG 450: max. 1513 g/ha/season; cherry: max. 1.513 kg /ha/season; apricot, peach, nectarine: max. 1.513 kg /ha/season; plum: max. 1.513 kg/ha/season; sweet corn: max. 0.756 kg/ha/season; maize: max. 0.757 kg /ha/season; tree nuts: maximum 1 kg /ha/season; cotton: max. 0.756 kg/ha/season; hops: max. 1 kg /ha/season

RESIDUES RESULTING FROM SUPERVISED TRIALS

Over one thousand (1129) supervised residue trials conducted with tebuconazole from 1986 to 2009 in a variety of crops were submitted to the Meeting (Table 46). Studies were conducted according to GLP, with the exception of the studies conducted before middle 90's and of all Brazilian studies. In some of the non-GLP studies, only a summary report containing the relevant information was provided; others included detailed information on trial conditions and analytical method validation. Unless indicated, concurrent determinations of residues in untreated crops gave residues < LOQ. Unless indicated, trials were conducted using foliar application under field conditions.

Residues of tebuconazole within 25% GAP are underlined and were considered for estimation of STMR, HR and MRL. Residues on the crop pulp were doubled underlined and considered only for recommendation of STMR and HR. When residues in samples harvested at a later stage were higher than that at the critical PHI, they will be selected for the estimations. In trials conducted at the same location but with different formulation, or the same site but different spray concentration for the same kg ai/ha, only the highest residue coming from one of the trials will be selected for the estimations.

Table 46 Summary of supervised residue trials conducted with tebuconazole

Table	Commodity	No.	Location	Year
47	Orange, mandarin	22	Brazil, Europe and South Africa	1994-2004
48	Pome fruits	10	Europe	1993-2002
49	Cherry	31	Europe and USA	1991-2005
50	Apricot, peach and nectarine	27	Europe and USA	1988-2008
51	Plum	38	Europe and USA	1988-2005
52	Elderberry	6	Austria	1999/2000
53	Grapes	52	Brazil, Europe and USA	1987-2008
54	Olive	6	Europe	2000/2009
55	Banana	32	Australia, Brazil, Puerto Rico and USA	1989-2004
56	Mango	18	Brazil	1997-2004
57	Papaya	14	Australia and Brazil	1995-2004
58	Passion fruit	8	Brazil	2004
59	Garlic	11	Brazil and France	1992-2004
60	Leek	12	Europe	1995/1996
61	Onion	37	Brazil and Europe	1993-2007
62	Broccoli	15	Europe	2001-2007
63	Brussels sprouts	16	Europe	1993-2003
64	Cabbages	13	Europe	1988-2002
65	Cauliflower	24	Europe	1990-2007
66	Cucumber and zucchini	28	Brazil and Europe	1989-2004
67	Melon	27	Brazil and Italy	1992-2006
68	Watermelon	8	Brazil and Italy	1991-2004
69	Aubergine	8	Brazil	1999-2006
70	Pepper (sweet)	26	Brazil and Europe	1997-2000
71	Sweet corn	13	Brazil and USA	1997-2004
72	Tomatoes	44	Brazil, Europe, Mexico and USA	1989-2002
73	Bean (dry)	32	Brazil and USA	1990-2003
74	Soya beans	34	Brazil and USA	2003-2006
75	Carrots	20	Brazil and Europe	1992-2004
76	Artichoke	9	Italy, Spain, Mexico and Peru	1991-2009
77	Barley	40	Europe	1986-2002
78	Maize	29	Brazil and USA	1994-2004
79	Rice	14	Brazil, Italy, Spain	1996-2008

Table	Commodity	No.	Location	Year
80	Wheat and rye	77	Brazil, Canada, Europe and USA	1986-2007
81	Tree nuts	15	Europe and USA	1995-2003
82	Cotton	24	Brazil and USA	1992-2007
83	Peanut	30	Brazil and USA	1987-2008
84	Rape seed	31	Europe	200-2007
85	Coffee	20	Brazil and Guatemala	1990-2004
86	Hops	11	Germany	1998/1999
87	Barley feed	39	Europe	1986-2002
88	Maize feed	20	USA	1997
89	Rice feed	8	Europe	1996-1997
90	Wheat feed	70	Canada, Europe and USA	1986-2007
91	Almond hulls	6	USA	1996
92	Cotton gintrash	6	USA	1996
93	Peanut feed	17	USA	1987-1990
94	Rape feed	31	Europe	2000-2007

Citrus

The use of tebuconazole in/on citrus is registered in Brazil, South Africa and Spain. Fourteen pre-harvest field trials were conducted in Brazil and South Africa and eight trials with post-harvest treatment were conducted in Europe in orange and mandarins. The results are shown in Tables 47a, and b.

Table 47a Results of pre harvest residue trials conducted with tebuconazole in/on orange in Brazil and South Africa

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Brazil, 2004	Orange Valencia	SC300	5	0.20	0.01	fruit	0 3 7 14 21	< 0.1 < 0.1 < 0.1 < 0.1 < 0.1	FR04BRA021- C1-A
				0.40	0.02	fruit	14	< 0.1	FR04BRA021-C1-B
				0.20	0.01	fruit	14	< 0.1	FR04BRA021-P1-A
				0.40	0.02	fruit	14	< 0.1	FR04BRA021-P1-B
				0.20	0.01	fruit	14	< 0.1	FR04BRA021-P2-A
				0.40	0.02	fruit	14	0.2	FR04BRA021-P2-B
		EC 200	3	0.30	0.015	fruit	20	1.3	FR04BRA053- P1-A
				0.60	0.03	fruit	20	2.2	FR04BRA053- P1-B
				0.30	0.015	fruit	20	1.3	FR04BRA053-P2-A
				0.60	0.03	fruit	20	2.2	FR04BRA053- P2-B
South Africa, 1994	Orange Bonina navels	EW 250	2	0.29	0.02	whole fruit	62	0.06	311/88892/M97-A
						peel	93 126 154 175	0.06 0.01 0.01 0.02	The results were corrected for recovery For peel 77% and for pulp 76%
						pulp	93 126 154 175	< 0.01 < 0.01 < 0.01 < 0.01	
						whole fruit, calculated	93 126 154 175	0.03 < 0.01 < 0.01 < 0.01	
			2	0.43	0.03	peel	62 93 126 154 175	0.06 0.09 0.06 0.06 0.06	311/88892/M97-B For peel 77% and for pulp 97%

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						pulp	62 93 126 154 175	0.03 < 0.01 < 0.01 < 0.01 < 0.01	
						whole fruit, calculated	62 93 126 154 175	0.04 0.04 0.02 0.02 0.02	
			2	0.29	0.02	peel	62 93 126 154 175	0.06 0.05 0.01 0.03 0.03	311/88893/M98-A The results were corrected for recovery For peel 79% and for pulp 91%
						pulp	62 93 126 154 175	0.03 < 0.01 < 0.01 < 0.01 <u>< 0.01</u>	
						whole fruit, calculated	62 93 126 154 175	0.05 0.02 < 0.01 0.02 <u>0.01</u>	
			2	0.43	0.03	peel	93 126 154 175	0.06 0.06 0.04 0.04	311/88893/M98-B For peel 90% and for pulp 93%
						pulp	93 126 154 175	< 0.01 < 0.01 < 0.01 < 0.01	
						whole fruit	62	0.02	
						whole fruit, calculated	93 126 154 175	0.02 0.02 0.01 0.01	

Table 47b Results of post-harvest residue trials conducted with tebuconazole in/on orange and mandarin in Europe

Country, year	Crop Variety	Application		Residues			Study Trial No.
		FL	g/sqm	Portion analysed	PHI, days	mg/kg	
Germany 1996	Orange New Hall	250 EW	0.024	fruit	0 3 7 14	0.23 0.27 0.25 0.20	RA-2076/96 60808/4 0808-9
				pulp	3 14	< 0.05 < 0.05	
				peel	3 14	0.91 0.90	

Country, year	Crop Variety	Application		Residues			Study Trial No.
		FL	g/sqm	Portion analysed	PHI, days	mg/kg	
Germany 1996	Orange Lanetate	250 EW	0.024	fruit	0 3 7 14	0.28 0.25 0.28 0.20	RA-2076/96 60577/8 0577-96
				pulp	3 14	< 0.05 < 0.05	
				peel	3 14	1.2 1.2	
Germany 1996	Orange Navel	250 EW	0.020	fruit	0 3 7 14	0.22 0.23 0.25 0.27	RA-2076/96 60273/6 0273-96
				pulp	3 14	< 0.05 < 0.05	
				peel	3 14	0.82 0.83	
Germany 1996	Orange Lanetate	250 EW	0.024	fruit	0 3 7 14	0.20 0.23 0.25 0.20	RA-2076/96 60806/8 0806-96
				pulp	3 14	< 0.05 < 0.05	
				peel	3 14	0.92 0.84	
Germany 1996	Mandarin Cleme-nules	250 EW	0.024	fruit	0 3 7 13	0.38 0.36 0.35 0.32	RA-2076/96 60578/6 0578-96
				pulp	3 13	< 0.05 < 0.05	
				peel	3 13	1.1 1.5	
Germany 1996	Mandarin Clause-llina	250 EW	0.024	fruit	0 3 7 13	0.46 0.35 0.38 0.32	RA-2076/96 60804/1 0804-96
				pulp	3 13	< 0.05 < 0.05	
				peel	3 13	1.3 1.4	
Germany 1996	Mandarin Nova	250 EW	0.024	fruit	0 3 7 13	0.40 0.35 0.33 0.30	RA-2076/96 60807/6 0807-96
				pulp	3 13	< 0.05 < 0.05	
				peel	3 13	1.1 1.2	
Germany 1996	Mandarin Satsumas	250 EW	0.024	fruit	0 3 7 13	0.48 0.43 0.33 0.35	RA-2076/96 60272/8 0272-96
				pulp	3 13	< 0.05 < 0.05	
				peel	3 13	1.4 1.3	

Apple and Pears

Ten residue field trials conducted with tebuconazole in/on apple and pears in Southern Europe were submitted. The results are shown on Table 48.

Table 48 Results of residue trials conducted with tebuconazole in/on pome fruit in Europe

		Application				Residues		Study
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	Trial No.
France, South 2002	Apple Golden Delicious	SE 043	4	0.23	0.019	0 14 28	0.65 0.50 0.47	RA-2152/02 R 2002 0559/7
France, South, 2002	Apple Fuji	SE 043	4	0.28	0.019	0* 0 7 14 21 28	0.37 0.78 0.53 0.47 0.43 0.34	RA-2152/02 R 2002 0560/0
Greece, 2002	Apple Granny Smith	SE 043	4	0.28	0.019	0 14 28	0.35 0.27 0.19	RA-2152/02 R 2002 0574/0
Italy, 1993	Apple Perleberg	WG 25	4	0.25	0.017	0* 0 7 10 14 21 28	0.11 0.23 0.14 0.10 0.14 0.17 0.12	RA-2062/93 30031/4
Italy, 1993	Apple Annurca	WG 25	4	0.25	0.017	0* 0 7 10 14 21 28	0.33 0.53 0.51 0.40 0.39 0.22 0.13	RA-2062/93 30284/8
Italy, 2000	Pear William	SE 043	4	0.28	0.019	0 14	0.20 0.07	RA-2075/00 R2000 0343/9
Italy, 2000	Pear William	WG 25	4	0.28	0.019	0 14	0.13 < 0.05	RA-2076/00 R2000 0344/7
Italy, 2002	Apple Florina	SE 043	4	0.28	0.019	0* 0 7 14 21 28	0.19 0.41 0.34 0.21 0.15 0.13	RA-2152/02 R 2002 0575/9
Portugal, 2000	Pear Rocha	SE 043	4	0.28	0.019	0 13	0.54 0.28	RA-2075/00 R2000 0378/1
Portugal, 2000	Pear Rocha	WG 25	4	0.28	0.019	0 13	0.72 0.38	RA-2076/00 R200 0380/3

* prior to last treatment

Stone fruit

Cherry

The use of tebuconazole in/on cherry is registered in several European countries and in the USA, where 31 trials were conducted. The results are shown in Table 49.

Table 49 Results of residue trials conducted with Tebuconazole in/on cherry in Europe and the USA

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
France North, 1997	sweet Garnett	25 WG	2	0.188-0.20	0.019	0* 0 3 7 10	0.07 0.30 0.21 <u>0.13</u> 0.07	RA-2076/97 70308/7 0308-97
France North, 1997	sweet Germersdorf	25 WG	2	0.188	0.019	0 7	0.29 <u>0.29</u>	RA-2076/97 70309/5
France North 2000	sweet Garnet	25 WG	2	0.188	0.019	0 7	0.20 <u>0.10</u>	RA-2071/00 R 2000 0304/8
France North 2003	sweet Garnet	250 EW	2	0.188	0.019	0* 0 3 7 10	0.11 0.57 0.32 <u>0.17</u> 0.15	RA-2007/03 R 2003 0938/4 0938-03
France North, 2003	sweet Burlat	250 EW	2	0.188	0.019	0 7	0.77 <u>0.40</u>	RA-2007/03 R 2003 0937/6; 0937-03
France South 2004	sweet Sumit	75 WG	3	0.188 -0.200	0.015	0* 0 3 7 10 14	0.11 0.29 0.20 <u>0.12</u> 0.10 0.09	RA-2103/04 R 2004 0617/7 0617-04
Germany 1998	sour Schattenmorellen	250 EW	2	0.188	0.019	0 7	0.51 <u>0.32</u>	RA-2137/98 R 1998 1088/6: 1088-98
Germany 1998	sour Schattenmorellen	250 EW	2	0.188	0.019	0* 0 3 7 10	0.24 0.66 0.73 <u>0.46</u> 0.30	RA-2137/98 R 1998 1087/8; 1087-98
Germany North 1999	sour Schattenmorelle	250 EW	2	0.188	0.019	0* 0 4 7 11	0.27 0.74 0.58 <u>0.38</u> 0.25	RA-2137/99 R 1999 0020/1 0020-99
Germany 1999	sour Schattenmorelle	250 EW	2	0.188	0.019	0 7	1.2 <u>0.74</u>	RA-2137/99 R 1999 0022/8; 0022-99
Germany 2000	sweet Regina	25 WG	2	0.281	0.019	0* 0 3 7 13	0.08 0.82 0.58 <u>0.45</u> 0.24	RA-2071/00 R 2000 0302/1
Germany 2003	sweet Regina	250 EW	2	0.188	0.019	0* 0 3 7 10	0.21 0.68 0.52 <u>0.48</u> 0.16	RA-2007/03 R 2003 0049/2 0049-03
Germany 2003	sweet Lambert	250 EW	2	0.188	0.019	0 7	0.73 <u>0.51</u>	RA-2007/03 R 2003 0048/4; 0048-03
Italy 1993	sweet Roma	25 WG	2	0.188	0.019	0 7	0.26 <u>0.20</u>	RA-2067/93 30290/2, 0290-93
Italy 1993	sweet Montagnola	25 WG	2	0.188	0.019	0* 0 3 7 10	0.11 0.30 0.23 <u>0.18</u> 0.16	RA-2067/93 30029/2 0029-93
Italy 1992	sweet Roma	25 WG	2	0.188	0.019	0* 0 5 10 14	0.18 0.59 0.50 0.29 0.26	RA-2019/92 20289/4 0289-92

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
						0* 0 5 10 14	0.15 0.48 0.40 0.25 0.22	Whole fruit, calculated
Italy 1996	sweet Lapins	25 WG	2	0.281	0.019	0* 0 3 7 10	0.17 0.67 0.30 <u>0.33</u> 0.22	RA-2075/96 60594/8 0594-96
Italy 1996	sweet Lambert	25 WG	2	0.281	0.019	0* 0 3 7 10	< 0.05 0.62 0.35 0.29 <u>0.30</u>	RA-2075/96 60592/1 0592-96
Spain 2005	sweet Venus	75 WG	3	0.202	0.015	0* 0 3 7 9 14	0.15 0.42 0.34 <u>0.26</u> 0.22 0.17	RA-2032/05 R 2005 0154/4 0154-05
Spain 2005	sweet 470	75 WG	3	0.225	0.015	0 7 14	0.18 <u>0.10</u> 0.03	RA-2032/05 R 2005 0153/6 0153-05
Portugal 2004	sweet Americanas	75 WG	3	0.138- 0.15	0.015	0 7 14	0.18 <u>0.06</u> 0.04	RA-2103/04 R 2004 0618/5 0618-04
USA OR, 1989	sweet Lambert	45 WG	6	0.19	0.02	0 3 7 10	<u>0.41</u> 0.60 0.25 0.17	99826 451-FR024-89D
USA MI, 1989	sour Montmorency	45 WG	6	0.19	0.02	0 3 7 14	<u>0.61</u>, 0.53 0.40, 0.34 0.39, 0.19 0.07, 0.03	99826* 855-FR029-89D 855-FR028-89D
USA WA, 1989	sweet Bing	45 WG	7	0.19	0.007	0 3 7 14	<u>3.1</u> 2.0 1.2 1.2	99826 454-FR025-89D
USA MI, 1991	sour Montmorency	45 WG	6	0.19	0.04	0 1 3 7	0.76 <u>0.86</u> 0.71 0.52	99826-1 855-FR017-91D
USA NY, 1991	sour Montmorency	45 WG	6	0.19	0.01	0 1 3 7	<u>0.92</u> 0.67 0.7 0.33	99826-1 758-FR014-91D
USA OR, 1991	sweet Bada	45 WG	6	0.25	0.05	0 1 3 7	<u>1.4</u> 1.4 1.3 0.97	99826-1 451-FR011-91D
USA, WA, 1997	Bing	45 WG	6	0.252- 0.268	0.01	0	<u>0.86</u>	109514 06554.97-WA47
USA CA, 1997	Bing	45 WG	6	0.220- 0.252	0.02	0	<u>0.97</u>	109514 06554.97-CA78
USA MI, 1997	Hedelfingen	45 WG	6	0.252	0.045	0	<u>0.64</u>	109514 06554.97-MI14
USA, WA, 1997	Rainier	45 WG	6	0.252	0.01	1	<u>0.79</u>	109514 06554.97-WA46

* replicate plots, the highest value selected

Apricot, peach and nectarine

The use of tebuconazole in/on apricot, peach and nectarine is registered in several European countries and the USA, where supervised trials were conducted. The results from the conducted trials are summarised in Table 50.

Table 50 Results of residue trials conducted with Tebuconazole in/on peach in the USA

	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Brazil 1997	Peach Aurora	200 EC	3	0.20	0.020	Whole fruit	7	< 0.1	USP 2366/97 S-C3-601/97
Brazil 2004	Peach Natal	200 EC	3	0.20	0.020	Whole fruit	7	0.01	UNESP RA-855/04 FR04BRA063-P1
Brazil 2003	Peach Natal	200 EC	3	0.20	0.020	Whole fruit	7	0.02	UNESP RA-856/04 FR04BRA063-P2
France South 1988	Peach Babygold	25 WP	3	0.275	0.0250	fruit	7	0.10	0448-88 80448/7
						whole fruit, calculated	7	0.09	
France, South 1988	Peach Sundance	25 WP	3	0.25	0.025	fruit whole fruit, calculated	7 7	0.11 0.11	0449-88 80449/5
Greece 2001	Peach Everts	25 WG	2	0.244	0.019	fruit	0* 0 3 7 10	0.10 0.28 0.31 0.13 0.17	RA-2177/01 R 2001 0451/0 0451-01
Italy 1992	Peach local variety	25 WG	4	0.281	0.0187	fruit	0* 0 5 7 10	0.10 0.41 0.22 0.23 0.15	RA-2019/92 20294/0 0294-92
						whole fruit, calculated	0* 0 5 7 10	0.09 0.38 0.21 0.22 0.14	
Italy 1992	Apricot Tirintos	25 WG	2	0.300	0.019	fruit	0* 0 7 10 14	0.25 0.65 0.32 0.22 0.23	RA-2019/92 20285/1 0285-92
						whole fruit, calculated	7 10 14	0.29 0.20 0.21	
Italy 1993	Apricot Antonio Errami	25 WG	2	0.25	0.016	fruit	0 14	0.50 0.14	RA-2067/93 30287/2
						whole fruit, calculated	0 14	0.45 0.09	
Italy 1993	Apricot Tirintos	25 WG	2	0.25	0.016	fruit	0* 0 3 7 10 14	0.16 0.48 0.40 0.30 0.36 0.28	RA-2067/93 30026/8
						Whole fruit.	10 14	0.30 0.25	

	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Italy 1993	Nectarine Fantalate	25 WG	4	0.281	0.019	fruit	0* 0 3 7 10	0.06 0.09 0.05 <u>0.06</u> < 0.02	RA-2067/93 30289/9 0289-93
						whole fruit, calculated	0* 0 3 7 10	0.05 0.08 0.04 <u>0.05</u> < 0.02	
Italy 1993	Peach Baby Gold	25 WG	4	0.281	0.019	fruit	0* 0 3 7 10	0.15 0.34 0.20 <u>0.23</u> 0.10	RA-2067/93 30034/9 0034-93
						whole fruit, calculated	0* 0 3 7 10	0.13 0.31 0.18 <u>0.21</u> 0.10	
Italy 1993	Peach Carsom	25 WG	4	0.281	0.019	fruit	0* 0 5 7 10	0.10 0.50 0.34 <u>0.37</u> 0.29	RA-2067/93 30288/0 0288-93
						whole fruit, calculated	5 7 10	0.31 <u>0.35</u> 0.27	
Italy 1996	Peach Sun Crest	25 WG	4	0.281	0.019	fruit	0* 0 3 7 10	< 0.05 0.34 0.34 <u>0.17</u> 0.14	RA-2074/96 60590/5 0590-96
Italy 1996	Peach Red Haven	25 WG	4	0.281	0.019	fruit	0 7	0.18 <u>0.06</u>	RA-2074/96 60591/3, 0591-96
Italy 2000	Nectarine Sweet Lady	25 WG	2	0.281	0.019	fruit	0 7	0.23 <u>0.14</u>	RA-2078/00 R 2000 0353/6; 0353-00
Spain 2000	Peach Rich Lady	25 WG	2	0.225	0.019	fruit	0 7	0.35 <u>0.19</u>	RA-2078/00 R 2000 0350/1; 0350-00
USA* SC, 1990	Peach Red Haven	45 WG	6	0.18	0.007	fruit	0	<u>0.44</u>	103208 752-FR010-90D
USA Michigan 1990	Peach Red Haven	45 WG	6	0.19	0.023	fruit	0 3 7 14	<u>0.21</u> 0.17 0.16 0.04	103208 855-FR012-90D
USA PA, 1990	Peach Glohaven	45 WG	6	0.19	0.026	fruit	0 3 7 14	<u>0.20</u> 0.12 0.13 0.04	103208 757-FR011-90D
USA CA, 1990	Peach Fay Elberta	45 WG	6	0.19	0.035	fruit	0 3 7 14	<u>0.46</u> 0.41 0.18 0.07	103208 455-FR009-90D
USA GA, 2008	Peach Ha-thorne	45 WG	6	0.25	0.05	fruit	0	<u>0.97</u>	RAGMP129** GM007-08BA
		432 SC	6	0.25	0.05	fruit	0	0.85	
USA NC, 2008	Peach Norman	45 WG	6	0.25	0.05	fruit	0	0.40	RAGMP129** GM008-08BA
		432 SC	6	0.25	0.05	fruit	0	<u>0.66</u>	
USA CA, 2008	Peach Halford	45 WG	6	0.25	0.05	fruit	0	<u>1.0</u>	RAGMP129** GM009-08BA
		432 SC	6	0.25	0.05	fruit	0	0.49	

*USA trials: residues is the mean of two samples

Plum

A total of 38 trials with tebuconazole on plum were conducted in Europe and USA. The results are shown on Table 51.

Table 51 Results of residue trials conducted with tebuconazole in plum (stone fruit)

Country, year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
France South, 1988	Plum Ente 707	WP 25	3	0.25	0.025	Fruit	7	0.40	0450-88
						Whole fruit	7	0.35	
France South, 1991	Ente 707	WG 25	3	0.25	0.025	Fruit	0 3 7	0.11 0.14 0.24	RA-2095/91 10391/8
France South, 1991	Ente 707	WG 25	3	0.25	0.025	Fruit	0 3 7	0.39 0.23 0.38	RA-2095/91 10392/6
France South, 1991	Plum Ente 707	WG 25	3	0.25	0.025	Fruit	3 7	0.17 0.28	RA-2095/91 10393/4
France, South, 1992	Golden Japan	WG 25	3	0.21-0.24	0.019	Fruit	0* 0 5 7 14	0.03 0.16 0.06 0.07 0.05	RA-2017/92 20409/9 0409-92
France, South, 1992	Golden Japan	WG 25	3	0.28-0.32	0.019	Fruit	0* 0 5 7 14	0.06 0.12 0.09 0.10 0.04	RA-2017/92 20410/2
France, North, 1992	Santa Clara	WG 25	3	0.24-0.25	0.019	Fruit	0 7 14	0.09 0.03 0.03	RA-2017/92 20412/9
France North, 1996	Reine Claude Ackman	WG 25	3	0.18	0.015	Fruit	0 7	0.05 ≤ 0.05	RA-2087/96 60260/4
France North, 1996	Reine Claude 1771	WG 25	3	0.18	0.015	Fruit	0* 0 3 5 7	< 0.05 < 0.05 < 0.05 < 0.05 ≤ 0.05	RA-2087/96 60261/2
France, North, 1997	Reine Claude de Varse	WG 25	3	0.18	0.015	Fruit	0 7	< 0.05 ≤ 0.05	RA-2070/97 70082/7
France, South, 2004	Bave	WG 75	3	0.225	0.015	Fruit	0 7 14	0.12 0.07 0.05	RA-2106/04 R 2004 0622/3
Germany 1996	Haus-zwetsche	WG 25	3	0.225	0.015	Fruit	0* 0 3 4 7	< 0.05 0.09 0.06 0.08 0.06	RA-2087/96 60343/0 0343-96
Germany, 1997	Italienische Zwetsche	WG 25	3	0.180	0.015	Fruit	0* 0 3 6 7	0.10 0.25 0.16 0.13 0.12	RA-2070/97 70081/9 0081-97
Germany, 1997	Cacak Fruchtbare	WG 25	3	0.18	0.015	Fruit	0 7	0.13 0.08	RA-2070/97 70079/7 0079-97
Italy 1992	Plum President	WG 25	2	0.30	0.019	Fruit	0* 0 7 10 14	0.04 0.15 0.10 0.09 0.05	RA-2019/92 20284/3 0284-92
Italy 1993	Stanley	WG 25	2	0.30	0.019	Fruit	0 7	0.23 0.11	RA-2067/93 30291/0

Country, year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Italy 1993	Ozark premier	WG 25	2	0.30	0.019	Fruit	0* 0 3 7 10	0.03 0.13 0.04 0.03 0.03	RA-2067/93 0035/7
Italy, 2004	Stanley	WG 75	3	0.225	0.015	Fruit	0* 0 3 7 10 14	< 0.02 0.07 0.05 0.05 0.03 0.03	RA-2106/04 R 2004 0621/5 0621-04
Italy, 2005	Lyncoln	WG 75	3	0.225	0.015	Fruit	0 7 14	0.12 0.12 0.09	RA-2033/05 R 2005 0155/2
Spain, 2005	Black gold	WG 75	3	0.15	0.015	Fruit	0 3 7 10 14	0.04 0.04 0.03 0.03 0.02	RA-2033/05 R 2005 0156 0
UK, 1996	Purple Pershore	WG 25	3	0.18	0.015	Fruit	0 7	0.08 < 0.05	RA-2087/96 60342/2
UK, 1997	Purple Pershore	WG 25	3	0.18	0.015	Fruit	0* 0 3 5 7	0.13 0.08 0.11 0.07 0.08	RA-2070/97 70080/0
USA CA, 1998	Casselman	45 WG	6	0.25-0.28	0.007-0.008	fruit	0 7 14 21	0.03 0.01 0.01 0.01	109761 FCA-FR001-98D-A
USA CA, 1998	Casselman	45 WG	6	0.24-0.27	0.054-0.063	fruit	0 7 14 21	0.02 0.01 0.01 0.01	109761 FCA-FR001-98D-B
USA MI, 2000	Stanley	45 WG	6	0.25-0.26	0.007-0.008	fruit	0	0.47	109761 BAY-FR002A-00H-A
USA MI, 2000	Stanley	45 WG	6	0.25-0.26	0.036-0.040	fruit	0	0.34	109761 BAY-FR002A-00H-B
USA CA, 1998	Friar	45 WG	6	0.25	0.007	fruit	0	0.03	109761 BAY-FR003-98H-A
USA CA1998	Friar	45 WG	6	0.25-0.26	0.028-0.032	fruit	0	0.03	109761 BAY-FR003-98H-B
USA CA, 1998	Angelinos	45 WG	6	0.25-0.26	0.01	fruit	0	0.13	109761 BAY-FR004-98H-A
USA CA, 1998	Angelinos	45 WG	6	0.25-0.26	0.034-0.036	fruit	0	0.06	109761 BAY-FR004-98H-B
USA CA, 1998	Prunes	45 WG	6	0.26	0.01	fruit	0	0.29	109761 BAY-FR005-98H-A
USA CA, 1998	Prunes	45 WG	6	0.26	0.031-0.04	fruit	0	0.37	109761 BAY-FR005-98H-B
USA OR, 1998	Italian	45 WG	6	0.25-0.26	0.007-0.008	fruit	0	0.12	109761 BAY-FR006-98H-A
USA OR, 1998	Italian	45 WG	6	0.25-0.26	0.035-0.039	fruit	0	0.09	109761 BAY-FR006-98H-B
USA CA, 1997	Casselman	45 WG	6	0.245-0.257	0.026-0.027	fruit, depitted	0	0.02	109739[a] 06553.97-CA80-A1
USA CA, 1997	Casselman	45 WG	6	0.245-0.257	0.026-0.027	fruit, depitted	0	0.06	109739 [a,b] 06553.97-CA80-A2
USA CA, 1997	Casselman	45 WG	6	0.245-0.257	0.026-0.027	fruit, depitted	0	0.01	109739[a] 06553.97-CA81-A1
USA CA, 1997	Casselman	45 WG	6	0.245-0.257	0.026-0.027	fruit, depitted	0	0.08	109739 [a,b] 06553.97-CA81-A2

[a] mean of two samples

[b] Crop oil concentrate was added to the tank mix before application to the 2-row subplot.

Berries and other small fruits

Elderberry

Tebuconazole in elderberry is registered in Austria, where six field trials were conducted. The trials were not conducted according to GLP. The results are shown on Table 52.

Table 52 Results of residue trials conducted in Austria with tebuconazole 250 EW in/on elderberry (variety, Haschberg)

	Application			Residues*		
Year	No.	kg ai/ha	kg ai/hL	PHI	mg/kg	Report
1999	3	0.26-0.34	0.038	27	0.70	OES-400035
1999	3	0.28-0.34	0.038	27	0.26	OES-400040
1999	4	0.26-0.34	0.038	14	1.1	OES-400037
1999	4	0.28-0.34	0.038	14	0.41	OES-400042
2000	3	0.30-0.36	0.038	24	0.30	OES-400545
2000	3	0.30-0.36	0.038	24	0.39	OES-400552

Grapes

Tebuconazole is registered in grapes in a variety of countries. Fifty trials were conducted in grapes in Brazil, Europe and USA (Table 53).

Table 53 Results of residue trials conducted with Tebuconazole in/on grapes (bunch)

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil PR, 2004	Benefuji	200 EC	4	0.20	0.02	14	0.52	UNESP RA-970/05 FR04BRA066-P2-A,
Brazil PR, 2004	Benefuji	200 EC	4	0.40	0.04	14	0.95	UNESP RA-970/05 FR04BRA066-P2-B
Brazil SP, 2003	Maria	200 EC	4	0.20	0.02	14	0.63	UNESP RA-859/04 FR04BRA066-P1-A
Brazil SP, 2003	Maria	200 EC	4	0.40	0.04	14	1.0	UNESP RA-859/04 FR04BRA066-P1-B
Brazil PR, 1995	Niagara	200 EC	6	0.20	0.02	14	0.30	USP 2048/96 BRA-S-C5-602/95-A
Brazil PR, 1995	Niagara	200 EC	6	0.40	0.04	14	0.50	USP 2048/96 BRA-S-C5-602/95-B
Brazil RS, 1994	Cabernet Franc	25 WP	6	0.25	0.025	0 5 10 15 20	2.6 0.70 0.50 0.30 0.20	CIENTEC 151641 BRA-CIENTEC 151641
Brazil PR, 1994	Rubi	25 WP	3	0.25	0.025	14	0.60	BRA-CIENTEC 148536-A
Brazil PR, 1994	Rubi	25 WP	3	0.5	0.05	14	1.6	BRA-CIENTEC 148536-B
France North, 2007	Pinot; red	400 SC	3	0.113	0.056	-23 0* 0 7 14 20 28	< 0.01 0.13 0.29 0.19 0.20 0.18 0.15	RA-2581/07 R 2007 0222/1 022-07

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Germany 2007	Weiß-burgunder; white	400 SC	3	0.113	0.014	0* 0 7 14 21 28	0.30 0.38 0.43 <u>0.51</u> 0.36 0.38	RA-2581/07 R 2007 0635/9
Italy 1995	Table Pergolone	300 EC	3	0.09	0.009	0* 0 3 7 10 14	0.10 0.27 0.18 <u>0.13</u> 0.08 0.08	RA-2091/95 50225/1 0225-95
Italy 1996	Trebbiano, wine	300 EC	3	0.09	0.009	0* 0 3 7 10 14	0.06 0.21 0.12 <u>0.09</u> 0.07 0.05	RA-2090/96 60265/5
Italy, 1996	Verduzzo Trevigiano, wine	300 EC	3	0.09	0.009	0* 14	0.19 <u>0.04</u>	RA-2090/96 60596/4
Italy, 1996	Carbenet, wine	300 EC	3	0.09	0.009	0* 14	0.09 <u>0.03</u>	RA-2090/96 60264/7
Italy, 1996	Alfonse de la valle, table	300 EC	3	0.09	0.009	0* 14	0.41 <u>< 0.10</u>	RA-2090/96 60262/0
Italy 1996	Sangiovese, wine	300 EC	3	0.09	0.009	0* 0 3 7 10 14	0.06 0.26 0.10 <u>0.11</u> 0.10 0.06	RA-2090/96 60597/2
Italy 1996	Italia, table	300 EC	3	0.09	0.009	0* 0 3 7 10 14	0.07 0.21 0.12 <u>0.08</u> 0.08 0.07	RA-2090/96 60263/9 0263-96
Italy 2003	Garga-nega; white	75 WG	3	0.09	0.009	0* 0 7 14 28 35	0.10 0.39 <u>0.14</u> 0.11 0.06 0.06	RA-2053/03 R 2003 0373/4
Italy 2007	Lambrusco di Sorbara; Red	400 SC	3	0.113	0.011	0* 0 7 14 21 28	0.15 0.36 <u>0.38</u> 0.23 0.20 0.11	RA-2582/07 R 2007 0224/8 0224-07
Portugal 2003	Tinta Roriz	75 WG	3	0.0900	0.008	0 14 28 35	0.30 <u>0.14</u> 0.13 0.11	RA-2053/03 R 2003 0371/8
Spain 2003	Temora nillo	75 WG	3	0.09	0.009	0 14 28 35	0.03 <u>0.04</u> 0.03 < 0.02	RA-2053/03 R 2003 0374/2
Spain 2003	Macabeo	75 WG	3	0.09	0.009	0* 0 7 14 28 36	0.02 0.07 <u>< 0.02</u> < 0.02 < 0.02 < 0.02	RA-2053/03 R 2003 0372/6

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Spain 2007	Tempranillo; Red variety	400 SC	3	0.113	0.011	0* 0 7 14 21 28	0.19 0.62 <u>0.41</u> 0.38 0.24 0.21	RA-2582/07 R 2007 0636/7 0636-07
CA, Kingsburg, 1987	Thompson	144 EC	8	0.126	0.0269	14 21	0.98 0.60	95678 456-FR101-87D
USA, CA, Greenfield, 1987	Chardonnay	144 EC	8	0.125	0.0089	14 20	<u>1.5</u> 0.93	95678 457-FR102-87D
USA, CA, Greenfield, 1987	Chardonnay	45 WG	8	0.13	0.0090	14 21	1.2 1.4	95677 457-FR093-87D
USA, CA, Kingsburg, 1987	Thompson	45 WG	8	0.13	0.027	14 21	<u>1.5</u> 0.56	95677 456-FR092-87D
USA, CA, Temecula, 1987	Chardonnay	45 WG	8	0.13	0.019- 0.029	14 21	0.39 0.41	95677 458-FR094-87D
USA, CA, Temecula, 1987	Chardonnay	144 EC	8	0.126	0.019- 0.029	15 21	<u>0.99</u> 0.81	95678 458-FR103-87D
USA, MI, Eau Claire, 1987	Concord	144 EC	8	0.126	0.014	14 21	0.07 0.12	95678 855-FR104-87D
USA, MI, Eau Claire, 1987	Concord	45 WG	8	0.13	0.014	14 21	<u>0.10</u> 0.07	95677 855-FR095-87D
USA, NY, Phelps, 1987	Catawaba	144 EC	8	0.126	0.014	14 21	0.28 0.20	95678 151-FR096-87D
USA, NY, Phelps, 1987	Catawaba	144 EC	8	0.126	0.045	14 26	0.25 0.32	95678 151-FR097-87D
USA, NY, Phelps, 1987	Catawaba	45 WG	8	0.13	0.014	14 21	<u>0.43</u> 0.28	95677 151-FR087-87D
USA, NY, Phelps, 1987	Catawaba	45 WG	8	0.13	0.045	14 21	0.29 0.39	95677 151-FR088-87D
USA, OR, Aurora, 1987	Grenache	144 EC	8	0.125	0.0066	14 21	<u>0.72</u> 0.37	95678 451-FR098-87D
USA, OR, Aurora, 1987	Grenache	45 WG	8	0.13	0.0068	14 21	0.37 0.27	95677 451-FR089-87D
USA, WA, Grandview, 1987	Chardonnay	144 EC	8	0.126	0.0448	14 21	<u>0.78</u> 0.73	95678 454-FR099-87D
USA, WA, Grandview 1987	Chardonnay	45 WG	8	0.13	0.045	14 21	0.56 1.0	95677 454-FR090-87D
USA CA, 1991 Fresno	Thompson Seedless	45 WG	8	0.13	0.0264	7 14 21	0.20 <u>0.20</u> 0.15	107132 FCA-FR006-91D
USA CA, 1991 St. Helena	Zinfadel	45 WG	8	0.13	0.027	6 13 19	2.8 4.0 <u>4.6</u>	107132 457-FR002-91D
USA CA, 1991 Tenecula	Chardonnay	45 WG	8	0.13	0.009	7 14 25	1.7 <u>1.8</u> 1.7	107132 458-FR003-91D
USA, NC, 1991	Muscadine	45 WG	8	0.13	0.0135	7 14 21	0.85 <u>0.94</u> 0.74	107132 751-FR098-91D
USA NY, 1991	Catawaba	45 WG	8	0.13	0.0135	7 14 21	0.37 <u>0.27</u> 0.18	107132 758-FR004-91D
USA MI, 1991	Concord	45 WG	8	0.13	0.027	7 14 21	0.51 <u>0.56</u> 0.21	107132 855-FR005-91D
USA WA, 1991	Chardonnay	45 WG	8	0.13	0.027	7 14 21	0.84 <u>0.67</u> 0.55	107132 454-FR001-91D
USA, CA, Aromas, 2008	Zinfandel	45 WG 432 SC	8	0.123- 0.130	0.022- 0.025	13 13	0.23 <u>0.33</u>	RAGMP127 GM004-08BA-B

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
USA, CA, Fresno, 2008	Thompson	45 WG	8	0.124-0.130	0.027	14	< 0.01,	RAGMP127
		432 SC				14	0.09	GM005-08BA-B
USA, CA, Sanger, 2008	Grenache	45 WG	8	0.122-0.130	0.027-0.028	14	1.0	RAGMP127
		432 SC				14	0.77	GM006-08BA-B

*US trials: residues are the mean of two samples

Olives

The use of tebuconazole in/on olive is registered in Spain. Six field trials were conducted in southern Europe (Table 54).

Table 54 Results of residue trials conducted with Tebuconazole EW 250 in/on olive fruit in Europe (application in spring before flowering)

Country, year	Variety	Application			Residues		Study Trial No.
		No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Greece, 2000	Koroneiki	1	0.15	0.015	186	< 0.05	RA-2070/00; R 2000 0357/9
Italy, 2000	Nocellara Etnea	1	0.15	0.015	189	< 0.05	RA-2070/00; R 2000 0362/5
Italy, 2009	Nocellara Etnea	1	0.15	0.019	161 175	< 0.01 < 0.01	09-2165; 09-2165-01
Spain, 2000	Farga	1	0.15	0.015	236	< 0.05	RA-2070/00; R 2000 0361/7
Spain, 2009	Arbequina	1	0.15	0.017	174 188	< 0.01 < 0.01	09-2165; 09-2165-02
Portugal, 2000	Blanquita	1	0.15	0.015	249	< 0.05	RA-2070/00; R 2000 0360/9

Assorted tropical and sub-tropical fruits - inedible peel

Banana

The use of tebuconazole in/on banana is registered in several countries, including Australia, Brazil and USA, where 29 trials conducted (Table 55).

Table 55 Results of residue trials conducted with tebuconazole in/on banana

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Australia 1992	Cavendish „Williams“	250 EC	6	0.10	0.046	calc. fruit whole, unbagged	0 1 3 5 7	0.04 0.04 0.03 0.04 0.04	40/90 AUS-40-90-A
						peel	0 1 3 5 7	0.08 0.06 0.02 0.04 0.04	
						pulp	0 1 3 5 7	0.02 0.03 0.04 0.04 0.04	
Australia 1992	Cavendish „Williams“	250 EC	6	0.20	0.09	calc. fruit whole, unbagged	0 1 3 5 7	0.19 0.12 0.13 0.20 0.05	40/90 AUS-40-90-C

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						peel	0 1 3 5 7	0.30 0.22 0.14 0.21 0.09	
						pulp	0 1 3 5 7	0.15 0.08 0.13 0.20 0.04	
Australia 1992	Cavendish „Williams“	250 EC	6	0.10	0.046	calc. fruit whole, bagged	0 1 3 5 7	0.01 $\underline{< 0.01}$ < 0.01 < 0.01 0.01	40/90 AUS-40-90-B
						peel	0 1 3 5 7	0.01 < 0.01 < 0.01 < 0.01 0.01	
						pulp	0 1 3 5 7	0.01 $\underline{< 0.01}$ < 0.01 < 0.01 0.01	
Australia 1992	Cavendish „Williams“	250 EC	6	0.20	0.09	calc. fruit whole, bagged	0 1 3 5 7	0.01 0.03 0.02 0.03 0.03	40/90 AUS-40-90-D
						peel	0 1 3 5 7	0.05 0.02 0.02 0.03 0.04	
						pulp	0 1 3 5 7	0.03 0.03 0.02 0.03 0.02	
Australia 1992	Cavendish "Williams"	250 EW	6	0.10	0.046	calc. fruit whole, unbagged	0 1 3 5 7	0.08 $\underline{0.16}$ 0.10 0.08 0.03	40/90 AUS-40-90-E
						peel	0 1 3 5 7	0.05 0.21 0.20 0.06 0.02	
						pulp	0 1 3 5 7	0.10 $\underline{0.14}$ 0.06 0.09 0.02	
Australia 1992	Cavendish "Williams"	250 EW	6	0.20	0.09	calc. fruit whole, unbagged	0 1 3 5 7	0.15 0.16 0.25 0.14 0.07	40/90 AUS-40-90-G

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						peel	0 1 3 5 7	0.18 0.13 0.32 0.16 0.06	
						pulp	0 1 3 5 7	0.14 0.17 0.22 0.13 0.06	
Australia 1992	Cavendish "Williams"	250 EW	6	0.10	0.046	calc. fruit whole, bagged	0 1 3 5 7	0.03 0.01 < 0.01 < 0.01 < 0.01	40/90 AUS-40-90-F
						peel	0 1 3 5 7	0.03 0.01 < 0.01 < 0.01 < 0.01	
						pulp	0 1 3 5 7	0.03 0.01 < 0.01 < 0.01 0.01	
Australia 1992	Cavendish "Williams"	250 EW	6	0.20	0.09	calc. fruit whole, bagged	0 1 3 5 7	0.03 0.03 0.01 0.01 < 0.01	40/90 AUS-40-90-H
						peel	0 1 3 5 7	0.02 0.02 0.01 0.02 < 0.01	
						pulp	0 1 3 5 7	0.03 0.03 0.01 0.01 < 0.01	
Australia 1990	Giant Cavendish "Williams"	250 EC	8	0.10	0.044	calc. fruit whole, unbagged	0 1 3 5	0.17 0.19 0.17 0.10	26/90 AUS-26-90-A2
						peel	0 1 3 5	0.35 0.45 0.35 0.14	
						pulp	0 1 3 5	0.10 0.10 0.09 0.08	
Australia 1990	Giant Cavendish "Williams"	250 EC	8	0.20	0.088	calc. fruit whole, unbagged	0 1 3 5	0.15 0.10 0.07 0.20	26/90 AUS-26-90-A2
						peel	0 1 3 5	0.40 0.23 0.12 0.43	

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						pulp	0 1 3 5	0.04 0.05 0.05 0.10	
Australia 1990	Giant Cavendish "Williams"	250 EC	8	0.10	0.044	calc. fruit whole, bagged	1 3 5	≤ 0.02 < 0.02 < 0.02	26/90 AUS-26-90-A1
						peel	1 3 5	< 0.02 0.02 < 0.02	
						pulp	1 3 5	≤ 0.02 < 0.02 < 0.02	
Australia 1990	Giant Cavendish "Williams"	250 EC	8	0.20	0.088	calc. fruit whole, bagged	1 3 5	0.02 < 0.02 < 0.02	26/90 AUS-26-90-A1
						peel	1 3 5	0.03 < 0.02 < 0.02	
						pulp	1 3 5	0.02 < 0.02 < 0.02	
Brazil SP, 1992	Nanica	250 EC	5	0.13	0.83	fruit	0 7 14 28 45	< 0.1 < 0.1 < 0.1 < 0.1 < 0.1	BRA-CIENTEC 143649
Brazil SP, 1995	Prata ana	200 EC	9	0.10	0.50	fruit	5	< 0.05	USP 2021/96 BRA-S-C1-604/95-A
Brazil SP, 1995	Prata ana	200 EC	9	0.20	1	fruit	5	0.05	BRA-S-C1-604/95-B
Brazil SP, 2004	Nanicao	200 EC	5	0.10	0.67	fruit	5	0.02	BRA-FR04BRA046-P1-A, GLP: no
Brazil SP, 2004	Nanicao	200 EC	5	0.20	1.3	fruit	5	0.04	BRA-FR04BRA046-P2-A, GLP: no
Brazil SP, 2001	Nanicão Jangada	200 EC	9	0.10	0.050	fruit	0 1 3 5 7	0.14 0.08 0.06 0.03 0.01	UNESP RA-297/02 BRA S-C1-641/02-C1-A
Brazil SP, 2001	Nanicão Jangada	200 EC	9	0.20	0.1	fruit	5	0.04	BRA S-C1-641/02-C1-A
Brazil SP, 2004	Nanica	300 SC	6	0.12	0.80	fruit	0	< 0.05	BRA-FR04BRA019-P3-A
Brazil SP, 2004	Nanica	300 SC	6	0.24	1.6	fruit	0	< 0.05	BRA-FR04BRA019-P3-B
Brazil SP, 2004	Nanicão	300 SC	6	0.12	0. 8	fruit	0	< 0.05	BRA-FR04BRA019-P1-A
Brazil SP, 2004	Nanicao	300 SC	6	0.24	1.6	fruit	0	< 0.05	BRA-FR04BRA019-P1-B
Brazil SP, 2004	Nanica	300 SC	6	0.12	0.80	fruit	0	< 0.05	BRA-FR04BRA019-P2-A
Brazil SP, 2004	Nanica	300 SC	6	0.24	1.6	fruit	0	< 0.05	BRA-FR04BRA019-P2-B
Puerto Rico 1989	Grain Nain	45 WG	5	0.1	0.045	calc.fruit	0 7 14	≤ 0.01 < 0.01 < 0.01	99827 750-FR060-88D1
						peel	0 7 14	< 0.01 0.01 < 0.01	

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						pulp	0 7 14	≤ 0.01 < 0.01 < 0.01	
Puerto Rico 1989	Grain Nain	45 WG	5	0.1	0.045	calc.fruit	0 7 14	≤ 0.01 < 0.01 < 0.01	99827 750-FR059-88D1
						peel	0 7 14	< 0.01 < 0.01 < 0.01	
						pulp	0 7 14	≤ 0.01 < 0.01 < 0.01	
Puerto Rico 1991		45 WG	5	0.1	0.038	whole fruit	0 7 14	≤ 0.01 < 0.01 < 0.01	99827-1 750-FR009-91D
USA Hawaii 1989	Williams Hybrid	45 WG	5	0.1	0.053	calc. fruit	0 7 14	≤ 0.01 0.01 0.02	99827 458-FR058-88D1
						peel	0 7 14	< 0.01 0.02 0.02	
						pulp	0 7 14	≤ 0.01 0.01 0.02	
USA, Hawaii 1989	Williams Hybrid	45 WG	5	0.1	0.053	calc. fruit	0 7 14	≤ 0.01 < 0.01 < 0.01	99827 458-FR057-88D1
						peel	0 7 14	0.01 0.01 < 0.01	
						pulp	0 7 14	≤ 0.01 < 0.01 < 0.01	
USA Hawaii, 1991	Grain Nain	45 WG	5	0.1	0.031	whole fruit	0 7 14	0.03 0.03 0.04	99827-1 458-FR007-91D
						whole fruit, washed	0 7 14	0.03 0.03 0.03	
USA Hawaii, 1991	Valery	45 WG	5	0.100	0.0429	whole fruit	0 7 14	≤ 0.01 < 0.01 < 0.01	99827-1 458-FR008-91D

Mango

The use of tebuconazole in/on mango is registered in several countries, including Brazil, where a total of 18 residue trials were performed (Table 56).

Table 56 Results of residue trials conducted in Brazil with tebuconazole in/on mango

Year	Crop Variety	Application				Residues		Study Trial No. Trial SubID
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
1997	Tommy Atkins	EC 200	6	0.20	0.010	20	< 0.1	2365-97-A
1997	Tommy Atkins	EC 200	6	0.40	0.020	20	< 0.1	2365-97-B
2003	Tommy	SC 300	4	0.24	0.012	20	< 0.1	BRA-FR04BRA025-P3-A
2003	Tommy	SC 300	4	0.48	0.024	20	< 0.1	BRA-FR04BRA025-P3-B
2003/2004	Palmer	SC 300	4	0.24	0.012	20	< 0.1	BRA-FR04BRA025-P1-A
2003/2004	Palmer	SC 300	4	0.48	0.024	20	< 0.1	BRA-FR04BRA025-P1-B
2003/2004	Palmer	SC 300	4	0.24	0.012	20	< 0.1	BRA-FR04BRA025-P2-A

Year	Crop Variety	Application				Residues		Study Trial No. Trial SubID
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
2003/2004	Palmer	SC 300	4	0.48	0.024	20	< 0.1	BRA-FR04BRA025-P2-B
2004	Palmer	EC 200	3	0.40	0.020	20	0.02	BRA-FR04BRA056-P1-A
2004	Palmer	EC 200	3	0.80	0.040	20	0.05	BRA-FR04BRA056-P1-B
2004	Palmer	EC 200	3	0.40	0.020	20	0.02	BRA-FR04BRA056-P2-A
2004	Palmer	EC 200	3	0.80	0.040	20	0.04	BRA-FR04BRA056-P2-B
2004	Palmer	EC 200	3	0.40	0.020	0 10 20 30 40	0.44 0.05 < 0.05 < 0.05 < 0.05	MR-107/05 BRA-FR04GEB056-C1-A*
2004	Palmer	EC 200	3	0.80	0.040	0 10 20 30 40	0.48 0.10 0.06 0.08 < 0.05	BRA-FR04GEB056-C1-B*
2004	Palmer	EC 200	3	0.40	0.020	0 10 20 30 40	0.30 < 0.05 < 0.05 < 0.05 < 0.05	BRA-FR04GEB056-C2-A*
2004	Palmer	EC 200	3	0.80	0.040	0 10 20 30 40	0.58 0.09 0.09 0.07 < 0.05	BRA-FR04GEB056-C2-B*
2004	Palmer	EC 200	3	0.40	0.020	0 10 20 30 40	< 0.05 0.07 < 0.05 < 0.05 < 0.05	BRA-FR04GEB056-C3-A*
2004	Palmer	EC 200	3	0.80	0.040	0 10 20 30 40	0.09 0.07 < 0.05 < 0.05 < 0.05	BRA-FR04GEB056-C3-B*

* residues expressed as < 0.05 mg/kg gave finite residues at levels starting at 0.01 mg/kg

Papaya (pawpaw)

The use of tebuconazole in/on papaya is registered in Brazil and Australia. Twelve residue trials were performed in/on papaya in Brazil and two trials in Australia (Table 57).

Table 57 Results of residue trials conducted with in/on papaya fruit

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Australia, 1995	Hybrid AE (GD 3-1-8 x ER 6-2)	SC 430	7	0.125	0.042	0 3 7 14	0.04 0.07 0.01 < 0.01	JME 200/96 AUS-JME200-96-A
				0.25	0.083	0 3 7 14	0.04 < 0.01 < 0.01 0.02	AUS-JME200-96-B
Brazil, 2002	Golden	EC 200	6	0.20	0.026	0 2 5 7 14	0.52 0.42 0.34 0.32 0.27	MR-392/02 BRA-S-C1-711/02-Linhares

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
				0.40	0.054	0 2 5 7 14	1.3 1.1 0.87 0.72 0.67	
				0.20	0.026	0 2 5 7 14	0.39 0.30 0.24 <u>0.17</u> 0.15	BRA-S-C1-711/02-Itamaraju
				0.40	0.054	0 2 5 7 14	0.55 0.52 0.39 0.37 0.29	
				0.20	0.026	0 2 5 7 14	0.08 < 0.05 < 0.05 <u>0.15</u> 0.12	BRA-S-C1-711/02-Aracruz
				0.40	0.054	7	0.18	
Brazil, 2002	Sunrise Solo	EC 200	6	0.20	0.026	0 2 5 7 14	0.25 0.19 0.17 <u>0.19</u> 0.09	MR-392/02 BRA-S-C3-711/02-Pinheiros
				0.40	0.05	7	0.38	
Brazil, 2004	Formosa	EC 200	6	0.20	0.02	0 7	0.08 <u>0.06</u>	MR-147/04 BRA-FR04GEB0067-C1
				0.40	0.04	0 7	0.18 0.21	
	Gold	EC 200	6	0.20	0.02	0 7	1.2 <u>1.2</u>	BRA-FR04GEB0067-C2
				0.40	0.04	0 7	2.6 2.4	

Passionfruit

The use of tebuconazole in/on passionfruit is registered in Brazil, where eight residue trials were performed in 2004. The results are shown in Table 58.

Table 58 Results of residue trials conducted with tebuconazole in/on passionfruit (yellow) Brazil

	Application			Residues			
State	FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	Study Trial No.
MG	EC 200	3	0.20	0.020	7	<u>0.02</u>	UNESP RA-894/05; BRA-FR04BRA057-P1-A
SP	EC 200	3	0.20	0.020	7	<u>0.02</u>	UNESP RA-895/05; BRA-FR04BRA057-P2-A
SP	SC 300	4	0.12	0.024	0 3 5 7 10	< 0.1 < 0.1 < 0.1 <u>< 0.1</u> < 0.1	BRA-FR04BRA007-C1-A
SP	SC 300	4	0.24	0.048	7	< 0.1	BRA-FR04BRA007-C1-B
MG	SC 300	4	0.12	0.024	7	<u>< 0.1</u>	BRA-FR04BRA007-P1-A
MG	SC 300	4	0.24	0.048	7	< 0.1	BRA-FR04BRA007-P1-B
SP	SC 300	4	0.12	0.024	7	<u>< 0.1</u>	BRA-FR04BRA007-P2-A
SP	SC 300	4	0.24	0.048	7	< 0.1	BRA-FR04BRA007-P2-B

Bulb vegetables

Garlic

The use of tebuconazole in/on garlic is registered in France, Spain, Brazil, and Mexico. Six field trials are available on garlic in Brazil and five in France. The results are shown on Table (59).

Table 59 Results of residue trials conducted with tebuconazole in/on garlic

Country, Year	Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 1992	Chonan	250 EC	5	0.25	0.05	14	< 0.05	138740; BRA-138740-A
Brazil, 1992	Chonan	250 EC	5	0.50	0.1	14	< 0.05	138740; BRA-138740-B
Brazil, 2004	Quitéria	EC 200	4	0.20	0.05	14	0.02	BRA-FR04BRA042-P1-A
				0.40	0.10	14	0.03	BRA-FR04BRA042-P1-B
Brazil, 2004	Quitéria	EC 200	4	0.20	0.05	14	0.02	BRA-FR04BRA042-P2-A
				0.40	0.10	14	0.04	BRA-FR04BRA042-P2-B
France, 1994	Germidour	EC 250	2	0.25	0.041	21	< 0.02	FRA-RAIL0194-01
France, 1995	Germidour	EC 250	2	0.25	0.044	0 21	< 0.02 0.06	RAIL0195/09 09025
France, 1995	Thermidrome	EW 250	2	0.25	0.0436	0 5 10 14 21	< 0.02 0.02 0.02 < 0.02 < 0.02	RAIL0195-84-A
France, 1996	Thermidrome	EW 250	2	0.25	0.063	0* 0 6 10 14 21	0.02 0.02 0.03 0.02 0.04 0.02	RAIL0195-84-B
France, 1996	Thermidrome	EW 250	2	0.25	-	0* 0 21	< 0.02 0.02 0.03	RAIL0195/09 09026

* prior to last treatment

Leek

The use of tebuconazole in/on leek is registered in several European countries, where twelve field trials were conducted over two seasons. None of the French field trials were conducted according to GLP. The results are shown on Table 60.

Table 60 Results of residue trials conducted with tebuconazole EW 250 in/on leek (stems) in Europe

Country, Year	Crop Variety	Application			Residues		Study Trial No.
		No	kg ai/ha	kg ai/hL	PHI, days	mg/kg]	
Belgium, 1996	Arkansas	3	0.23-0.26	0.042	0* 0 3 7 14 21	0.26 0.58 0.40 0.34 0.22 0.11	RA-2081/96 601802
Belgium, 1996	Latina	3	0.26-0.27	0.042	0 14 21	0.78 0.31 0.07	RA-2081/96 601810
France, 1995	Leek Armor	3	0.25	0.025	0* 0 3 7 14 21	0.13 0.62 0.60 0.24 0.24 0.20	RPOIR195/42 42182

Country, Year	Crop Variety	Application No	kg ai/ha	kg ai/hL	Residues PHI, days	mg/kg]	Study Trial No.
France, 1995	Tadorna	3	0.25	0.063	0* 0 3 7 14 21	0.21 0.91 0.70 0.57 <u>0.19</u> 0.09	RPOIR195/42 42183
France, 1995	Vrizo	3	0.25	0.037	0* 0 5 10 14	0.30 0.24 0.40 0.21 <u>0.19</u>	RPOIR195/42 42184
France, 1995	Armor	3	0.25	0.037	0* 0 5 10 14	0.67 0.88 0.27 0.24 <u>0.28</u>	RPOIR195/42 42185
France, 1995	Armor	3	0.25	0.025	0* 0 14 21	0.23 0.59 <u>0.14</u> 0.14	RPOIR195/65 65186
France, 1995	Ardea	3	0.25	0.063	0* 0 14 21	0.23 1.4 <u>0.44</u> 0.25	RPOIR195/65 65187
France, 1995	Armor	3	0.25	0.037	0* 0 14	0.14 0.20 <u>0.03</u>	RPOIR195/65 65188
France, 1995	Artana	3	0.25	0.037	0* 0 14	0.03 0.24 <u>0.15</u>	RPOIR195/65 65189
Germany, 1996	Hannibal	3	0.25	0.042	0* 0 3 7 14 21	0.69 2.60 0.48 0.23 0.11 <u>0.15</u>	RA-2081/96 602329
Germany, 1996	Hannibal	3	0.25	0.042	0 14 21	2.30 0.16 <u>0.20</u>	RA-2081/96 602337 0233-96

* prior to last treatment

Onion

The use of tebuconazole in/on bulb onion is registered in Brazil and in European countries, where trials were conducted. The results are shown on Table 61.

Table 61 Results of residue trials conducted with tebuconazole in/on onion

Country, Year	Variety	Application FL	No	kg ai/ha	kg ai/hL	Residues Portion analysed	PHI, days	mg/kg	Study Trial No.
Belgium, 1997	Hyduro	EW 250	2	0.250	0.042	bulb	0* 0 5 10 14 22	< 0.05 0.05 0.05 < 0.05 < 0.05 <u>< 0.05</u>	RA-2068/97 701610
						green material	0	5.7	
Brazil, 1993	Granex 33	WP 25	4	0.25	0.083	Bulb	14	<u>0.06</u>	BRA-145631-A
				0.50	0.16	Bulb	14	0.10	BRA-145631-B

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Brazil, 2004	Agranex	WP 200	4	0.20	0.040	Bulb	14	0.02	BRA-FR04BRA050-P1-A
				0.40	0.080	Bulb	14	0.05	BRA-FR04BRA050-P1-B
Brazil, 2004	Agranex	EC 200	4	0.20	0.040	Bulb	14	0.03	BRA-FR04BRA050-P2-A
				0.40	0.080	Bulb	14	0.05	BRA-FR04BRA050-P2-B
Brazil, 2002	Crioula	EC 300	4	0.15	0.030	Bulb	14	< 0.02	BRA-S-D6-682/02-S1-A
				0.30	0.060	Bulb	14	≤ 0.02	BRA-S-D6-682/02-S1-B
Brazil, 2002	Crioula	EC 300	4	0.15	0.030	Bulb	14	< 0.02	BRA-S-D6-682/02-S2-A
				0.30	0.060	Bulb	14	≤ 0.02	BRA-S-D6-682/02-S2-B
Brazil, 2002	Baia periforme	SC 300	4	0.15	0.030	Bulb	14	< 0.02	BRA-S-D6-682/02-S3-A
				0.30	0.060	Bulb	14	≤ 0.02	BRA-S-D6-682/02-S3-B
France, North 1997	Oporto	EW 250	2	0.250	0.089	bulb	0* 0 5 10 14 21	< 0.05 0.10 0.08 < 0.05 < 0.05 ≤ 0.05	RA-2068/97 701599
						green material	0	4.1	
France, North 1996	Maru	EW 250	2	0.25	0.089	whole plant	0* 0 5 10 14 21	< 0.05 1.3 0.13 0.05 < 0.05 ≤ 0.05	RA-2085/96 602841
France, North 1997	Hysam	EW 250	2	0.25	0.089	bulb	0 21	0.07 ≤ 0.05	RA-2068/97 701645
						green material	0	3.6	
France, North 2006	Jaunes des Céven-nes	400 SC	2	0.20	0.040	bulb	0* 0 7 14 21	0.04 0.05 0.02 0.01 0.02	RA-2567/06 R 2006 0340/1 0340-06
France, Center 2007	Onion Hybing F1	400 SC	2	0.20	0.033	bulb	0* 0 7 14 21	< 0.01 0.06 < 0.01 < 0.01 ≤ 0.01	RA-2517/07 R 2007 0560/3 0560-07
France, South 2006	Rebou-illon	400 SC	2	0.20	0.033	bulb	0* 0 7 14 21	< 0.01 < 0.01 < 0.01 < 0.01 ≤ 0.01	RA-2568/06 R 2006 0342/8 0342-06
France, South 2007	Daytona	400 SC	2	0.20	0.033	bulb	0* 0 7 14 21	0.02 0.09 0.02 0.02 ≤ 0.01	RA-2518/07 R 2007 0040/7 0040-07
Germany, 1996	Sturon	EW 250	2	0.25	0.042	Washed bulb, skin removed	0 21	< 0.05 ≤ 0.05	RA-2085/96 603457
Germany, 1997	Stutt-garter Riesen	EW 250	2	0.25	0.042	bulb	0* 0 5 10 13 20	< 0.05 < 0.05 < 0.05 < 0.05 < 0.05 ≤ 0.05	RA-2068/97 701602
						green material	0	3.2	
Germany, 1997	Stutt-garter Riesen	EW 250	2	0.25	0.042	bulb	0 21	< 0.05 ≤ 0.05	RA-2068/97 701637

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						green material	0	3.4	
Germany 2006	Stutt-garter Riesen	400 SC	2	0.20	0.067	bulb	0* 0 7 14 21	< 0.01 0.07 < 0.01 < 0.01 < 0.01	RA-2567/06 R 2006 0537/4 0537-06
Germany 2006	Takstar	400 SC	2	0.20	0.040	bulb	0* 0 7 14 21	0.02 0.07 0.01 < 0.01 < 0.01	RA-2567/06 R 2006 0538/2 0538-06
Germany 2007	Stutt-garter Riesen	400 SC	2	0.20	0.067	bulb	0* 0 7 14 21	< 0.01 0.06 < 0.01 0.01 0.01	RA-2517/07 R 2007 0038/5 0038-07
Germany 2007	Benito	400 SC	2	0.20	0.067	bulb	0* 0 7 14 20	0.01 0.09 < 0.01 < 0.01 < 0.01	RA-2517/07 R 2007 0558/1 0558-07
Greece 2006	Ideal	400 SC	2	0.20	0.033	bulb	0* 0 7 15 21	< 0.01 0.05 < 0.01 < 0.01 < 0.01	RA-2568/06 R 2006 0542/0 0542-06
Greece 2007	Kozanis	400 SC	2	0.20	0.040	bulb	0* 0 7 14 21	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RA-2518/07 R 2007 0566/2 0566-07
Italy 2006	Density 5	400 SC	2	0.20	0.040	bulb	0* 0 7 14 21	0.02 0.05 0.01 < 0.01 < 0.01	RA-2568/06 R 2006 0541/2 0541-06
Italy 2007	Rossa di Toscana	400 SC	2	0.20	0.033	bulb	0* 0 7 14 21	< 0.01 0.03 < 0.01 < 0.01 < 0.01	RA-2518/07 R 2007 0563/8 0563-07
Netherlands 2007	Hybell	400 SC	2	0.20	0.025	bulb	0* 0 7 14 21	< 0.01 0.03 0.01 < 0.01 < 0.01	RA-2517/07 R 2007 0561/1 0561-07
Portugal 2007	Spring Star	400 SC	2	0.20	0.040	bulb	0* 0 7 14 21	0.03 0.10 0.03 0.03 0.02	RA-2518/07 R 2007 0565/4 0565-07
Spain 2006	Dulce de Fuentes	400 SC	2	0.20-0.21	0.033	bulb	0* 0 7 14 21	< 0.01 0.06 0.01 < 0.01 < 0.01	RA-2568/06 R 2006 0540/4 0540-06
Spain 2007	Liria	400 SC	2	0.20	0.033	bulb	0* 0 7 14 21	< 0.01 0.01 < 0.01 < 0.01 < 0.01	RA-2518/07 R 2007 0564/6 0564-07

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
United Kingdom, 1997	Hystar	EW 250	2	0.25	0.062	bulb	0 21	0.24 < 0.05	RA-2068/97 701629
						green material	0	6.3	
United Kingdom 2006	Red Barron	400 SC	2	0.20	0.067	bulb	0* 0 7 14 20	0.02 0.09 0.03 0.02 0.03	RA-2567/06 R 2006 0539/0 0539-06

* prior to last treatment

Brassica vegetables

Broccoli

The use of tebuconazole in/on broccoli is registered in Northern European countries. A total of 15 trials were conducted in Europe. The results are shown on Table 62.

Table 62 Results of residue trials conducted with tebuconazole in/on broccoli

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
France, North 2006	Chevalier	400 SC	2	0.20	0.067	curd	0* 0 3 7 14 21	< 0.01 0.77 0.41 0.17 0.06 0.11	RA-2607/06 R 2006 0400/9
France, North 2007	Chevalier	400 SC	2	0.20	0.067	curd	0* 0 3 7 14 21	< 0.01 0.96 0.06 < 0.01 < 0.01 < 0.01	RA-2525/07 R 2007 0069/5
Germany, 2003	Lord	WG 75	2	0.20	0.04	curd	0* 0 7 14 21 28	< 0.02 1.2 < 0.02 < 0.02 < 0.02 < 0.02	RA-2026/03 R 2003 0114/6
Germany, 2003	Marathon	WG 75	2	0.20	0.04	whole plant without roots	0	1.3	RA-2026/03 R 2003 0163/4
						curd	22	< 0.02	
Germany 2007	Patinon	400 SC	2	0.20	0.033	curd	0* 0 3 8 14 22	< 0.01 0.44 0.05 < 0.01 < 0.01 < 0.01	RA-2525/07 R 2007 0586/7
Greece 2007	Marathon	400 SC	2	0.20	0.040	curd	0* 0 3 7 14 21	0.04 0.38 0.32 0.23 0.04 0.03	RA-2526/07 R 2007 0070/9
Italy, 2001	Lord	WG 50	2	0.20	0.02	curd	0* 0 7 14 21 28	< 0.05 0.69 0.41 0.15 0.12 < 0.05	RA-2175/01 R 2001 0448/0

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Italy, 2002	Marathon	WG 50	2	0.20	0.02	curd	0* 0 7 14 21 28	< 0.05 0.65 0.26 0.08 < 0.05 < 0.05	RA-2175/02 R 2002 0078/1
Italy 2006	Olimpia	400 SC	2	0.20	0.025	curd	0* 0 3 7 14 21	0.10 0.74 0.48 0.37 0.09 0.02	RA-2608/06 R 2006 0502/1
Italy 2007	Parthenon F1	400 SC	2	0.20	0.027	curd	0* 0 3 7 14 21	0.01 0.46 0.22 0.05 0.01 < 0.01	RA-2526/07 R 2007 0588/3
Netherlands 2006	Ironman	400 SC	2	0.20	0.067	curd	0* 0 3 7 14 21	< 0.01 0.86 0.61 0.11 0.03 < 0.01	RA-2607/06 R 2006 0501/3
Spain, 2002	Marathon	WG 50	2	0.20	0.02	curd	0 14 21	0.34 0.06 < 0.05	RA-2175/02 R 2002 0077/3
Spain, 2002	Marathon	WG 50	2	0.20	0.02	curd	0 14 21	0.62 < 0.05 < 0.05	RA-2175/01 R 2001 0447/2
Spain 2006	Parthenon	400 SC	2	0.20	0.50	curd	0* 0 3 7 14	< 0.01 0.53 0.04 0.03 < 0.01	RA-2608/06 R 2006 0401/7
Spain 2007	Megaton	400 SC	2	0.20	0.033	curd	0* 0 4 7 14 20	0.02 0.71 0.35 0.14 0.04 0.02	RA-2526/07 R 2007 0587/5

* prior to last treatment

Brussels sprouts

The use of tebuconazole in/on Brussels sprouts is registered in European, where 16 trials were performed. The results are shown on Table 63.

Table 63 Results of residue trials conducted with tebuconazole in/on Brussels sprouts

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI [days]	mg/kg]	
France, North 2000	Warrior	EW 250	3	0.25	0.04	0 21	< 0.05 < 0.05	RA-2072/00 R 2000 0297/1
France, North 2002	Nautilus	75 WG	3	0.20	0.033	0 21	0.31 0.17	RA-2059/02 R 2002 0252/0
France, North 2002	Ariston	75 WG	3	0.20	0.033	0 21	0.32 0.12	RA-2059/02 R 2002 0253/9
Germany, 1996	Harald	EW 250	3	0.125/ 0.19/0.25	0.02- 0.04	0 21	0.41 0.15	RA-2080/96 602892

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI [days]	mg/kg]	
Germany, 1996	Harald	EW 250	3	0.125/ 0.19/0.25	0.02-0.04	0* 0 7 14 21 28	0.05 0.21 0.18 0.14 0.09 0.11	RA-2080/96 602906
Germany, 2000	Warrior	EW 250	3	0.25	0.04	0* 0 7 14 21 28	0.10 0.18 0.12 0.11 0.07 < 0.05	RA-2072/00 R 2000 0295/5
Germany 2002	Roger	75 WG	3	0.20	0.033	0* 0 3 7 14 21 28	0.07 0.16 0.19 0.21 0.10 0.07 < 0.05	RA-2059/02 R 2002 0256/3
Germany 2002	Roger	75 WG	3	0.20	0.033	0* 0 3 7 14 21 28	0.08 0.19 0.13 0.15 0.09 0.06 < 0.05	RA-2059/02 R 2002 0257/1
Germany 2003	Clodirs	75 WG	3	0.20	0.066	0 21	0.13 0.02	RA-2054/03 R 2003 0378/5
Germany 2003	Clodirs	75 WG	3	0.20	0.066	0 21	0.07 < 0.02	RA-2054/03 R 2003 1015/3
Netherlands, 2000	Estate	EW 250	3	0.25	0.04	0 21	0.39 0.19	RA-2072/00 R 2000 0296/3
United Kingdom, 1990		EW 250	3	0.25	0.06	0 14 21	0.12 < 0.05 < 0.05	0049-90
United Kingdom, 1993	Ottoline	EW 250	3	0.19	0.03	0* 0 7 14 21	0.07 0.24 0.10 0.10 0.05	RA-2056/93 300012
United Kingdom, 1993	Ottoline	EW 250	3	0.19	0.03	0* 0 7 14 21	0.07 0.25 0.19 0.16 0.12	RA-2056/93 302732
United Kingdom, 2003	Helemus	75 WG	3	0.20	0.050	0 21	0.20 0.09	RA-2054/03 R 2003 0376/9
United Kingdom, 2003	Helemus	75 WG	3	0.20	0.050	0 21	0.17 0.10	RA-2054/03 R 2003 1014/5

Cabbage, head

The use of tebuconazole in/on head cabbage is registered in Europe, where thirteen field trials were conducted, distributed over several seasons. The results are shown on Table 64.

Table 64 Results of residue trials conducted with tebuconazole in/on head cabbage

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
France, North 2002	white Nostranabus	WG 75	3	0.20	0.03	0 21	0.07 < 0.05	RA-2075/02 R 2002 0510/4
Germany, 1996	white Marner Allfrüh	EW 250	3	0.125/ 0.19/0.25	0.02-0.04	0 21 35	1.9 < 0.05 < 0.05	RA-2078/96 602914
Germany, 1996	Savoy Marner Grünkopf	EW 250	3	0.125/ 0.19/0.25	0.02-0.04	0* 0 7 14 21 28	0.09 0.87 0.21 0.05 < 0.05 < 0.05	RA-2078/96 603414
Germany, 2002	red Rodima	WG 75	3	0.20	0.03	0 21	< 0.05 < 0.05	RA-2075/02 R 2002 0511/2
Germany, 2002	white Marcello	WG 75	3	0.20	0.03	0* 0 3 7 14 21 28	< 0.05 0.20 0.08 < 0.05 < 0.05 < 0.05 < 0.05	RA-2075/02 R 2002 0512/ 0
Germany, 2002	reed Rodeo	WG 75	3	0.20	0.03	0* 0 3 7 14 21 28	< 0.05 0.15 0.09 < 0.05 < 0.05 < 0.05 < 0.05	RA-2075/02 R 2002 0513/9
Netherlands, 1989	Ramco	250 EC	3	0.38	0.06	0 14 21 28	0.14 < 0.05 < 0.05 < 0.05	0268-89 90268/3
United Kingdom, 1988	Stonehead F1	250 EC	3	0.38	-	21	0.25	TCR 392 54-88
				0.76	-	21	0.47	
United Kingdom, 1993	white Stone-head	EW 250	3	0.19	0.05	0* 0 7 14 21	0.40 0.88 0.63 0.48 0.32	RA-2058/93 302740
United Kingdom, 1993	white Stone-head	EW 250	3	0.19	0.05	0* 0 7 14 21	0.42 1.1 0.60 0.40 0.32	RA-2058/93 302759
United Kingdom, 1996	white Augustor	EW 250	3	0.125/ 0.19/0.25	0.03-0.06	0* 0 7 14 21 28	0.24 2.1 0.56 0.33 0.37 0.19	RA-2078/96 602922
United Kingdom, 1996	Savoy Mila	EW 250	3	0.125/ 0.19/0.25	0.03-0.06	0 21	3.4 0.56	RA-2078/96 603406

Cauliflower

The use of tebuconazole in/on cauliflower is registered in several European countries. The results are shown in Table 65.

Table 65 Results of residue trials conducted with tebuconazole in/on cauliflower in Europe

Country, Year	Crop Variety	Application				Residues			
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI [days]	mg/kg]	Study Trial No.
France, North 1995	White Ball	250 EW	3	0.25	0.089	head	0 21	0.06 < 0.05	RA-2085/95 50402/5
France, North 1995	Nautilus	250 EW	3	0.25	0.089	head	0* 0 7 14 21 28	< 0.05 < 0.05 < 0.05 < 0.05 < 0.05 < 0.05	RA-2085/95 50373/8
France, North 1996	Nautilus	250 EW	3	0.25	0.089	head	21	< 0.05	RA-2079/96 60189/6
						whole plant without roots	0	6.8	
France, South 1996	Siria	250 EW	3	0.25	0.089	head	7 14 21 28	< 0.05 < 0.05 < 0.05 < 0.05	RA-2089/96 60234/5
						whole plant without roots	0* 0	0.11 2.9	
France, South 1996	Nautilus	250 EW	3	0.25	0.089	head	21	< 0.05	RA-2089/96 60235/3
						whole plant without roots	0	2.6	
France, South 1997	Rhonia	250 EW	3	0.25	0.089	head	21 28	< 0.05 < 0.05	RA-2075/97 70084/3
						whole plant without roots	0* 0 7 14	1.0 3.8 1.5 0.65	
France, South 1997	Fremont	250 EW	3	0.25	0.089	head	21	< 0.05	RA-2075/97 70085/1
						whole plant without roots	0	7.3	
France, South 2006	Thalassa	400 SC	2	0.20	0.033	head	0* 0 3 7 13 21	< 0.01 0.15 0.04 < 0.01 < 0.01 < 0.01	RA-2572/06 R 2006 0346/0
France, South 2007	Cauli-flower Thalassa	400 SC	2	0.20	0.033	head	0* 0 3 7 14 21	< 0.01 0.09 0.06 0.03 < 0.01 < 0.01	RA-2526/07 R 2007 0068/7
Germany 1995	Nautilus	250 EW	3	0.25	0.042	head	21	< 0.05	RA-2085/95 50403/3
						whole plant without roots	0	5.7	
Germany 1995	Nautilus	250 EW	3	0.25	0.042	head	21 25	< 0.05 < 0.05	RA-2085/95 50374/6
						whole plant without roots	0* 0 7 14	1.5 6.2 2.5 2.2	
Germany 1996	Nautilus	250 EW	3	0.25	0.042	head	7 14 21 28	< 0.05 < 0.05 < 0.05 < 0.05	RA-2079/96 60236/1

Country, Year	Crop Variety	Application				Residues			
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI [days]	mg/kg]	Study Trial No.
						whole plant without roots	0* 0	0.41 5.6	
Germany 1996	Nautilus	250 EW	3	0.25	0.042	head	21	< 0.05	RA-2079/96 60238/8
						whole plant without roots	0	6.0	
Germany 2003	Aviso	75 WG	2	0.20	0.040	head	14 21 28	< 0.02 < 0.02 < 0.02	RA-2026/03 R 2003 0113/8
						whole plant without roots	0* 0 7	0.11 0.83 0.11	
Germany 2006	Freedom	400 SC	2	0.20	0.0666	head	0* 0 3 7 14 21	< 0.01 0.82 0.18 0.08 0.01 < 0.01	RA-2571/06 R 2006 0471/8
Germany 2007	Freedom	400 SC	2	0.20	0.033	head	3 7 14 21	0.04 0.02 < 0.01 < 0.01	RA-2525/07 R 2007 0067/9
						whole plant without roots	0* 0	0.29 3.6	
Italy 2006	Violetto Catanese	400 SC	2	0.20	0.025	head	0* 0 3 7 14 20	0.11 0.92 0.53 0.21 0.05 < 0.01	RA-2572/06 R 2006 0472/6
Italy 2007	Meridien F1	400 SC	2	0.20	0.033	head	0* 0 3 7 14 21	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RA-2526/07 R 2007 0585/9
Netherlands 2007	Speedy	400 SC	2	0.200	0.067	head	0* 0 3 7 14 21	< 0.01 0.04 < 0.01 0.02 < 0.01 < 0.01	RA-2525/07 R 2007 0583/2
Spain 2007	Movi-dick	400 SC	2	0.20	0.025-0.040	head	7 14 21	< 0.01 < 0.01 < 0.01	RA-2526/07 R 2007 0584/0
						whole plant without roots	0* 0 3	0.70 2.3 2.5	
United Kingdom 1996	Fargo	250 EW	3	0.25	0.062	head	7 14 21 28	< 0.05 < 0.05 < 0.05 < 0.05	RA-2079/96 60184/5
						whole plant without roots	0* 0	1.5 3.9	
United Kingdom 1990	Dok	250 EC	3	0.25	0.062	head	0 14 21	0.23 0.06 < 0.05	0050-90 00050/7[a]
United Kingdom, 2003	Pierrot	75 WG	2	0.20	0.040	head	0 21	< 0.02 < 0.02	RA-2026/03 R 2003 0162/6

Country, Year	Crop Variety	Application				Residues			
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI [days]	mg/kg]	Study Trial No.
United Kingdom 2006	Optamist	400 SC	2	0.20-0.21	0.067	head	0* 0 3 7 14 21	< 0.01 0.06 0.07 0.04 0.04 < 0.01	RA-2571/06 R 2006 0345/2

[a] mean of two samples

Fruiting vegetables, Cucurbits

Cucumber and zucchini

The use of tebuconazole in/on cucumber and/or zucchini is registered in Brazil and Europe, where trials were conducted (Table 66).

Table 66 Results of residue trials conducted with tebuconazole in/on cucumber and zucchini

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI [days]	mg/kg]	
Cucumber								
Belgium 2000	Cucumber Arcade	25 WG	4	0.178-0.188	0.012	0* 0 1 3 7	< 0.05 0.08 0.08 0.06 < 0.05	RA-2006/00 R 2000 0117/7
Brazil SP, 1995	Cucumber Safira	200 EC	5	0.20	0.040	5	0.06	USP BRA-S-D1-609/95 BRA-S-D1-609/95-A
Brazil SP, 1995	Cucumber Safira	200 EC	5	0.40	0.080	5	0.10	USP BRA-S-D1-609/95 BRA-S-D1-609/95-B
Brazil 2004	Cucumber Vitoria	200 EC	4	0.20	0.020	5	< 0.01	UNESP RA-850/04 BRA-FR04BRA062-P1-A
Brazil 2004	Cucumber Vitoria	200 EC	4	0.40	0.040	5	0.02	UNESP RA-850/04 BRA-FR04BRA062-P1-B
Brazil MG, 2003	Cucumber Vitoria	200 EC	4	0.20	0.020	5	< 0.01	UNESP RA-851/04 BRA-FR04BRA062-P2-A
Brazil MG, 2003	Cucumber Vitoria	200 EC	4	0.40	0.040	5	3.0	UNESP RA-851/04 BRA-FR04BRA062-P2-B
Germany 2000	Cucumber Indira	25 WG	4	0.112-0.188	0.012	0* 0 1 3 7	< 0.05 0.10 0.08 < 0.05 < 0.05	RA-2006/00 R 2000 0131/2
Germany 2000	Cucumber Indira	25 WG	4	0.112-0.188	0.012	0 3 7	0.11 0.10 0.06	RA-2006/00 R 2000 0118/5
Greece 2000	Cucumber Virginia 722	25 WG	4	0.094-0.141	0.012	0 3 7	0.12 0.08 0.06	RA-2006/00 R 2000 0116/9
Greece 2000	Cucumber Virginia 722	43 SE	4	0.093-0.140	0.012	0 3 7	0.17 0.09 < 0.05	RA-2006/00 R 2000 0115/0
Greece 2004	Cucumber Louberon	75 WG	3	0.038-0.11	0.01	0* 0 1 3 7	< 0.02 0.03 0.03 0.04 < 0.02	RA-2101/04 R 2004 0609/6

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI [days]	mg/kg]	
Italy 1997	Cucumber Hyeld	25 WG	4	0.125	0.012	0* 0 1 3 7	< 0.05 < 0.05 < 0.05 <u>< 0.05</u> < 0.05	RA-2074/97 70390/7
Italy 1997	Cucumber Hyeld	25 WG	4	0.125	0.012	0 3 7	< 0.05 <u>< 0.05</u> < 0.05	RA-2074/97 70391/5
Italy 2004	Cucumber Solverde	75 WG	3	0.15	0.01	0 3	0.05 <u>0.04</u>	RA-2101/04 R 2004 0604/5
Italy 2004	Cucumber Locali de Polignano	75 WG	3	0.15	0.01	0 3	0.03 <u>< 0.02</u>	RA-2101/04 R 2004 0606/1
Spain 1989	Cucumber Dasher II	50 WG	3	0.20	0.020	0 3 7 10	0.17 0.04 0.04 < 0.02	0532-89[a] 90532/1
Spain 1989	Cucumber Dasher II	50 WG	3	0.20	0.020	0 3 7 10	0.34 0.08 0.02 < 0.02	0534-89[a] 90534/8
Spain 1989	Cucumber Dasher II	50 WG	3	0.20	0.020	0 3 7 10	0.13 0.05 < 0.02 < 0.02	0535-89[a] 90535/6
Spain 1993	Cucumber Alaska	50 WP	3	0.20- 0.28	0.020	0* 0 3 5 7 10	0.02 0.12 0.07 0.06 0.03 0.03	RA-2071/93 30355/0
Spain 1993	CucumberChampion	50 WP	3	0.202- 0.287	0.020	0 3 7	0.30 0.09 0.03	RA-2071/93 30356/9
Spain 2004	Cucumber Fito Porto	75 WG	3	0.125- 0.150	0.01	0* 0 1 3 7	< 0.02 0.05 0.04 <u>0.03</u> < 0.02	RA-2101/04 R 2004 0608/8
Zucchini								
Italy 1997	Zucchini President	25 WG	4	0.125	0.012	0 3 7	0.16 <u>< 0.05</u> < 0.05	RA-2074/97 70392/3
Italy 2000	Zucchini Greyzini	43 SE	4	0.125	0.012	0 3 7	0.17 <u>0.10</u> < 0.05	RA-2006/00 R 1999 0728/1
Italy 2000	Zucchini Greyzini	25 WG	4	0.125	0.012	0* 0 1 3 7	< 0.05 0.14 0.12 <u>0.08</u> < 0.05	RA-2006/00 R 1999 0735/4
Italy 2000	Zucchini Sito F1	25 WG	4	0.125	0.012	0* 0 1 3 7	0.05 0.10 0.09 <u>< 0.05</u> < 0.05	RA-2006/00 R 1999 0730/3
Italy 2000	Zucchini Sito F1	25 WG	4	0.125	0.012	0 3 7	0.05 <u>< 0.05</u> < 0.05	RA-2006/00 R 1999 0727/3
Netherlands 2000	Zucchini Bengal	25 WG	4	0.125	0.012	0 3 7	0.13 0.08 < 0.05	RA-2006/00 R 1999 0731/1

[a] mean of two samples

Melon

The use of tebuconazole in/on melon is registered in Brazil and Italy. Fourteen trials were conducted in Brazil and thirteen trials were conducted in Europe. The results are shown in Table 67.

Table 67 Results of residue trials conducted with tebuconazole in/on melon in Brazil and Europe

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Brazil, 1993	Amarelo CAC	WP 25	5	0.25	0.03	fruit	7	< 0.05	BRA-CIENTEC 144632-A
Brazil, 1993	Amarelo CAC	WP 25	5	0.25	0.03	fruit	0 5 7 10 14	0.4 < 0.05 < 0.05 < 0.05 ≤ 0.05	BRA-CIENTEC 145490
Brazil, 1996	Yellow Quinn	EC 200	3	0.20	0.05	fruit	14	≤ 0.05	BRA-USP 2264/97-A
				0.40	0.10	fruit	14	< 0.05	BRA-USP 2264/97-B
Brazil, 2002	Eldorado	EC 200	5	0.20	0.025	fruit	14	0.03	BRA S-D1-644/02-S2-A
				0.40	0.05	fruit	14	0.05	BRA S-D1-644/02-S2-B
Brazil, 2002	Redondo Amarelo	SC 300	5	0.15	0.02	fruit	0 3 7 14 21	0.10 < 0.05 < 0.05 0.10 < 0.05	BRA-S-D1-683/02-C1-A
				0.30	0.04	fruit	14	0.10	BRA-S-D1-683/02-C1-B
Brazil, 2002	Eldorado	SC 300	5	0.15	0.02	fruit	14	< 0.05	BRA-S-D1-683/02-S1-A
				0.30	0.04	fruit	14	≤ 0.05	BRA-S-D1-683/02-S1-B
Brazil, 2002	Cantaloup	SC 300	5	0.15	0.02	fruit	14	< 0.05	BRA-S-D1-683/02-S2-A
				0.30	0.04	fruit	14	≤ 0.05	BRA-S-D1-683/02-S2-B
Brazil, 2005	Amarelo	EC 200	4	0.20	0.025	fruit	14	≤ 0.01	BRA-FR04BRA059-P1-A
				0.40	0.05	fruit	14	0.03	BRA-FR04BRA059-P1-B
France, South 2005	Hugo	WG 75	3	0.15	0.015	fruit	0* 0 1 3 7	0.04 0.08 0.06 0.08 0.04	RA-2027/05 R 2005 0137/4
France, North 2006	Melon Edgar	75 WG	3	0.15	0.015	Fruit	0* 0 1 3 7	0.05 0.09 0.08 0.06 0.04	RA-2114/06 R 2006 0045/3
						Peel	3	0.18	
						pulp	3	≤ 0.01	
France, North 2006	Melon Torgal	75 WG	3	0.15	0.015	Fruit	0* 0 1 3 7	0.05 0.09 0.09 0.08 0.07	RA-2114/06 R 2006 0044/5
						Peel	3	0.29	
						pulp	3	≤ 0.01	
Italy, 1992	Helton	WG 25	5	0.125	0.012	pulp	0* 0 3 7 10	< 0.02 < 0.02 < 0.02 ≤ 0.02 < 0.02	RA-2144/92 202924

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						peel	0*	0.07	
							0	0.19	
							3	0.25	
							7	0.34	
							10	0.07	
Italy, 1993	Parsifal	WG 25	5	0.125	0.012	pulp	0*	< 0.02	RA-2068/93 300322
							0	< 0.02	
							3	< 0.02	
							7	≤ 0.02	
							10	< 0.02	
						peel	0*	0.08	
							0	0.34	
							3	0.27	
							7	0.09	
							10	0.12	
						whole fruit, calculated	0*	0.05	
							0	0.18	
							3	0.13	
							7	0.05	
							10	0.06	
Italy, 1993	Superstar	WG 25	5	0.125	0.012	pulp	0	< 0.02	RA-2068/93 302953
							7	≤ 0.02	
						peel	0	0.11	
							7	0.08	
						whole fruit, calculated	0	0.04	
							7	0.03	
Italy, 2004	Exsalto	WG 75	3	0.15	0.015	fruit	0*	0.04	RA-2109/04 R 2004 0640/1
							0	0.15	
							1	0.11	
							3	0.10	
							7	0.09	
Italy, 2004	Pamir	WG 75	3	0.150	0.015	fruit	0*	0.04	RA-2109/04 R 2004 0642/8
							0	0.08	
							1	0.09	
							3	0.09	
							7	0.07	
Italy, 2004	Drake	WG 75	3	0.100	0.010	fruit	0*	< 0.02	RA-2110/04 R 2004 0635/5 Greenhouse
							0	< 0.02	
							1	< 0.02	
							3	< 0.02	
							7	≤ 0.02	
Italy, 2004	Figaro	WG 75	3	0.100	0.010	fruit	0*	0.04	RA-2110/04 R 2004 0636/3 Greenhouse
							0	0.12	
							1	0.07	
							3	0.09	
							7	0.06	
Italy, 2005	Summer-dream	WG 75	3	0.150	0.015	fruit	0*	< 0.02	RA-2027/05 R 2005 0138/2
							0	0.05	
							1	0.05	
							3	0.03	
							7	0.03	
Italy, 2005	Proteo	WG 75	3	0.100	0.01	fruit	0*	0.03	RA-2028/05 R 2005 0143 9 Greenhouse
							0	0.06	
							1	0.05	
							3	0.04	
							7	0.05	
Spain, 2005	Siglo	WG 75	3	0.100	0.01	fruit	0*	< 0.02	RA-2028/05 R 2005 0144 7 Greenhouse
							0	0.03	
							1	0.03	
							3	0.03	
							8	0.03	

* prior to last treatment

Watermelon

The use of tebuconazole in/on watermelon is registered in Italy and Brazil, where eight trials were conducted. The results are shown in Table 68.

Table 68 Results of residue trials conducted with tebuconazole in/on watermelon

Country, Year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg]	
Brazil, 2004	Perola	EC 200	4	0.20	0.025	fruit	14	≤ 0.01	BRA-FR04BRA058-P1-A
				0.40	0.05	fruit	14	< 0.01	BRA-FR04BRA058-P1-B
Brazil, 2004	Crimson sweet	EC 200	4	0.20	0.025	fruit	14	0.01	BRA-FR04BRA058-P2-A
				0.40	0.05	fruit	14	0.02	BRA-FR04BRA058-P2-B
Italy, 1991	Crimson Sweet	WG 25	4	0.062	0.012	pulp	0 3 7 10	< 0.02 < 0.02 < 0.02 < 0.02	RA-2144/92 102997 299/91
						peel	0 3 7 10	0.02 0.04 0.05 < 0.02	
						whole fruit, calculated	3 7 10	0.04 0.05 < 0.02	
Italy, 1992	Valchiria	WG 25	4	0.125	0.012	pulp	0* 0 3 7 10	< 0.02 < 0.02 < 0.02 ≤ 0.02 < 0.02	RA-2144/92 202908 290/92
						peel	0* 0 3 7 10	< 0.02 0.05 < 0.02 < 0.02 < 0.02	
						whole fruit, calculated	3 7 10	< 0.02 ≤ 0.02 < 0.02	
Italy, 1993	Crimson Sweet	WG 25	4	0.125	0.012	pulp	0* 0 3 7 10	< 0.02 < 0.02 < 0.02 ≤ 0.02 < 0.02	RA-2068/93 300306
						peel	0* 0 3 7 10	0.02 0.06 0.05 0.05 0.02	
						whole fruit, calculated	0* 0 3 7 10	< 0.02 0.03 0.03 0.03 < 0.02	
Italy, 1993	Crimson Sweet	WG 25	4	0.125	0.0125	pulp	0 7	< 0.02 ≤ 0.02	RA-2068/93 302929
						peel	0 7	0.31 0.08	
						whole fruit, calculated	0 7	0.15 0.04	

Fruiting vegetables, other than Cucurbits

Eggplant

The use of tebuconazole in/on eggplant (aubergine) is registered in Spain and Brazil. Eight trials were conducted in Brazil (Table 69).

Table 69 Results of residue trials conducted with tebuconazole EC 200 in/on eggplant in Brazil

State, Year	Crop Variety	Application			Residues		Study: Trial No.
		No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
RJ, 1999	Napolis	4	0.20	0.020	7	< 0.1	USP 2940/00. BRA-S-D1-609/99-A
RJ, 1999	Napolis	4	0.40	0.040	7	< 0.1	USP 2940/00; BRA-S-D1-609/99-B
RJ, 2000	Napoli	4	0.20	0.020	7	< 0.1	USP 2953/00; BRA-S-D1-609/99-A1
RJ, 2000	Napoli	4	0.40	0.040	7	< 0.1	USP 2953/00; BRA-S-D1-609/99-A2
PR, 2006	Embu	4	0.20	0.025	0 3 5 7 10	0.62 0.30 0.12 0.04 < 0.01	UNESP RA-1105/06 BRA-FR06BRA012-C1
SP, 2006	Embu	4	0.20	0.025	0 3 5 7 10	0.58 0.25 0.10 0.03 < 0.01	UNESP RA-1106/06; BRA-FR06BRA012-C2
MG, 2006	Florida Markt	4	0.20	0.025	7	0.04	UNESP RA-1107/06; FR06BRA012-P1
GO, 2006	Embu	4	0.20	0.025	7	0.02	UNESP RA-1108/06; FR06BRA012-P2

Peppers, sweet

The use of tebuconazole in/on sweet pepper is registered in Brazil and Europe, where the trials were conducted. The results are shown in Table 70.

Table 70 Results of residue trials conducted with tebuconazole EC 200 in/on sweet pepper

Country, Year	Crop Variety	Field/in door	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil SP, 1999	Mg-gali R	Field	200 EC	4	0.20	0.040	7	< 0.1	USP2933/00 BRA-S-D1-608/99-A
Brazil SP, 1999	Mg-gali R	Field	200 EC	4	0.40	0.080	7	< 0.1	USP 2933/00 BRA-S-D1-608/99-B
Brazil RJ, 2000	MYR 10	Field	200 EC	4	0.20	0.020	7	< 0.1	USP2934/00 BRA-S-D1-608/99-A1
Brazil RJ, 2000	MYR 10	Field	200 EC	4	0.40	0.040	7	< 0.1	USP2934/00 BRA-S-D1-608/99-B1
Brazil GO, 2000	Cascadura Ikeda	Field	200 EC	4	0.20	0.040	7	< 0.1	USP 2935/00 BRA-S-D1-608/99-A2
Brazil GO, 2000	Cascadura Ikeda	Field	200 EC	4	0.40	0.080	7	< 0.1	USP 2935/00 BRA-S-D1-608/99-B2
France, South 1997	Elisa	Indoor	25 WG	3	0.125-0.150	0.012	0* 0 3 7 10	0.10 0.13 0.15 0.06 < 0.05	RA-2073/97 70505/5
Germany 1997	Rumba	Indoor	25 WG	3	0.075-0.125	0.012	0 3 7	0.15 0.06 0.05	RA-2073/97 70506/3

Country, Year	Crop Variety	Field/in door	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Germany 1997	Rumba	Indoor	50 WP	3	0.150-0.25	0.025	0* 0 3 7 10	0.07 0.34 0.15 <u>0.15</u> 0.12	RA-2059/97 70477/6 0477-97
Italy 1997	Pepper, sweet Lux	Indoor	25 WG	3	0.10-0.125	0.012	0* 0 3 7 10	0.09 0.16 0.16 0.14 0.20	RA-2073/97 70183/1
Italy 1997	Pepper, sweet Ibrido indalo	Indoor	25 WG	3	0.075-0.125	0.012	0 3 7	0.13 0.13 0.13	RA-2073/97 70507/1
Italy 1997	Mondero	Indoor	25 WG	3	0.075-0.088	0.012	0 3 7	0.09 0.06 0.06	RA-2073/97 70185/8
Italy 2000	PS 132	Indoor	25 WG	3	0.162	0.012	0 3 7	0.34 0.33 <u>0.26</u>	RA-2171/99 R 1999 0725/7
Italy 2000	PS 132	Indoor	43 SE	3	0.162	0.012	0 3 7	0.45 0.40 <u>0.37</u>	RA-2171/99 R 1999 0726/5
Netherlands 1997	Spirit	Indoor	25 WG	3	0.231-0.250	0.012	0 3 7	0.23 0.23 0.13	RA-2073/97 70509/8
Netherlands 1997	Cardio	Indoor	50 WP	3	0.338-0.383	0.025	0 3 7 10	0.31 0.23 0.12 0.15	RA-2059/97** 70478/4
Netherlands 1997	3545	Indoor	50 WP	3	0.42-0.46	0.025	0 7	0.33 0.24	RA-2059/97** 70481/4
Portugal 1997	Clovis	Indoor	25 WG	3	0.075-0.105	0.012	0* 0 3 7 10	< 0.05 0.20 0.16 0.15 0.08	RA-2073/97 70504/7
Spain 1997	Mazur-ka	Indoor	25 WG	3	0.157-0.170	0.012	0* 0 3 7 10	0.23 0.38 0.32 <u>0.33</u> 0.28	RA-2073/97 70503/9
Spain 1997	Italiano	Indoor	50 WP	3	0.15-0.20	0.025	0 7	0.29 <u>0.10</u>	RA-2059/97 70480/6
Spain 1997	Stilo	Indoor	50 WP	3	0.275-0.30	0.025	0* 0 3 7 10	0.13 0.58 0.37 0.30 0.26	RA-2059/97 70175/0
Spain 1997	Alberto	Indoor	50 WP	3	0.31-0.40	0.025	0 7	0.53 0.35	RA-2059/97 70176/9
Spain 1997	Peto seed	Indoor	50 WP	3	0.325-0.375	0.025	0* 0 3 7 10	0.35 0.71 0.40 0.28 0.62	RA-2059/97 70479/2
Spain 1997	Laser	Indoor	50 WP	3	0.162-0.200	0.025	0 7	0.15 <u>0.10</u>	RA-2059/97 70482/2
Spain 2000	Roxy	Indoor	25 WG	3	0.162	0.012	0 3 7	0.28 0.25 <u>0.24</u>	RA-2171/99 R 1999 0733/8

Country, Year	Crop Variety	Field/in door	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Spain 2000	Roxy	Indoor	43 SE	3	0.15	0.012	0 3 7	0.33 0.27 0.25	RA-2171/99 R 1999 0734/6

* prior last treatment; ** artificial medium

Sweet corn (Corn-on-the-cob)

The use of tebuconazole in/on sweet corn is registered in the USA (Table 71).

Table 71 Results of residue trials conducted with 4 applications of tebuconazole SC formulation in/on sweet corn ear (kernels and cob, without husk).

Country, year	Crop Variety	Application		Residues		Study; Trial No.
		kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, PR, 2003	P 30F33	0.2	0.067	15	< 0.1	BRA-FR04BRA027-P2-A
Brazil, MS, 2004	Pioneer	0.2	0.067	15	< 0.1	BRA-FR04BRA027-P1-A
Brazil, SP, 2004	AG9090	0.2	0.067	15	< 0.1	BRA-FR04BRA027-P3-A
USA, CA, 1997	Golden Queen	0.19	0.13	7	0.36	108938; FCA-FR072-97H
USA, MN, Ruthton, 1997	Bodacious	0.19	0.101	7	0.10	108938; 851-FR068-97H
USA, MN, Lamberton, 1997	Bodacious	0.19	0.101	7	0.07	108938; 851-FR067-97H
USA, FL, 1997	Merit	0.19	0.11	7	0.32	108938; VBL-FR077-97H
USA, NY, Phelps, 1997	Bodacious	0.18-0.19	0.10	7	0.08	108938; 856-FR063-97H
USA, NY, North Rose, 1997	Tuxedo	0.19	0.10	7	0.05	108938; 856-FR064-97H
USA, OR, 1997	Jubilee	0.19	0.065-0.11	7	0.03	108938; 451-FR074-97H
USA, WA, 1997	Crookham 710A	0.19	0.13	7	< 0.01	108938; 454-FR073-97H
USA, WI, 1997	Jubilee	0.19	0.11-0.13	7	0.04	108938; 851-FR069-97H
USA, GA, 2003	Merit	0.19	0.10-0.11	7	< 0.01	108938-1; FR035-03H
USA, WI, 1997	Empire EH	0.19	0.12	7	0.08	108938, 851-FR070-97H
USA, IN, 1997	Ambrosia	0.19	0.14	6 13 20 27	< 0.01 0.04 0.08 0.01	108938, HIN-FR071

Tomato

The use of tebuconazole in/on tomato is registered in Spain, Italy and Brazil. Residue trials were conducted in Brazil, Europe and North America. The results are shown on Table 72.

Table 72 Results of residue trials conducted with tebuconazole in/on tomato

Country, Year	Field/ indoor	Crop Variety	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Belgium, 1997	indoor	Atletico	WP 50	3	0.37-0.50	0.025	0 7	0.22 0.18	RA-2062/97 704911
Brazil, 1989	Field	Camelo	WP 50	3	0.25	0.016	0 3 7 10	0.39 0.28 0.11 0.05	0528/89
Brazil, 2002	Field	Santa Clara	SC 300	4	0.30	0.03	7	0.06	BRA-S-D1-685/02-C1-B
					0.15	0.015	0 2 5 7 10	< 0.05 < 0.05 < 0.05 < 0.05 < 0.05	BRA-S-D1-685/02-C1-A

Country, Year	Field/ indoor	Crop Variety	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 2001	Field	U - 570	SC 446	4	0.26	0.026	7	0.05	BRA-S-D1-611/01-C1-B
					0.13	0.013	0 3 5 7 14	< 0.05 < 0.05 < 0.05 < 0.05 < 0.05	BRA-S-D1-611/01-C1-A
Brazil, 2001	Field	Seculus longa vida	SC 446	4	0.26	0.026	7	< 0.05	BRA-S-D1-611/01-S1-B
					0.13	0.013	7	< 0.05	BRA-S-D1-611/01-S1-A
Brazil, 2002	Field	Funny	SC 300	4	0.30	0.03	7	< 0.05	BRA-S-D1-685/02-S1-B
					0.15	0.015	7	< 0.05	BRA-S-D1-685/02-S1-A
Brazil, 2002	Field	Rio Grande	SC 300	4	0.30	0.03	7	0.10	BRA-S-D1-685/02-S2-B
					0.15	0.015	7	0.06	BRA-S-D1-685/02-S2-A
Germany, 1997	indoor	Suso	WP 50	3	0.45-0.50	0.025	0* 0 3 7 10	0.12 0.36 0.15 0.12 0.18	RA-206297 70490/3
Germany, 2000	indoor	Rogella	WP 50	3	0.50	0.025	0* 0 3 7 10	0.08 0.29 0.18 0.18 0.19	RA-2056/00 R 2000 0070/7
Germany, 2000	indoor	Ferrari	WP 50	3	0.50	0.025	0* 0 3 7 10	0.43 0.68 0.46 0.43 0.38	RA-2056/00 R 2000 0299/8
Greece, 2000	Field	Tomato Roma	WP 50	3	0.375	0.025	0* 0 7	0.07 0.13 0.10	RA-2055/00 R 2000 0067/7
Mexico, 1997	Field	Cherry	SC 432	6	0.28-0.30	0.17-0.21	7	0.15	108730**; MX1-FR013-97H
		Cherry			0.24-0.25	0.13-0.14	7	0.22	MX1-FR014-97H
		R-440			0.23-0.31	0.12-0.23	7	0.05	MX1-FR015-97H
		Toro			0.25	0.14	7	0.08	MX4-FR004-97H
Netherlands, 2000	indoor	Durinta	WP 50	3	0.50	0.025	0* 0 7	0.25 0.49 0.13	RA-2056/00 R 2000 0301/3
Spain, 1989	Field	Carmelo	WG 50	3	0.30	0.03	0 3 7 10	0.36 0.15 0.09 0.03	0408-89 GLP no
Spain,1992	Field	Arleta	WP 50	3	0.30	0.02	0* 0 7 10	0.12 0.23 0.10 0.04	RA-2022/92 201480
Spain,1992	Indor	Dario	WP 50	3	0.30	0.02	0* 0 3 7 10	0.10 0.46 0.13 0.10 0.08	RA-2022/92 201499
Spain,1992	Indor	Leopard	WP 50	3	0.30	0.02	0 3 7 10	0.04 0.03 < 0.02 < 0.02	RA-2022/92 201502
Spain,1997	Field	Royesta	WP 50	3	0.375	0.025	0 7	0.22 0.13	RA-2064/97 703990
Spain,1997	Field	Valenciano	WP 50	3	0.375	0.025	0 7	0.29 0.24	RA-2064/97 704857

Country, Year	Field/ indoor	Crop Variety	Application				Residues		Study Trial No.
			FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Spain,1997	Field	Brillante	WP 50	3	0.425-0.50	0.025	0* 0 3 7 10	0.07 0.28 0.18 0.16 0.23	RA-2062/97 701734
Spain,1997	Field	Bond	WP 50	3	0.425-0.45	0.025	0 7	0.45 0.45	RA-2062/97 701742
Spain,2000	indoor	Valentina	WP 50	3	0.475-0.50	0.025	0* 0 7	0.17 0.36 0.33	RA-2056/00 R 2000 0069/3
Spain,2000	indoor	Bond	WP 50	3	0.425-0.50	0.025	0* 0 7	0.28 0.47 0.46	RA-2056/00 R 2000 0300/5
Spain, 2000	Field	Bodar	WP 50	3	0.351-0.375	0.025	0* 0 3 8 10	< 0.05 0.12 0.08 0.07 0.09	RA-2055/00 R 2000 0068/5
USA, 1997	Field	Big Red Cherry	SC 432	6	0.25	0.17-0.19	7	0.97	108730**; 455-FR006-97H
		#3155	SC 432	6	0.25-0.26	0.17	7	0.41	455-FR007-97H
		Shady Lady	SC 432	6	0.25	0.18	7	0.25	455-FR008-97H
		3155 - Break	SC 432	6	0.25-0.26	0.17	7	0.20	455-FR009-97H
		Rio Grande	SC 432	6	0.24-0.25	0.17-0.18	7	0.24	457-FR010-97H
		C X D 181	SC 432	6	0.25-0.26	0.18	7	0.43	457-FR011-97H
		Super Roma	SC 432	6	0.25-0.26	0.18-0.19	7	0.28	457-FR012-97H
		Beef-steak	SC 432	6	0.25-0.27	0.12-0.14	7	0.11	856-FR001-97H
		Celebrity	SC 432	6	0.25-0.26	0.14-0.15	7	0.05	856-FR002-97H
		Brigade	SC 432	6	0.24	0.14-0.19	0 7 14 21	0.37 0.30 0.22 0.12	FCA-FR016-97D
		H-9035	SC 432	6	0.25	0.15	7	0.21	HIN-FR005-97H
		Sunpride	SC 432	6	0.25-0.26	0.17-0.20	0 7 14 21	0.08 0.03 0.02 < 0.01	VBL-FR003-97D

* prior to the last treatment; **two samples were analysed, the mean residue level reported

Legume vegetables (pulses)

Beans (dry)

The use of tebuconazole in/on dry bean is registered and covered by residue trials from Brazil and the USA, where the trials were conducted. The results are showing in Table 73.

Table 73 Results of residue trials conducted with tebuconazole in/on beans

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil MS, 1995	Carioquinha	200 EC	3	0.20	0.10	14	< 0.1	USP 1972/95; BRA-USP 1972/95-A
Brazil MS, 1995	Carioquinha	200 EC	3	0.40	0.20	14	< 0.1	USP 1972/95; BRA-USP 1972/95-B
Brazil SP, 1992	Carioquinha	250 EC	3	0.25	0.083	14	0.1	136865; BRA-136865-A
Brazil SP, 1992	Carioquinha	250 EC	3	0.50	0.16	14	0.25	136865; BRA-136865-B
Brazil SP, 1990	Carioquinha	250 EC	3	0.25	0.083	5 10 14 21	0.06 0.10 0.16 0.05	00585/1 0585-90
Brazil MS, 1990	Carioquinha	250 EC	3	0.25	0.083	5 10 14 21	< 0.05 < 0.05 < 0.05 < 0.05	0588-90 00588/6
Brazil SP, 1992	Carioquinha	25 WP	3	0.25	0.083	14	< 0.05	BRA-137028-P1-A
Brazil SP, 1992	Carioquinha	25 WP	3	0.50	0.16	14	< 0.05	BRA-137028-P1-B
Brazil MS, 2001	Pérola	446 SC	3	0.13	0.043	14	< 0.05	USP 61/4179/02 BRA-S-D3-604-01-S2-A
Brazil MS, 2001	Pérola	446 SC	3	0.26	0.086	14	0.05	USP 61/4179/02 BRA-S-D3-604-01-S2-B
Brazil SP, 2001	Pérola	446 SC	3	0.13	0.043	14	< 0.05	USP 61/4184/02 BRA-S-D3-604-01-S1-A
Brazil SP, 2001	Pérola	446 SC	3	0.26	0.086	14	0.05	USP 61/4184/02 BRA-S-D3-604-01-S1-B
Brazil SP, 2003	Carioquinha	300 SC	3	0.15	0.050	14	< 0.05	USP 83/4757/03 BRA-FR03BRA011-A
Brazil SP, 2003	Carioquinha	300 SC	3	0.30	0.10	14	< 0.05	USP 83/4757/03 BRA-FR03BRA011-B
Brazil PR, 2003	IAPRA 81	300 SC	3	0.15	0.050	14	< 0.05	USP 83/4759/03 BRA-FR03BRA011-P3-A
Brazil PR, 2003	IAPRA 81	300 SC	3	0.30	0.10	14	< 0.05	USP 83/4759/03 BRA-FR03BRA011-P3-B
Brazil MG, 2003	Carioquinha	300 SC	3	0.15	0.050	14	< 0.05	USP 83/4758/03 BRA-FR03BRA011-P2-A
Brazil MG, 2003	Carioquinha	300 SC	3	0.30	0.10	14	< 0.05	USP 83/4758/03 BRA-FR03BRA011-P2-B
USA CO, 1992	Bill "Z"	432 SC	2	0.19	0.244-0.25	15	< 0.05	107916 858-FR015-92D
USA ID, 1992	Harold Pinks	432 SC	2	0.19	0.202	14	< 0.05	107916 452-FR011-92H
USA IN, 1992	climbing French; Kentucky onder	432 SC	2	0.19	0.23	14	< 0.05	107916 HIN-FR017-92D
USA KS, 1992	Great Northern	432 SC	2	0.19	0.202	14	< 0.05	107916 STF-FR019-92D
USA MI, 1992	Mayflower	432 SC	2	0.19	0.202	15	< 0.05	107916 855-FR014-92D
USA MI, 1992	Upland Navy	432 SC	2	0.19	0.102	14	< 0.05	107916 851-FR012-92D
USA ND, 1992	Topaz (Pinto-type)	432 SC	2	0.19	0.202	14	< 0.05	107916 851-FR013-92D
USA NE, 1992	Navy Great Northern	432 SC	2	0.19	0.20	14	< 0.05	107916 SNE-FR018-92D
USA CA, 1993	Linden Large Red Kidney	432 SC	2	0.19	0.226	14	< 0.05	107916 FCA-FR016-92D
USA NE, 1996	Great Northern (Breyl)	432 SC	2	0.19	0.15-0.17	9	< 0.05	107916 453-FR011-96H

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
USA NE, 1996	Olathe	432 SC	2	0.19	0.15-0.16	8	< 0.05	107916 453-FR012-96H
USA KS, 1996	Othello Pinto	432 SC	2	0.19	0.10	11	< 0.05	107916 852-FR013-96H
USA NY, 1996	Califor-nia Red Kidney	432 SC	2	0.19	0.102	14	0.08	107916 854-FR010-96H
USA CO, 1996	Bill Z	432 SC	2	0.19	0.134	14	< 0.05	107916 453-FR014-96H

Soya bean (dry)

The use of tebuconazole in/on soya bean is registered Brazil and the USA, where 34 trials were conducted. The results are shown on Table 74.

Table 74 Results of residue trials conducted with tebuconazole in/on soya bean seed

Country, Year	Crop Variety	Application				Residues		Study Trial No. Trial SubID
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 2004	Suprema	EC 200	3	0.15	0.03	30	0.03	BRA-FR04BRA065-P1-A
				0.30	0.06	30	0.06	BRA-FR04BRA065-P1-B
Brazil, 2004	A 7002	EC 200	3	0.15	0.03	30	0.03	BRA-FR04BRA065-P2-A
				0.30	0.06	30	0.06	BRA-FR04BRA065-P2-B
Brazil, 2004	A 7002	SC 300	4	0.15	0.05	30	< 0.05	BRA-FR04BRA028-P1-A
				0.30	0.10	30	< 0.05	BRA-FR04BRA028-P1-B
Brazil, 2004	CD 201	SC 300	4	0.15	0.05	30	< 0.05	BRA-FR04BRA028-P2-A
				0.30	0.10	30	< 0.05	BRA-FR04BRA028-P2-B
Brazil, 2004	Suprema	SC 300	4	0.15	0.05	30	< 0.05	BRA-FR04BRA028-P3-A
				0.30	0.10	30	< 0.05	BRA-FR04BRA028-P3-B
Brazil, 2005	CD 202	300 SC	4	0.12	0.06	21	< 0.1	BRA-FR05BRA019-P1-A
				0.24	0.12	21	0.1	BRA-FR05BRA019-P1-B
Brazil, 2006	CO2	300 SC	4	0.12	0.06	21	0.02	BRA-FR06BRA027-P1
Brazil, 2006	BRS 133	300 SC	4	0.12	0.06	21	0.03	BRA-FR06BRA027-P2
USA, AR Proctor 2003	Horn-beck 5588RR	SC 432	3	0.13	0.09	21	0.04	201087, FR014-03H
USA, AR New Port ,2003	Delta King 5661RR	SC 432	3	0.13	0.07	20	0.01	201087, FR015-03H
USA, KS 2005	Fontanelle 431RR	SC 432	3	0.12-0.13	0.09	21	0.02	201087-1, FR036-03H
USA, FL 2003	NK S73-Z5	SC 432	3	0.12-0.13	0.06	24	< 0.01	201087, FR013-03H
USA, GA 2003	Hartz Seed H6686RR	SC 432	3	0.127	0.088	20	0.01	201087*, FR012-03H
USA, IA Richland 2003	Pioneer 93B86	SC 432	3	0.12-0.13	0.06-0.08	19	0.01	201087, FR030-03H
USA, IA, Bagley, 2003	92B94	SC 432	3	0.12-0.13	0.05-0.06	20	0.05	201087, FR021-03H
USA, IL Seymour, 2003	FS HT 322 STS	SC 432	3	0.13	0.09	18 21 24 27 33	0.02 0.02 0.02 0.02 0.02	201087, FR017-03D
USA, IL Carlyle, 2003	BT-402	SC 432	3	0.13	0.07-0.09	19	0.04	201087, FR022-03H
USA, IN 2003	Becks 323RR	SC 432	3	0.13	0.06-0.08	20	0.05	201087, FR020-03H
USA, IN 2003	Dekalb 3151	SC 432	3	0.12-0.13	0.07-0.08	21	0.03	201087, FR028-03H
USA, MN	Dekalb 06-51	SC 432	3	0.13	0.045	20	0.01	201087, FR026-03H

Country, Year	Crop Variety	Application				Residues		Study Trial No. Trial SubID
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
2003	Pioneer 91m50	SC 432	3	0.13	0.08-0.09	20	0.01	201087, FR027-03H
USA, MI 2003	GL2301RR	SC 432	3	0.13	0.06-0.07	20	< 0.01	201087, FR023-03H
USA, MS 2003	Soya X248R	SC 432	3	0.12	0.10-0.11	18 25 27 31 32	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	201087, FR016-03D
USA, NE 2003	NK S29 C9	SC 432	3	0.13	0.09	21	0.02	201087, FR018-03H
USA, ND Gardner, 2003	Mycogen44150	SC 432	3	0.13	0.04	20	0.03	201087, FR024-03H
USA, ND Northwood, 2003	Rough Rider	SC 432	3	0.13	0.04-0.05	21	0.01	201087, FR029-03H
USA, OH 2003	SC 9373	SC 432	3	0.12	0.08	19	0.02	201087, FR025-03H
USA, WI 2003	Brunner BR-1500 RR	SC 432	3	0.13	0.04	20	0.01	201087, FR031-03H

* Mean residues from two samples

Carrot

The use of tebuconazole in/on carrot is registered in several European countries and in Brazil, where the trials were conducted. The results are shown on Table 75.

Table 75 Results of residue trials conducted with tebuconazole in/on carrot

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 1995	Nantes	EC 200	8	0.20	0.067	14	0.1	BRA-USP 2012/96-A
				0.40	0.13	14	< 0.1	BRA-USP 2012/96-B
Brazil, 2003	Nantes Forte	SC 300	5	0.15	0.03	14	< 0.1	BRA-FR04BRA020-P1-A
				0.30	0.06	14	< 0.1	BRA-FR04BRA020-P1-B
Brazil, 2004	Brasilia	EC 200	4	0.20	0.040	14	0.17	BRA-FR04BRA051-P1-A
				0.40	0.08	14	0.26	BRA-FR04BRA051-P1-B
Brazil, 2004	Brasilia	EC 200	4	0.20	0.040	14	0.19	BRA-FR04BRA051-P2-A
				0.40	0.08	14	0.27	BRA-FR04BRA051-P2-B
Brazil, 2004	Brasilia	SC 300	5	0.15	0.03	14	< 0.1	BRA-FR04BRA020-P2-A
				0.30	0.06	14	< 0.1	BRA-FR04BRA020-P2-B
Brazil, 2004	Nantes Forte	SC 300	5	0.15	0.03	14	< 0.1	BRA-FR04BRA020-P3-A
				0.30	0.06	14	< 0.1	BRA-FR04BRA020-P3-B
France, 1997	Turbo	EW 250	3	0.25	0.09	0 14 21	0.08 0.08 0.22	RA-2066/97 704946
France, 1998	Turbo	EW 250	3	0.25	0.09	0 14 21 28 35 49	0.08 0.06 0.07 0.07 0.10 0.10	RA-2138/98 810924
Germany, 1997	Nantaise 2	EW 250	3	0.25	0.04	0* 0 7 14 21 28	0.16 0.22 0.25 0.15 0.19 0.11	RA-2066/97 701653
Germany, 1997	Nantaise 2	EW 250	3	0.25	0.04	0 14 21	0.13 0.18 0.18	RA-2066/97 701661

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Germany, 1998	Carrot Nantaise	EW 250	3	0.25	0.04	0* 0 15 21 28 35 49	0.10 0.17 0.15 <u>0.11</u> 0.07 0.10 < 0.05	RA-2138/98 810894
Germany, 1998	Carrot Nantaise	EW 250	3	0.25	0.04	0 14 21 28 35 49	0.17 0.15 <u>0.11</u> 0.09 0.10 0.05	RA-2138/98 810916
United Kingdom, 1997	Nairobi	EW 250	3	0.25	0.06	0* 0 7 14 21 28	0.11 0.14 0.15 0.15 <u>0.13</u> 0.10	RA-2066/97 704938
United Kingdom, 1998	Carrot Nairobi	EW 250	3	0.25	0.06	0* 0 14 21 28 35 49	0.05 0.16 0.06 0.08 <u>0.09</u> 0.08 0.05	RA-2138/98 810908

Artichoke

The use of tebuconazole in/on artichoke is registered in Italy and in Peru. Trials were conducted in Europe, Mexico and Peru. The results are shown on Table 76.

Table 76 Results of residue trials conducted with tebuconazole in/on artichoke

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Italy, 1991	Violetto Toscano	WG 25	4	0.125	0.012	0 3 7 10	0.36 0.22 <u>0.12</u> 0.06	RA-2145/92 103020
Italy, 1992	Violetto Toscano	WG 25	4	0.125	0.012	0* 0 7 10	< 0.05 0.42 <u>< 0.05</u> < 0.05	RA-2145/92 202878
Italy, 1992	Violetto di Provenza	SE 043	4	0.125	0.012	0 3 7	0.31 0.39 <u>0.12</u>	RA-2085/02 R 2002 0620/8
Italy, 1993	Violetto	WG 25	4	0.125	0.012	0* 0 3 7 10	0.14 0.67 0.49 <u>0.32</u> 0.19	RA-2064/93 300276
Italy, 1993	Violetto Toscano	WG 25	4	0.125	0.012	0 7	0.40 <u>0.17</u>	RA-2064/93 302937
Mexico 2008	Blanca de Tudela	75 WG	3	0.15	0.10	3	0.43	RATFL002-1* TF001-07HA
Peru 2009	Imperial Star	75 WG	3	0.14-0.16	0.022-0.024	3	<u>0.08</u>	RATFL002-1* TF002-07HA
Peru 2008	Imperial Star	75 WG	3	0.15	0.026-0.034	3	<u>0.06</u>	RATFL002-1* TF003-07HA

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Spain, 2002	Tudela	SE 043	4	0.125-0.136	0.013	0* 0 3 8 11	0.28 0.51 0.53 0.29 0.21	RA-2085/02 R 2002 0621/6

* residues are the mean of two samples

Cereal grains

Barley

The use of tebuconazole in/on barley is registered in various countries worldwide for use as foliar spray as well as seed treatment. Fourty foliar trials conducted in Europe from 1986 to 2002 were submitted. The results are shown on Table 77.

Table 77 Results of residue trials conducted in Europe with tebuconazole in/on barley (grain)

Country, year	Crop Variety	Application				Residue s		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
France, 2001	Winter Esterel	EW 250	2	0.25	0.083	27 35	0.93 0.70	RA-2031/01 R 2001 0087/6
France, 2002	Kelibia	EW 250	2	0.25	0.083	43	0.10	RA-2181/02 R 2002 0653/4
France, 2002	Flicka	EW 250	2	0.25	0.083	28 39	0.10 0.10	RA-2181/02 R 2002 0648/8
Germany, 1986	Winter Tapir	EC 250	2	0.38	0.094	35 42	< 0.05 < 0.05	10630-86
Germany, 1986	Winter Mammut	EC 250	2	0.38	0.094	49	< 0.05	10631/86
Germany, 1986	Winter Tapir	EC 250	2	0.25	0.063	35 42	< 0.05 < 0.05	10634-86
Germany, 1986	Winter Mammut	EC 250	2	0.25	0.063	49	< 0.05	10635/86
Germany, 1986	Winter Tapir	EC 375	2	0.25	0.063	35 42	< 0.05 < 0.05	10650-86
Germany, 1987	Winter Tapir	EC 250	2	0.38	0.094	49	< 0.05	10631/87
Germany, 1988	Spring Aramir	EC 375	2	0.25	0.062	42	< 0.05	0412-88
Germany, 1988	Winter Igri	EC 401	2	0.25	0.063	35 42	< 0.05 0.08	0250-88
Germany, 1989	Spring Aura	EC 290	2	0.25	0.063	35 42	0.21 0.06	0249-89
Germany, 1989	Spring Aura	EC 309	2	0.19	0.047	35	0.06	0253-89
Germany, 1989	Wnter Catinka	EC 250	2	0.38	0.094	48	0.07	0463-89
Germany, 1989	Winter Andrea	EC 250	2	0.38	0.094	42	0.08	0462-89
Germany, 1990	Spring Golf	EC 375	2	0.25	0.083	42	< 0.05	PF 3703 0142-90
	Spring Carina	EC 375	2	0.25	0.083	35 42	< 0.05 < 0.05	0145-90
Germany, Burscheid, 1990	Spring Golf	EW 250	2	0.38	0.125	42	< 0.05	PF3464 0146-90
Germany, 1990 Monheim	Spring Aura	EW 250	2	0.38	0.125	35 43	< 0.05 < 0.05	PF3464 00161/9
		EC 250	2	0.38	0.125	35 43	< 0.05 < 0.05	PF3464 0147-90
Germany, 1991	Spring Carina	EW 250	2	0.31	0.104	42 48	< 0.05 < 0.05	RA-2065/91 104620
Germany, 1991	Spring Aura	EC 500	2	0.25	0.083	28 35	0.12 0.13	RA-2058/91 10522/8
Germany, 1994	Winter Pamir	EW 250	2	0.31	0.104	35	0.08	RA-2069/94 404322

Country, year	Crop Variety	Application				Residue s		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Germany, 1994	Spring Sissy	EC 383	2	0.20	0.07	35 40	< 0.05 < 0.05	RA-2004/94 400157
	Winter Plaisant	EC 383	2	0.20	0.07	49	< 0.05	401951
Greece, 2001	Mucho	EW 250	2	0.25	0.08	28	0.96	RA-2031/01 R 2001 0084/1
Greece, 2002	Tessaloniki / Trixi Both	EW 250	2	0.25	0.08	50	< 0.05	RA-2181/02 R 2002 0654/2
Italy, 1993	Winter Trebbia	EW 250	2	0.25	0.04	28	0.38	RA-2059/93 302783
Italy, 2002	Klaxon	EW 250	2	0.25	0.08	28	0.85	RA-2181/02 R 2002 0649/6
	Kelibia	EW 250	2	0.25	0.08	28 38	0.05 0.07	R 2002 0651/8
Portugal, 2002	Frenes	EW 250	2	0.25	0.08	28 38	1.0 1.1	2181/02 R 2002 0652/6
Portugal, 2001	Spring Carina	EW 250	2	0.25	0.08	28 42	0.31 0.65	RA-2031/01 R 2001 0086/8
Spain, 2002	Grafit	EW 250	2	0.25	0.08	28 35	< 0.05 < 0.05	RA-2181/02 R 2002 0655/0
United Kingdom, Suffolk, 1991	Winter Marinka	EW 250	2	0.25	0.125	33	0.06	RA-2063/91 0137-91
		EW 250	2	0.50	0.25	33	0.16	0138-91
		EC 250	2	0.27	0.125	33	0.06	0210-91
		EC 250	2	0.50-0.53	0.25	33	0.17	0211/91
UK, Warwickshire, 1991	Winter Marinka	EC 250	2	0.25-0.27	0.125	45	0.07	0139-91
		EW 250	2	0.25-0.27	0.125	45	0.06	0208/91
		EW 250	2	0.50-0.53	0.25	45	0.15	0209/91

Maize

The use of tebuconazole in/on maize/corn is registered in Brazil and the United States, and other countries. None of the studies were conducted under GLP. The results are shown in Table 78.

Table 78 Results of residue trials conducted with Tebuconazole in/ on corn/maize kernel

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil SP, 1994	BR 201	WP 25	3	0.25	0.083	0 3 7 15 21	0.1 < 0.1 < 0.1 < 0.1 < 0.1	USP I-A2-603/94 BRA-USP I-A2-603/94
Brazil MS, 1994	C.808	WP 25	3	0.5	0.17	15	< 0.1	BRA-USP I-A2-604/94-B
Brazil MS, 1995	BR 201	EC 200	3	0.2	0.1	15	< 0.1	USP 1973/95; BRA-USP 1973/95-A
Brazil SP, 2004	Al Bandeirante	EC 200	3	0.2	0.04	15	0.01	UNESP RA-848/04 BRA-FR04BRA060-P1-A
Brazil SP, 2004	Al Bandeirante	EC 200	3	0.4	0.08	15	0.03	UNESP RA-848/04 BRA-FR04BRA060-P1-B
Brazil GO, 2004	A 2555	EC 200	3	0.2	0.04	15	0.02	UNESP RA-849/04 BRA-FR04BRA060-P2-A
Brazil GO, 2004	A 2555	EC 200	3	0.4	0.08	15	0.03	UNESP RA-849/04 BRA-FR04BRA060-P2-B
USA[a], NY 1997	Agway 266	432 SC	4	0.19	0.10	42	< 0.01	108936 854-FR043-97H
USA, GA 1997	DPL5750	432 SC	4	0.19	0.14	48	< 0.01	108936 TGA-FR044-97H
USA, IN 1997	GL 4929	432 SC	4	0.19	0.14	64 71 78 85	< 0.01 < 0.01 < 0.01 < 0.01	108936 GLP: no HIN-FR045-97D

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
USA, NE, 1997	DK574GR	432 SC	4	0.19	0.18	69	< 0.01	108936; SNE-FR046-97H
USA, KS 1997	Pioneer 3394	432 SC	4	0.19	0.11-0.21	49 57 63 70	< 0.01 < 0.01 < 0.01 < 0.01	108936 STF-FR047-97D
USA, MN 1997	N2555 Bt	432 SC	4	0.19	0.14	62	< 0.01	108936 851-FR048-97H
USA, MN 1997	Pioneer 3751	432 SC	4	0.19	0.10	63	< 0.01	108936 851-FR049-97H
USA, WI 1997	Renk RK553	432 SC	4	0.19	0.12-0.13	70	< 0.01	108936 851-FR050-97H
USA, NE 1997	Pioneer 3394	432 SC	4	0.19	0.10	42	< 0.01	108936 GLP: no 852-FR051-97H
USA, IL 1997	Pioneer 3394	432 SC	4	0.19	0.13	70	< 0.01	108936 853-FR052-97H
USA, IL 1997	Pioneer 3394	432 SC	4	0.19	0.13	53	< 0.01	108936; 853-FR053-97H
USA, IN 1997	Pioneer 3394	432 SC	4	0.19	0.12	57	< 0.01	108936 853-FR054-97H
USA, MI 1997	Pioneer 3751	432 SC	4	0.19	0.12	71	< 0.01	108936 855-FR055-97H
USA, OH 1997	GL276	432 SC	4	0.19	0.1-0.13	58	< 0.01	108936 855-FR056-97H
USA, OH 1997	Pioneer 3394E	432 SC	4	0.19	0.12	71	< 0.01	108936 857-FR057-97H
USA, IA 1997	Pioneer 35A19	432 SC	4	0.19	0.10-0.11	50	< 0.01	108936 857-FR058-97H
USA, IA 1997	DK592SR	432 SC	4	0.19	0.10	54	< 0.01	108936 857-FR059-97H
USA, IA 1997	DK592SR	432 SC	4	0.19	0.10-0.11	50	< 0.01	108936 GLP: no 857-FR060-97H
USA, IA 1997	DK592SR	432 SC	4	0.19	0.10-0.11	50	< 0.01	108936 857-FR061-97H
USA, TX 1997	Pioneer 3223	432 SC	4	0.19-0.20	0.13-0.13	36	< 0.01	108936; 459-FR062-97H

[a] results from USA trials are the mean of two samples. All trials were conducted in different locations.

Rice

The use of tebuconazole in/on rice is registered in Spain, Brazil, and many other countries. Trials were conducted in Brazil and Europe (Table 70).

Table 79 Results of residue trials conducted with tebuconazole in/on rice grain

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, SP, 2004	IAC 201	EC 200	2	0.15	0.05	35	0.02	UNESP RA-812/04; FR04BRA044-P1-A
Brazil, SP, 2004	IAC 201	200 EC	2	0.30	0.10	35	0.03	UNESP RA-812/04; FR04BRA044-P1-B
Brazil, SP, 2004	IAC 201	EC 200	2	0.15	0.05	35	0.01	UNESP RA-813/04; FR04BRA044-P2-A
Brazil, SP, 2004	IAC 201	200 EC	2	0.30	0.10	35	0.03	UNESP RA-813/04; FR04BRA044-P2-B
Brazil, MG, 2008	Prima-vera	300 SC	2	0.15	0.075	35	0.03	UNESP RA-1439/08; F08-093-P3
Brazil, SC, 2008	Prima-vera	300 SC	2	0.15	0.075	35	0.01	UNESP RA-1440/08; BRA-F08-093-P4
Italy, 1996	Padano	EW 250	2	0.25	0.04	35 44	0.33 0.25	RA-2091/96; 60257/4; 0257-96
Italy, 1996	Vialone Nano	EW 250	2	0.250	0.042	35 44	0.11 0.11	RA-2091/96; 60259/0; 0259-96

Country, year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Italy, 1997	Balilla	EW 250	2	0.25	0.04	35 48	0.12 0.12	RA-2065/97; 70087/8; 0087-97
Italy, 1997	Balilla	EW 250	2	0.25	0.04	35 42	0.26 0.23	RA-2065/97; 70089/4; 0089-97
Spain, 1996	Tahinato	EW 250	2	0.21-0.26	0.08	35	0.53	RA-2091/96; 60258/2; 0258-96
Spain, 1996	Tebre	EW 250	2	0.25	0.08	35	0.97	RA-2091/96; 60256/6; 0256-96
Spain, 1997	Loto	EW 250	2	0.25	0.08	33	0.24	RA-2065/97; 70088/6; 0088-97
Spain, 1997	Tebre	EW 250	2	0.25-0.27	0.08	33 47	0.29 0.23	RA-2065/97; 70090/8; 0090-97

Wheat and rye

The use of tebuconazole in/on wheat and/or rye is registered in various countries worldwide, in various solo and mixed formulations, for use as foliar spray as well as seed treatment. Trials were conducted in Brazil, Europe and North America. The results are shown in Table 80.

Table 80 Results of residue trials conducted with tebuconazole in/on wheat and rye grain

Country, year	Crop, variety	Application							
		FL	No	kg ai/ha	kg ai/hL	GS	PHI, days	mg/kg	Study Trial No.
Belgium 2007	Wheat spring Tybalt	216 EC	2	0.249	0.083	69	36 55	0.05 < 0.01	RA-2008/07 R 2007 0166/7
Brazil SP, 2004	Wheat OR1	200 EC	3	0.15	0.05	77	35	0.02	UNESP RA-892/05 BRA-FR04BRA002-P1-A
Brazil PR, 2004	Wheat BR 2	200 EC	3	0.15	0.05	[a]	35	0.02	UNESP RA-893/05 BRA-FR04BRA002-P2-A
Brazil PR, 2005	Wheat BRS 209	300 SC	3	0.15	0.05	77	30	0.02	UNESP RA-989/06 BRA-FR05BRA020-P1-A
Brazil RS, 2005	Wheat Pan-peano	300 SC	3	0.15	0.05	77	30	0.03	UNESP RA-990/06 BRA-FR05BRA020-P2-A
Brazil SP, 2005	Wheat OR 1	300 SC	3	0.15	0.05	77	30	0.02	UNESP RA-991/06 BRA-FR05BRA020-P3-A
Brazil SP, 2003	Wheat BRS 193	300 SC	3	0.15	0.05	75	30	< 0.05	USP 83/4763/03 BRA-FR03BRA005-P2-A
Brazil PR, 2003	Wheat CD 104	300 SC	3	0.15	0.05	75	30	< 0.05	USP 83/4765/03 BRA-FR03BRA005-P1-A
Brazil RS, 2003	Wheat Embrapa 40	300 SC	3	0.15	0.07	97	30	< 0.05	USP 83/4766/03 BRA-FR03BRA005-P3-A
Canada 2005	Wheat AC Barrie	432 SC	1	0.126	0.06	61	22 29 35 43 50	0.19 0.12 0.08 0.05 0.02	05BCS01-01-05D*
Canada, 2005	Wheat, AC Barrie	432 SC	1	0.126	0.06	61	35	0.01	05BCS01-02-05H-B*
Canada, 2005	AC Superb	432 SC	1	0.126	0.06	65	33	0.02	05BCS01-03-05H-B*
Canada, 2005	Wheat, Abbey	432 SC	1	0.126	0.06	61	36	0.01	05BCS01-04-05H-B*
Canada, 2005	Wheat, Barrie	432 SC	1	0.126	0.06	58	36	< 0.01	05BCS01-05-05H-B*
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.06	58	35	0.01	05BCS01-06-05H-B*
Canada, 2005	Wheat, AC Barrie	432 SC	1	0.126	0.06	59	35	0.06	05BCS01-07-05H-B*
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.06	61	35	0.04	05BCS01-08-05H-B*

Country, year	Crop, variety	Application							
		FL	No	kg ai/ha	kg ai/hL	GS	PHI, days	mg/kg	Study Trial No.
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.06	59	35	0.01	05BCS01-09-05H-B*
Canada, 2005	Wheat, Teal	432 SC	1	0.126	0.06	59	35	0.02	05BCS01-10-05H-B*
Canada, 2005	Wheat Teal	432 SC	1	0.126	0.06	61	35	0.02	05BCS01-11-05H-B*
Canada, 2005	Wheat Teal	432 SC	1	0.126	0.06	65	35	0.02	05BCS01-12-05H-B*
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.06	59	22 29 35 43 49	0.08 0.02 < 0.01 < 0.01 < 0.01	05BCS01-13-05D*
Canada, 2007	Wheat AC Andrew	432 SC	1	0.126	0.06	37	36	< 0.02	RAHWC006-01-07H-A2*
Canada, 2007	Wheat AC A ndrew	250 EW	1	0.126	0.06	37	36	< 0.02	RAHWC006-01-07H-B2*
Canada, 2007	Wheat AC Lillian	432 SC	1	0.126	0.06	39	36	< 0.02	RAHWC006-02-07H-A2*
Canada, 2007	Wheat AC Lillian	250 EW	1	0.126	0.06	39	36	< 0.02	RAHWC006-02-07H-B2*
Canada, 2007	Wheat AC Andrew	432 SC	1	0.126	0.06	37	42	< 0.02	RAHWC006-03-07H-A2*
Canada, 2007	Wheat AC A ndrew	250 EW	1	0.126	0.06	37	42	< 0.02	RAHWC006-03-07H-B2*
Canada, 2007	Wheat AC Lillian	432 SC	1	0.126	0.06	39	43	< 0.02	RAHWC006-04-07H-A2*
Canada, 2007	Wheat AC Lillian	250 EW	1	0.126	0.06	39	43	< 0.02	RAHWC006-04-07H-B2*
France, North, 1994	Wheat winter Fortal	383 EW	2	0.199	0.071	69	52	< 0.05	RA-2004/94 40194/3; 0194-94
France, North 2003	Triticale Carnac	300 SC	2	0.200	0.067	69	35	0.02	RA-2027/03 R 2003 0166/9
France, North 2007	Wheat winter Mercato	216 EC	2	0.249	0.083	69	55	< 0.01	RA-2008/07 R 2007 0165/9
France 2002	Wheat Apache	250 EW	2	0.25	0.083	69	56	< 0.05	RA-2182/02 R 2002 0658/5
France, South 2002	Wheat Apache	250 EW	2	0.25	0.083	69	56	< 0.05	RA-2182/02 R 2002 0659/3
France, South 2003	Wheat, winter Frelon	300 SC	2	0.200	0.066	69	35 41	< 0.01 0.01	RA-2028/03 R 2003 0167/7
France, South 2003	Wheat, durum Orjaune	300 SC	2	0.20	0.080	69	35	< 0.01	RA-2028/03 R 2003 0169/3
France 2003	Wheat, winter Apache	300 SC	2	0.2000	0.067	69	51	0.02	RA-2028/03 R 2003 0129/4
France, South 2007	Wheat, winter Andalou	216 EC	2	0.249	0.083	69	63	0.03	RA-2048/07 R 2007 0606/5
Germany 1986	Wheat winter Caribo	125 EW	2	0.25	0.06	61	35 42	< 0.05 < 0.05	10606-86
Germany 1986	Wheat winter Caribo	250 EC	2	0.25	0.063	61	35 42	< 0.05 < 0.05	10636-86
Germany 1986	Wheat winter Caribo	375 EC	2	0.25	0.063	61	35 42	< 0.05 < 0.05	10652-86
Germany 1986	Rye, winter Danko	375 EC	2	0.25	0.063	61	35 49 56	< 0.05 < 0.05 < 0.05	10655-86
Germany 1988	Wheat, spring Star	375 EC	2	0.25	0.062	69	35 42	< 0.05 < 0.05	0639-88
Germany 1988	spring Star	375 EC	2	0.25	0.062	69	35 42	< 0.05 < 0.05	0641-88
Germany 1990	Wheat, spring Star	375 EC	2	0.25	0.083	65	35 42	< 0.05 < 0.05	PF 3703 00144/9

Country, year	Crop, variety	Application							
		FL	No	kg ai/ha	kg ai/hL	GS	PHI, days	mg/kg	Study Trial No.
Germany 1991	Rye, winter Amando	500 EC	2	0.25	0.083	70	35 42	< 0.05 < 0.05	0519-91
Germany 1991	Rye, winter Dauko	250 EW	2	0.312	0.104	[c]	42	< 0.05	RA-2142/91; 101338
Germany 1991	Wheat winter Kanzler	300 EC	2	0.225	0.075	69	35 42	< 0.05 < 0.05	RA-2099/91 10053/6; 0053-91
Germany 1992	Wheat spring Star	500 EC	2	0.20	0.067	65	35 42	< 0.05 < 0.05	RA-2107/92 20607/5; 0607-92
Germany 1992	Wheat winter Kanzler	500 EC	2	0.20	0.067	61	42	< 0.05	RA-2107/92 20607/5
Germany 1993	Wheat spring Nandu	500 EC	2	0.25	0.083	61	35 42	< 0.05 < 0.05	RA-2055/93 30121/3; 0121-93
Germany 1994	Wheat winter Konsul	383 EW	2	0.20	0.066	71	35 42	< 0.05 < 0.05	RA-2004/94 40018/1; 0018-94
Germany 1994	Wheat spring Nandu	383 EW	2	0.20	0.066	69	35 42	< 0.05 < 0.05	RA-2004/94 40016/5; 0016-94
Germany 1994	Rye, winter Gambit	383 EW	2	0.20	0.066	71	40	< 0.05	RA-2004/94 40017/3; 0017-94
Germany 1994	Wheat spring Nunda	250 EW	2	0.25	0.083	71	35	< 0.05	RA-2069/94 40431/4; 0431-94
Germany 1994	Rye, winter Gambit	250 EW	2	0.312	0.104	71	40	< 0.05	RA-2069/94 40433/0; 0433-94
Germany 2007	Wheat spring Thasos	216 EC	2	0.249	0.083	69	35 56	0.06 0.01	RA-2008/07 R 2007 0616/2
Greece 2007	Wheat, winter Moro (durum)	216 EC	2	0.249	0.083	69	35	0.09	RA-2048/07 R 2007 0617/0
Italy 2002	Wheat Cen-tauro	250 EW	2	0.25	0.083	69	43	< 0.05	RA-2182/02 R 2002 0661/5
Italy 2002	Wheat Serio	250 EW	2	0.25	0.083	69	28 54	0.06 < 0.05	RA-2182/02 R 2002 0662/3
Italy 2002	Wheat Enesco	250 EW	2	0.25	0.083	67	28 40	< 0.05 < 0.05	RA-2182/02 R 2002 0660/7
Italy 2003	Wheat, durum Arcan-gelo	300 SC	2	0.2000	0.067	69	30 35	< 0.01 < 0.01	RA-2028/03 R 2003 0168/5
Italy 2007	Wheat, durum Simeto	216 EC	2	0.249	0.083	69	44	0.02	RA-2048/07 R 2007 0607/3
Spain 2002	Wheat Soissons	250 EW	2	0.25	0.083	69	28 41	< 0.05 < 0.05	RA-2182/02 R 2002 0656/9
Spain 2002	Wheat Sem-grain	250 EW	2	0.25	0.083	75	21 28	< 0.05 < 0.05	RA-2182/02 R 2002 0657/7
Spain 2007	Wheat, winter Soissons	216 EC	2	0.25-0.27	0.083	69	35 44	0.01 < 0.01	RA-2048/07 R 2007 0608/1
Sweden 2003	Rye Picarro	300 SC	2	0.200	0.067	69	56	< 0.01	RA-2027/03 R 2003 0165/0
Sweden 2003	Wheat, winter Kris	300 SC	2	0.20	0.067	69	43	0.02	RA-2027/03 R 2003 0164/2
United Kingdom 1991	Wheat winter Mercia	250 EC	2	0.25	0.125	71	56	< 0.05	RA-2063/91 10143/5; 0143-91
United Kingdom 1991	Wheat winter Mercia	250 EC	2	0.25-0.267	0.12	71	49	< 0.05	RA-2063/91 10215/6; 0215-91
United Kingdom 2003	Wheat, winter Claire	300 SC	2	0.200	0.067	73	35	0.03	RA-2027/03 R 2003 0115/4
United Kingdom 2007	Wheat spring Belvoir	216 EC	2	0.249	0.083	69	73	< 0.01	RA-2008/07 R 2007 0615/4
USA Minnesota, 1995	Wheat spring #2375	432 SC	1	0.126	0.09	[b]	35	< 0.05	107519; 851-FR011-95H-2*
USA, SD, 1995	Wheat spring #2375	432 SC	1	0.126	0.09	[b]	32	< 0.05	107519; 851-FR012-95H-2*
USA SD, 1995	Wheat spring Marshall	432 SC	1	0.13	0.09	[b]	37	< 0.05	107519; 851-FR015-95H-2*

Country, year	Crop, variety	Application							
		FL	No	kg ai/ha	kg ai/hL	GS	PHI, days	mg/kg	Study Trial No.
USA Washington, 1995	Wheat spring Nomad	432 SC	1	0.129	0.14	[b]	33	< 0.05	107519; 454-FR025-95H-2

[a] late milk

[b] middle of heading

[c] development of fruit

* For each year, all Canadian and USA trials were conducted at different sites; in each site, two samples were analysed, the mean reported.

Tree nuts

In the USA the use of tebuconazole is registered in/on almonds, pistachios and other tree nuts. Trials conducted in USA were not according to GAP.

Table 81 Results of residue trials conducted with tebuconazole in/on tree nuts (nuts without shell)

County Year	Crop, variety	Application					PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL	GS			
Italy, 2003	Walnut Lara	43 SE	2	0.22	0.07	[a]	71 91 113	< 0.05 < 0.05 < 0.05	ISPaVe-TNZ-F-17/03-A
Italy, 2003	Walnut Lara	43 SE	2	0.22	0.04	[a]	71 91 113	< 0.05 < 0.05 < 0.05	ISPaVe-TNZ-F-17/03-C
Italy, 2003	Walnut Lara	43 SE	2	0.22	0.05	[a]	71 91 113	< 0.05 < 0.05 < 0.05	ISPaVe-TNZ-F-17/03-B
Italy, 2003	Walnut Lara	43 SE	2	0.22	0.04	[a]	71 91 113	< 0.05 < 0.05 < 0.05	ISPaVe-TNZ-F-17/03-D
USA[a], CA, 1996	Almond Non-Pariel	45 WG	4	0.25	0.04	[b]	35	< 0.05	107544 FCA-FR006-96H;
USA CA, 1996	Almond Price	45 WG	4	0.25	0.01	[b]	29	< 0.05	107544 457-FR005-96H;
USA CA, 1996	Almond Merced	45 WG	4	0.25	0.04	[c]	35	< 0.05	107544 457-FR004-96H;
USA CA, 1996	Almond Carmel	45 WG	4	0.25	0.01	[c]	31	< 0.05	107544 457-FR003-96H;
USA CA, 1996	Almond Carmel	45 WG	4	0.25	0.04	[c]	32	< 0.05	107544 455-FR002-96H
USA CA, 1996	Almond Non-Pariel	45 WG	4	0.25	0.01	[c]	25 35 42 49	< 0.05 < 0.05 < 0.05 < 0.05	107544 455-FR001-96D
USA OK, 199	Pecan Western Schley	432 SC	4	0.25	0.05	[d]	50	< 0.05	107344 456-FR004-95H
USA GA, 1995	Pecan nut Desir-able	432 SC	4	0.25	0.05	[e]	12	< 0.05	107344 352-FR002-95H
USA GA, 1995	Pecan Stuart	432 SC	4	0.25	0.05	[g]	21	< 0.05	107344 352-FR001-95H
USA TX, 1995	Pecan Wichita	432 SC	4	0.25	0.03-0.04	[f]	19	< 0.05	107344 459-FR005-95H
USA LA, 1995	Pecan Cape Fear	432 SC	4	0.25	0.006-0.01	[h]	25	< 0.05	107344 355-FR003-95H

[a] Residues in USA trials are the mean of two samples

[b] after blooming

[c] 30-60% hull split

[d] immature nut

[e] shucks shelled

[f] 5% shuck split

[g] just before shuck split

[h] nut fill; 8) mature kernel

Cotton

The use of tebuconazole in/on cotton is registered in Brazil and the USA where 24 trials were conducted. The results are shown in Table 82.

Table 82 Results of residue trials conducted with Tebuconazole in/on cotton

County Year	Crop, variety	Application				Portion analysed	PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL				
Brazil SP, 2007	Delta Opal	300 SC	4	0.15	0.075	seed	21	0.02	UNESP RA-1266/07 BRA-FR07BRA005-P1
Brazil MT, 2007	Delta Opal	300 SC	4	0.15	0.075	seed	21	0.01	UNESP RA-1267/07 BRA-FR07BRA005-P2
Brazil MS, 2007	Delta Opal	300 SC	4	0.15	0.075	seed	21	0.02	UNESP RA-1268/07 FR07BRA005-P3
Brazil MG, 2007	Delta Opal	300 SC	4	0.15	0.075	seed	21	0.03	UNESP RA-1269/07 FR07BRA005-P4
Brazil SP, 2004	IAC 23	300 SC	5	0.15	0.050	seed	21	< 0.1	FR04BRA014-P1-A
Brazil MG, 2004	IAC 23	300 SC	5	0.15	0.050	seed	21	< 0.1	FR04BRA014-P2-A
Brazil MS, 2004	Delta Opal	300 SC	5	0.15	0.050	seed	21	< 0.1	FR04BRA014-P3-A;
USA, TX 1992	DPL50	432 SC	3	0.258	0.30	fuzzy seed	23 30 37	< 0.05 < 0.05 < 0.05	107915 352-FR031-92D
USA, TX 1992	DPL119	432 SC	3	0.258	0.27	fuzzy seed	22 28 35	< 0.05 0.05 < 0.05	107915 353-FR033-92D
USA, OK 1992	Pay-master HS-26	432 SC	3	0.258	0.27	fuzzy seed	21 28 35	0.07 < 0.05 0.12	107915 353-FR034-92D
USA, LA 1992	Hyper-former HS-46	432 SC	3	0.258	0.28	fuzzy seed	24 30 37	< 0.05 < 0.05 < 0.05	107915 355-FR036-92D
USA, NC 1992	KC 311	432 SC	3	0.258	0.27-0.28	fuzzy seed	25 32 39	< 0.05 < 0.05 < 0.05	107915 751-FR038-92D
USA, SC 1992	Coker 320	432 SC	3	0.25	0.27	fuzzy seed	23 30 37	< 0.05 < 0.05 < 0.05	107915 752-FR039-92D
USA, AL 1992	Cotton DPL 90	432 SC	3	0.258	0.27	fuzzy seed	22 30 37	< 0.05 < 0.05 < 0.05	107915 754-FR040-92D
USA, CA 1992	Acala GC 510	432 SC	3	0.258	0.30	fuzzy seed	23 30 37	0.17 0.22 0.10	107915 FCA-FR042-92D GLP: no
USA, GA 1992	DPL 90	432 SC	3	0.247	0.32-0.33	fuzzy seed	23 30 37	< 0.05 < 0.05 < 0.05	107915 TGA-FR043-92D
USA, MS 1992	DPL 50	432 SC	3	0.258	0.29-0.34	fuzzy seed	23 30 37	< 0.05 < 0.05 < 0.05	107915 BMS-FR041-92D
USA, AR 1992	DES 119	432 SC	3	0.258	0.28 -0.29	fuzzy seed	23 30 37	< 0.05 < 0.05 < 0.05	107915 354-FR035-92D

County Year	Crop, variety	Application				Portion analysed	PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL				
USA, OK 1996	HS200	432 SC	3	0.258	0.18-0.19	fuzzy seed	32	0.10	107915* 456-FR015-96H
USA, TX 1996	Atlas	432 SC	3	0.258	0.23	fuzzy seed	29	0.43	107915* 456-FR016-96H
USA, TX 1996	Pay-master 145	432 SC	3	0.25	0.18	fuzzy seed	30	0.69	107915* 456-FR017-96H
USA, CA 1996	Acala Maxxa	432 SC	3	0.258	0.16	fuzzy seed	29	1.6	107915* FCA-FR018-96H
USA, AR 1996	DP 5409	432 SC	3	0.258	0.18	fuzzy seed	29	0.10	107915* 458-FR019-96H
USA, AR 1996	Stone-ville 474	432 SC	3	0.25	0.18	fuzzy seed	30	0.42	107915* 458-FR020-96H

* residues are the mean of two samples

Peanut

The use of tebuconazole in/on peanut is registered in the USA, Australia, Brazil, Argentina, South Africa and India. Trials conducted in Brazil and USA are shown in Table 83.

Table 83 Results of residue trials conducted with tebuconazole SC 432 in/on peanut kernel

County Year	Variety	Application				PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL			
Brazil SP, 1992	Tatu Vermelho	250 EC	3	0.125	0.0418	35	< 0.05	137214 BRA-137214-A
Brazil SP, 1992	Tatu Vermelho	250 EC	3	0.125	0.0418	35	< 0.05	137209 BRA-137209-A
Brazil SP, 1995	Tatu Vermelho	200 EC	3	0.15	0.050	30	< 0.1	USP 1975/95 BRA-S-G4-601/95-A
Brazil SP, 2002	Tatu Vermelho	200 EC	4	0.20	0.067	30	0.02	UNESP RA-218/02 BRA S-G4-639/02-S2-A
Brazil SP, 2002	Tatu Vermelho	200 EC	4	0.20	0.067	30	0.03	UNESP RA-219/02 BRA S-G4-639/02-S3-A
Brazil PR, 2002	Cavalo	200 EC	4	0.20	0.067	30	0.02	UNESP RA-220/02 BRA S-G4-639/02-S4-A
Brazil SP, 2004	Tatu	200 EC	4	0.20	0.050	30	0.02	UNESP RA-810/04 BRA-FR04BRA043-P1-A
Brazil SP, 2004	Peanut Tatu	200 EC	4	0.20	0.050	30	0.02	UNESP RA-811/04 BRA-FR04BRA043-P2-A
Brazil SP, 2008	Tatu	300 SC	3	0.12	0.024	30	0.01	UNESP RA-1433/08 F08-094-P1
Brazil SP, 2008	Tatu	300 SC	3	0.12	0.024	30	0.02	UNESP RA-1434/08 F08-094-P2
Brazil SP, 2008	Tatu	300 SC	3	0.12	0.024	30	0.02	UNESP RA-1435/08 F08-094-P3
Brazil MG, 2008	Tatu	300 SC	3	0.12	0.024	30	0.03	UNESP RA-1436/08 F08-094-P4
USA, Dickson, OK, 1987	Spanco	144 EC	7	0.25	0.268	5 12	0.04 0.04	96728 353-H8026-87D
USA, Dickson, OK, 1987	Spanco	45 WG	7	0.25	0.268	5 12	0.03 0.03	96728 353-FR081-87D
USA, Yoakum, TX, 1987	Tamnut-74	144 EC	7	0.25	0.180	8 15	< 0.02 < 0.02	96728 352-H8025-87D
USA, Yoakum, TX, 1987	Peanut Tamnut-74	45 WG	7	0.25	0.18	8 15	< 0.02 < 0.02	96728 352-FR080-87D
USA TX, 1988	Spanco	SC 432	7	0.25	0.112-0.13	5 14	0.02 < 0.01	99129 352-FR046-88D
USA OK, 1988	Florunner	SC 432	7	0.25	0.270	7 14	0.04 0.08	99129 353-FR047-88D

County Year	Variety	Application				PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL			
USA NC, 1988	VA 81 B	SC 432	7	0.25	0.149	6 13	0.01 0.01	99129 751-FR048-88D
USA AL, 1988	Florunner	SC 432	7	0.25	0.168	7 14	< 0.01 < 0.01	99129 754-FR049-88D
USA MS, 1988	Florunner	SC 432	7	0.25	0.22-0.27	7 14	0.05 0.03	99129 BMS-FR050-88D
USA GA, 1988	Florunner	SC 432	7	0.26-0.29	0.12-0.14	3 7	0.02 0.01	99129 TGA-FR051-88D
USA FL, 1989	Florunner	SC 432	7	0.25	0.126	7 14	0.05 0.03 (c=0.02)	100073 VBL-FR042-89D
USA TX, 1989	Florunner (aerial appl.)	SC 432	7	0.25	0.53	6 13	0.04 0.03 (c=0.03)	100073 352-FR043-89D
USA OK, 1989	Spanco (aerial appl.)	SC 432	7	0.25	0.53	7 14	< 0.01 < 0.01 (c=0.01)	100073 353-FR044-89D
USA GA, 1989	Florunner (aerial appl.)	SC 432	7	0.25	0.68	7 14	0.01 < 0.01	100073 TGA-FR045-89D
USA OK, 1990	Olsum	SC 432	7	0.25	0.270	7 14	< 0.05 < 0.05	101344 353-FR016-90D
USA NC, 1990	Florigiant	SC 432	7	0.25	0.12	7 14	0.05 < 0.05	101344 751-FR017-90D
USA GA, 1990	Florunner	SC 432	7	0.057-0.302	0.027-0.154	7 14	< 0.05 < 0.05	101344 TGA-FR019-90D
USA FL, 1990	Florunner	SC 432	7	0.25	0.12	7 14	0.05 < 0.05	101344 VBL-FR020-90D

Rape seed

The use of tebuconazole in/on oilseed rape is registered in several European countries, where 31 trials were conducted (Table 84).

Table 84 Results of residue trials conducted with tebuconazole EW 250 in/on rape seed

County Year	Crop, variety	Application					PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL	BBCH GS			
Belgium 2006	Excalibur	EW 250	2	0.375	0.125	69	52	0.11	RA-2116/06 R 2116 0509 6 ; 0509-06
Belgium 2007	Standing	250 EW	2	0.375	0.150	69	72	0.04	RA-2000/07 R 2007 0015 6; 0015-07
France South, 2000	Olara	EW 250	2	0.25	0.083	67	56	0.17	RA-2073/00 R 2000 0366 8; 0366-00
France South, 2000	Ebonite	EW 250	2	0.25	0.083	78	55	0.09	RA-2073/00 R 2000 0381 1; 0381-00
France South, 2000	Rape Olara	EC 400	2	0.20	0.066	67	56	0.12	RA-2080/00 R 2000 0363 3; 0363
France South, 2000	Rape Ebonite	EC 400	2	0.20	0.066	78	42 55	< 0.05 < 0.05	RA-2080/00 R 2000 0364 1; 0364-00
France North, 2000	Capitol	EC 400	2	0.20	0.066	73	56	< 0.05	RA-2079/00 R 2000 0383 8; 0383-00
France North, 2000	Pronto	EC 400	2	0.20	0.066	79	53	0.06	RA-2079/00 R 2000 0384 6; 0384-00
France South, 2001	Capitole	EW 250	2	0.25	0.083	69	56	0.07	RA-2160/01 R 2001 0405 7; 0405-01
France South, 2001	Constant	EW 250	2	0.25	0.083	72	56	0.11	RA-2160/01 R 2001 0406 5; 0406-01
France North, 2001	Zenith	EC 400	2	0.20	0.066	73	59	0.12	RA-2161/01 R 2001 0407 3; 0407-01
France North, 2001	Capitol	EC 400	2	0.20	0.066	73	56	0.08	RA-2161/01 R 2001 0408 1; 0408-01

County Year	Crop, variety	Application					PHI, days	Residues, mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL	BBCH GS			
France South, 2001	Cordial	400 EC	2	0.20	0.066	67	56 59	0.08 0.06	RA-2162/01 R 2001 0410 3; 0410-01
France South, 2001	Adelie	EC 400	2	0.20	0.066	68	56 62	0.02 0.02	RA-2162/01 R 2001 0411 1; 0411-01
France South, 2001	Capitole	EC 400	2	0.20	0.066	69	56	0.11	RA-2162/01 R 2001 0415 4; 0415-01
France South, 2001	Con-stant	EC 400	2	0.20	0.066	72	56	0.03	RA-2162/01 R 2001 0416 2; 0416-01
France South, 2001	Con-stant	EC 400	2	0.20	0.066	69	56	0.12	RA-2162/01 R 2001 0417 0; 0417-01
France South, 2001	Synergy	EC 400	2	0.20	0.066	71	56	0.28	RA-2162/01 R 2001 0418 9; 0418-01
France North, 2002	Capitol	EC 250	2	0.125	0.042	73	56	0.07	RA-2101/02 R 2002 0527 9; 0527-02
France North, 2006	Salomon	EW 250	2	0.375	0.150	69	71	0.02	RA-2116/06 R 2116 0118 6; 0118-06
France North, 2007	Grizzly	250 EW	2	0.375	0.125	69	63	0.12	RA-2000/07 R 2007 0016 4; 0016-07
Germany 2002	Express	EC 250	2	0.125	0.042	73	55	< 0.02	RA-2101/02 R 2002 0534 1; 0534-02
Germany 2002	Licon-dor	EC 250	2	0.125	0.042	73	55 62	0.02 0.02	RA-2101/02 R 2002 0537 6; 0537-02
Germany 2006	Talent	EW 250	2	0.375	0.125	69	65	0.04	RA-2116/06 R 2116 0507 6; 0507-06
Germany 2006	Smart	EW 250	2	0.375	0.125	69	60	0.03	RA-2116/06 R 2116 0508 6; 0508-06
Germany 2007	Elektra	250 EW	2	0.375	0.125	69	77	0.16	RA-2000/07 R 2007 0017 2; 0017-07
Italy 2002	Pegletta	EC 250	2	0.125	0.042	63	56 63	< 0.02 < 0.02	RA-2102/02 R 2002 0528 7; 0528-02
Netherlands 2007	Maximus	250 EW	2	0.37	0.125	69	56	0.13	RA-2000/07 R 2007 0018 0 0018-07
Spain 2002	Bistol	EC 250	2	0.125	0.042	65	58 65	0.15 0.12	RA-2102/02 R 2002 0538 4; 0538-02
U K, 2002	Madrigal	EC 250	2	0.114-0.125	0.042	75	54	0.04	RA-2101/02 R 2002 0536 8; 0536-02
UK, 2007	Es Astrid	250 EW	2	0.37-0.44	0.125	69	57	0.19	RA-2000/07 R 2007 0298 1; 0298-07

Coffee

The use of tebuconazole in/on coffee is registered in Brazil, where 16 field trials were conducted. Four trials were conducted in Guatemala (Table 85).

Table 85 Results of residue trials conducted with tebuconazole in/on coffee beans, dry

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 1990	Sumatra	EC 250	3	0.25	0.05	5 15 30 45	< 0.1 < 0.1 < 0.1 < 0.1	BRA-122722-A
			3	0.5	0.1	30	< 0.1	BRA-122722-B
Brazil, 1993	Mundo Novo	WP 25	3	0.25	0.025	30	< 0.1	BRA-143556-A
			3	0.5	0.05	30	< 0.1	BRA-143556-B
Brazil, 1995	Catuaí vermelho	EC 200	3	0.2	0.05	30	< 0.1	BRA-USP 1976/95-A
			3	0.4	0.1	30	< 0.1	BRA-USP 1976/95-B

Country, Year	Crop Variety	Application				Residues		Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	PHI, days	mg/kg	
Brazil, 1996	Novo Mundo	SC 432	5	0.25	0.05	0* 0 7 15 22 30 45 60	< 0.01 0.03 < 0.01 0.01 < 0.01 < 0.01 < 0.01 < 0.01	108947* BRA-FR-C01-96D
			5	0.25	0.05	0 30	0.07 0.06	BRA-FR-C02-96H
			5	0.25	0.05	0 30	0.01 < 0.01	BRA-FR-C03-96H
	Catuai Amarelo	SC 432	5	0.25	0.05	0 30	0.02 < 0.01	BRA-FR-C04-96H
Brazil, 1998	Mundo Novo	EC 375	5	0.2	0.067	30	< 0.1	BRA-USP 2545/98-A
			5	0.4	0.13	30	< 0.1	BRA-USP 2545/98-B
Brazil, 2004	Catuai	EC 200	3	0.2	0.04	30	0.02	BRA-FR04BRA049-P1-A
			3	0.4	0.08	30	0.05	BRA-FR04BRA049-P1-B
Brazil, 2004	Catuai	EC 200	3	0.2	0.04	30	0.02	BRA-FR04BRA049-P2-A
			3	0.4	0.08	30	0.05	BRA-FR04BRA049-P2-B
Guatemala, 1996	Caturra	SC 432	3	0.25	0.042	0* 0 7 14 21 28 45 60	0.02 0.01 0.02 0.02 0.05 0.03 0.02 0.03	108947* GUA-FR-C01-96D
	-	SC 432	3	0.251	0.042	0 28	0.03 0.02	GUA-FR-C02-96H
	-	SC 432	3	0.251	0.042	0 28	0.01 < 0.01	GUA-FR-C03-96H
	Catimor 5269	SC 432	3	0.25	0.041	0 28	0.02 0.01	GUA-FR-C04-96H

* two samples analysed, mean residue reported

Hops

The use of tebuconazole in/on hops is registered in the Czech Republic and USA. Trials were conducted in Germany and USA (Table 86).

Table 86 Results of residue trials conducted in with applications in/on hops

Country, year	Variety,	Application				Portion analysed	PHI, days	Residues, mg/kg	Study Trial No.
		FL	No.	kg ai/ha	kg ai/hL				
Germany 1998	Haller-tauer Magnum	EW 250	2	0.56-0.62	0.0125	cone, green	0* 0 7 14 21 28	1.8 6.9 3.7 2.1 2.0 1.2	RA-2184/98 R 1998 1720/1
						cone, kiln-dried	14 21 28	7.0 8.3 3.9	
Germany 1998	Perle	EW 250	2	0.56-0.62	0.0125	cone, green	0* 0 7 14 21 28	1.6 9.9 4.9 2.5 2.6 1.5	RA-2184/98 R 1998 1722/8

Country, year	Variety,	Application FL	No.	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	Residues, mg/kg	Study Trial No.
						cone, kiln-dried	14 21 28	11 12 5.2	
Germany 1998	Spalter Select 1998	EW 250	2	0.56-0.62	0.019	cone, green	0* 0 7 14 21 28	2.0 8.4 7.3 4.4 5.8 2.2	RA-2184/98 R 1998 1723/6
						cone, kiln-dried	14 21 28	16 21 8.2	
Germany 1998	Perle	EW 250	2	0.56-0.62	0.019	cone, green	0* 0 7 14 21 28	1.9 8.4 3.7 1.8 2.5 1.2	RA-2184/98 R 1998 1724/4
						cone, kiln-dried	14 21 28	9.2 11 4.4	
Germany 1999	Haller-tauer Magnum	EW 250	2	0.51-0.56	0.0125	cone, green	0* 0 7 14 21 28	1.3 5.7 3.5 2.9 1.5 1.2	RA-2184/99 R 1999 0036/8
						cone, kiln-dried	14 21 28	9.1 6.3 3.7	
Germany 1999	Perle	EW 250	2	0.51-0.56	0.0125	cone, green	0* 0 7 14 21 28	0.47 5.0 2.3 1.9 1.7 0.96	RA-2184/99 R 1999 0037/6
						cone, kiln-dried	14 21 28	7.3 6.0 3.0	
Germany 1999	Perle	EW 250	2	0.51-0.56	0.019	cone, green	0* 0 7 14 21 28	1.1 3.8 2.1 3.6 2.9 1.1	RA-2184/99 R 1999 0038/4
						cone, kiln-dried	14 21 28	11 5.8 7.1	
Germany 1999	Spalter Select 1999	EW 250	2	0.51-0.56	0.019	cone, green	0* 0 7 14 21 28	2.6 12 7.0 7.2 4.0 3.9	RA-2184/99 R 1999 0039 2 0039-99
						cone, kiln-dried	14 21 28	26 18 18	
USA, OR 1997	Nugget Hops	432 SC	4	0.25-0.26	0.034	cone, dried	15	3.2	IR-4 PR** 06672.97-OR14
USA, WA 1997	Nugget Hops	432 SC	4	0.25-0.26	0.014-0.026	cone, dried	13	1.1	IR-4 PR** 06672.97-WA31
USA, WA 1997	Nugget Hops	432 SC	4	0.25-0.28	0.016-0.026	cone, dried	13	0.73	IR-4 PR** 06672.97-WA30

* prior to last treatment ** mean value reported

Residues in animal feed

In the residue trials on conducted on barley, maize, rape, rice and wheat, almond, cotton and peanut described previously, commodities used for animal feed were also analysed. The results are shown on Tables 87 to 94.

Table 87 Results of residue trials conducted in Europe with tebuconazole in/on barley feed

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
France, 2001	Winter Esterel	EW 250	2	0.25	0.08	ear	0* 0 7 14 21	1.4 7.6 3.7 4.7 3.9	RA-2031/01 R 2001 00876
						rest of plant	0* 0 7 14 21	2.9 9.6 7.6 <u>10</u> 10	
						straw	27 35	<u>6.7</u> 2.6	
France, 2002	Flicka	EW 250	2	0.25	0.08	ear	0	12	RA-2181/02 R 2002 06488
						rest of plant	0	<u>6.1</u>	
						straw	28 39	<u>2.0</u> 1.1	
France, 2002	Kelibia	EW 250	2	0.25	0.08	ear	0* 0 7 14 21 28	0.90 11 1.4 0.57 0.26 0.23	RA-2181/02 R 2002 06534
						rest of plant	0* 0 7 14 21 28	1.5 5.6 <u>3.4</u> 2.4 1.7 1.3	
						straw	43	<u>2.2</u>	
Germany, 1986	Winter Tapir	EC 375	2	0.25	0.06	green material	0 7 21 28	3.1 <u>0.29</u> 0.13 0.15	10650-86
						straw	35 42	0.28 <u>1.7</u>	
Germany, 1986	Winter Tapir	EC 250	2	0.38	0.094	green material	0 7 21 28	7.8 0.36 <u>0.37</u> 0.31	10630-86
						straw	35 42	0.66 <u>0.71</u>	
Germany, 1986	Winter Mammut	EC 250	2	0.38	0.09	green material	0 7 21 28 35 42	10 <u>1.4</u> 0.50 0.26 0.82 0.68	10631/86
						ear	35 42	0.07 0.06	
						straw	49	<u>0.86</u>	

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Germany, 1986	Winter Tapir	EC 250	2	0.25	0.06	green material	0 7 21 28	5.0 0.35 0.27 0.26	10634-86
						straw	35 42	0.38 0.50	
Germany, 1986	Winter Mammut	EC 250	2	0.25	0.06	green material	0 7 21 28 35 42	6.7 1.2 0.30 0.21 0.54 0.49	10635/86
						ear	35 42	< 0.05 0.05	
						straw	49	0.80	
Germany, 1987	Winter Tapir	EC 250	2	0.38	0.09	green material	0 7 21 28	6.4 1.2 0.34 0.25	10631/87
						ear	35	0.12	
						straw	49	0.29	
Germany, 1988	Spring Aramir	EC 375	2	0.25	0.06	green material	0 7 28	4.1 0.78 0.18	0412-88
						straw	35 42	0.13 0.14	
						ear	35	< 0.05	
Germany, 1988	Winter Igri	EC 401	2	0.25	0.06	green material	0 7	6.5 1.4	0250-88
						straw	28 35 42	1.0 0.74 1.3	
						ear	28	0.47	
Germany, 1989	Winter Catinka	EC 250	2	0.38	0.09	green material	0 28	7.4 0.70	0463-89
						straw	48	1.4	
						ear	35	0.15	
Germany, 1989	Wwinter Andrea	EC 250	2	0.38	0.09	green material	0 28	10 1.6	0462-89
						straw	42	3.1	
						ear	35	0.26	
Germany, 1989	Spring Aura	EC 290	2	0.25	0.06	green material	0 7 28	5.4 1.0 0.63	0249-89
						straw	35 42	0.72 0.69	
Germany, 1989	Spring Aura	EC 309	2	0.19	0.05	green material	0 7 28	5.2 2.0 1.1	0253-89
						straw	35 42	0.63 0.88	
Germany, 1990	Spring Aura	EW 250	2	0.38	0.125	green material	0 14 28	9.0 2.2 1.5	PF3464 0161-90
						ear	28	0.16	
						straw	35 43	2.4 2.3	
Germany, 1990	Spring Golf	EW 250	2	0.38	0.125	green material	0 14 28	14 1.1 2.7	PF3464 0146-90
						ear	28 35	0.31 0.37	

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
						straw	35 42	1.1 2.8	
Germany, 1990	Sspring Aura	EC 250	2	0.38	0.125	green material	0 14 28	9.2 2.8 1.6	PF3464 0147-90
						ear	28	0.18	
						straw	35 43	2.5 2.1	
Germany, 1990	Spring Carina	EC 375	2	0.25	0.08	green material	0 14 28	9.6 1.5 1.7	PF 3703 0145-90
						ear	28	0.26	
						straw	35 42	1.5 1.7	
Germany, 1990	Spring Golf	EC 375	2	0.25	0.08	green material	0 14 28	9.2 0.85 1.1	PF 3703 0142-90
						ear	28 35	0.14 0.17	
						straw	35 42	0.86 1.7	
Germany, 1991	Spring Aura	EC 500	2	0.25	0.08	green material	0 14	5.6 3.2	RA-2058/91 10522/8 0522-91
						straw	28 35	3.7 4.3	
Germany, 1991	Spring Carina	EW 250	2	0.31	0.10	green material	0 14 28 35	5.2 1.3 0.60 1.9	RA-2065/91 0462-91
						ear	28 35	0.14 0.11	
						straw	42 48	0.77 0.53	
Germany, 1994	Winter Pamir	EW 250	2	0.31	0.10	green material	0	6.0	RA-2069/94 404322
Germany, 1994	Spring Sissy	EC 383	2	0.20	0.07	green material	0	3.8	RA-2004/94 400157
						straw	35 40	2.8 3.9	
Greece, 2001	Mucho	EW 250	2	0.25	0.08	ear	0	5.5	RA-2031/01 R 2001 00841 0084-01
						rest of plant	0	5.8	
						straw	28	7.9	
Greece, 2002	Barley Thessa-loniki / Trixi Both	EW 250	2	0.25	0.08	ear	0* 0 7 14 21 28	0.26 12 2.0 0.57 0.18 0.14	RA-2181/02 R 2002 06542
						rest of plant	0* 0 7 14 21 28	3.2 11 6.5 4.6 3.9 4.8	
						straw	50	5.6	
Italy, 1993	Winter Trebbia	EW 250	2	0.25	0.04	green material	0	4.3	RA-2059/93 302783
						straw	28	3.3	
Italy, 2002	Klaxon	EW 250	2	0.25	0.08	ear	0	7.1	RA-2181/02 R 2002 06496
						rest of plant	0	18	
						straw	28	4.9	

Country, Year	Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	
Italy, 2002	Kelibia	EW 250	2	0.25	0.08	ear	0	22	RA-2181/02 R 2002 065180
						rest of plant	0	8.9	
						straw	28 38	1.9 3.8	
Portugal, 2002	Frenes	EW 250	2	0.25	0.08	ear	0	14	RA-2181/02 R 2002 06526
						rest of plant	0	14	
						straw	28 38	17 13	
Portugal, 2001	Spring Carina	EW 250	2	0.25	0.08	ear	0* 0 7 14 21	1.4 9.0 3.6 3.0 2.7	RA-2031/01 R 2001 00868
						rest of plant	0* 0 7 14 21	4.0 12 12 10 11	
						straw	28 42	13 9.5	
Spain, 2002	Barley Grafit	EW 250	2	0.25	0.08	ear	0 7 14 21	4.2 0.82 0.18 0.08	RA-2181/02 R 2002 06550
						rest of plant	0 7 14 21	9.3 6.4 4.9 7.2	
						straw	28 35	5.8 5.5	
United Kingdom, 1991	Winter Marinka	EW 250	2	0.25	0.125	green material	0	4.7	RA-2063/91 0137-91
						straw	33	2.2	
		EW 250	2	0.50	0.25	green material	0	8.4	0138-91
						Straw	33	6.4	
		EC 250	2	0.25-0.27	0.125	green material	0	6.2	0139-91
						straw	45	0.45	
		EW 250	2	0.25-0.27	0.125	green material	0	5.7	0208/91
						straw	45	0.49	
		EW 250	2	0.50-0.53	0.25	green material	0	9.5	0209/91
						straw	45	1.4	
		EC 250	2	0.27	0.125	green material	0	4.3	0210-91
						straw	33	2.8	
		EC 250	2	0.50-0.53	0.25	green material	0	8.6	0211/91
						straw	33	5.3	

Table 88 Results of residue trials conducted with tebuconazole in/ on corn/maize feed

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	
USA[a], NY 1997	Agway 266	432 SC	4	0.19	0.10	forage	14	0.98	108936 854-FR043-97H
						fodder	42	0.61	
USA, GA 1997	DPL5750	432 SC	4	0.19	0.14-0.15	forage	28	0.75	108936 TGA-FR044-97H
						fodder	48	0.83	
USA, Indiana 1997	GL 4929	432 SC	4	0.19	0.14	forage	17 24 31 38	0.49 0.31 0.31 0.22	108936 HIN-FR045-97D

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
						fodder	64 71 78 85	0.44 0.29 0.25 0.34	
USA, NE 1997	DK574GR	432 SC	4	0.19	0.10	forage	1	2.9	108936 SNE-FR044-97H
						fodder	69	0.46	
USA, Kansas 1997	Pioneer 3394	432 SC	4	0.19	0.11-0.21	forage	13 20 27 34	0.30 0.22 0.15 0.16	108936 STF-FR047-97D
						fodder	49 57 63 70	0.28 0.19 0.20 0.16	
USA, Minnesota 1997	N2555 Bt	432 SC	4	0.19	0.14	forage	23	0.49	108936 851-FR048-97H
						fodder	62	0.63	
USA, Minnesota 1997	Pioneer 3751	432 SC	4	0.19	0.10	forage	18	0.44	108936 GLP: no 851-FR049-97H
						fodder	63	0.21	
USA, WI, 1997	Renk RK553	432 SC	4	0.19	0.12-0.13	forage	23	0.47	108936 851-FR050-97H
						fodder	70	0.17	
USA,Nebraska 1997	Pioneer 3394	432 SC	4	0.19	0.10	forage	22	0.28	108936 852-FR051-97H
						fodder	42	0.20	
USA, IL 1997	Pioneer 3394	432 SC	4	0.19	0.13	forage	6	0.75	108936 853-FR052-97H
						fodder	70	0.78	
USA, Illinois 1997	Pioneer 3394	432 SC	4	0.19	0.13	forage	18	0.19	108936 853-FR053-97H
						fodder	53	0.25	
USA, Indiana 1997	Pioneer 3394	432 SC	4	0.19	0.12	forage	23	0.22	108936 853-FR054-97H
						fodder	57	0.15	
USA, Michigan 1997	Pioneer 3751	432 SC	4	0.19	0.1-0.13	forage	23	0.25	108936 855-FR055-97H
						fodder	71	0.13	
USA, OH 1997	GL276	432 SC	4	0.19	0.1-0.13	forage	29	0.13	108936 855-FR056-97H
						fodder	58	0.15	
USA, OH1997	Pioneer 3394E	432 SC	4	0.19	0.12	forage	29	0.10	108936 855-FR057-97H
						fodder	59	0.18	
USA, Iowa 1997	Pioneer 35A19	432 SC	4	0.19	0.10-0.11	forage	17	0.47	108936 857-FR058-97H
						fodder	50	0.40	
USA, Iowa 1997	DK592SR	432 SC	4	0.19	0.10	forage	18	0.37	108936 857-FR059-97H
						fodder	54	< 0.02	
USA, Iowa 1997	DK592SR	432 SC	4	0.19	0.10-0.11	forage	26	0.12	108936 857-FR060-97H
						fodder	50	0.08	
USA, Iowa 1997	DK592SR	432 SC	4	0.19	0.10	forage	26	0.09	108936 857-FR061-97H
						fodder	50	0.08	
USA Texas, 1997	Pioneer 3223	432 SC	4	0.19-0.20	0.13	forage	7	2.9	108936 459-FR062-97H
						Fodder	36	2.4	

[a] results from USA trials are the mean of duplicate samples

Table 89 Results of residue trials conducted with tebuconazole EW 250 in/on rice feed in Europe

Country, year	Crop Variety	Application			Residues			Study Trial No.
		No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	
Spain 1996	Tebre	2	0.25	0.08	green material	0	6.8	RA-2091/96 60256/6; 0256-96
					rest of plant	35	1.9	

Country, year	Crop Variety	Application			Residues			Study Trial No.
		No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	
Italy 1996	Padano	2	0.25	0.04	rest of plant	0* 1 7 14 35 44	0.72 3.3 1.8 0.97 0.80 0.57	RA-2091/96 60257/4; 0257-96
					panicle	0* 1 7 14	0.06 3.6 1.1 0.30	
Spain 1996	Tahinato	2	0.21-0.26	0.08	green material rest of plant	0 35	4.5 0.85	RA-2091/96 60258/2; 0258-96
Italy 1996	Vialone Nano	2	0.250	0.042	rest of plant	0* 1 7 14 35 44	1.2 4.2 1.7 1.3 0.94 0.57	RA-2091/96 60259/0; 0259-96
					panicle	0* 1 7 14	0.08 4.2 0.46 0.38	
Italy 1997	Balilla	2	0.25	0.04	green material	0	5.5	RA-2065/97 70087/8; 0087-97
					straw	35 48	1.1 0.79	
Spain 1997	Loto	2	0.25	0.08	green material	0	8.3	RA-2065/97 70088/6; 0088-97
					straw	33	1.7	
Italy 1997	Balilla	2	0.25	0.04	rest of plant	14 21 28	1.7 1.5 1.5	RA-2065/97 70089/4; 0089-97
					panicle	14 21 28	0.64 0.33 0.27	
					green material	0* 0	1.1 5.3	
					straw	35 42	1.6 1.1	
Spain 1997	Tebre	2	0.25-0.27	0.083	rest of plant	12 19 26	2.1 1.7 1.4	RA-2065/97 70090/8; 0090-97
					panicle	12 19 26	0.38 0.33 0.27	
					green material	0* 0	1.4 6.2	
					straw	33 47	1.1 0.79	

* before the last application

Table 90 Results of residue trials conducted in with applications in/on wheat feed

Country, year	Crop Variety	Application				Residues			Study Trial No.
		FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	
Belgium 2007	Wheat, spring Tybalt	216 EC	2	0.249	0.083	straw	36 55	1.7 1.5	RA-2008/07 R 2007 0166/7
						green material	0* 0	1.8 5.8	

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
Canada[a] 2007	Wheat AC Andrew	432 SC	1	0.126	0.063	Straw Forage Hay	36 15 15	0.26 0.34 1.8	RAHWC006-01-07H-A2
Canada 2007	Wheat AC Andrew	250 EW	1	0.126	0.063	Straw Forage Hay	36 15 15	0.34 0.62 2.1	RAHWC006-01-07H-B2
Canada 2007	Wheat AC Lillian	432 SC	1	0.126	0.063	Straw Forage Hay	36 13 15	1.0 0.61 1.6	RAHWC006-02-07H-A2
Canada 2007	Wheat AC Lillian	250 EW	1	0.126	0.063	Straw Forage Hay	36 13 15	2.1 1.0 3.5	RAHWC006-02-07H-B2
Canada 2007	Wheat AC Andrew	432 SC	1	0.126	0.063	Straw Forage Hay	42 14 13	0.50 0.07 2.5	RAHWC006-03-07H-A2
Canada 2007	Wheat AC Andrew	250 EW	1	0.126	0.063	Straw Forage Hay	42 14 13	0.11 0.18 2.6	RAHWC006-03-07H-B2
Canada 2007	Wheat AC Lillian	432 SC	1	0.126	0.063	Straw Forage Hay	43 12 14	0.12 0.20 1.0	RAHWC006-04-07H-A2
Canada 2007	Wheat AC Lillian	250 EW	1	0.126	0.063	Straw Forage Hay	43 12 14	1.4 0.22 1.4	RAHWC004-04-07H-B2
Canada 2007	Wheat AC Lillian	432 SC	1	0.126	0.063	Straw Forage Hay	48 14 13	0.17 0.10 0.67	RAHWC006-05-07H-A2
Canada 2007	Wheat AC Lillian	250 EW	1	0.126	0.063	Straw Forage Hay	48 14 13	0.30 0.18 0.93	RAHWC004-05-07H-B2
Canada 2005	Wheat Bounty	432 SC	1	0.126	0.06	straw	22 29 35 43 50	1.4 1.2 1.4 0.96 0.86	05BCS01-01-05D
Canada, 2005	Wheat, ACBarrie	432 SC	1	0.126	0.063	Straw Forage Hay	35 13 17	0.94 0.19 2.2	05BCS01-02-05H-B
Canada, 2005	Wheat, ACSuperb	432 SC	1	0.126	0.063	Straw Forage Hay	33 15 21	0.64 0.32 2.2	05BCS01-03-05H-B
Canada, 2005	Wheat, Abbey	432 SC	1	0.126	0.063	Straw Forage Hay	36 14 19	0.14 0.01 1.1	05BCS01-04-05H-B
Canada, 2005	Wheat, Barrie	432 SC	1	0.126	0.063	Straw Forage Hay	36 14 21	0.20 0.02 0.49	05BCS01-05-05H-B
Canada, 2005	Wheat, ACBarrie	432 SC	1	0.126	0.063	Straw Forage Hay	35 13 18	0.30 0.11 2.2	05BCS01-06-05H-B
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.063	Straw Forage Hay	35 14 22	0.87 0.28 4.4	05BCS01-07-05H-B
Canada, 2005	Wheat, ACBarrie	432 SC	1	0.126	0.063	Straw Forage Hay	35 12 21	0.52 0.47 2.4	05BCS01-08-05H-B
Canada, 2005	Wheat AC Barrie	432 SC	1	0.126	0.063	Straw Forage Hay	35 13 18	0.68 0.02 0.99	05BCS01-09-05H-B
Canada, 2005	Wheat Teal	432 SC	1	0.126	0.063	Straw Forage Hay	35 13 25	0.36 0.07 1.6	05BCS01-10-05H-B

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
Canada, 2005	Wheat, Teal	432 SC	1	0.126	0.063	Straw Forage Hay	35 14 28	0.58 0.20 1.6	05BCS01-11-05H-B
Canada, 2005	Wheat, Teal	432 SC	1	0.126	0.063	Straw Forage Hay	35 13 24	0.13 0.02 1.1	05BCS01-12-05H-B
Canada 2005	Wheat AC Barrie	432 SC	1	0.126	0.063	straw	22 29 35 43 49	0.37 0.30 0.35 0.21 0.05	05BCS01-13-05D
France, North, 1994	winter Fortal	383 EW	2	0.199	0.071	ear	28 35	0.39 0.50	RA-2004/94 40194/3; 0194-94
						straw	28 35 52	0.76 0.98 0.38	
						green material	0* 0 14	0.13 1.3 0.98	
France 2002	Wheat Apache	250 EW	2	0.25	0.083	rest of plant	0 28	5.8 2.0	RA-2182/02 R 2002 0658/5
						ear	0 28	5.0 0.74	
						straw	56	3.0	
France, South 2002	Wheat Apache	250 EW	2	0.25	0.083	ear	0 28	5.4 0.76*	RA-2182/02 R 2002 0659/3
						Rest of plant	0 28	6.7 2.5**	* c=0.17 ** c=0.39
						straw	56	3.6***	***c=0.49
France, North 2003	Triticale Carnac	300 SC	2	0.200	0.067	ear	0	4.0	RA-2027/03 R 2003 0166/9
						rest of plant	0	3.5	
						straw	35	2.1	
France, South 2003	Wheat, durum Orjaune	300 SC	2	0.20	0.080	ear	0	3.2	RA-2028/03 R 2003 0169/3
						rest of plant	0	4.7	
						straw	35	4.2	
France 2003	Wheat, winter Apache	300 SC	2	0.200	0.067	ear	0 35	4.8 0.49	RA-2028/03 R 2003 0129/4
						rest of plant	0 35	4.3 1.8	
						straw	51	1.5	
France, South 2003	Wheat, winter Frelon	300 SC	2	0.20	0.066	ear	0	5.4	RA-2028/03 R 2003 0167/7
						rest of plant	0	3.9	
						straw	35 41	< 0.02 2.3	
France, South 2007	Wheat, winter Andalou	216 EC	2	0.249	0.083	green material	0* 0	2.1 6.6	RA-2048/07 R 2007 0606/5
						straw	63	7.1	
						ear	35	0.37	
						rest of plant	35	2.3	
France, North 2007	Wheat, winter Mercato	216 EC	2	0.249	0.083	green material	0* 0	0.89 5.7	RA-2008/07 R 2007 0165/9
						straw	55	1.3	
						ear	35	0.26	
						rest of plant	35	1.3	

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
Germany 1986	Wheat winter Caribo	125 EW	2	0.25	0.063	green material	0 7 21 28	3.2 2.3 1.5 1.0	10606-86
						straw	35 42	3.3 2.2	
Germany 1986	Wheat winter Caribo	250 EC	2	0.25	0.063	green material	0 7 21 28	2.7 2.6 1.1 1.3	10636-86
						straw	35 42	3.4 3.6	
Germany 1986	Wheat, winter Caribo	375 EC	2	0.25	0.063	green material	0 7 21 28	3.1 0.92 1.6 2	10652-86
						straw	35 42	3.9 3.4	
Germany 1986	Rye, winter Danko	375 EC	2	0.25	0.063	ear	42	0.08	10655-86
						straw	35 42 49 56	0.29 0.23 0.22 0.22	
						green material	0 7 21 28	3.4 0.4 0.15 0.15	
Germany 1988	Wheat, spring Star	375 EC	2	0.25	0.062	green material	0 14 28	4.8 1.3 1.2	0639-88 80639/0
						straw	35 42	0.63 1.6	
Germany 1988	spring Star	375 EC	2	0.25	0.062	green material	0 14 28	7.8 1.7 0.90	0641-88 80641/2
						straw	35 42	1.9 1.6	
Germany 1990	Wheat, spring Star	375 EC	2	0.25	0.083	ear	28	0.56	PF 3703 00144/9
						green material	0 14 28	6.1 1.9 2.4	
						straw	35 42	1.8 1.7	
Germany 1991	Rye, winter Amando	500 EC	2	0.25	0.083	ear	28	0.65	RA-2058/91 10519/8; 0519-91
						green material	0 14 28	2.6 1.3 0.51	
						straw	35 42	0.76 0.86	
Germany 1991	Rye, winter Dauko	250 EW	2	0.312	0.104	green material	0 14 21	5.2 0.72 0.72	RA-2142/91 10133/8; 0133-91
						straw	35 42	1.2 1.3	
Germany 1991	winter Kanzler	300 EC	2	0.225	0.075	green material	0 14 21	2.9 0.82 0.60	RA-2099/91 10053/6; 0053-91
						straw	35 42	1.4 1.4	

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
Germany 1992	spring Star	500 EC	2	0.20	0.067	green material	0*	3.2	RA-2107/92 20607/5; 0607-92
							0	9.5	
						straw	35	7.1	
							42	7.8	
Germany 1993	spring Nandu	500 EC	2	0.25	0.083	straw	35	4.0	RA-2055/93 30121/3; 0121-93
							42	7.1	
						green material	0*	0.79	
							0	8.7	
Germany 1994	winter Konsul	383 EW	2	0.199	0.066	straw	35	5.8	RA-2004/94 40018/1; 0018-94
							42	6.0	
						green material	0*	0.63	
							0	2.2	
Germany 1994	spring Nandu	383 EW	2	0.199	0.066	straw	35	2.7	RA-2004/94 40016/5; 0016-94
							42	1.6	
						green material	0*	0.08	
							0	2.7	
Germany 1994	Rye, winter Gambit	383 EW	2	0.199	0.066	ear	33	0.32	RA-2004/94 40017/3; 0017-94
						green material	0*	0.16	
							0	2.6	
							33	0.49	
						straw	40	0.92	
Germany 1994	Wheat, spring Nunda	250 EW	2	0.25	0.083	green material	0*	0.82	RA-2069/94 40431/4; 0431-94
							0	6.4	
Germany 1994	Rye, winter Gambit	250 EW	2	0.312	0.104	green material	0*	0.27	RA-2069/94 40433/0; 0433-94
							0	6.8	
Germany 2007	Wheat, spring Thasos	216 EC	2	0.249	0.083	straw	35	1.1	RA-2008/07 R 2007 0616/2
							56	0.54	
						green material	0*	2.2	
							0	9.4	
Greece 2007	Wheat, winter Moro durum	216 EC	2	0.249	0.083	straw	35	12	RA-2048/07 R 2007 0617/0
						green material	0*	5.9	
							0	12	
Italy 2002	Wheat Enesco	250 EW	2	0.25	0.083	rest of plant	0	5.7	RA-2182/02 R 2002 0660/7
						ear	0	7.4	
						straw	28	1.5	
							40	2.2	
Italy 2002	Wheat Cen-tauro	250 EW	2	0.25	0.083	ear	0*	0.46	RA-2182/02 R 2002 0661/5
							0	7.4	
							7	2.5	
							14	1.2	
							21	1.3	
							28	0.93	
						Rest of plant	0*	0.81	
							0	3.3	
							7	1.5	
							14	1.4	
							21	0.65	
							28	0.98	
						straw	43	1.1	
Italy 2002	Wheat Serio	250 EW	2	0.25	0.083	rest of plant	0*	1.9	RA-2182/02 R 2002 0662/3
							0	5.3	
							7	2.4	
							14	3.3	
							21	3.1	
						ear	0*	0.96	
							0	4.9	
							7	2.6	
							14	2.1	
							21	1.5	
						straw	28	2.3	
							54	1.6	

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
Italy 2003	Wheat, durum Arcan-gelo	300 SC	2	0.200	0.067	ear	0	2.5	RA-2028/03 R 2003 0168/5
						rest of plant	0	4.1	
						straw	30 35	3.4 2.3	
Italy 2007	Wheat, durum Simeto	216 EC	2	0.249	0.083	straw	44	3.2	RA-2048/07 R 2007 0607/3
						green material	0* 0	1.7 5.9	
						ear	35	1.4	
						rest of plant	35	7.2	
Spain 2002	Wheat Soissons	250 EW	2	0.25	0.083	rest of plant	0	6.2	RA-2182/02 R 2002 0656/9
						ear	0	6.2	
						straw	28 41	5.6 2.2	
Spain 2002	Wheat Sem-grain	250 EW	2	0.25	0.083	rest of plant	0* 0 7 14	1.9 5.5 3.7 2.0	RA-2182/02 R 2002 0657/7
						ear	0* 0 7 14	1.4 5.0 2.7 1.8	
						straw	21 28	1.7 1.8	
Spain 2007	Wheat, winter Soissons	216 EC	2	0.25-0.27	0.083	straw	35 44	2.9 3.5	RA-2048/07 R 2007 0608/1
						green material	0* 0	2.3 6.6	
Sweden 2003	Wheat, winter Kris	300 SC	2	0.20	0.067	ear	0 35	2.0 0.33	RA-2027/03 R 2003 0164/2
						rest of plant	0 35	4.6 2.0	
Sweden 2003	Rye Picarro	300 SC	2	0.200	0.067	ear	0 35	11 0.09	RA-2027/03 R 2003 0165/0
						rest of plant	0 35	3.7 0.31	
						straw	56	0.47	
United Kingdom 1991	winter Mercia	250 EC	2	0.25-0.27	0.12	green material	0	2.2	RA-2063/91 10215/6; 0215-91
						straw	49	0.68	
United Kingdom 1991	winter Mercia	250 EC	2	0.25	0.125	green material	0	3.4	RA-2063/91 10143/5; 0143-91
						straw	56	4.8	
United Kingdom 2003	Wheat, winter Claire	300 SC	2	0.200	0.067	ear	0	2.4	RA-2027/03 R 2003 0115/4
						rest of plant	0	6.6	
						straw	35	5.2	
United Kingdom, 2007	Wheat, spring Belvior	216 EC	2	0.249	0.083	green material	0* 0	1.4 5.1	RA-2008/07 R 2007 0615/4
						ear	35	0.13	
						rest of plant	35	0.65	
						straw	73	1.3	
USA, MN, 1995	Wheat spring #2375	432 SC	1	0.126	0.09	Straw Forage Hay	35 7 6	< 0.1 0.53 0.71	107519 851-FR011-95H-2

		Application				Residues			
Country, year	Crop Variety	FL	No	kg ai/ha	kg ai/hL	Sample analysed	PHI, days	mg/kg	Study Trial No.
USA SD, 1995	Wheat spring #2375	432 SC	1	0.126	0.09	Straw Forage Hay	32 7 6	< 0.1 0.53 0.78	107519 851-FR012-95H-2
USA SD, 1995	Wheat spring Marshall	432 SC	1	0.13	0.089	Straw Forage Hay	37 8 6	< 0.1 0.65 1.0	851-FR015-95H-2
USA WA, 1995	Wheat spring Nomad	432 SC	1	0.129	0.14	Straw Forage Hay	33 8 8	1.1 1.8 1.1	107519 454-FR025-95H-2

[a] trials from Canada and USA: residues are the mean of two samples

Table 91 Results of residue trials conducted with tebuconazole applications in/on almond hulls in USA (California) in 1996 (residues are the mean of two samples)

	Application				PHI, days	Residues, mg/kg	Study Trial No.
Variety,	FL	No.	kg ai/ha	kg ai/hL			
Non-Pariel	45 WG	4	0.25	0.04	35	1.2	107544; FCA-FR006-96H
Price	45 WG	4	0.25	0.01	29	1.4	107544; 457-FR005-96H
Merced	45 WG	4	0.25	0.045	35	4.1	107544; 457-FR004-96H
Carmel	45 WG	4	0.25	0.01	31	1.1	107544; 457-FR003-96H
Carmel	45 WG	4	0.25	0.045	32	2.0	107544; 455-FR002-96H
Non-Pariel	45 WG	4	0.25	0.01	25 35 42 49	2.4 2.3 3.0 2.5	107544; 455-FR001-96D

Table 92 Results of residue trials conducted with tebuconazole 432 SC in/on cotton gintrash in USA

State, year	Variety	Application			PHI, days	Residues, mg/kg	Study, trial number
		No	kg ai/ha	kg ai/hL			
Arizona, 1996	Stone-ville 474	3	0.25-0.26	0.18	30	12	107915; 458-FR020-96H
Texas, 1996	Pay-master 145	3	0.25-0.26	0.18	30	4.1	107915;456-FR017-96H
Oklahoma, 1996	HS200	3	0.258	0.19	32	0.10	107915; 456-FR015-96H
California, 1996	Acala Maxxa	3	0.258	0.16	29	13	107915; FCA-FR018-96H
Arizona, 1996	DP 5409	3	0.258	0.18	29	7.1	107915; 458-FR019-96H
Texas, 1996	Atlas	3	0.258	0.23	29	1.5	107915; 456-FR016-96H

Table 93 Results of residue trials conducted with Tebuconazole SC 432 in/on peanuts feed in USA

State, year	Variety	Application				Portion Analysed	PHI, days	Residues, mg/kg	
		FL	No	kg ai/ha	kg ai/hL				
Texas, 1988	Spanco	SC 432	7	0.25-	0.11-0.13	hull, dry	5 14	0.38 0.17	99129. 352-FR046-88D
						hay	5 14	11 13	
Oklahoma, 1988	Florunner	SC 432	7	0.25	0.270	hull, dry	7 14	0.75 1.8	99129 353-FR047-88D
						hay	7 14	29 17	
North Carolina, 1988	VA 81 B	SC 432	7	0.25	0.149	hull, dry	6 13	0.24 0.31	99129 751-FR048-88D
						hay	6 13	7.4 6.8	

State, year	Variety	Application				Portion Analysed	PHI, days	Residues, mg/kg	
		FL	No	kg ai/ha	kg ai/hL				
Alabama 1988	Florunner	SC 432	7	0.25	0.168	hull, dry	7 14	0.18 0.27	99129 754-FR049-88D
						hay	7 14	2.5 1.8	
Mississippi 1988	Florunner	SC 432	7	0.25	0.22-0.27	hull, dry	7 14	2.0 2.2	99129 BMS-FR050-88D
						hay	7 14	8.4 5.0	
Texas 1989	Florunner	SC 432	7	0.25	0.53	hull, dry	6 13	0.54 0.49	100073 352-FR043-89D
						hay	6 13	2.4 18	
Oklahoma 1989	Peanut Spanco	SC 432	7	0.25	0.533	hull, dry	7 14	0.02 0.14	100073; 353-FR044-89D c=0.30
						hay	7 14	11 3.7	c=3.0
Georgia 1989	Florunner	SC 432	7	0.25	0.677	hull, dry	7 14	0.46 0.45	100073 TGA-FR045-89D
						hay	7 14	14 11	
Florida 1989	Florunner	SC 432	7	0.25	0.126	hull, dry	7 14	0.56 0.37	100073 VBL-FR042-89D
						hay	7 14	7.9 5.1	
Oklahoma 1990	Olsum	SC 432	7	0.2542	0.270	hull, dry	7 14	1.8 1.2	101344 353-FR016-90D
						hay	7 14	22 9.1	
North Carolina 1990	Florigiant	SC 432	7	0.25	0.12	hull, dry	7 14	0.50 0.55	101344 751-FR017-90D
						hay	7 14	18 15	
Georgia 1990	Florunner	SC 432	7	0.057-0.302	0.027-0.15	hull, dry	7 14	0.28 0.46	101344 TGA-FR019-90D
						hay	7 14	13 8.6	
Florida 1990	Florunner	SC 432	7	0.25	0.12	hull, dry	7 14	0.79 0.85	101344 VBL-FR020-90D
						hay	7 14	14 9.4	
Oklahoma 1987	Spanco	144 EC	7	0.252	0.2681	shell	5 12	2.6 1.8	96728 353-H8026-87D
						vines	5 12	46 20	
Texas 1987	Tamnut-74	144 EC	7	0.252	0.180	shell	8 15	0.19 0.49	96728 352-H8025-87D
						vines	8 15	19 23	
Oklahoma 1987	Spanco	45 WG	7	0.25	0.268	shell	5 12	3.4 2.1	96728 353-FR081-87D
						vines	5 12	22 5.6	
Texas 1987	Tamnut-74	45 WG	7	0.25	0.18	shell	8 15	0.91 0.39	96728 352-FR080-87D
						vines	8 15	9.2 n.a.	

Table 94 Results of residue trials conducted with Tebuconazole SC 432 in/on rape feed

County Year	Crop, variety	Application				Portion analysed	PHI, days	mg/kg	Study, trial number
		FL	No	kg ai/ha	kg ai/hL				
France South, 2000	Olara	EW 250	2	0.25	0.083	green material	0	2.7	RA-2073/00 R 2000 0366 8; 0366-00
France South, 2000	Ebonite	EW 250	2	0.25	0.083	green material	0	4.6	RA-2073/00 R 2000 0381 1; 0381-00
France South, 2001	Capitole	EW 250	2	0.25	0.083	green material	0	5.1	RA-2160/01 R 2001 0405 7; 0405-01
France South, 2001	Constant	EW 250	2	0.25	0.083	green material	0	4.3	RA-2160/01 R 2001 0406 5; 0406-01
France North 2006	Oilseed rape Salomon	EW 250	2	0.375	0.150	green material	0* 0	1.6 7.3	RA-2116/06 0118-06
						pod	34	0.10	
						rest of plant	34	0.97	
Germany 2006	Oilseed rape Talent	EW 250	2	0.375	0.125	green material pod rest of plant	0* 0 18 18	3.5 11 0.31 2.9	RA-2116/06 R 2116 0507 6 0507-06
Germany 2006	Oilseed rape Smart	EW 250	2	0.375	0.125	green material pod rest of plant	0* 0 22 22	1.2 7.5 0.28 1.0	RA-2116/06 R 2116 0508 6 0508-06
Belgium 2006	Excali-bur	EW 250	2	0.375	0.125	green material pod rest of plant	0* 0 18 18	1.2 5.7 1.2 2.7	RA-2116/06 R 2116 0509 6 0509-06
Belgium 2007	Stan-ding	250 EW	2	0.375	0.150	green material	0* 0	2.2 3.6	RA-2000/07 R 2007 0015 6 0015-07
						pod	14	0.55	
						rest of plant	14	2.0	
France North 2007	Grizzly	250 EW	2	0.375	0.125	green material	0* 0	2.7 4.9	RA-2000/07 R 2007 0016 4 0016-07
						pod	27	0.18	
						rest of plant	27	2.6	
Germany 2007	Rape, winter Elektra	250 EW	2	0.375	0.125	green material	0* 0	3.2 5.2	RA-2000/07 R 2007 0017 2 0017-07
						pod	22	0.19	
						rest of plant	22	2.3	
Nether-lands 2007	Maxi-mus	250 EW	2	0.375	0.125	green material	0* 0	0.72 5.6	RA-2000/07 0018-07
						pod	36	0.50	
						rest of plant	36	0.37	
UK 2007	Es Astrid	250 EW	2	0.375-0.435	0.125	green material	0* 0	0.83 6.3	RA-2000/07 0298-07
						pod	25	0.53	
						rest of plant	25	1.1	
France, North, 2002	Capitol	EC 250	2	0.125	0.042	green material	0	1.9	RA-2101/02 0527-02
						straw	56	0.20	
Italy 2002	Pegletta	EC 250	2	0.125	0.042	green material	0	4.4	RA-2102/02 0528-02
						straw	56 63	0.30 0.34	
Germany 2002	Express	EC 250	2	0.125	0.042	green material	0	2.0	RA-2101/02; 0534-02
						straw	55	0.17	
UK 2002	Madri-gal	EC 250	2	0.114-0.125	0.042	green material	0	1.6	RA-2101/02 0536-02
						straw	54	0.32	
Germany 2002	Licon-dor	EC 250	2	0.125	0.042	green material straw	0 55 62	2.0 0.09 0.11	RA-2101/02 R 2002 0537 6 0537-02

County Year	Crop, variety	Application FL	No	kg ai/ha	kg ai/hL	Portion analysed	PHI, days	mg/kg	Study, trial number
Spain 2002	Bistol	EC 250	2	0.125	0.042	green material straw	0 58 65	2.6 0.32 0.45	RA-2102/02 R 2002 0538 4 0538-02
France South, 2000	Rape Olara	EC 400	2	0.20	0.066	green material	0	2.5	RA-2080/00 R 2000 0363 3 0363
France South 2000	Rape Ebonite	EC 400	2	0.20	0.066	green material	0 0 14 28	0.46 3.4 0.23 0.14	RA-2080/00 R 2000 0364 1 0364-00
France North 2000	Capitol	EC 400	2	0.20	0.066	green material rest of plant pod	0* 0 14 28 42 42	0.58 4.0 0.96 0.33 0.13 0.27	RA-2079/00 R 2000 0383 8 0383-00
France North, 2000	Pronto	EC 400	2	0.20	0.066	green material	0	2.5	RA-2079/00 R 2000 0384 6; 0384-00
France North, 2001	Zenith	EC 400	2	0.20	0.066	green material	0	3.8	RA-2161/01 R 2001 0407 3; 0407-01
France North 2001	Capitol	EC 400	2	0.20	0.066	green material rest of plant pod	0* 0 14 28 42 42	0.41 3.1 0.98 0.58 0.10 0.74	RA-2161/01 R 2001 0408 1 0408-01
France South, 2001	Cordial	400 EC	2	0.20	0.066	green material	0	4.2	RA-2162/01 R 2001 0410 3; 0410-01
France South, 2001	Adelie	EC 400	2	0.20	0.066	green material rest of plant pod	0* 0 14 28 42 42	0.50 4.8 0.29 0.19 0.06 0.18	RA-2162/01 R 2001 0411 1 0411-01
France South, 2001	Capitole	EC 400	2	0.20	0.066	green material	0	3.7	RA-2162/01 R 2001 0415 4; 0415-01
France South, 2001	Con-stant	EC 400	2	0.20	0.066	green material	0	4.2	RA-2162/01 R 2001 0416 2, 0416-01
France South 2001	Con-stant	EC 400	2	0.20	0.066	green material rest of plant pod	0* 0 14 28 42 42	0.74 3.9 0.94 0.57 0.10 0.90	RA-2162/01 R 2001 0417 0 0417-01
France South 2001	Synergy	EC 400	2	0.20	0.066	green material rest of plant pod	0* 0 14 28 42 42	0.31 2.6 0.90 0.55 0.11 0.58	RA-2162/01 R 2001 0418 9 0418-01

Fate of residues in processing

Effects on the nature of residues

A study was conducted to investigate the hydrolytic degradation of tebuconazole in buffered drinking water (Babczinski, 2001). [Phenyl-UL-^{14}C]tebuconazole was dissolved in citrate buffers at a concentration of approximately 1.0 mg/L, the solution incubated at three representative sets of conditions. At zero-time and test termination, the radioactivity of the samples was determined by LSC

(Table 95). TLC analysis shows that in all systems, radioactivity was related to tebuconazole, with no degradation products being formed during the experimental conditions.

Table 95 Degradation of [phenyl-UL-^{14}C]tebuconazole in buffered drinking water

Hydrolysis conditions	Sampling time [minutes]	Content of tebuconazole [% of applied radioactivity]	Recovery
pH 4; 90 °C;	0	96.2	100 *
20 min.	20	101.7	103.9
pH 5; 100 °C;	0	97.3	100 *
60 min.	60	90.7	92.9
pH 6; 120 °C;	0	97.8	100 *
20 min.	20	96.4	99.2

*The measured values were set to 100% representing the applied radioactivity at zero-time.

Processing studies

The effect of processing on tebuconazole residues was investigated in orange, apples, plum, peach, grapes, barley, cabbage, green bean, coffee, cotton, rape, soya bean, peanut, tomato, sweet pepper, and hops. When residues in the processed commodity were < LOQ the calculated processing factor (PF) (LOQ ÷ residue level in raw commodity) is reported with a "less than" (<) symbol. In case that residue levels in the RAC were below the LOQ, no processing factor was calculated.

Oranges

Four studies were conducted in Brazil to determine the levels of tebuconazole in orange peel and pulp following treatment of orange trees with WP (Anon, 1994; CIENTEC 149024) or EC formulation (Anon, 1995; USP 1970/95 and Anon, 1995; USP 1971/95). Tebuconazole was applied 3 times at 0.67 to 2 kg ai/ha, and samples harvested at 20 days PHI. Tebuconazole was not detected in any pulp sample. Residues in the peel were 1.8 and 5 mg/kg (LOQ = 0.05 mg/kg) and 0.4 and 0.9 mg/kg (LOQ= 0.1 mg/kg). Residues in the whole fruit were not reported, so processing factors were not estimated.

Two trials were conducted Germany to determine the residues of tebuconazole in orange juice and marmalade prepared from orange treated with tebuconazole (EW 250) at 0.24 kg ai/ha (Allmendinger and Walz-Tylla, 1998; RA-3076/96). Samples collected at 3 days PHI were processed simulating household and commercial practice (Figure 9). The results are shown on Table 96.

Table 96 Tebuconazole residue found in orange and processing products (RA-3076/96)

Product	Residue [mg/kg]	PF	Residue [mg/kg]	PF	PF* (best estimate)
Fruit	0.23	-	0.27	-	-
Peel	0.92	4.0	0.91	3.4	3.7
Fruit pulp	< 0.05	< 0.22	< 0.05	< 0.18	0.2
Juice	< 0.05	< 0.22	< 0.05	< 0.2	0.2
Marmalade	< 0.05	< 0.22	0.17	0.63	0.4

* to estimate the mean, the symbols < was ignored

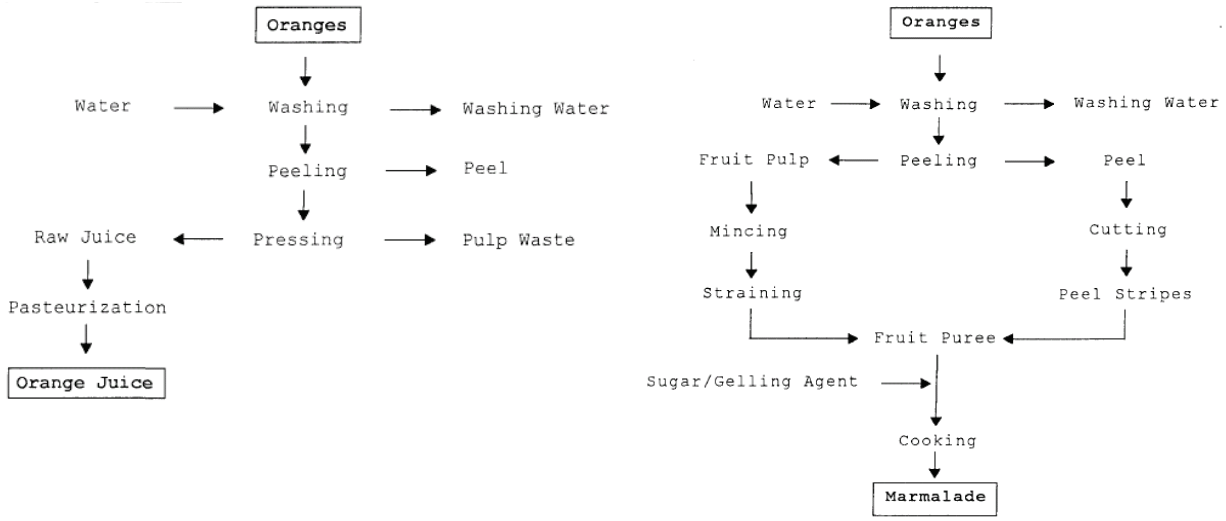


Figure 9 Processing of orange fruit to orange juice and marmalade

Apple

In two trials conducted in Italy, tebuconazole (WG 25) was applied four times at 0.1875 to 0.25 kg a.i/ha on apple and samples were harvested at 21 days after the final application (Allmendinger and Waltz-Tylla, 1993b; RA2018/92; Almendinger and Waltz-Tylla, 1996; RA2062/93). Washed apples were produced by a household preparation, whereas juice, sauce, dried pomace, and dried apples were prepared by simulated industrial processing (Figure 10). The results are shown in Table 97.

In two trials conducted in USA, tebuconazole was applied 6 times (WG formulation) to apple trees at 0.5 or 1.3 kg ai/ka and samples harvested at 115 or 125 days PHI (Harbin, 2004; Report 200289; Williams and Conrath, 1990b; Report 100066). A sub-sample of the unwashed apples (RAC) was removed for analysis prior to the washing step, and the remainder of the apples was processed to generate washed fruit, wet and dried pomace, juice, juice concentrate, apple sauce, and dried fruit. Processing was performed using methods which simulated commercial practices. The results are shown in Table 97.

Table 97 Tebuconazole residue found in apples and apple processed products and processing factors

	Italy [a]		USA [b]		PF [c]
Product	Residue [mg/kg]	PF	Residue [mg/kg]	PF	(best estimate)
Apples, unprocessed	0.37 / 0.17	-	0.03 /< 0.01	-	
Apples, washed	0.40 / 0.06	1.1 / 0.35	0.03 / -	1.0 / -	0.72
Juice	0.05 / < 0.02	0.14 / < 0.12	< 0.01 /< 0.01	< 0.33 / -	0.22
Juice concentrated			0.01 / -	0.33 / -	0.33
Sauce	0.17 / 0.04	0.46 / 0.24	< 0.01 / -	< 0.33 / -	0.34
Apples, dried	0.20 / 0.05	0.54 / 0.29	0.03 / -	1.0 / -	0.61
Dried pomace	6.8 / 1.2	18.4 / 7.1	- / 0.05	- / -	12.7
Wet pomace	-	-	0.10 / 0.02	3.3 / -	2.6

[a] RA2018/92/ RA2062/93

[b] 200289/100066

[c] to estimate the mean, the symbol < was ignored.

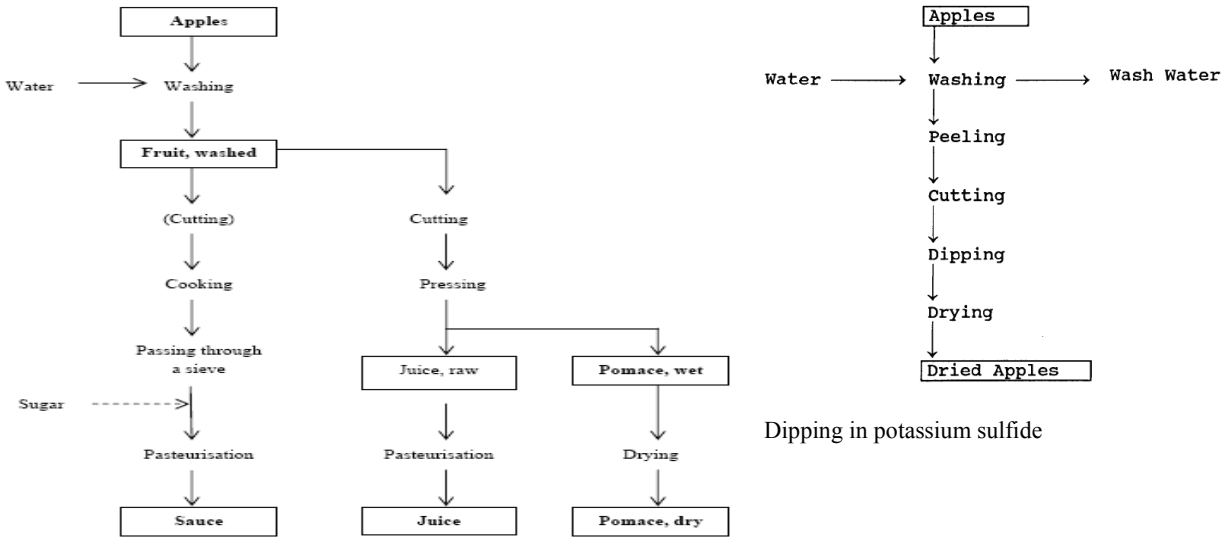


Figure 10 Processing of apples to sauce, juice, pomace and dried fruit

Plums

Tebuconazole WG 25 was applied three times at 0.236 to 0.251 kg as/ha/application in/on plums in France, with samples collected 7 days prior to the expected harvest date processed as in a household preparation (sauce) or simulating industrial procedures (preserve and prunes) (Figure 11) (Allmendinger and Walz-Tylla, 1994; RA2017/92). The results are showing in Table 98.

A study was conducted in the United States (Harbin, 2001; 109762) in which plum trees were treated 6 times with tebuconazole at 0.25–0.26 kg ai/ha, samples harvested at 0 day PHI and processed to prunes using procedures which simulated commercial processing practices. The results are showing in Table 98.

Table 98 Tebuconazole residue found in plums and plum processed products and the transfer factors determined for plum processed products

Product	Report RA2017/92		Report 109762		PF, best estimate
	Residue [mg/kg]	PF	Residue [mg/kg]	PF	
Plum, unprocessed	0.03	-	0.18	-	-
Plums, washed	0.02	0.67	-	-	0.67
Prunes (dried fruit)	0.14	4.7	0.22	1.2	2.9
Sauce	0.03	1.0	-	-	1
Preserve	< 0.02	< 0.67	-	-	0.67

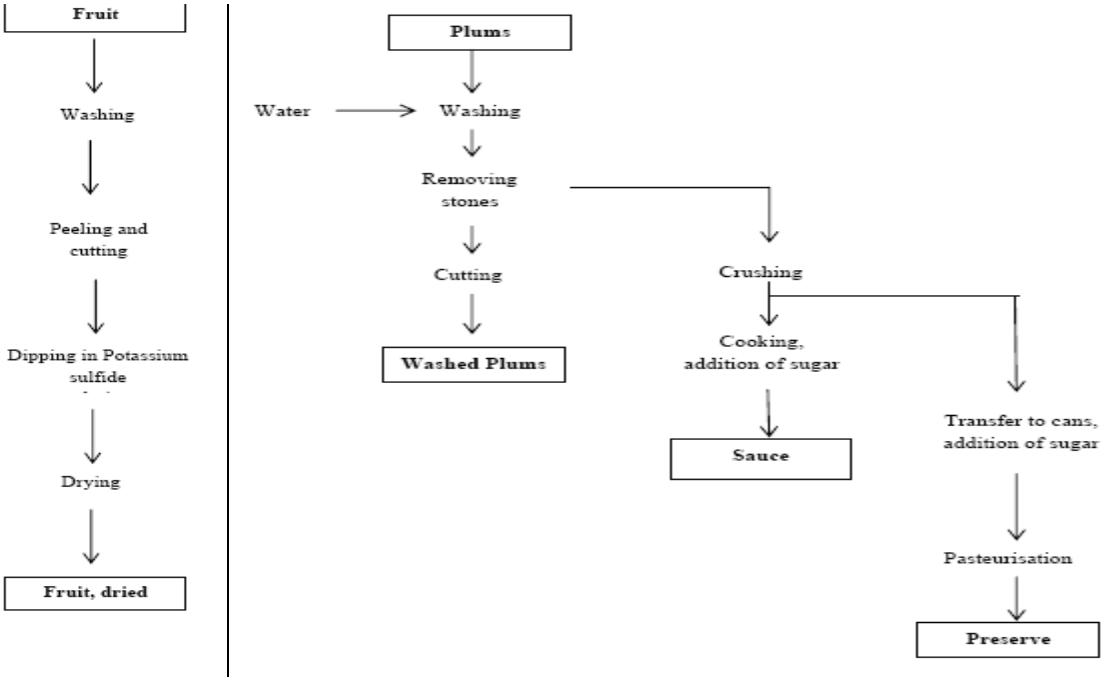


Figure 11 Processing of plums to dried plums (prunes), sauce and preserve

Peach

Tebuconazole WG 25 was applied four times at 0.281 kg ai/ha on peaches in Italy, samples were harvested at 10 days PHI and processed to jam, juice and preserve (Figure 12) (Allmendinger and and Walz-Tylla, 1993; RA2019/92). Residues of tebuconazole in peach, jam, juice and preserve were 0.15, > 0.02, 0.03 and < 0.02 mg/kg, respectively. Processing factors was < 0.013 for jam and preserve and 0.2 for juice.

Tebuconazole WG 25 was applied two times at 0.125 kg ai/ha in/on peach in France, samples harvested 14 or 15 days PHI and processed to jam, juice and preserve) (Anon. 1992; Report No.: 0383-91; Report No.: 0384-91). No information on processing procedures is given in the reports. No tebuconazole residues above LOQ (0.02 mg/kg) were found in the raw agricultural commodity or any of the processed commodities. Therefore no processing factors could be calculated.

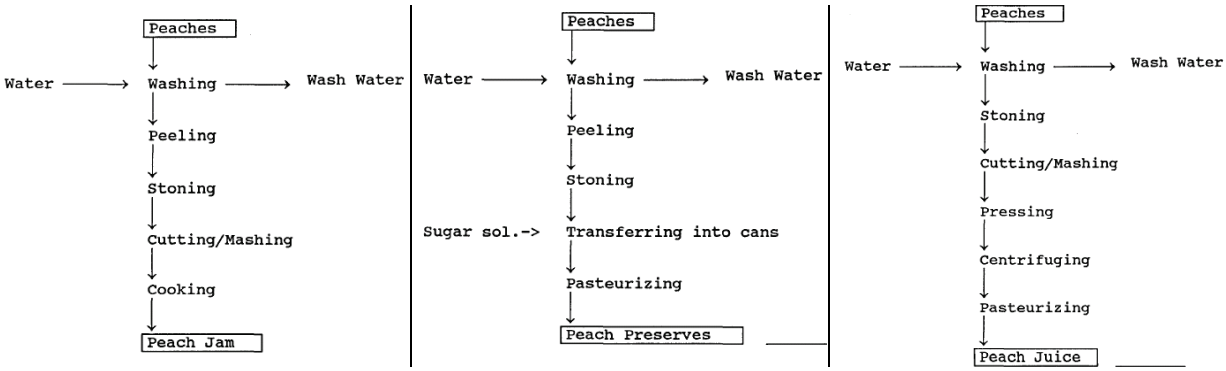


Figure 12 Processing of peach to jam, preserve and juice

Grapes

Twenty studies were performed in Europe from 1986 to 1994 where grapes were processed to must and wine according to local practice, replicating commercial practice but at a technical scale (Figure

13). In eight German studies, WP tebuconazole was applied five times to grapes at a rate of up to 0.45 kg ai/ha, grapes were sampled at 35 days PHI and processed (Anon. 1987, report No. 10690-86, 10691-86, 10692-86, 10693-86, 11070-87, 11071-87, 11072-87, 11073-87). In two studies in France, EW 250 formulation was applied 4-5 times at 0.1 kg ai/ha, grape sampled 29 or 33 days PHI and processed (Anon. 1992, report No. 0378-91, 0379-91). In two studies in Portugal, EC 250 product was applied at rates of up to 0.128 kg ai/ha, grapes sampled 50 days PHI and processed to must and wine (Allmendinger 1992, report No. RA-2090/91). In four German studies conducted at 2× up to 0.4 kg ai/ha, grapes sampled 42 days PHI were processed (Brennecke, Walz-Tylla 1993; report no. RA-2071/91). In another four German studies, white and red grapes were treated at 3 × 0.3 to 0.45 kg ai/ha, sampled 35 days PHI and processed (report No. RA-2074/94 and RA-2076/94). The results are shown in Table 99.

In two processing trials conducted in the USA, tebuconazole (EC) was applied at 8 × 0.125 kg ai/ha, sampled at the day of the last application and grapes were either sun-dried or oven-dried to produce raisins. No detailed information on processing procedures is given in the report (Delk, 1988; Report 98394). In another US study, tebuconazole WG 45 was applied four times at 0.252 kg ai/ha, samples taken at the day of the last application and grapes processed to raisins (sun- or oven-dried), wet and dry pomace, raisin waste and juice (Figure 13) (Krolski, 1995; Report 106972). The results are shown in Table 99.

Table 99 Tebuconazole residues found in grapes and grape processed products and processing factors

Study/trial	Grape, mg/kg	Must, mg/kg	PF must	Wine, mg/kg	PF wine	Raisins, mg/kg	PF raisins
10690-86	0.49	0.21	0.43	0.21	0.43		
10691-86	0.54	0.42	0.78	0.43	0.80		
10692-86	1.10	0.20	0.18	0.15	0.14		
10693-86	0.82	0.30	0.37	< 0.05	< 0.06		
11070-87	0.69	0.48	0.70	0.22	0.32		
11071-87	0.51	0.35	0.69	0.20	0.39		
11072-87	0.86	0.15	0.17	0.09	0.10		
11073-87	0.84	0.27	0.32	< 0.05	< 0.06		
0378-91	0.27	0.03	0.11	0.05	0.19		
0379-91	0.03	< 0.02	< 0.67	< 0.02	< 0.67		
RA2090/91- 0326	0.17	0.11	0.65	0.07/0.04[a]	0.41/0.24 [a]		
RA2090/91- 0320	0.14	0.08	0.57	0.06/0.04[a]	0.43/0.29 [a]		
RA2071/91-0080	0.14	0.05	0.36	0.03	0.21		
RA2071/91-0081	0.22	0.11	0.50	0.09	0.41		
RA2071/91-0083	0.13	0.07	0.54	0.04	0.31		
RA2071/91-00841	0.35	0.14	0.40	0.11	0.31		
RA2074/94-0450	0.23	0.04	0.17	0.02	0.09		
RA2074/94-0451	0.60	0.06	0.10	0.07	0.12		
RA2076/94-0447	0.38	0.04	0.11	0.06	0.16		
RA2076/94-0448	0.46	0.07	0.15	0.05	0.11		
98394[b]	1.7					2.4/2.0	1.4/1.2
106972[b]	0.16					0.14/0.21	0.88/1.3
PF, best estimate[c]			0.40 (n=20)		0.28 (n=22)		1.2 (n=4)

[a] preparation by cidermaking/mashing

[b] Sun dried/oven dried raisins

[c] to estimate the mean, the symbol < was ignored

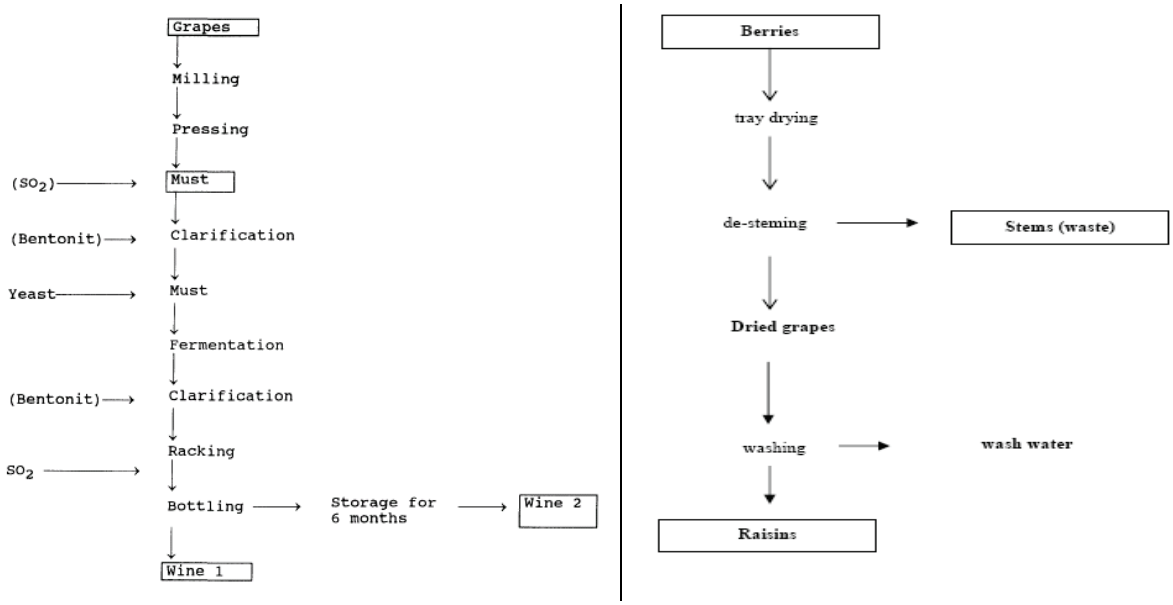


Figure 13 Processing of grape to must and wine (study RA-2071/91) and of raisins (USA)

Cabbage

In Germany, cabbage (savoy) was treated 3 times with tebuconazole at 0.125–0.250 kg ai/ha and samples harvested at 21 days PHI were processed in a simulated household (Allmendinger, 1998; RA-2078/96). Residues were not detect (LOQ = 0.05 mg/kg) either in cabbage head or in cooked head, and PFs were not estimated.

In 4 trials conducted in France and Germany (Schoening *et al*., 2007 and 2008; RA-3577/06; RA-3578/06), a SC tebuconazole formulation was applied two times at 0.2 kg ai/ha to cabbage, samples harvested at 7 days PHI and processed. The results are summarised in Table 100.

Table 100 Tebuconazole residues found in head cabbage and cabbage processed products and the transfer factors determined for cabbage processed products

Product Trial No.	Residue [mg/kg]				Processing Factor				
	0354-06	0478-06	0357-06	0479-06	0354-06	0478-06	0357-06	0479-06	Best estimate
Cabbage, head	0.02	0.03	0.02	0.05					
Head, washed	< 0.01	< 0.01	< 0.01	< 0.01	< 0.50	< 0.33	< 0.50	< 0.20	0.38
Head , cooked	< 0.01	< 0.01	< 0.01	< 0.01	< 0.50	< 0.33	< 0.50	< 0.20	0.38

Tomato

In three trials conducted in Europe, tebuconazole was applied 3 times at 0.125 to 0.250 kg ai/ha, samples harvested at 3 days PHI and processed using household practices (washing and peeling) or simulating the industrial practice (juice, preserves, and paste) (Heinemann, 1999c/Report RA3139/98; Heinemann and Deissler, 1999/Report RA3071/97). In one trial conducted in USA (Russo, 2001b; 108729), tomato plants were treated 6 times with tebuconazole SC formulation at 1.26 kg ai/ha, samples were harvested at 7 days PHI and processed. The juice was condensed to tomato puree and tomato puree was taken for further condensation to tomato paste (Figure 14). Sub-samples of puree and paste from the treated and control tomatoes were then canned. The results are shown in Table 101.

Table 101 Tebuconazole residues found in tomatoes and tomato processing products and the transfer factors determined for tomato processing products.

Study	Heinemann, 1999c		Heinemann and Deissler, 1999				USA, Russo, 2001b		PF (best estimate)
Product	Residue, mg/kg	PF	Residue, mg/kg	PF	Residue, mg/kg	PF	Residue, mg/kg	PF	
Tomato	0.12	-	0.17		0.20		1.8 (3)	-	
Washed	0.09	0.75	0.12	0.7	0.28	1.4	-	-	0.95
Peeled	< 0.05	< 0.42	< 0.05	< 0.3	< 0.05	< 0.25	-	-	0.25
Juice	< 0.05	< 0.42	0.07	0.4	0.11	0.55	-	-	0.55
Preserves	< 0.05	< 0.42	0.05	0.3	0.06	0.3	-	-	0.3
Puree	-	-	-	-	-	-	0.56/0.65/ 0.57	0.31/0.36/ 0.32	0.33
Paste	0.53	4.4	0.67	3.9	1.7	8.5	1.5/1.4/1.8	0.83/0.78/1	3.2

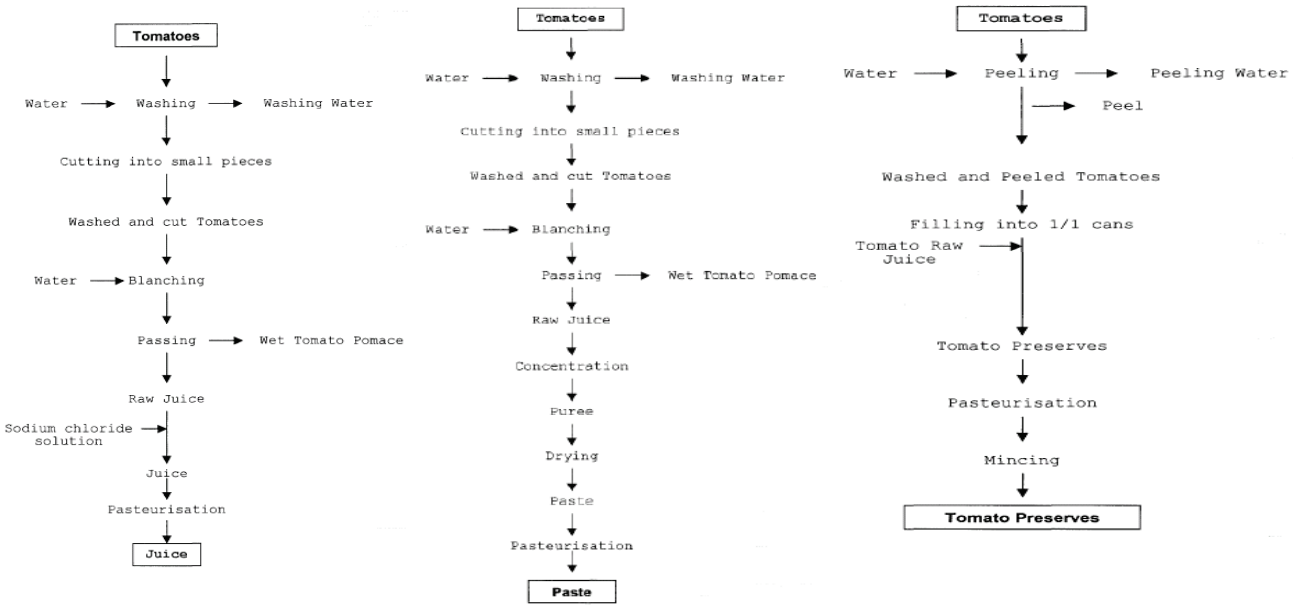


Figure 14 Processing of tomatoes (Europe)

Sweet pepper

A field trial was carried out in the USA in 2007 in sweet pepper treated six times at 0.25 kg ai/ha with tebuconazole SC 430 (Hartz *et al*., 2008). Samples were harvested at 7 days PHI and samples washed and cooked as in normal household practice. Residues of tebuconazole were 0.64 mg/kg in raw sweet pepper and 0.36 mg/kg in washed and cooked sweet pepper, with processing factor of 0.56.

Bean in the pod

In two greenhouse studies conducted in Germany, tebuconazole was applied 3 times to French beans at 0.375 kg ai/ha, samples of bean with pod collected at 3 days PHI and processed to washed bean with pod and cooked bean with pod (Billian and Eberhardt, 2003; Report RA-3190/02). The results are shown on Table 102.

Table 102 Tebuconazole residue found in French beans processing products and processing factor (PF)

Product	Residue, mg/kg		PF		Residue, mg/kg		PF		PF (best estimate)
Bean with pod	0.43		-		0.55		-		
Washed bean with pod	0.14	0.10	0.32	0.23	0.17	0.17	0.3	0.3	0.29
Bean cooked	0.07	0.07	0.16	0.16	0.14	0.13	0.25	0.24	0.20

Soya bean

A field trial was conducted to measure the magnitude of tebuconazole residue in/on soya bean seed, aspirated grain fractions and processed commodities, following three foliar spray applications of tebuconazole SC at 0.63 kg ai/ha (Beedle and Harbin, 2004; Report 201088). Processing was performed using procedures that simulated commercial practices (Figure 15); batch procedure rather then continuous was used. The results are show on Table 103.

Table 103 Tebuconazole residue found in soya bean products and processing factors (PF)

Product	Residue, mg/kg	PF
Seed	0.14	-
Aspirated grain fractions	38.7	276
Hulls	0.15	1.1
Meal	0.03	0.2
Refined oil	< 0.01	< 0.07
Defatted flour	0.03	0.2
Full fat flour	0.05	0.4
Protein isolate	0.04	0.3

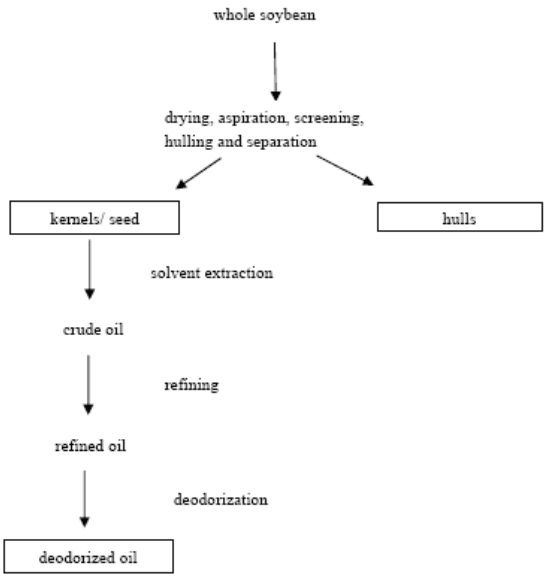


Figure 15 Processing of soya bean to oil

Barley

In two studies conducted in Germany, tebuconazole EW was applied two times to barley at 0.25 kg ai/ha, grain samples harvested at 27 or 42 days PHI and processed into beer in a specialised pilot plant in Germany (Figure 22) (Preu and Hoffmann, 2002; Report RA 3031/01). The results are shown on Table 104.

Table 104 Tebuconazole residue found in barley products and processing factors

Product	Residues, mg/kg		PF		Residues, mg/kg		PF		PF(best estimate)
Grain	0.65		-		0.93		-		-
Pearl barley	0.21	0.21	0.32	0.32	0.20	0.19	0.22	0.20	0.27
Pearl barley rub-off	0.96	1.0	1.5	1.5	3.6	3.0	3.9	3.2	2.5
Brewer's malt	0.27	0.32	0.42	0.49	0.53	0.51	0.57	0.55	0.51
Malt sprouts	0.46	0.49	0.71	0.75	1.2	1.1	1.3	1.2	1.0
Brewer's grain	0.24	0.28	0.37	0.43	0.41	0.52	0.44	0.56	0.45
Hops draff	0.32	0.34	0.49	0.52	0.12	0.06	0.13	0.07	0.30
Brewer's yeast	0.16	0.14	0.25	0.22	0.15	0.13	0.16	0.14	0.19
Beer	< 0.02	< 0.02	< 0.03	< 0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.025

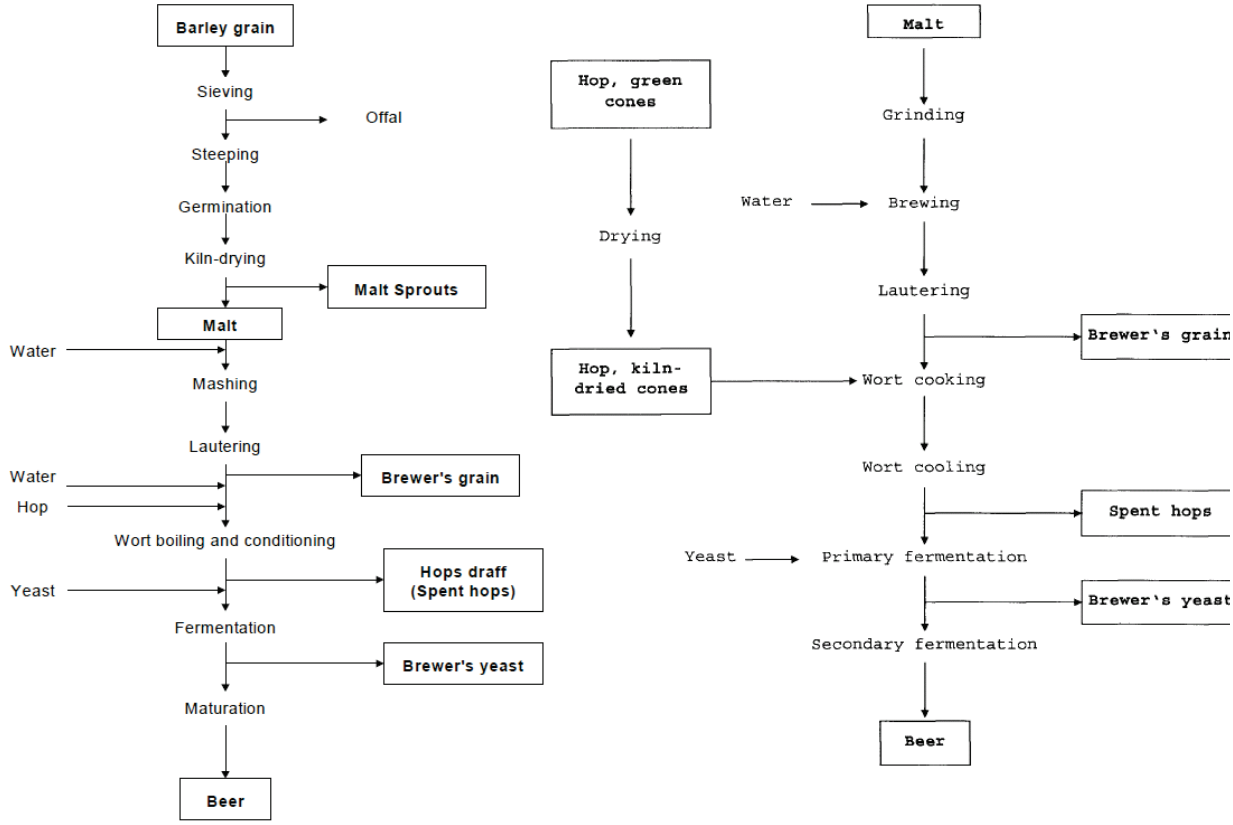


Figure 16 Processing of barley and hops to beer

Cotton

In one processing study conducted in USA, tebuconazole SC 432 was applied three times to cotton at 1.26 kg ai/ha, seeds harvested at 30 days PHI and processed to refined oil (Figure 17) (Harbin and Freeseman, 1999). Residues in fuzzy seed were 0.04 mg/kg, were not detected in cotton meal, hull or refined oil (< 0.04 mg/kg). Estimated processing factor for all three commodities were < 0.01.

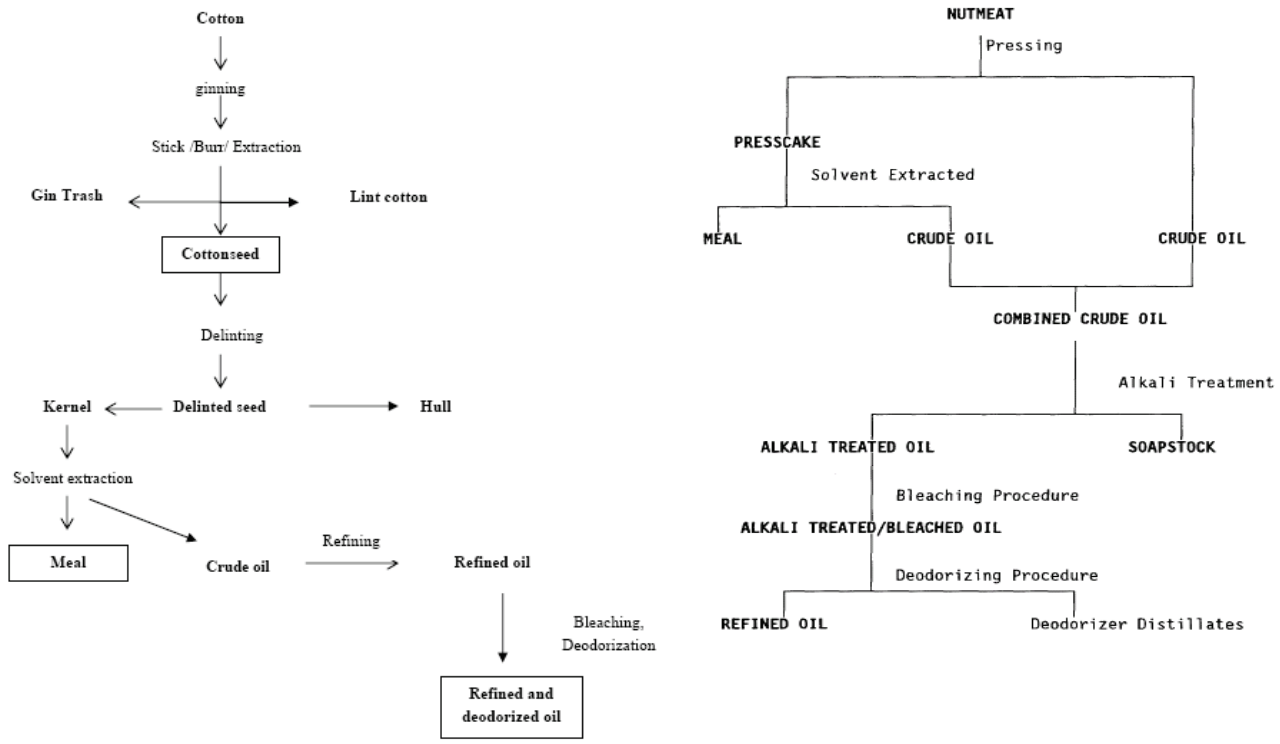


Figure 17 Processing of cotton and peanut nut meat to oil

Peanut

Peanut plants were treated four times with tebuconazole SC at 1.26 kg ai/ha, samples dug at 14 days PHI and allowed to dry in the field for six days prior to final harvesting (Maloney, 1993). Kernels were processed into oil using commercially relevant procedures (Figure 17). Residues of tebuconazole were 0.07 mg/kg in dried nutmeat, 0.06 mg/kg in meal (PF of 0.86), and < 0.01 mg/kg in refined oil (PF < 0.14). Residues in soapstock and crude oil were 0.24 and 0.14 mg/kg, with PF of 3.4 and 2, respectively.

Rape seed

In two studies conducted in France, oilseed rape was treated twice with tebuconazole at 0.2 kg ai/ha, seed harvested at a PHI of 56 to 59 days and processed to oil replicating industrial practice (Hoffmann, 2002c and d; Report RA3161/01 and RA3162/01). In four German studies conducted in 2006, tebuconazole EW was applied twice at 0.375 kg ai/ha (last application at the end of flowering), samples were taken at harvest and processed with procedures duplicating the industrial practice at a laboratory scale (Figure 18) (Wolters, 2007; RA-3116/06). The results are shown on Table 105.

Table 105 Tebuconazole residue in oilseed rape pe processing products and the processing factors

	France		Germany		PF, best estimate
Trial No.	Residue, mg/kg	PF	Residue, mg/kg	PF	
Seed	0.12 / 0.12	--	0.12 / 0.12 / 0.02 / 0.04	--	
Screw-pressed oil	0.13 / 0.11	1.1 / 0.9	0.13 / 0.11 /0.02 / 0.13	1.1 / 0.92 / 1.0 / 3.3	1.5
Press cake (pomace)	0.10 / 0.11	0.8 / 0.9	0.10 / 0.11 / 0.01 / 0.07	0.83 / 0.92 / 0.50 / 1.8	0.96
Solvent-extracted oil	0.15 / 0.09	1.3 / 0.8	0.15 / 0.09 / 0.04 / 0.20	1.3 /0.75 / 2.0 / 5.0	1.6
Crude oil	0.14 / 0.11	1.2 / 0.9	0.14 / 0.11 / 0.03 / 0.15	1.2 / 0.92 / 1.5 / 3.8	1.6
Extracted press cake meal	0.09 / 0.13	0.8 / 1.1	0.09 / 0.13 / < 0.01 /0.03	0.75 / 1.1 / < 0.50 / 0.75	0.83
Refined oil	0.10 / 0.10	0.8 / 0.8	0.10 / 0.10 / 0.03 / 0.07	0.83 / 0.83 / 1.5 / 1.8	1.1

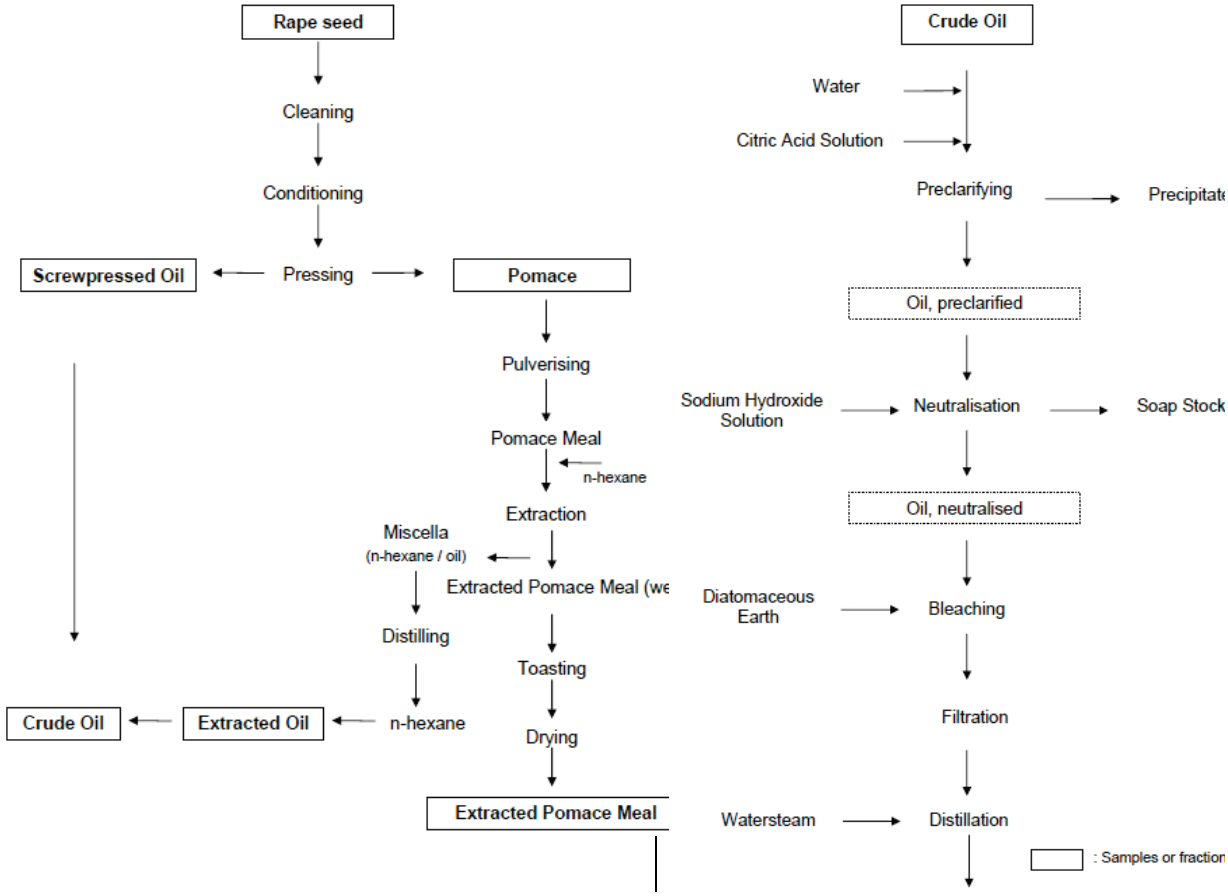


Figure 18 Processing of oilseed rape to oil

Coffee

A study was conducted in Guatemala on coffee with tebuconazole applied three time at 1.3 kg ai/ha. Coffee beans were harvested at 28 days PHI, dried and processed into roasted coffee beans and instant coffee using procedures which replicated commercial processing practices (Judy & Conrath. 1999b; Report 108948). Residues of tebuconazole in beans (dried) were 0.04 mg/kg. Residues in roasted been and instant coffee were 0.08 and 0.03 mg/kg, respectively, with calculated processing factors of 2 and 0.8.

Hops

In one processing study conducted in Germany, hop plants received 2 applications of tebuconazole EW at 0.51–0.56 kg ai/ha, samples were taken at 14 days PHI and processed at a laboratory scale utilising practices comparable to the industrial process (Figure 16) (Spiegel and Elke. 2001b; Report RA 3184/99). The malt was commercially bought and had no tebuconazole residues (< 0.05 mg/kg). Mash was produced using the infusion method. Residues of tebuconazole were 2.7 mg/kg in green cones, 8.3 mg/kg in kiln-dried cones, 0.09 mg/kg in spent hops, 0.12 mg/kg in brewer's yeast, and < 0.05 mg/kg in malt, brewer's grain and beer. Processing factors were 0.01 for spent hops and beer.

Animal feeding studies

Dairy cow

Twelve dairy cows (average body weight 1335 kg) were given 28 consecutive daily doses of tebuconazole by bolus at levels corresponding to 0, 25, 75 and 250 ppm feed (assuming an intake of 0.27 mg/kg bw) (Smyser *et al*., 1988). Milk was collected twice daily throughout the study, individual samples were thoroughly mixed and aliquots were kept frozen until analysis. Immediately prior to

analysis, the morning and evening samples were combined. At the end of the dosing period, the cows were sacrificed and samples of liver, kidney, composite muscle and composite fat were taken. The tissues were homogenised with dry ice and stored frozen until analysis. All samples were kept in a freezer below -10 °C. Samples of tissues and milk were analysed for parent compound and tebuconazole-1-hydroxy (*M03*), the main metabolite found in the livestock metabolism studies (Tables 106 and 107).

Table 106 Concentration of the residues in the milk from tebuconazole treated cows

Days	25 ppm			75 ppm			250 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
7	na	na	na	na	na	na	< 0.01	0.03	0.03
							< 0.01	0.02	0.02
							< 0.01	0.03	0.03
14	na	na	na	na	na	na	< 0.01	0.01	0.01
							< 0.01	< 0.01	< 0.01
							0.01	< 0.01	0.01
21	na	na	na	na	na	na	< 0.01	0.01	0.01
							< 0.01	< 0.01	< 0.01
							< 0.01	0.01	0.01
26	na	na	na	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.02
				< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01
				< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.02
27	na	na	na	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.03
				< 0.01	0.02	0.02	< 0.01	0.01	0.01
				< 0.01	< 0.01	< 0.01	na	0.01	0.01

*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

Table 107 Concentrations of the residues in the edible tissues from tebuconazole treated cows

Tissue	25 ppm			75 ppm			250 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
Fat	na[2]	na	na	na	na	na	< 0.05	< 0.05	< 0.05
							< 0.05	< 0.05	< 0.05
							< 0.05	< 0.05	< 0.05
Muscle	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
							< 0.05	< 0.05	< 0.05
							< 0.05	< 0.05	< 0.05
Kidney	< 0.05	< 0.05	< 0.05	0.05	0.11	0.16	< 0.05	0.87	0.83
	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.05	0.09	0.72	0.77
	0.25	< 0.05	0.25	< 0.05	0.09	0.08	< 0.05	0.55	0.54
Liver	0.06	0.10	0.15	0.07	0.10	0.16	0.11	0.28	0.38
	0.07	0.08	0.14	0.06	0.08	0.13	0.20	0.81	0.97
	< 0.05	< 0.05	< 0.05	0.12	0.06	0.17	0.13	0.32	0.44

*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

Four groups of dairy cows (three cows/dose group and one control animal) were fed daily with capsules containing tebuconazole at levels corresponding to 30, 90 and 300 ppm feed (assuming an intake of 0.27 mg/kg bw) for 28 consecutive days (Chopade and Fitzpatrick, 1991). The cows were milked twice daily throughout the study and aliquots of the morning and evening milk were mixed together to form a sample representative of a single day and stored in a freezer at -24 °C until analysis. At the end of the dosing period, the cows were sacrificed and liver, kidney, composite muscle, and composite fat were taken. The tissues were homogenised with dry ice and stored frozen until analysis. Samples of tissues and milk were analysed for parent compound and tebuconazole-1-hydroxy (*M03*) (Tables 108 and 109).

Table 108 Concentration of the residues in the milk from tebuconazole treated cows

Days	30 ppm			90 ppm			300 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
7	na[2]	na	na	na	na	na	< 0.05	< 0.05	< 0.05
							< 0.05	0.06	0.06
							< 0.05	0.06	0.06
14	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
							< 0.05	0.06	0.06
							< 0.05	0.09	0.09
21	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
							< 0.05	0.05	0.05
							< 0.05	< 0.05	< 0.05
28	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	0.06
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	0.10
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.12	0.11

*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

Table 109 Concentrations of the residues in the edible tissues from tebuconazole treated cows

Tissue	30 ppm			90 ppm			300 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
Fat	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1
							0.1	< 0.1	0.1
							< 0.1	< 0.1	< 0.1
Muscle	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1
							< 0.1	< 0.1	< 0.1
							< 0.1	< 0.1	< 0.1
Kidney	< 0.1	< 0.1	< 0.1	< 0.1	0.7	0.7	< 0.1	1.2	1.1
	< 0.1	< 0.1	< 0.1	< 0.1	0.9	0.9	< 0.1	2.2	2.1
	< 0.1	< 0.1	< 0.1	< 0.1	0.6	0.6	< 0.1	1.5	1.4
Liver	< 0.1	0.1	0.1	0.2	0.6	0.8	0.4	1.9	2.3
	< 0.1	< 0.1	< 0.1	0.1	0.4	0.5	0.8	1.5	2.3
	< 0.1	< 0.1	< 0.1	0.2	0.8	1.0	0.7	1.3	2.0

*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

Poultry

Four groups of laying hens were given 28 consecutive daily doses of tebuconazole at levels corresponding to 0.0, 2.0, 6.0, and 20 mg/kg feed (assuming a feed consumption of approximately 0.15 kg bw) (Leimkuehler *et al*., 1988). Eggs were collected daily, and samples over a week were cracked and pooled according to the treatment group. At the end of the dosing period, the hens were sacrificed, and samples of liver, skin, composite muscle, and composite fat were taken. The tissues were homogenised and stored frozen at -10 °C until analysis. Samples of tissues and eggs were analysed for parent compound and tebuconazole-1-hydroxy (Table 110).

Table 110 Concentrations of the residues in the edible tissues and eggs

Tissue	2 ppm			6 ppm			20 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
Liver	na [2]	na	na	< 0.05	< 0.05	< 0.05	0.05	0.112	0.16
Muscle	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
Fat	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
Skin	na	na	na	na	na	na	< 0.05	< 0.05	< 0.05
Eggs	na	na	na	< 0.025	< 0.05	< 0.05	0.045	< 0.05	0.05

*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

Four groups of laying hens (average body weight approx. 1.5 kg) were given 28 consecutive daily doses of tebuconazole at levels 0, 0.17, 0.49, and 1.56 mg/kg bodyweight (2.0, 6.0, and 20.0 mg/kg feed, feed consumption approx. 0.12 kg/day/animal) (Mathew et al., 1991). Samples of tissues and milk were analysed for parent compound and tebuconazole-1-hydroxy (Table 111).

Table 111 Concentrations of the residues in the edible tissues and eggs

Tissue	2 ppm			6 ppm			20 ppm		
	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*	tebuconazole	tebuconazole 1-hydroxy	Total residues*
Liver	na 2	na	na	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2
Muscle	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1
Fat	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1
Skin	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1
Eggs	na	na	na	na	na	na	< 0.1	< 0.1	< 0.1

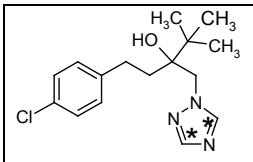
*sum of tebuconazole and tebuconazole-1-hydroxy, expressed as tebuconazole; residues < LOQ are considered 0

APPRAISAL

Tebuconazole was last evaluated for residues in 2008. In 2010, the compound was evaluated for toxicology within the periodic review program, when an ADI of 0–0.03 mg/kg bw and a ARfD of 0.3 mg/kg bw were established. The compound was scheduled for periodic review for residues at the present Meeting. Data on metabolism in livestock animals and plant, field rotational crops studies, environmental fate, methods of residue analysis, storage stability studies, GAP information, residue data on various crops, processing studies, and animal feeding studies were submitted.

Animal metabolism

Metabolism studies were conducted in rats, goats and hens. The positions of the radiolabel compounds used in the studies and the structures of the main metabolites found in animals and plants are shown below: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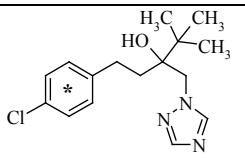
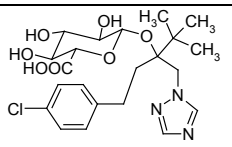
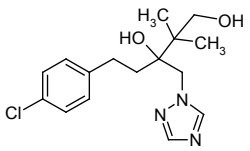
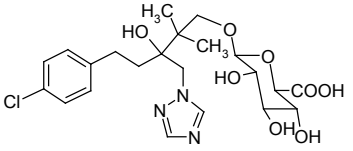

[Phenyl-UL-^{14}C]tebuconazole


tebuconazole glucuronide


tebuconazole-1-hydroxy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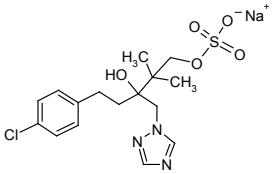
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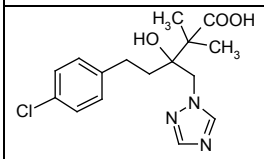
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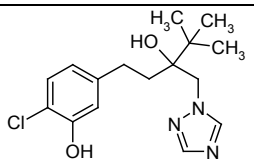
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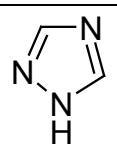
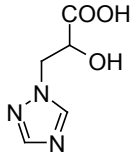
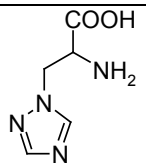
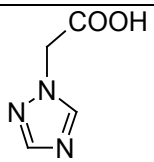

1,2,4-Triazole (M26)

 Triazole lactic acid	 Triazole alanine	 Triazole acetic acid

The metabolism of tebuconazole in rats was evaluated by the WHO panel of the JMPR at the 2010 Meeting. In summary, the main metabolites of tebuconazole in rats were the oxidation products of one of the methyl groups of the tertiary butyl moiety (alcohol and the carboxylic acid), further conjugation with glucuronide and/or sulfate, and oxidation to triol and keto acid derivatives and cleavage of the triazole moiety (mostly in males).

In a study conducted in 1987, a lactating goat was treated orally with [phenyl-UL-^{14}C]tebuconazole at 15.0 mg/kg bw on three consecutive days. Milk was collected twice a day. The highest tebuconazole equivalents levels were found in liver (5.18 mg/kg) and kidney (3.96 mg/kg), where tebuconazole accounted for 12.4 and 2.5% TRR, respectively. Fat, muscle and milk contained 0.15, 0.05 and 0.04 mg/kg tebuconazole equiv., respectively. Over 85% of the radioactivity in milk and tissues were recovered in the organosoluble extract. Tebuconazole was not detected in muscle and milk (< 0.01 mg/kg) and accounted for 0.01 mg/kg in fat. The predominant residues in all cases were the conjugates of tebuconazole-1-hydroxy, representing 92.8% TRR in kidney, 67.9% TRR in liver, 68.1% TRR in fat, 67.6% TRR in muscle and 49.4% TRR in milk. Tebuconazole-1-hydroxy levels corresponded to 15.3% TRR in liver, 2.3% TRR in kidney, 12.5% TRR in fat, 21.4% TRR in muscle 22.2% TRR in milk.

In a more recent goat study (2002), two animals were orally dosed with [triazolyl-3,5-^{14}C]tebuconazole at a rate of 3.0 mg/kg bw for 3 consecutive days. The highest tebuconazole equivalents levels were found in liver (1.9 mg/kg) and kidney (2.0 mg/kg). Fat, muscle and milk contained 0.095, 0.027 and 0.011 mg/kg tebuconazole equiv., respectively. Residues of unchanged parent were highest in fat and liver (18 and 15% of the total radioactive residues, TRR, respectively), and accounted for 3, 5 and 7% TRR in kidney, muscle and milk. The main metabolites were tebuconazole-1-OH-glucuronide, found in all tissues at 46 to 77% TRR, and tebuconazole-glucuronide, only found in liver and kidney (17 and 36% TRR, respectively). Milk contained also a polar component (12% TRR), which has chromatographic properties similar to 1,2,4-triazole.

In a study conducted in 1988, laying hens were orally dosed with 10 mg/kg bw [phenyl-UL-^{14}C]tebuconazole for three consecutive days. Quantification of metabolites was based on the recovered radioactivity only. The mean TRR were higher in liver and kidney (8.29 and 6.42 mg/kg tebuconazole equiv.), followed by gizzard (2.09 mg/kg), heart (1.77 mg/kg), fat (1.27 mg/kg), skin (0.5 mg/kg), muscle (0.44 mg/kg) and eggs (0.15 mg/kg). Tebuconazole amounted from 28.3 to 42.3% TRR in eggs, liver and kidney, and from 61.4 to 87.3% TRR in muscle, heart, skin, fat, and gizzard. Tebuconazole-1-hydroxy was detected in all tissues (8.4 to 29.4% TRR) and eggs (56.5% TRR). Tebuconazole-carboxylic acid and tebuconazole-1-hydroxysulfate were detected in liver and kidney (12.6 to 23.1% of the TRR).

In another study (1991), 10 mg/kg bw [phenyl-UL-^{14}C]tebuconazole (approx. 100 mg/kg feed) was administered orally to laying hens on three consecutive days. A total of 84.2% of the administered dose was recovered during the experiment, from which 80.3% in the excreta. The highest TRR were found in liver (10.86 mg/kg tebuconazole equiv.), kidney (9.05 mg/kg) and fat (5.25 mg/kg); muscle and eggs accounted for 0.9 mg/kg each and skin for 1.61 mg/kg. In liver and kidney, tebuconazole accounted for 4 and 2% TRR, respectively, with tebuconazole 1-hydroxysulfate being the main metabolite found (67 and 45.2% TRR, respectively), and tebuconazole-1-hydroxy accounting for less than 10% TRR. In muscle, tebuconazole represented 19 to 38% TRR and tebuconazole-1-hydroxy 22 to 27% TRR. In eggs, those levels were 52.9 and 31.6% TRR, respectively. Tebuconazole-carboxylic acid was present in kidney at 23.5% TRR.

In a more recent study (2002), laying hens were dosed orally for 3 days with [triazolyl-3,5-^{14}C]tebuconazole at 2.0 mg/kg bw (30 mg/kg in the feed). TRR was 3.72 mg/kg tebuconazole equ., in liver, 0.295 mg/kg in fat, 0.179 mg/kg in muscle and ranged from 0.037 to 0.162 mg/kg in eggs. Tebuconazole was the major radioactive residue in fat and muscle (65.4 and 53.4% TRR, respectively) and accounted for 16.5% TRR in liver and from 31.4 to 42.7% in eggs. Tebuconazole-1-hydroxy was present in all tissues (19 to 24.9% TRR) and in eggs (about 30% TRR). Tebuconazole-carboxylic acid and tebuconazole-1-hydroxysulfate were found in liver at 22.7 and 26.4% TRR, respectively. 1,2,4-triazole was detected only in muscle and eggs (11 to 14% of the TRR).

In summary, the metabolism of tebuconazole was extensive in goats, where the main metabolites were tebuconazole-1-hydroxy (up to 22% TRR) and its conjugates (up to 93% TRR). In hens, tebuconazole was a major component in fat and skin. Tebuconazole-1-hydroxy or its conjugates were found in all tissues (over 20% TRR in liver and muscle) and corresponded to over 50% TRR in eggs. Tebuconazole-carboxylic acid was also detected in hen liver and kidney and 1,2,4-triazole in hen muscle and eggs. The metabolic pathway of tebuconazole in livestock animals is similar to that observed in rats, which involves mainly hydroxylation and carboxylation of the tertiary butyl moiety, followed by conjugation. Cleavage of the triazole was only observed in hens.

Plant metabolism

The metabolism of tebuconazole was investigated from 1985 to 1991 in wheat, peanuts, and grapes under simulated field conditions. In the first study conducted in wheat, [triazole-3,5-^{14}C]tebuconazole was applied to the seeds at approx. 11 g/100 kg, the seeds planted in a sandy loam soil (70 kg seed/ha) and the wheat grown in a greenhouse. Samples of green forage were taken at the boot stage and grain and straw at maturity. Straw contained the highest percentage of the applied radioactivity (17.1%). About 11% of the radioactivity was translocated to green forage and 24% to mature wheat plant. Grains contained 2.4% of the applied radioactivity. Tebuconazole accounted for 25.0% of radioactivity in straw and 76.0% in roots. Tebuconazole-1-hydroxy and its glucuronide conjugate were identified in straw (29% of the radioactivity).

In a second study, [triazole-3,5-^{14}C]tebuconazole was sprayed to wheat during the boot stage at 0.5 kg ai/ha, and plants grown in a greenhouse. In green forage, total radioactive residues (TRR) amounted 28.0 mg/kg tebuconazole equiv. at the day of the application, decreasing to 9.8 mg/kg after 21 days and increasing to 20 mg/kg at day 28; unchanged tebuconazole was the predominant residue (87.3 to 123% TRR throughout the study). At plant maturity, most of the radioactivity was found in straw (37 mg/kg), 95.1% of unchanged tebuconazole. Grain contained 0.5 mg/kg (1.2% of radioactivity in the whole plant), from which 6% was tebuconazole, 80% tebuconazole alanine and 13% triazole acetic acid. The majority of the radioactivity recovered from wheat grain was in starch (74.0%).

The metabolism of [triazole-3,5-^{14}C]tebuconazole and [phenyl-UL-^{14}C]tebuconazole were investigated in peanuts after 3 spray applications at 0.25 kg ai/ha. The plants were grown in a greenhouse and harvested at 7 weeks PHI. Foliage had the highest residue level (29.2 and 22.6 mg/kg tebuconazole equiv. in the triazole and phenyl labels, respectively), followed by the nuts (1.19 and 0.09 mg/kg) and shells (0.16 and 0.27 mg/kg). Most of the residues in foliage was tebuconazole (62% TRR) and about 15% was tebuconazole-1-hydroxy. No tebuconazole was detected in nuts, which contained mostly the cleavage product triazole alanine (54.1% TRR), triazole lactic acid and 1,2,4 triazole (10% TRR each). Peanut shells contained tebuconazole (about 15% TRR), tebuconazole-1-hydroxy and its conjugates.

In another study conducted in peanuts, [Phenyl-UL-^{14}C]tebuconazole was applied seven times to peanut plants at 0.6 kg ai/ha, the plants grown under field conditions, moved into a greenhouse in the last phase of the study and harvested 14 weeks after the last application. TRR in foliage/forage were 110 mg/kg (98% of the residues in the plant), 70% of which corresponding to tebuconazole residues; tebuconazole-1-hydroxy and tebuconazole-m-hydroxy represented < 10% TRR each. In nuts, TRR was 0.55 mg/kg and tebuconazole was the only residue identified (19% TRR); about 64%

TRR remained in the lipid and aqueous fractions. Residues in the shell amounted 17.7 mg/kg, mostly as tebuconazole (58% TRR).

[Phenyl-UL-^{14}C]tebuconazole was applied once to grapes at 0.28 kg ai/ha and samples taken at 0 to 28 days PHI. TRR declined from 7.86 mg/kg at 3 days to 2.1 mg/kg at 28 days PHI, and the majority of the recovered residue (> 90% TRR) was identified as tebuconazole at any sampling time. There was evidence of small amounts of cellulose conjugation, but no metabolites were detected.

In summary, metabolism studies conducted in wheat, peanut and grapes have shown that tebuconazole was the main compound found in most samples. The main metabolite in wheat grain and peanut nut is triazole alanine. Hydroxylation of the tertiary butyl moiety of tebuconazole and conjugation also occurred. The compound was able to translocate from the treated wheat seeds to the forage and mature plant, and from foliar application to peanut plants to the peanut kernel. Although metabolism studies were not conducted in vegetables, metabolism studies showing that tebuconazole is the main residue in cereal and peanut forage support the conclusion that the same occurs in leafy vegetables.

Environmental fate in soil

[Phenyl-UL-^{14}C]tebuconazole showed a half-life longer than 1 year in sandy loam soil treated at 10 mg/kg (13 kg ai/ha), when about 30% of the radioactivity was found bound to the organic components of the soil. In another study, [phenyl-UL-^{14}C]tebuconazole and [triazole-UL-^{14}C]tebuconazole were shown to be more stable in silt soil (Höfchen) (40% of the applied radioactivity as unchanged parent after 433 days) compared with silt loam (Nisse, manure-treated) (60%). 1,2,4-Triazole was found at higher levels in the silt soil (3.8% of the applied radioactivity). Other possible metabolites found in both soils are a mixture of tebuconazole-5-keto (or its tautomer tebuconazole-5-enol) and tebuconazole-4-hydroxy.

Soil dissipation studies with tebuconazole were carried out under field conditions in Europe (six trials, 1989, 1997 and 2001) and North America (20 trials, 1988 to 1999) at various application rates and soil types. DT_{50} ranged from 8 to 912 days, and in most cases was over 100 days.

Thirteen long-term field studies (3 to 6 years) were conducted in various locations in Europe between 1991 to 1997 plus one in Canada (2003). In all cases, tebuconazole was shown to be stable in soil, but there is no indication of accumulation. In two trials conducted in Germany, residues in the upper 10 cm soil layer decreased from 0.16 mg/kg in the first and second year to 0.12 mg/kg in the third year. In bare soil plots, residues peaked after each application, followed by an initial rapid decline reaching a plateau, where additional decline was significantly slower.

Rotational crops

The metabolism of tebuconazole was investigated in rotational crops under confined conditions in kale, red beet, and spring wheat. [Triazole-3,5-^{14}C]tebuconazole or [phenyl-UL-^{14}C]tebuconazole were applied to the target crop (wheat) at a rate of 0.50 or 0.56 kg ai/ha at the boot stage of growth, the wheat harvested, the soil re-treated at the same rate, and after ageing for 29/30 days, the first set of rotational crops were planted (immediate planting), followed by an intermediate (122/135 days after treatment, DAT) and a final planting (273 days DAT). In soil, radioactivity was mostly due to tebuconazole at day 29/30 DAT (minimum of 83.2%); at 122 DAT, it corresponded to 31.9% TRR. At intermediate and final planting, most of the radioactivity was found in soil as bound residues (52.9 to 88% TRR). There was a significant uptake of ^{14}C-activity by the plants from the treated soil. Residues in wheat from the [triazole-3,5-^{14}C]tebuconazole treatment were mostly concentrated at in crops from the intermediate planting, mainly on wheat grain (35.4 mg/kg; 64.8% TRR of wheat plant at harvest) and from 0.8 to 2.7 mg/kg in kale, beet tops and roots. Wheat grain from the final planting period had 7.6 mg/kg. The major metabolites detected in the crops were triazole alanine (> 50% TRR in wheat grain, beet root and kale at 29 to 273 days after planting), triazole lactic acid (mainly in wheat straw and beet top; 20.5 to 52% TRR), and triazole acetic acid (wheat grain and straw, 16.2 to 42% TRR). In general, residues from the [phenyl-UL-^{14}C] tebuconazole treatment declined during the study period, and were most concentrated in wheat straw from the initial planting (0.548 mg/kg;

78.6% TRR in wheat plant at harvest). The highest residues in wheat grain and beet roots were found in plants from the intermediate planting (0.110 and 0.049 mg/kg, respectively). Tebuconazole was extensively metabolised in both studies, with low amounts detected in wheat straw, beet and kale from the initial planting (4.3 to 15% of TRR at harvest).

In another study conducted, [phenyl-UL-^{14}C]tebuconazole was incorporated into a sandy loam topsoil layer at a rate of 2.5 kg ai/ha (10x the recommended rate), spring wheat planted after 32 and 152 days, sampled for forage after 7–8 weeks and harvested at maturity. Residues in soil did not change significantly during the whole experiment period (around 0.8–1.2 mg/kg equ.). Wheat grain contained < 3% TRR present in the wheat plant at harvest (0.26 and 0.075 mg/kg), and most of the residues were present in straw (6.29 and 3.9 mg/kg). In grain, only the parent compound was detected, but at very low concentration (< 0.01 mg/kg). In wheat straw, tebuconazole was the major residue (2.27 mg/kg equ., 36% TRR) and tebuconazole-1-hydroxy and its conjugates represented 7.1% TRR. Tebuconazole accounted for over 50% TRR in wheat forage.

Four field rotational crop studies were conducted with tebuconazole in winter wheat in Germany. In three trials, tebuconazole was sprayed once onto the bare soil at 0.5 kg ai/ha and wheat was sown approximately 30 days after application as a rotation crop. In the fourth trial, the product was applied at the same rate and after harvest; the field was re-planted with winter wheat. Tebuconazole residues were only detected in the upper soil layers (0–10 cm), at levels ranging from 0.09 to 0.47 mg/kg (0 to 63 days after planting). With the exception of one sample of green material (0.14 mg/kg; 240 days after planting), residues in all other samples were below the LOQ (0.05 mg/kg).

Eleven field rotational studies were conducted in the USA in 1997/1998 with spinach, wheat, sorghum and turnip planted 30 and 120 days after treatment of the soil with seven applications (7 days interval) of EC tebuconazole at 0.25 kg ai/ha. Tebuconazole residues ranged between < 0.01 and 0.05 mg/kg in plant matrices.

In twenty field trials conducted in USA in 1997/1998, wheat was treated once with tebuconazole at 0.126 kg, the wheat was destroyed after 35 days and soya beans were planted-back into the same plots. Tebuconazole residues were only detected in one hay sample (0.04 mg/kg). Residues were < 0.01 mg/kg in soya bean seed and forage and < 0.02 mg/kg in hay.

In summary, tebuconazole was the major residues in rotational crops, being metabolised to three major metabolites, triazole alanine, triazole lactic acid and triazole acetic acid. The metabolite distribution pattern showed little variation between the planting intervals, an indication that metabolite formation is influenced by the plants more than the soil. Field studies have shown that tebuconazole was generally present at levels < 0.05 mg/kg in succeeding crops.

Analytical methods

Tebuconazole can be analysed in plant commodities using the multi-residue enforcement method DFG S19. This method involves extraction with acetone/water, partition in ethyl acetate/cyclohexane and sodium chloride, clean-up by gel permeation chromatography (GPC) and analysis by GC/MSD. LOQ is 0.02 mg/kg. Various specialized methods were used in the supervised residue trials. In the methods developed in the 1980´s and early 1990´s, the plant material is extracted with organic solvent (dichloromethane, acetonitrile, acetone/water), cleaned up with SPE (C18, silica gel, aluminium oxide, diatomaceous earth) and analysed by gas chromatography using either TID, NPD or MSD. LOQ is 0.02 or 0.05 mg/kg. In all methods, inclusion of hexane extraction step for lipid removal is required for high fat content matrices. In the more recent methods, the sample is extracted with acetonitrile:water, submitted to SPE clean up or injected directly to the LC/MS/MS for quantification. LOQ ranged from 0.01 to 0.05 mg/kg. Some methods used matrix-matched standards or internal stable labelled standards for quantification.

Two methods to analyse tebuconazole and its metabolite tebuconazole-1-hydroxy in animal commodities were reported. In the Mobay method 97468, the samples are extracted with methanol, methanol/hexane or methanol/acetonitrile, the extract partitioned in dichloromethane/water or directly

hydrolysed with HCl, purified by GPC and a combination of silica and florisil column or HPLC clean up. Tebuconazole is measured directly by GC/NPD and tebuconazole-1-hydroxy is derivatised to a monosilyl ether before quantitation. GC-MSD is used for confirmation. LOQ for tebuconazole and the metabolite was 0.1 mg/kg in cattle kidney, 0.05 mg/kg in cattle liver and fat, and milk. In poultry commodities, the method was satisfactory validated for tebuconazole in muscle, liver, fat and skin at 0.05 mg/kg and in eggs at 0.01 mg/kg. In Method 101316, the matrices are extracted with methanol and acetonitrile, the extract hydrolysed overnight under acidic reflux, residues separated by GPC, hexane/acetonitrile partitioning and HPLC. Tebuconazole and the t-butyldimethylsilane derivative of the 1-hydroxy metabolite were analysed by GC/NPD, and GC-MSD used for confirmation. LOQ for tebuconazole and the metabolite was 0.1 mg/kg in cattle and poultry tissues and eggs, and 0.05 mg/kg in milk.

Stability of residues in stored analytical samples

Tebuconazole residues showed to be stable in various crops fortified at 1.0 mg/kg under frozen storage (-10 °C to -24 °C) for at least 30 months (at least 86% of the residues remained). Residues in wheat straw and forage and peanut meat showed stability for at least 63 months of storage.

Stability studies conducted with ^{14}C tebuconazole and ^{14}C tebuconazole-1-hydroxy showed that the compounds were stable for at least 5.6 months (169 days) at -24 °C in chickens and cattle tissues (from 94 to 119% remaining) and for at least 12 months in eggs and milk. The concentration of the compounds did not show a profile of decline during the period of the studies.

The periods of sample storage in the supervised trials and the feeding studies conducted with tebuconazole are considered acceptable.

Definition of the residue

Metabolism studies conducted in goat and hens show that tebuconazole was present in all animal commodities. The main metabolite was tebuconazole-1-hydroxy, free and/or in its conjugated form, represented at over 20% TRR in liver and muscle of cattle and poultry, about 50% TRR and milk and eggs and over 90% TRR in hen kidney. Tebuconazole-carboxylic acid was present in hen liver and kidney at about 20% TRR and 1,2,4-triazole at > 10% TRR in hen muscle and eggs. 1,2,4 triazole is not as specific marker for tebuconazole use as it can be formed in plants treated with other triazole compounds. Animal feeding studies have shown that residues of tebuconazole-1-hydroxy are not found in cattle and poultry meat, milk and eggs from animals exposed to tebuconazole residues at up to 4–5 times the estimated livestock dietary burden and was only found in poultry liver (0.11–0.2 mg/kg) at 2.3 times the maximum dietary burden. The metabolite is only found at the estimated dietary burden in cattle liver and kidney (< 0.2 mg/kg), two minor commodities in trade and with a low impact in the total human diet. Tebuconazole residues do not accumulate in fat.

Residue definition for animal commodities for enforcement and risk assessment purposes:

Tebuconazole

Residues of tebuconazole are not fat soluble

Tebuconazole was the major compound found in plant commodities samples, with only two exceptions. Triazole alanine, a common triazole metabolite, was the main residue in wheat grain and peanut nut (> 50% TRR) and tebuconazole-1-hydroxy and its conjugates represented about 30% TRR in wheat straw. Triazole alanine is not as specific marker for tebuconazole use as it can be formed in plants treated with other triazole compounds. The presence of tebuconazole-1-hydroxy is only found in a feed item, not relevant for human exposure.

Residue definition for plant commodities for enforcement and risk assessment purposes:

Tebuconazole

Results of supervised trials on crops

The OECD MRL calculator was used to assist in the estimation of maximum residue levels from the selected residue data set obtained from the supervised residue trials. The Meeting reviewed the trial conditions and other relevant factors related to each dataset to arrive at a best estimate of the maximum residue level using expert judgment. When the OECD calculator suggested a different value, an explanation on the discrepancy was included in the text.

Citrus fruits

In Brazil, critical GAP for tebuconazole in citrus is 2 × 0.015 kg ai/hL, 20 days PHI. Two trials conducted with 3 applications at the GAP rate gave residues of 1.3 (2) mg/kg. These trials are considered to be at GAP as the first application is unlikely to affect residues at 20 days PHI. Ten other trials did not match GAP.

In two trials conducted in oranges in South Africa at GAP (2 × 0.02 kg ai/hL), residues at 175 days PHI were < 0.01 and 0.01 mg/kg in the fruit and < 0.01 (2) in the pulp. Two trials conducted at double rate gave residues within the same range.

Data was received for eight post-harvest trials conducted in Germany in oranges and mandarins at 0.1 kg ai/hL, however there is no GAP that match these trials.

The Meeting agreed that there were an insufficient number of trials conducted according to GAP to estimate a maximum residue level for tebuconazole in citrus or any commodity within the group.

Apples and pears

In Spain, maximum GAP rate in apple and pears is 4 × 0.019 kg ai/hL, with PHI of 14 days. In six trials conducted in apples in France, Italy and Greece matching this GAP, residues were: 0.17, 0.21, 0.27, 0.39, 0.47 and 0.50 mg/kg. In four trials conducted in pears in Italy and Portugal at the same GAP, residues were: < 0.05, 0.07, 0.28 and 0.38 mg/kg.

Residues in apples and pears conducted at the same GAP belong to the same population and can be combined as < 0.05, 0.07, 0.17, 0.21, 0.27, 0.28, 0.38, 0.39, 0.47 and 0.50 mg/kg

The Meeting estimates a maximum residue level of 1 mg/kg, a HR of 0.50 mg/kg and a STMR of 0.275 mg/kg for tebuconazole in apple and pears.

The Meeting withdraws its previous recommendation of maximum residues level of 0.5 mg/kg for tebuconazole in Pome fruit.

Cherries

Tebuconazole is registered in cherry in France and Italy at maximum of 2 × 0.02 kg ai/hL and 7 days PHI. In Spain, up to 3 applications of the same rate can be used. In thirteen trials conducted in France, Italy, Spain and Portugal with 2-3 applications of the GAP rate, residues at 7 days PHI were 0.06, 0.10 (2), 0.12, 0.13, 0.17, 0.18, 0.20, 0.26, 0.29, 0.30, 0.33 and 0.40 mg/kg.

In the Czech Republic, GAP consists of 2 × 0.25 kg ai/ha with a 7 day PHI. In seven trials conducted in Germany complying with this GAP, residues were: 0.32, 0.38, 0.45, 0.46, 0.48, 0.51 and 0.74 mg/kg.

In ten trials conducted in USA according to GAP (up to 6 × 0.25 kg ai/ha, 0 days PHI), residues were 0.41, 0.61, 0.64, 0.79, 0.86 (2), 0.92, 0.97, 1.4, and 3.1 mg/kg.

Using the residue data coming from the most critical GAP (USA), the Meeting estimates a maximum residue level of 4 mg/kg, a HR of 3.1 mg/kg and a STMR of 0.86 mg/kg for tebuconazole in cherries.

The Meeting withdraws its previous recommendation of maximum residues level of 5 mg/kg for tebuconazole in cherry.

Apricot, peach and nectarines

In three trials conducted in peaches in Brazil according to GAP (3 × 0.2 kg ai/ha and 7 days PHI), residues in whole fruit were 0.01, 0.02 and < 0.1 mg/kg.

Tebuconazole is registered in Italy and Spain in apricot, peach and nectarine at a maximum of 2 × 0.28 kg ai/ha and 7 days PHI. In nine trials conducted in peaches in Italy, France, Greece and Spain matching this GAP, residues were 0.09, 0.11, 0.21, 0.22 and 0.35 mg/kg in whole fruit and 0.06, 0.10, 0.11, 0.13, 0.17, 0.19, 0.23 (2) and 0.37 mg/kg in peach without stone. In the five trials, the residue ratio in whole fruit/fruit without stone was calculated (0.91, 0.94, 0.96, 0.9 and 1; mean of 0.94). When the mean ratio was applied to residues in fruit without stone, the residue population in whole fruit is 0.06, 0.09, 0.11, 0.12, 0.16, 0.18, 0.21, 0.22 and 0.35 mg/kg

In two trials conducted in nectarines in Italy according to GAP, residues were 0.06 and 0.14 mg/kg in fruit without stone and 0.05 and 0.12 (by applying a ratio of 0.83 to 0.14 mg/kg) mg/kg in whole fruit. In two trials conducted in apricots in Italy according to GAP, residues at 7 days PHI were 0.30 and 0.32 mg/kg in fruit without stone and 0.27 (by applying a ratio of 0.9 to 0.30 mg/kg) and 0.29 mg/kg in whole fruit.

In seven trials conducted in peaches in the USA according to GAP (0.25 kg ai/ha, 0 day PHI), residues in fruit without stone were 0.20, 0.21, 0.44, 0.46, 0.66, 0.97 and 1.0 mg/kg. By applying the whole fruit/fruit without stone ratio estimated previously for peaches (0.94), the estimated residues in whole fruit were 0.19, 0.20, 0.41, 0.43, 0.62, 0.91 and 0.94 mg/kg.

Based on the most critical GAP and highest residue population (USA), the Meeting estimated a maximum residue level of 2 mg/kg, a HR of 1.0 mg/kg and a STMR of 0.46 mg/kg for tebuconazole in apricot, peaches and nectarine.

The Meeting withdraws its previous recommendation of maximum residues level of 1 mg/kg for tebuconazole in peaches.

Plums

GAP for tebuconazole in plums is 3 × 0.013 kg ai/hL in the Netherlands and 3 × 0.019 kg ai/hL in Spain, with a 7 day PHI.

A total of 22 trials were conducted with tebuconazole on plums in Europe. In trials conducted in Germany matching the GAP of the Netherlands, residues in fruit were 0.06, 0.08 and 0.12 mg/kg. Trials conducted in France, Italy and Spain matching Spanish GAP were: 0.03 (3), < 0.05 (4), 0.05, 0.07, 0.07, 0.08, 0.10 (2), 0.11, 0.12, 0.24, 0.28, 0.38 and 0.40 mg/kg.

Nine trials were conducted in plums in USA at the maximum GAP rate (6 × 0.25 kg ai/ha; 0 day PHI), giving residues at in fruit of 0.02, 0.03 (2), 0.06, 0.08, 0.12, 0.13, 0.37 and 0.47 mg/kg.

Based on the most critical GAP and highest residue population (USA), the Meeting estimated a maximum residue level of 1 mg/kg, a HR of 0.47 mg/kg and a STMR of 0.08 mg/kg for tebuconazole in plums (including prunes).

The Meeting withdraws its previous recommendation of maximum residues level of 0.2 mg/kg for tebuconazole in plums (including prunes).

Elderberrries

Six trials were conducted in Austria according to the GAP rate of 3 × 0.038 kg ai/hL. Residues within the 24 days PHI were: 0.26, 0.30, 0.39, 0.70 mg/kg. In two trials, samples were harvested 14 days after the last application.

The Meeting estimated a maximum residue level of 1.5 mg/kg, a HR of 0.70 mg/kg and a STMR of 0.345 mg/kg for tebuconazole in elderberries.

The Meeting withdraws its previous recommendation of maximum residues level of 2 mg/kg for tebuconazole in elderberries

Grapes

In Brazil, the critical GAP for tebuconazole in grapes is for a maximum application rate of 0.025 kg ai/hL, maximum number of applications unspecified and a 14 day PHI. Five trials were conducted in the country with 4–6 applications of the GAP rate, with residues of 0.30 (2), 0.52, 0.60 and 0.63 mg/kg. Four trials did not match the GAP.

In France, tebuconazole can be used up to 3 times at 0.1 kg ai/ha with a PHI of 14 days. In two trials conducted in France and Germany matching this GAP, residues were 0.20 and 0.51 mg/kg.

In Italy, the GAP is 3 × 0.1 kg ai/ha with a PHI of 14 days. In five trials conducted in Italy, Portugal and Spain matching this GAP, residues were 0.03, 0.04 (2), < 0.1 and 0.14 mg/kg.

In Portugal, the GAP is 3 × 0.1 kg ai/ha with a PHI of 7 days. In eight trials conducted in Italy, Portugal and Spain matching this GAP, residues were: < 0.02, 0.08, 0.09, 0.11, 0.13, 0.14, 0.38 and 0.41 mg/kg.

Seventeen trials were conducted in the USA according to GAP (8 × 0.126 kg ai/ha). Residues at 14 days PHI were 0.09, 0.10, 0.20, 0.27, 0.33, 0.43, 0.56, 0.67, 0.72, 0.78, 0.94, 0.99, 1.0, 1.5 (2), 1.8 and 4.6 mg/kg.

Based on the most critical GAP and highest residue population (USA), the Meeting estimated a maximum residue level of 6 mg/kg, a HR of 4.6 mg/kg and a STMR of 0.72 mg/kg for tebuconazole in grapes.

The Meeting withdraws its previous recommendation of maximum residues level of 2 mg/kg for tebuconazole in grapes.

Olives

In six trials conducted with tebuconazole in olives in Greece, Italy, Spain and Portugal matching Spanish GAP (one application at 0.015 kg ai/hL before flowering), residues were: < 0.01 (2) and < 0.05 (4) mg/kg. As the application is done before flowering, no residues are expected in the olive fruit.

The Meeting estimated a maximum residue level of 0.05* mg/kg and a STMR of 0 mg/kg for tebuconazole in olives.

Bananas

Tebuconazole is registered to be used in bananas in Australia at up to 6 × 0.1 kg ai/ha with a 1 day PHI. Three trials were conducted in the country according to GAP, giving residues of 0.04, 0.16 and 0.19 mg/kg in whole fruit and 0.03, 0.10 and 0.14 mg/kg in pulp. In three trials conducted with bagged banana, residues in whole fruit and in the pulp were: < 0.01, 0.01 and < 0.02. Six other trials conducted at double rate gave residues within the same range (maximum of 0.16 mg/kg).

Thirteen trials were conducted in Brazil. In one trial conducted according to GAP (5 × 0.1 kg ai/ha, 5 days PHI), residues in the fruit were 0.02 mg/kg. Twelve trials did not match GAP.

Tebuconazole is registered in Mexico and the USA at a rate of 0.1 kg ai/ha with a 0 day PHI. In the USA, the maximum number of application is five. In three trials conducted in Puerto Rico and in four trials conducted in the USA (Hawaii) according to the US GAP rate, residues at 0 day PHI were: < 0.01 (6) and 0.03 mg/kg in fruit and < 0.01 (4) mg/kg in the pulp.

As the number of trials conducted at the most critical GAP giving rise to the highest residues (Australia) was not considered sufficient to make an estimation, the Meeting used the data from trials conducted in the USA.

The Meeting estimated a maximum residue level of 0.05 mg/kg, a HR of 0.03 mg/kg and a STMR of 0.01 mg/kg for tebuconazole in bananas.

The Meeting confirms its previous recommendation of maximum residues level of 0.05 mg/kg for tebuconazole in bananas.

Mango

A total of 18 trials were conducted with tebuconazole in mangoes in Brazil, where the critical GAP is 3 × 0.02 kg ai/hL with a 20 days PHI. In five trials matching GAP, residues in the fruit were 0.02 (2) and < 0.05 (3) mg/kg. The trials conducted at double rate or 4–6 applications gave residues at 20 days PHI from < 0.05 to < 0.1 mg/kg.

The Meeting estimated a maximum residue level of 0.05 mg/kg, a HR of 0.05 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in mango.

The Meeting withdraws its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in mango.

Papaya

Tebuconazole is registered for papaya in Australia (6 × 0.125 kg/ha, 3 days PHI). One trial conducted in at the country at this GAP gave residues of 0.07 mg/kg; one trial at double rate gave residues < 0.01 mg/kg.

In six trials conducted in Brazil according to GAP (up to 6 × 0.2 kg ai/ha, 7 days PHI), residues in the fruit were: 0.06, 0.15, 0.17, 0.19, 0.32 and 1.2 mg/kg. Six trials were conducted at double rate.

Based on the trials conducted in Brazil, the Meeting estimated a maximum residue level of 2 mg/kg, a HR of 1.2 mg/kg and a STMR of 0.18 mg/kg for tebuconazole in papaya.

The Meeting confirms its previous recommendation of maximum residues level of 2 mg/kg for tebuconazole in papaya.

Passion fruit

Tebuconazole is registered to be used in passion fruit in Brazil at a maximum rate of 4 × 0.024 kg ai/hL and 7 days PHI. In five trials conducted in the country according to GAP, residues in the fruit were 0.02 (2) and < 0.1 (3) mg/kg. Three trials conducted at double rate gave residues < 0.1 mg/kg.

The Meeting estimated a maximum residue level of 0.1 mg/kg, a HR of 0.1 mg/kg and a STMR of 0.1 mg/kg for tebuconazole in passion fruit.

Garlic

In Brazil, the critical GAP rate for tebuconazole in garlic is 4 × 0.25 kg ai/ha; PHI is 14 days. Three trials according to GAP gave residues in the bulb of 0.02 (2) and < 0.05, mg/kg. Three trials conducted at double rate gave residues up to 0.04 mg/kg.

In five trials conducted in France according to GAP (2 × 0.25 kg ai/ha, 21 days PHI), residues were: < 0.02 (2), 0.02, 0.03 and 0.06 mg/kg.

Based on the highest residue population (France), the Meeting estimated a maximum residue level of 0.1 mg/kg, a HR of 0.06 mg/kg and a STMR of 0.02 mg/kg for tebuconazole in garlic.

The Meeting confirms its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in garlic.

Leek

Tebuconazole is registered in leek in Northern Europe, with a critical GAP in the Netherlands (3 × 0.30 kg ai/ha, 14 days PHI). In 12 field trials conducted in Belgium, France and Germany according to this GAP, residues were: 0.03, 0.14, 0.15 (2), 0.19 (2), 0.20, 0.22, 0.24, 0.28, 0.31 and 0.44 mg/kg.

The Meeting estimated a maximum residue level of 0.7 mg/kg, a HR of 0.44 mg/kg and a STMR of 0.195 mg/kg for tebuconazole in leek.

The Meeting withdraw its previous recommendation of maximum residues level of 1 mg/kg for tebuconazole in leek.

Onion, bulb

Twelve trials were conducted with onions in Brazil, where the critical GAP is 4 × 0.25 kg ai/ha and 14 days PHI. In six trials conducted according to GAP, residues in bulb were: < 0.02 (3), 0.02, 0.03 and 0.06 mg/kg. Six other trials conducted at higher rate gave residues up to 0.10 mg/kg.

Tebuconazole is registered in Germany and Austria at 2 × 0.25 kg ai/ha and 21 days PHI. Seventeen trials were conducted in Germany, France, Belgium, the Netherlands and the UK according to German/Austrian GAP, giving residues of < 0.01 (7), 0.01, 0.02, 0.03 and < 0.05 (7) mg/kg.

GAP in Spain is 1 application at 0.50 kg ai/ha after seeding. Seven trials conducted in Spain, Greece and Portugal did not match this GAP.

Based on the most critical GAP and the highest residue population (Brazil), the Meeting estimates a maximum residue level of 0.1 mg/kg, a HR of 0.06 mg/kg and a STMR of 0.02 mg/kg for tebuconazole in onion, bulb.

The Meeting confirms its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in onion, bulb.

Broccoli

Tebuconazole is registered in Germany in broccoli at 2 × 0.25 kg ai/ha with a 21 day PHI. Six trials conducted in France, Germany and the Netherlands according to this GAP gave residues of < 0.01 (3), < 0.02 (2) and 0.11 mg/kg. Nine trials conducted in Greece, Italy and Spain did not match any GAP from Southern Europe.

The Meeting estimated a maximum residue level of 0.2 mg/kg, a HR of 0.11 mg/kg and a STMR of 0.015 mg/kg for tebuconazole in broccoli.

Brussels sprouts

Tebuconazole is registered in northern Europe, with the critical GAP from the Netherlands, with a maximum GAP of 3 × 0.30 kg ai/ha and 21 days PHI. In Germany, GAP is 3 × 0.25 kg ai/ha with a 21 day PHI. In four trials conducted in France, Germany, Netherlands and the UK, matching the GAP of the Netherlands, residues were: < 0.05 (2), 0.07 and 0.19 mg/kg. In 12 trials conducted in France, Germany and the UK, according to German GAP, residues were: < 0.02, 0.02, 0.05, 0.06, 0.07, 0.09, 0.10, 0.11, 0.12 (2), 0.15 and 0.17 mg/kg.

Based on the largest residue population, the Meeting estimated a maximum residue level of 0.3 mg/kg, a HR of 0.19 mg/kg and a STMR of 0.095 mg/kg for tebuconazole in Brussels sprout.

Cabbages, head

The critical GAP for tebuconazole in head cabbage in Northern Europe is 3 × 0.256 kg ai/ha, with a 21 day PHI (the Netherlands). In ten trials conducted in France, Germany and the UK matching this GAP residues were: < 0.05 (6), 0.32 (2), 0.37 and 0.56 mg/kg. Three other trials were not at GAP.

The Meeting estimated a maximum residue level of 1 mg/kg, a HR of 0.56 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in head cabbage.

The Meeting withdraw its previous recommendation of maximum residues level of 1 mg/kg for tebuconazole in brassica (Cole or Cabbage) vegetables; head cabbage, flowered brassicas.

Cauliflower

Tebuconazole is registered for use in cauliflower in France and the Netherlands at a maximum GAP of 3 × 0.25-0.26 kg ai/ha, PHI is 21 days. In 21 trials conducted according to GAP in France,

Germany, the Netherlands and the UK, residues in cauliflower head were: < 0.01 (6), < 0.02 (2) and < 0.05 (13) mg/kg. Three trials conducted in Italy and Spain did not match GAP.

The Meeting estimated a maximum residue level of 0.05* mg/kg, a HR of 0.05 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in cauliflower.

Cucumber

Tebuconazole is registered in Brazil in cucumber at a maximum of 4 × 0.2 kg ai/ha and a 5 day PHI. Three trials were conducted in the country according to GAP, giving residues of < 0.01 (2) and 0.06 mg/kg. Three other trials did not match GAP.

In Italy, the compound is registered in cucumber at a maximum rate of 4 × 0.125 kg ai/ha and a 3 day PHI. Seven trials conducted in cucumber in Italy, Greece and Spain according to this GAP gave residues of < 0.02, 0.03, 0.04, < 0.05 (2), 0.08 and 0.09 mg/kg. Six trials conducted in Spain and Greece were not at GAP. Four trials were conducted in Germany, Belgium and the Netherlands (no GAP).

Using the more extensive European data, the Meeting estimated a maximum residue level of 0.15 mg/kg, a HR of 0.09 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in cucumber.

The Meeting withdraws its previous recommendation of maximum residue level of 0.2 mg/kg for tebuconazole in cucumber.

Squash, Summer

In Italy, the compound is registered in zucchini at a maximum rate of 4 × 0.125 kg ai/ha with a 3 day PHI. Five trials conducted in zucchini in Italy according to GAP gave residues of < 0.05 (3), 0.08 and 0.10 mg/kg.

The Meeting estimated a maximum residue level of 0.2 mg/kg, a HR of 0.10 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in squash, summer.

The Meeting withdraws its previous recommendation of maximum residues level of 0.02 mg/kg for tebuconazole in squash, summer.

Melons

The critical GAP for tebuconazole in melons in Brazil is 0.25 kg ai/ha (number of applications not specified) and a 14 day PHI. Seven trials were conducted in Brazil according to GAP, giving residues in the fruit of < 0.01, 0.03, < 0.05 (4) and 0.10 mg/kg. When applying the ratio pulp/whole fruit of 0.36 (see below) to this data, estimated residues in the pulp were: < 0.01, 0.02, < 0.02 and 0.036 mg/kg. Seven trials were not according to GAP.

In Italy, tebuconazole is registered to be used at a maximum of 4 × 0.125 kg ai/ha, with a 7 day PHI. In eight field trials conducted in France and Italy according to Italian GAP, residues in the fruit were: 0.03 (2), 0.04 (2), 0.05, 0.07 (2) and 0.09 mg/kg. In five trials residues in the pulp were: < 0.01 (2) and < 0.02 (3) mg/kg. The mean ratio of residues in pulp/fruit was < 0.36 (n = 4). In four greenhouse trials conducted in Italy and Spain at the same GAP, residues in fruit were: < 0.02, 0.03, 0.05 and 0.06 mg/kg. When applying the ratio of 0.36 to this data, estimated residues in the pulp were: 0.007, 0.01, 0.02 and 0.02 mg/kg.

Trials conducted in Italy and France gave a higher residue population (all detectable residues) and were used for the estimations. The combined residues of tebuconazole were: < 0.02, 0.03 (2), 0.04 (2), 0.05 (3), 0.06, 0.07 (2) and 0.09 mg/kg in whole fruit and 0.007, < 0.01 (2), < 0.02 (3), 0.01, and 0.02 (2) mg/kg in the pulp

The Meeting estimates a maximum residue level of 0.15 mg/kg, a HR of 0.02 mg/kg (in the pulp) and a STMR of 0.02 mg/kg (in the pulp) for tebuconazole in melons, except watermelon.

The Meeting withdraw its previous recommendation of maximum residues level of 0.2 mg/kg for tebuconazole in melons, except watermelon.

Watermelon

The maximum rate for tebuconazole in watermelon in Brazil is 4 × 0.20 kg ai/ha with 14 days PHI. In two trials conducted according to GAP, residues in fruit were: < 0.01 and 0.01mg/kg. Two trials were conducted at double rate.

In Italy, the compound can be applied up to 4 × 0.125 kg ai/ha and 7 days PHI. In three trials conducted according to Italian GAP, residues in fruit were: < 0.02, 0.03 and 0.04 mg/kg. Residues in pulp were: < 0.02 (3) mg/kg. One trial conducted at a lower rate gave residues of 0.05 mg/kg.

The Meeting agree that three trials conducted at the same GAP were not sufficient to estimate a maximum residue level for watermelon.

The Meeting withdraws its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in watermelon.

Eggplant

Tebuconazole is registered in Brazil in eggplant (aubergine) at a maximum rate of 4 × 0.2 kg ai/ha and 7 days PHI. In six trials conducted in that country according to GAP, residues were 0.02, 0.03, 0.04 (2) and < 0.10 (2) mg/kg. Two other trials did not match GAP.

The Meeting estimated a maximum residue level of 0.1 mg/kg, a HR of 0.10 mg/kg and a STMR of 0.04 mg/kg for tebuconazole in eggplant.

Peppers, sweet

Tebuconazole is registered in Brazil at a maximum rate of 4 × 0.2 kg ai/ha and 7 days PHI. In three field trials conducted in that country according to GAP, residues were: < 0.10 (3) mg/kg. Three trials were conducted at double rate.

In Italy, the compound can be applied at a maximum of 4 × 0.0125 kg ai/hL and 3 days PHI. Twelve indoor trials conducted in Italy, Germany, the Netherlands, France, and Spain according to this GAP gave residues of 0.06 (2), 0.13, 0.15, 0.16, 0.20, 0.23, 0.25, 0.27, 0.33 (2) and 0.40 mg/kg.

In Spain, the maximum GAP is 3 × 0.025 kg ai/hL and 7 days PHI. Eight indoor trials conducted in the Netherlands, Germany and Spain according to this GAP gave residues of 0.10 (2), 0.15 (2), 0.24, 0.30, 0.35 and 0.62 mg/kg.

Based on the most critical GAP (Spain) and highest residue population, the Meeting estimated a maximum residue level of 1 mg/kg, an HR of 0.62 mg/kg and a STMR of 0.185 mg/kg for tebuconazole in sweet peppers.

The Meeting withdraws its previous recommendation of maximum residues level of 0.5 mg/kg for tebuconazole in sweet peppers.

By applying a concentration factor of 10, the Meeting also estimates a maximum residue level of 10 mg/kg, a HR of 6.2 mg/kg and a STMR of 1.85 mg/kg for tebuconazole in peppers, chili (dry).

The Meeting withdraws its previous recommendation of maximum residues level of 5 mg/kg for tebuconazole in peppers, chili (dry).

Sweet corn

Tebuconazole is registered in maize Brazil at a maximum rate of 3 × 0.20 kg ai/ha and 15 days PHI. In three trials conducted in Brazil with 4 applications, residues were: < 0.1 mg/kg.

Tebuconazole is registered in USA in sweet corn at a total maximum application rate of 0.756 kg ai/ha per season with a 7 day PHI. In twelve trials conducted in that country according to GAP, residues were: < 0.01 (2), 0.03, 0.04 (2), 0.05, 0.07, 0.08 (2), 0.10, 0.32 and 0.36 mg/kg.

Based on the highest residue population (USA), the Meeting estimated a maximum residue level of 0.6 mg/kg, an HR of 0.36 and a STMR of 0.06 mg/kg for tebuconazole in sweet corn (corn-on-the-cob).

The Meeting withdraws its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in sweet corn (corn-on-the-cob).

Tomato

Tebuconazole is registered in tomato in Brazil at 4 × 0.25 kg ai/ha with a 7 day PHI. Six trials were conducted in that country complying with this GAP, residues found were: < 0.05 (2), 0.05, 0.06, 0.10 and 0.11 mg/kg. Five trials did not match GAP.

In Spain the GAP is 3 × 0.025 kg ai/hL, 3 days PHI. Seven indoor trials conducted in Germany and Spain according to this GAP gave residues of 0.03, 0.13, 0.15, 0.19, 0.23 and 0.46 mg/kg. In two trials conducted at the same GAP in the field, residues were 0.09 and 0.15 mg/kg. Residues conducted in Europe at the Spanish GAP were: 0.03, 0.09, 0.13, 0.15 (2), 0.19, 0.23 and 0.46 mg/kg.

Based on the trials giving the highest residue levels (Europe), the Meeting estimated a maximum residue level of 0.7 mg/kg, a HR of 0.46 and a STMR of 0.15 mg/kg for tebuconazole in tomato.

The Meeting withdraws its previous maximum residue level recommendation of 0.5 mg/kg for tebuconazole in tomato.

Beans, dry

Tebuconazole is registered in Brazil in beans at up to 3 × 0.20 kg ai/ha with a 14 days PHI. In ten trials conducted in that country at this GAP, residues were: < 0.05 (5), 0.05 (2), < 0.10, 0.10 and 0.16 mg/kg. Eight trials conducted at lower or higher GAP gave residues in the same range.

In the USA, the compound can be used at a maximum of 3 × 0.189 kg ai/ha with a 14 days PHI. None of the 14 trials conducted in that country were at GAP.

Based on the Brazilian results, the Meeting estimated a maximum residue level of 0.3 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in beans, dry.

Soya bean, dry

In Brazil, tebuconazole can be applied up to 3 × 0.15 kg ai/ha with a 30 days PHI. In eight trials conducted in that country within GAP, residues were: 0.02, 0.03 (3), < 0.05 (3), < 0.10 mg/kg. Six trials were conducted at double rate.

In the USA, GAP is up to 3 × 0.126 kg ai/ha and 21 days PHI. In 20 trials conducted in that country according to GAP, residues were: < 0.01 (3), 0.01 (7), 0.02 (4), 0.03 (2), 0.04 (2) and 0.05 (2) mg/kg.

Based on the largest residue data population (USA), the Meeting estimated a maximum residue level of 0.15 mg/kg, a highest residue of 0.05mg/kg and a STMR of 0.02 mg/kg for tebuconazole in soya bean, dry.

The Meeting withdraws its previous recommendation of maximum residues level of 0.1 mg/kg for tebuconazole in soya bean, dry.

Carrot

The GAP for tebuconazole in carrots in Brazil is up to 4 × 0.20 kg ai/ha and a 14 day PHI. In five trials conducted according to GAP, residues were: < 0.1 (3), 0.17 and 0.19 mg/kg. Seven other trials conducted at higher GAP gave residues up to 0.27 mg/kg.

In the Netherlands and Germany, tebuconazole can be used up to 3 × 0.258 kg ai/ha with a PHI of 21 days. In eight trials conducted in France, Germany and the UK according to this GAP, residues were 0.09, 0.10, 0.11 (2), 0.13, 0.18, 0.19 and 0.22 mg/kg.

Based on the most critical GAP and highest residue population from Europe, the Meeting estimated a maximum residue level of 0.4 mg/kg, a HR of 0.22 mg/kg and a STMR of 0.11 mg/kg for tebuconazole in carrot. The Meeting withdraws its previous of maximum residue level recommendation of 0.5 mg/kg for tebuconazole in carrots.

Artichoke, globe

The use of tebuconazole in/on artichoke is registered in Italy, with up to 4 applications at 0.12 kg ai/ha (0.0125 kg ai/hL) and 7 days PHI. Six trials were performed in Italy and Spain according to Italian GAP, with residues of < 0.05, 0.12 (2), 0.17, 0.29 and 0.32 mg/kg.

In Peru, critical GAP is 0.10 kg ai/ha with a 3 day PHI (number of applications not specified). Two trials conducted in the country did not match GAP. One trial was conducted in Mexico, where there is no GAP.

The Meeting estimated a maximum residue level of 0.6 mg/kg, a HR of 0.32 mg/kg and a STMR of 0.145 mg/kg for tebuconazole in artichoke, globe.

The Meeting withdraws its previous recommendation of 0.5 mg/kg for tebuconazole in globe artichoke.

Barley

Tebuconazole is registered in Germany at 2 × 0.31 kg ai/ha (PHI of 35 days). In 18 trials conducted in Germany, France and the UK according to this GAP, residues were: < 0.05 (11), 0.06 (2), 0.08 (2), 0.10, 0.13 and 0.21 mg/kg.

In France, GAP is 2 × 0.25 kg ai/ha and 28 days PHI. In 14 trials conducted in France, Germany, Greece, Italy, Portugal and Spain according to this GAP, residues were: < 0.05 (5), 0.07 (2), 0.10, 0.38, 0.65, 0.85, 0.93, 0.96 and 1.1 mg/kg

Based on the trials with the most critical GAP (France) and highest residue population, the Meeting estimated a maximum residue level of 2 mg/kg and a STMR of 0.085 mg/kg for tebuconazole in barley. The Meeting agrees to expand these estimations to oats

The Meeting confirms its previous recommendation for tebuconazole in barley, and withdraw its previous recommendation of 0.05* mg/kg in oats.

Maize

Tebuconazole is registered in maize Brazil at a maximum of 3 × 0.20 kg ai/ha and a 15 day PHI. In four trials conducted in Brazil according to GAP, residues were: 0.01, 0.02 and < 0.1 (2) mg/kg. Three trials conducted at double rate gave similar results.

In USA, the rate is 0.189 kg ai/ha (maximum 0.757 kg ai/ha per season) with a 36 day PHI. In three trials conducted in USA according to GAP, residues were < 0.01 (3) mg/kg. Fourteen trials conducted at higher PHIs gave the same results.

The Meeting decided that four trials according to GAP were insufficient to estimate a maximum residue level for tebuconazole in maize and withdraw its previous recommendation of 0.1 mg/kg.

Rice

Tebuconazole is registered in rice in Brazil at a maximum of 2 × 0.15 kg ai/ha, and a 35 day PHI. Four trials were conducted in Brazil according to GAP, residues found were: 0.01(2), 0.02 and 0.03 mg/kg. Two trials conducted at double rate.

In Spain, GAP is 0.15 kg ai/ha (number of applications not specified) and a 35 day PHI. In eight trials conducted in Italy and Spain according to this GAP, residues in rice (with husk) were 0.11, 0.12, 0.24, 0.26, 0.29, 0.33, 0.53 and 0.97 mg/kg.

Based on trials with the highest residue population (Europe), the Meeting estimated a maximum residue level of 1.5 mg/kg and a STMR of 0.275 mg/kg for tebuconazole in rice.

The Meeting withdraws its previous recommendation of 2 mg/kg for tebuconazole in rice.

Wheat and Rye

The GAP rate for tebuconazole in wheat in Brazil is 0.187 kg ai/ha (number of applications not specified); PHI is 35 days. In eight trials conducted in that country according to GAP, residues were: 0.02 (4), 0.03 and < 0.05 (3) mg/kg

In Canada and the USA, the GAP rate for wheat a single application at 0.126 kg ai/ha, with a PHI of 36 and 30 days, respectively. In 21 trials conducted in Canada and four in USA according to GAP, residues were: < 0.01 (2), 0.01 (4), < 0.02 (8), 0.02 (4), 0.04, < 0.05 (4), 0.06 and 0.08 mg/kg.

In France, the GAP rate for wheat and rye is 2 × 0.25 kg ai/ha, with a PHI of 28 days. In ten trials conducted in France, Greece, Italy and Spain according to this GAP, residues were 0.02 mg/kg in triticale and < 0.01, 0.01 (2) and < 0.05 (4), 0.06 and 0.09 mg/kg in wheat.

In Ireland and the UK, the GAP rate is 2 × 0.25 kg ai/ha and the last application should be done before the watery ripe stage (up to BBCH 71). In 27 trials conducted in Germany, France and the UK according to this GAP residues in wheat were: < 0.01 (3), 0.02 (3), 0.03 (2), < 0.05 (18) and 0.06 mg/kg. Six trials conducted in Germany and Sweden in rye gave residues of < 0.01, < 0.05 (5) mg/kg.

In Portugal, GAP for wheat is 2 × 0.25 kg ai/ha, with a PHI of 35 days. One trial conducted in Italy according to this GAP gave residues of 0.02 mg/kg.

Based on the trials with the most critical GAP (France) and highest residue population, the Meeting estimated a maximum residue level of 0.15 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in wheat. The Meeting also agreed to expand these estimations to rye and triticale.

The Meeting withdraws its previous recommendation of 0.05 mg/kg for tebuconazole in wheat.

The Meeting withdraws its previous recommendation of 0.05* mg/kg for tebuconazole in rye.

Tree nuts

In Italy, tebuconazole is registered for use on walnuts and other tree nuts (not specified) at 2 × 0.226 kg ai/ha, applied until the end of flowering. Four trials were conducted in that country in walnut according to GAP, with residues of < 0.05 (4) mg/kg

In the USA, the GAP for tree nuts is up to 4 × 0.252 kg ai/ha and a 35 day PHI. In six trials conducted in almonds, according to GAP, residues were < 0.05 (6) mg/kg. In four trials conducted in pecans at the GAP rate, samples collected 12 to 25 days after the last application gave residues of < 0.05 mg/kg.

Based on the trials with the most critical GAP (USA), the Meeting estimated a maximum residue level of 0.05* mg/kg, an HR of 0 mg/kg and a STMR of 0 mg/kg for tebuconazole in tree nuts.

Cotton seed

The GAP rate for tebuconazole in cotton in Brazil is 0.15 kg ai/ha (normally, 3 applications is enough) and 21 days PHI. Seven trials were conducted in the country with 4 or 5 applications of the GAP rate, giving residues at 21 days PHI of 0.01, 0.02 (2), 0.03 and < 0.1 (3) mg/kg.

In the USA, maximum GAP rate is 0.252 kg ai/ha (maximum of 0.756 kg ai/ha/season) and a 30 day PHI. In 17 trials conducted in that country according to GAP, residues in fuzzy (undelinted) seeds were: < 0.05 (8), 0.05, 0.10 (2), 0.12, 0.22, 0.42, 0.43, 0.69 and 1.6 mg/kg.

Based on the trials with the most critical GAP (USA) and highest residue population, the Meeting estimated a maximum residue level of 2 mg/kg and a STMR of 0.05 mg/kg for tebuconazole in cotton seed.

Peanut

In Brazil, the critical GAP for tebuconazole in peanuts is 0.125 kg ai/ha (number of applications not specified) with a 30 day PHI. In seven trials conducted according to GAP, residues were 0.01, 0.02 (2), 0.03, < 0.05 (2) and < 0.1 mg/kg. Five trials conducted at a higher rate gave residues in the same range.

In the USA, the critical GAP rate is 4 × 0.23 kg ai/ha, and a PHI of 14 days. The Meeting agreed that residues from the first 3 applications are unlikely to affect the final residues at the PHI. In 12 trials conducted with 7 applications, residues at 14 days PHI were: < 0.01 (3), 0.01, < 0.02, 0.03, 0.04, < 0.05 (4) and 0.08 mg/kg

Based on the data from the most critical GAP (USA) with the highest detected residue, the Meeting estimated a maximum residue level of 0.15 mg/kg and a STMR of 0.035 mg/kg for tebuconazole in peanut kernels.

The Meeting withdraws its previous recommendation of 0.1 mg/kg for tebuconazole in peanuts.

Rape seed

In Germany, tebuconazole is registered to be applied up to 2 × 0.375 kg ai/ha with a PHI of 56 days. In twelve trials conducted in Belgium, France, Germany, the Netherlands and the UK matching this GAP, residues were: < 0.05 (2), 0.03, 0.04, 0.06, 0.09, 0.11, 0.12 (2), 0.13, 0.17, 0.19 mg/kg.

Nineteen trials conducted in Europe did not match any GAP in the region.

The Meeting estimated a maximum residue level of 0.3 mg/kg and a STMR of 0.10 mg/kg for tebuconazole in rape seed.

The Meeting withdraws its previous recommendation of 0.5 mg/kg for tebuconazole in rape seed.

Coffee beans

The critical GAP for tebuconazole in coffee in Brazil is for 3 × 0.25 kg ai/ha, with a 30 days PHI. The Meeting agreed that residues from the first two applications are unlike to affect the final residues at the GAP PHI, as the second application was done more than 100 days before harvest. In nine trials conducted in the country in which 3 or 5 applications were made at the GAP rate, residues were: < 0.01 (2), 0.02 (2), 0.06 and < 0.10 (4) mg/kg. Six trials conducted at double GAP rate gave residues in a same range.

Four trials were conducted in Guatemala (no GAP).

The Meeting estimated a maximum residue level of 0.1 mg/kg and a STMR of 0.04 mg/kg for tebuconazole in coffee beans.

The Meeting confirms its previous recommendation of 0.1 mg/kg for tebuconazole in coffee beans.

Hops, dry

In the Czech Republic, tebuconazole can be applied to hops at up to 2 × 0.56 kg ai/ha with a 21 day PHI. In eight trials conducted in Germany within this GAP, residues in cones, kiln dried were: 5.8, 6.0, 6.3, 8.3, 11, 12, 18 and 21 mg/kg.

In the USA, the GAP rate is 0.252 kg ai/ha (maximum of 1 kg ai/ha/season) and a 14 day PHI. In three trials conducted in the country according to GAP, residues were: 0.73, 1.1 and 3.2 mg/kg.

Based on the trials with the most critical GAP (the Czech Republic) and highest residue population, the Meeting estimated a maximum residue level of 40 mg/kg and a STMR of 9.65 mg/kg for tebuconazole in hops, dry

The Meeting withdraw its previous recommendation of 30 mg/kg for tebuconazole in hops.

Animal feed commodities

Feed commodities were analysed in the studies described previously for the edible commodities. Only the trials conducted according to GAP as described before were discussed here. Maximum residue levels were not estimated for forage. Highest and/or medium residues were estimated for commodities listed in the OECD feeding table for dietary burden calculation purposes.

Barley, wheat, rye and triticale straw and/or fodder

In 16 trials conducted in barley in Germany and the UK according to German GAP (2 × 0.31 kg ai/ha 35 days PHI), residues in barley straw were: 0.14, 0.45 0.50, 0.72, 0.77, 0.86, 0.88, 1.3, 1.7 (2), 2.2, 2.5, 2.8, 3.1, 3.9 and 4.3 mg/kg.

In ten trials conducted in France, Germany, Greece, Italy, Portugal and Spain according to French GAP (2 × 0.25 kg ai/ha, 42 days PHI), residues in barley straw were: 0.29, 0.80, 1.4, 3.3, 3.8, 4.9, 5.8, 7.9, 13 and 17 mg/kg

Residues of tebuconazole in wheat straw from 25 trials conducted in Canada and USA according to GAP were: < 0.10 (3), 0.11, 0.12, 0.13, 0.14, 0.20, 0.26, 0.30, 0.34, 0.35, 0.36, 0.50, 0.52, 0.58, 0.64, 0.68, 0.87, 0.94, 1.0, 1.1, 1.4 (2) and 2.1 mg/kg.

Residues of tebuconazole in wheat and rye straw from 27 trials conducted in France, Germany, Sweden and the UK according to the GAP of the UK (2 × 0.25 kg ai/ha and the last application up to BBCH 71) were: 0.29, 0.47, 0.68, 0.86, 0.92, 0.98, 1.1, 1.3 (3), 1.4, 1.5, 1.6, 1.8, 1.9, 2.7, 3.0, 3.3, 3.6 (2), 3.9, 4.8, 5.2, 6.0, 7.1 (2), and 7.8 mg/kg.

In 12 trials conducted in Spain, Italy and France according to French GAP (2 × 0.25 kg ai/ha, 28 day PHI) residues in wheat and rye straw were: 1.1, 1.8, 2.2, 2.3 (2), 3.2, 3.4, 3.5 (2), 4.2, 5.6 and 12 mg/kg.

Residues in 25 trials conducted in Canada and the U.S. according to GAP gave residues in wheat hay of: 0.49, 0.67, 0.71, 0.78, 0.93, 0.99, 1.0 (2), 1.1 (3), 1.4, 1.6 (3), 1.8, 2.1, 2.2 (3), 2.5 (2), 2.6, 3.5 and 4.4 mg/kg.

Based on the trials with the highest residue population (barley according to French GAP), the Meeting estimated a maximum residue level of 40 mg/kg for barley straw and fodder, dry; rye straw and fodder, dry; and wheat straw and fodder, dry (residues corrected for 88% dry matter).

The Meeting estimated a median and a highest residue of 4.35 and 17 mg/kg, respectively, for tebuconazole in barley straw and fodder.

The Meeting estimated a median and highest residues, of 3.3 and 12 mg/kg, respectively for tebuconazole in wheat and rye straw and fodder.

The Meeting estimated a median and a highest residue of 1.6 and 4.4 mg/kg, respectively, for tebuconazole in wheat hay.

The Meeting withdraws its previous recommendation of 30 mg/kg for barley straw and fodder, of 10 mg/kg for wheat straw and fodder, dry and of 5 mg/kg for rye straw and fodder, dry.

Maize fodder

The residues in maize fodder from five trials conducted in USA according to GAP were: 0.20, 0.28, 0.61, 0.83, and 2.4 mg/kg.

The Meeting estimated a median and a highest residue of 0.61 and 2.4 mg/kg, respectively, for tebuconazole in maize fodder.

The Meeting also estimated a maximum residue level of 6 mg/kg for tebuconazole in maize fodder, dry (residues corrected for 83% dry matter).

Rice straw

Four rice trials conducted in Spain and Italy according to Spanish GAP, residues found in straw 33 or 35 days after the last application (grain PHI) were: 1.1 (2), 1.6, and 1.7 mg/kg.

The Meeting agreed that there were insufficient trials according to GAP to estimate a maximum residue level for tebuconazole in rice straw.

Peanut fodder/hay/vine

In 16 trials conducted in USA considered to be at GAP, residues in hay/vine were: 1.8, 3.7, 5.0, 5.1, 5.6, 6.8, 8.6, 9.1, 9.4, 11, 13, 15, 17, 18, 20 and 23 mg/kg.

The Meeting estimated a maximum residue level of 40 mg/kg, a median residue of 9.25 mg/kg and a highest residue of 23 mg/kg for tebuconazole in peanut fodder. The Meeting withdraws its previous recommendation of 30 mg/kg.

Forage

In the trials, the forage samples (described as forage, green material or rest of the plant) were harvested at different PHIs. Whenever data was available, the 7 days PHI residue (or any day later that gave a higher residue) was chosen to represent the level of residues to which animals would be exposed. In cases where this data point was not available, the highest value from any PHI available (up to the grain PHI) would be taken, including from 0 day PHI.

Barley forage

The residues in barley forage from 37 trials conducted according to GAP rate in Europe were: 0.29, 0.35, 0.37, 0.78, 1.0, 1.2 (2), 1.4 (2), 2.0, 3.4, 3.8, 4.3 (2), 4.7, 5.2, 5.6, 5.7, 5.8, 6.0, 6.1, 6.2, 6.5, 7.2, 7.4, 8.9, 9.0, 9.2 (2), 9.6, 10 (2), 12, 14 (2) and 18 mg/kg.

The Meeting estimates a median and highest residue of 5.8 and 18 mg/kg, respectively, for tebuconazole in barley forage.

Maize forage

The residues in maize forage from 20 trials conducted according to GAP rate in USA were: 0.09, 0.10, 0.12, 0.13, 0.19, 0.22, 0.25, 0.28, 0.30, 0.37, 0.44, 0.47 (2), 0.49 (2), 0.75 (2), 0.98 and 2.9 (2) mg/kg

The Meeting estimated a median and highest residue of 0.405 and 2.9 mg/kg, respectively, for tebuconazole in maize forage.

Wheat, rye and triticale forage

Residues of tebuconazole in wheat, rye and triticale forage from 43 trials conducted in Europe according to GAP were: 0.40, 0.49, 0.92, 1.3, 1.5, 2.2 (2), 2.3, 2.4, 2.6 (3), 2.7, 2.9, 3.3, 3.4, 3.5, 3.7

(2), 3.9, 4.1, 4.3, 4.6, 4.7, 4.8, 5.1, 5.2, 5.7 (2), 5.8 (2), 5.9, 6.1, 6.2, 6.4, 6.6 (3), 6.7, 6.8, 7.8, 8.7, 9.4, 9.5 and 12 mg/kg.

Residues in 25 trials conducted in Canada and USA according to GAP in wheat forage were: 0.01, 0.02 (3), 0.07 (2), 0.10, 0.11, 0.18 (2), 0.19, 0.20 (2), 0.22, 0.28, 0.32, 0.34, 0.47, 0.53 (2), 0.61, 0.62, 0.65, 1.0 and 1.8 mg/kg

Based on the highest residue population (Europe), the Meeting estimated a median and a highest residue of 4.6 and 12 mg/kg, respectively, for tebuconazole in wheat, rye and triticale forage.

Rape forage

From 25 trials conducted in rape in Europe according to GAP residues in forage were: 2.5 (2), 2.6, 2.7, 3.1, 3.4, 3.6, 3.7, 3.8, 3.9, 4.0, 4.2 (2), 4.3, 4.6, 4.8, 4.9, 5.1, 5.2, 5.6, 5.7, 6.3, 7.3, 7.5 and 11 mg/kg.

The Meeting estimated a median and a highest residue of 4.2 and 11 mg/kg, respectively for tebuconazole in rape forage

Almond hulls

Six trials conducted in USA according to GAP gave residues in almond hulls of 1.1, 1.2, 1.4, 2.0, 3.0 and 4.1 mg/kg. The Meeting estimated a median residue of 1.7 mg/kg for tebuconazole in almond hulls.

Cotton gin trash

Six trials conducted in USA according to GAP gave residues in cotton gin trash of 0.10, 1.5, 4.1, 7.1, 12 and 13 mg/kg. The Meeting estimated a median and a highest residue of 5.6 and 13 mg/kg, respectively, for tebuconazole in cotton gin trash.

Fate of residues during processing

A hydrolysis study conducted in buffered water (pH 4 to 6, 90 to 120 ^{o}C) simulating processing did not show degradation of tebuconazole.

A variety of processing studies were conducted with crops treated with tebuconazole. Processing factors (PF) in commodities with relevance for dietary exposure assessment and for animal dietary burden calculation are shown in the table below. The estimated PFs were multiplied by the estimated STMR of the raw commodity to estimate the STMR-P for the processed commodity.

Processing factor (PF) and estimations for processed commodities

Commodity	Mean PF (n)*	STMR-P, mg/kg	HR-P, mg/kg	Maximum residue level, mg/kg
Apple, STMR= 0.275 mg/kg, HR=0.5 mg/kg				
Apple juice	0.23 (4)	0.063		
Apple juice, concentrated	0.33 (2)	0.091		
Apple sauce	0.34 (3)	0.094		
Apple, dried	0.61 (3)	0.168	0.305	
Apple wet pomace	2.6 (2)	0.715		
Apple dried pomace	12.7 (2)	3.5		
Plum, STMR=0.08 mg/kg, HR= 0.47 mg/kg				
Prune	2.9 (2)	0.232	1.36	3
Plum sauce	1 (1)	0.08		
Plum preserve	0.67 (1)	0.054		
Peach, STMR=0.46 mg/kg				
Peach juice	0.2 (1)	0.092		

Commodity	Mean PF (n)*	STMR-P, mg/kg	HR-P, mg/kg	Maximum residue level, mg/kg
Peach jam	0.013 (1)	0.006		
Peach preserve	0.013 (1)	0.006		
Grape, STMR=0.72mg/kg; HR= 4.6 mg/kg				
Wine	0.28 (22)	0.20		
Dried grapes	1.2 (4)	0.86	5.5	7
Cabbage, head STMR=0.05 mg/kg, HR=0.56 mg/kg				
Cabbage, cooked	0.38 (4)	0.019	0.23	
Tomato, STMR=0.15 mg/kg				
Tomato juice	0.55 (3)	0.033		
Tomato preserve	0.3 (3)	0.018		
Tomato puree	0.33 (6)	0.02		
Tomato paste	3.2 (6)	0.19		
Soya beans, STMR=0.02 mg/kg				
Soya bean oil, refined	0.07 (1)	0.001		
Soya bean aspired grain fractions	276 (1)	5.52		
Soya bean, hulls	1.1 (1)	0.022		
Soya bean meal	0.2 (1)	0.004		
Barley, STMR=0.085 mg/kg				
Barley beer	0.025 (4)	0.013		
Cotton, STMR=0.05 mg/kg				
Cotton oil, refined	0.01 (1)	0.000		
Cotton meal	0.01 (1)	0.000		
Cotton hulls	0.01 (1)	0.000		
Peanut, STMR=0.035 mg/kg				
Peanut oil, refined	0.01 (1)	0.000		
Peanut meal	0.86 (1)	0.026		
Rape seed, STMR=0.10 mg/kg				
Rape seed oil, refined	1.1 (6)	0.11		
Rape seed meal	0.83 (6)	0.08		
Coffee, STMR= 0.04 mg/kg				
Coffee, roasted	2 (1)	0.08		
Coffee, instant	0.8 (1)	0.032		
Hops, STMR=9.65 mg/kg				
Hops, beer	< 0.01 (1)	0.0965		

*n is the number of processing studies

The Meeting agreed that one processing study is not sufficient to make a recommendation for coffee, roasted and withdraws its previous recommendation of 0.5 mg/kg for coffee, roasted

Residues in animal commodities

Farm animal dietary burden

The Meeting estimated the dietary burden of tebuconazole in farm animals on the basis of the diets listed in Annex 6 of the 2009 JMPR Report (OECD Feedstuffs Derived from Field Crops), the STMR, STMR-Ps, median or highest residue levels estimated at the present Meeting. Dietary burden calculations are provided in Annex 6.

		Animal dietary burden, tebuconazole, ppm of dry matter diet			
		US-Canada	EU	Australia	Japan
Beef cattle	max	2.9	26	54[a]	0.1

	mean	1.0	8.3	18.9[c]	0.1
Dairy cattle	max	19.6	24.2	54[b]	4.0
	mean	7.4	8.1	18.9[d]	0.69
Poultry - broiler	max	0.14	0.1	0.19	0.01
	mean	0.14	0.1	0.19	0.01
Poultry - layer	max	0.14	8.5[e]	0.19	0.00
	mean	0.14	3.3[f]	0.19	0.00

[a] Highest maximum beef or dairy cattle dietary burden suitable for maximum residue level estimates for mammalian tissues

[b] Highest maximum dairy cattle dietary burden suitable for maximum residue level estimates for mammalian milk

[c] Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian tissues.

[d] Highest mean dairy cattle dietary burden suitable for STMR estimates for milk.

[e] Highest maximum poultry dietary burden suitable for maximum residue level estimates for poultry tissues and eggs.

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry tissues and eggs.

The tebuconazole dietary burdens for animal commodity maximum residue level and STMR estimation (residue levels in animal feeds expressed on dry weight) reached a maximum of 54 ppm for cattle and of 8.5 ppm for poultry.

Animal feeding studies

Two dairy cattle feeding studies were submitted. The animals were fed for 28 days at 25/75/250 ppm (study 1) or 30/90/300 ppm (study 2), with 3 cows per group in each dose level. In both studies, meat and fat samples were only analysed for tebuconazole at the higher dose group (250 or 300 ppm feed), but no residues were detected (< 0.05 or < 0.1 mg/kg). Mean residues of tebuconazole at 25 and 30 ppm were 0.15 and < 0.1 mg/kg, respectively, in kidney (maximum of 0.25 and < 0.1 mg/kg) and 0.06 and < 0.1mg/kg, respectively, in liver (maximum of 0.07 and < 0.1 mg/kg). Mean residues at 75 and 90 ppm were 0.05 and < 0.1 mg/kg, respectively, in kidney (maximum of 0.05 and < 0.1 mg/kg) and 0.08 and 0.17 mg/kg, respectively, in liver (maximum of 0.12 and 0.2 mg/kg). Two poultry studies were submitted, with laying hens fed at 2, 6 and 20 ppm tebuconazole for 28 days. Residues of tebuconazole were only found in liver and eggs at the highest dose in both studies (at 0.05 mg/kg).

Animal commodity maximum residue levels

The cattle feeding studies have shown that no residues of tebuconazole are expected in muscle and milk at the maximum estimated animal dietary burden (54 ppm). At 250/300 ppm, residues were < LOQ in muscle and milk.

The Meeting estimated a maximum residue level of 0.05* mg/kg, a STMR of 0 mg/kg and a HR of 0 mg/kg for tebuconazole in meat (from mammalian other than marine mammals).

The Meeting estimated a maximum residue level of 0.01* mg/kg and a STMR of 0 mg/kg for tebuconazole in milks.

The Meeting confirms its previous recommendation of 0.05* and 0.01* for tebuconazole in meat (from mammalian other than marine mammals) and milks, respectively.

Residues in kidney and liver at the expected dietary burden are shown in the Table below. Based on the highest estimated residue in cattle liver (0.15 mg/kg), the Meeting estimates a maximum residue level of 0.2 mg/kg, a HR of 0.15 mg/kg and a STMR of 0.06 mg/kg for tebuconazole in edible offal (mammalian).

The Meeting withdraw its previous recommendation of maximum residues level of 0.5 mg/kg for tebuconazole in edible offal (mammalian).

	Feeding level (ppm) for tissue residue	Residues (mg/kg)			Feeding level (ppm) for tissue residue	Residues (mg/kg)	
		Liver	Kidney			Liver	Kidney

Maximum residue level beef or dairy cattle							
Feeding study [a]	25/75	0.10/0.12	0.25*/0.05	Feeding study [a]	30/90	< 0.1/0.2	< 0.1/< 0.1
Dietary burden and residue estimate	54	0.11	-/0.036	Dietary burden and residue estimate	54	0.15	0.05
STMR beef and dairy cattle							
Feeding study [b]	25	0.06	0.15	Feeding study [b]	30	< 0.1	< 0.1
Dietary burden and residue estimate	18.9	0.04	0.11	Dietary burden and residue estimate	18.9	0.06	

[a] highest residues for tissues;

[b] mean residues for tissue; * this value was not considered as the other 2 animals had residues < 0.05 mg/kg and the levels at 75ppm were at or <LOQ.

Poultry feeding studies have shown that no residues are expected at the dietary burden of 8.5 ppm. With exception of liver, no residues were also found at 20 ppm level.

The Meeting estimated a maximum residue level of 0.05* mg/kg, a STMR of 0 mg/kg and a HR of 0 mg/kg for tebuconazole in poultry meat

The Meeting estimated a maximum residue level of 0.05* mg/kg, a STMR of 0.05 mg/kg and a HR of 0.05 mg/kg for tebuconazole in poultry edible offal.

The Meeting estimated a maximum residue level of 0.05* mg/kg and a STMR of 0 mg/kg for tebuconazole in eggs.

The Meeting confirms its previous recommendations of 0.05* mg/kg for tebuconazole in eggs, poultry edible offal and poultry meat.

RECOMMENDATIONS

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

For compliance with maximum residue levels and estimation of dietary intake in plants: *tebuconazole*

For compliance with maximum residue levels and estimation of dietary intake in animal commodities: *tebuconazole*

CCN	Commodity name	Recommended maximum residue level (mg/kg)		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
FP 0226	Apple	1		0.275	0.5
JF 0226	Apple juice			0.063	
	Apple sauce			0.094	
FS 0240	Apricot	2		0.46	1
VS 0620	Artichoke, globe	0.6	0.5	0.145	0.32
FI 0327	Banana	0.05	0.05	0.01	0.03
GC 0640	Barley	2	2	0.085	
	Barley beer			0.002	
AS 0640	Barley straw and fodder, dry	30	30		
VD 0071	Beans, dry	0.3		0.05	
	Beans, cooked			0.01	
VB 0400	Broccoli	0.2		0.015	0.11
VB 0402	Brussels sprout	0.3		0.095	0.19
VB 0040	Cabbages, head	1		0.05	0.56
	Cabbage, cooked			0.019	0.23

CCN	Commodity name	Recommended maximum residue level (mg/kg)		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
VR 0577	Carrot	0.4	0.5	0.11	0.22
VB 0404	Cauliflower	0.05*		0.05	0.05
MO 0812	Cattle, edible offal of	W	0.05		
FS 0013	Cherries	4	5	0.86	3.1
SB 0716	Coffee beans	0.1	0.1	0.04	
SM 0716	Coffee, roasted	W	0.5	0.08	
	Coffee, instant				
SO 0691	Cotton seed	2		0.05	
VC 0424	Cucumber	0.15	0.2	0.05	0.09
DF 0269	Dried grapes (=currants, Raisins and Sultanas)	7	3	0.86	5.5
MO 0105	Edible offal (Mammalian)	0.2	0.05	0.06	0.15
VO 0440	Eggplant	0.1		0.04	0.10
PE 0112	Eggs	0.05*	0.05*	0	0
FB 0267	Elderberries	1.5	2	0.345	0.70
VA 0381	Garlic	0.1	0.1	0.02	0.06
FB 0269	Grapes	6	2	0.72	4.6
	Wine			0.20	
DH 1100	Hops, dry	40	30	9.65	
VA 0384	Leek	0.7	1	0.195	0.44
GC 0645	Maize	w	0.1		
AS 0645	Maize fodder	6			
FI 0345	Mango	0.05	0.1	0.05	0.05
MM 0095	Meat (from mammals other than marine mammals)	0.05*	0.05*	0	0
VC 0046	Melons, except Watermelon	0.2	0.2	0.02	0.02
ML 0106	Milks	0.01*	0.01*	0	
FS 0245	Nectarine	2		0.46	1
GC 0647	Oats	2	0.05*	0.085	
FT 0305	Olives	0.05*		0	
VA 0385	Onion, bulb	0.1	0.1	0.02	0.06
FI 0350	Papaya	2	2	0.18	1.2
FI 0351	Passion fruit	0.1		0.1	0.1
FS 0247	Peach	2	1	0.46	1
	Peach juice			0.092	
	Peach jam			0.006	
	Peach preserve			0.006	
SO 0697	Peanut	0.15	0.1	0.035	
AL 0697	Peanut fodder	40	30		
FP 0230	Pear	1	0.5	0.275	0.50
HS 0444	Peppers Chili, dried	10	5	1.85	6.2
VO 0445	Peppers, Sweet (including pimento or pimiento	1	0.5	0.185	0.62
FS 0014	Plums (including prunes)	1	0.2	0.08	0.47
	Plum preserve			0.054	
FP 0009	Pome fruit	W	0.5		
DF 0014	Prunes	3	0.5	0.232	1.36
PM 0110	Poultry meat	0.05*	0.05*	0	0
PO 0111	Poultry Edible offal	0.05*	0.05*	0.05	0.05
SO 0495	Rape seed	0.3	0.5	0.10	
GC 0649	Rice	1.5	2	0.275	
GC 0650	Rye	0.15	0.05*	0.05	
AS 0650	Rye straw and fodder, Dry	40	5		
VD 0541	Soya bean (dry)	0.15	0.1	0.02	
OR 0541	Soya bean oil, refined			0.001	
VC 0431	Squash, Summer	0.2	0.02	0.05	0.10
VO 0447	Sweet corn (corn-on-the-cob)	0.6	0.1	0.06	0.36
VO 0448	Tomato	0.7	0.5	0.15	0.46
JF 0048	Tomato juice			0.082	
	Tomato preserve			0.045	
	Tomato puree			0.049	
VW 0448	Tomato paste			0.48	
GC 0653	Triticale	0.15		0.05	

CCN	Commodity name	Recommended maximum residue level (mg/kg)		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
TN 0085	Tree nuts	0.05*		0	0
VC 0432	Watermelon	W	0.1		
GC 0654	Wheat	0.15	0.05	0.05	
AS 0654	Wheat straw and fodder, dry	40	10		

DIETARY RISK ASSESSMENT

Long-term intake

The ADI for tebuconazole is 0–0.03 mg/kg bw. The International Estimated Daily Intakes (IEDI) for tebuconazole was estimated for the 13 GEMS/Food cluster diets using the STMR or STMR-P values estimated by the current Meeting. The results are shown in Annex 3 of the 2011 JMPR Report. The IEDI ranged from 3 to 10% of the maximum ADI. The Meeting concluded that the long-term intake of residues of tebuconazole from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The ARfD for tebuconazole is 0.3 mg/kg bw. The International Estimated Short Term Intake (IESTI) for tebuconazole was calculated for the plant commodities for which STMRs/STMR-P and HRs/HR-P were estimated by the current Meeting and for which consumption data were available. The results are shown in Annex 4 of the 2011 JMPR Report. The maximum% ARfD was 70%, from the consumption of grapes by children 0–6 years old. The Meeting concluded that the short-term intake of residues of tebuconazole, when used in ways that have been considered by the JMPR, is unlikely to present a public health concern.

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