ANNEX B

Metconazole

B.8 Environmental fate and behaviour

B.8.1 Route and rate of degradation in soil (Annex IIA 7.1.1; Annex IIIA 9.1.1)

B.8.1.1 Route of degradation (Annex IIA 7.1.1.1)

B.8.1.1.1 Aerobic degradation in soil (Annex IIA 7.1.1.1.1)

Metconazole (BAS 555 F): degradation in soil under aerobic Conditions (Gedik L. and Fullard D.C. 2002)
Guidelines :
SETAC Europe, OECD Draft Guideline No. 307
GLP :
Yes
Material and Methods :
Test substance : [^{14}C-3, 5-triazole]-metconazole, 82.7/15.4 cis/ trans ratio, 30.86 pCi/mg with a radiochemical purity of 99.8%.

Soil :
Table B.8.1.1.1-1: Characteristics of the soil

Soil designation	Levington Soil Code PT 190	
Textural class (UK and USDA)	sandy loam	
Origin	Ipswich, UK	
Particle size distribution [%]:	UK	USDA
Sand	65.1	66.5
Silt	26.1	26.0
Clay	8.7	7.5
Organic Matter [%]	2.2	
Organic C [%]	1.3	
Microbial biomass [mg C/100g dry soil]	49.9 (initial) 62.6 (final)	
Cation Exchange Capacity [meq/100g]	11.4	
pH[100 mM KCI]	6.8	
Maximum Water Holding Capacity [g H_2O/100g dry soil]	46.34	
Supplied Moisture Content [g H_2O /100g dry soil]	9.8	
Field Capacity [g H_2O /100g dry soil], 0 bar	46.1	
Field Capacity [g H_2O /100g dry soil], 0.33 bar	12.6	

Experimental design :
Soil samples were treated with [^{14}C]-metconazole at a concentration of 0.230 mg/kg dry soil. The samples were incubated under aerobic conditions in the dark at 20 ± 2°C, 50% MWHC.
The test system had continuous aeration (CO_2-free air) and contained 1,2-ethanediol and 0.5M sodium hydroxide traps for capturing organic volatiles and CO_2.

Analytical methods :
At various time intervals, duplicate samples were removed from the test system and the soils were extracted three times with acetonitrile:water (7:3, v/v). Soil extracts were analyzed for metconazole and soil metabolites by HPLC and/or TLC. Extracted soil samples were combusted to determine the quantity of bound residues. Approximately 10 g of the 120-day soil sample were extracted with 0.5M sodium hydroxide to further characterize the bound residues.

Findings :

Table B.8.1.1.1-2: Recovery of radioactivity in % AR and distribution of metabolites after application of [^{14}C]-metconazole to a sandy loam soil and incubation under aerobic conditions at 20°C

Days	Extractable residue				Volatile traps		Bound residues	Total balance
	a.s.	CL 382389	Unidentified components	Polar (multiple components)	CO_2	Other volatiles		
0	96.34	Nd	Nd	Nd	ns	Nd	1.89	98.23
3	91.53	Nd	Nd	Nd	0.14	0.01	3.62	95.30
7	90.87	Nd	Nd	Nd	0.21	0.03	5.18	96.29
14	85.83	2.38	Nd	Nd	0.34	0.06	7.89	96.50
28	74.36	3.16	Nd	3.26	0.77	0.03	14.49	96.07
56	61.46	4.02	2.96	6.31	2.10	0.06	20.77	97.68
91	54.86	4.56	2.50	6.51	4.85	0.09	27.50	100.87
120	30.68	3.39	2.50	10.54	10.30	0.08	39.24	96.73

Ns : no sample; nd : not detected

Conclusions :

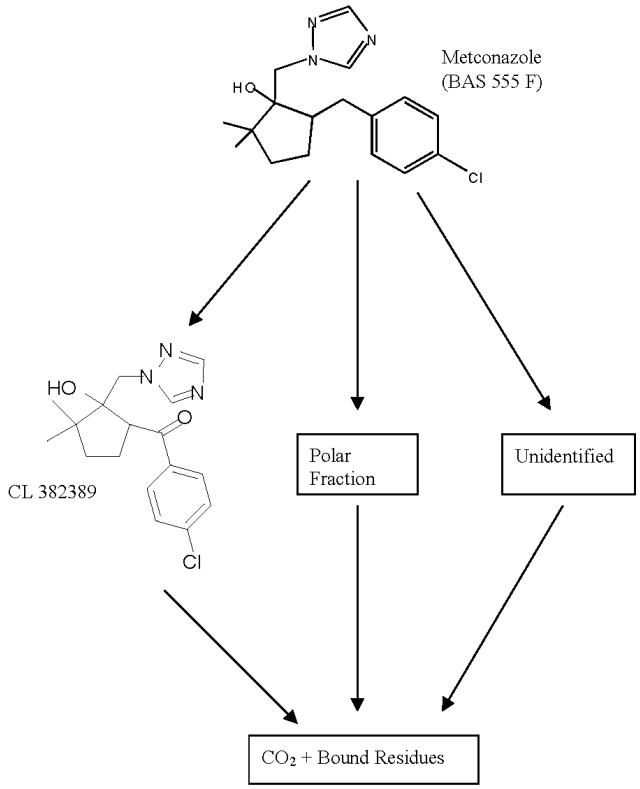
The rate of degradation of the a.s. was calculated using linear regression assuming first order kinetics. The DT_{50} (20°C) = 84 days; DT_{90} (20°C) = 277 days. DT_{50} (20°C) corrected to pF2 = 67 days

Besides the active substance, benzyl-ketone metabolite (CL 382389) unidentified components and several polar components were recovered at day 120 at level of 3.39% AR, 2.50% and 10.54% AR, respectively. Mineralization accounts for 10.3% AR at day 120.

The amount of bound residues increased steadily from 2% AR at day 0 to approximately 40% AR at day 120. Further analysis of the bound residues at 120 days showed 26, 10, and 1% of the applied radioactivity was associated with the humin (irreversibly bound), fulvic acid and humic acid fractions, respectively.

The HPLC chromatogram of the 120-day sample indicates multiple components in the polar fractions. These fractions were more polar than the benzyl-ketone metabolite or M-13.

Only one label position has been investigated in the metabolism study. However, the identification of polar fractions and bound residues give sufficient information on the fate of the active substance.



Metconazole (BAS 555 F): Rate of Degradation in Soil Under Aerobic Conditions at 10°C. (Hall B. E. and Lowrie C. 2002)

Guidelines :

SETAC Europe, OECD Draft Guideline No. 307

GLP :

Yes

Material and Methods :

Test substance : [^{14}C-3, 5-triazole]-metconazole, 81.5/18.5 cis/ trans ratio, 30.86 pCi/mg with a radiochemical purity of 99.8%.

Soil :

Table B.8.1.1.1-3: Characteristics of the soil

Soil designation	Levington Soil Code PT 190	
Textural class (UK and USDA)	sandy loam	
Origin	Ipswich, UK	
Particle size distribution [%]:	UK	USDA
Sand	65.0	66.7
Silt	28.4	27.7
Clay	6.6	5.6
Organic Matter [%]	2.2	
Organic C [%]	1.3	
Microbial biomass [mg C/100g dry soil]	17.7 (initial) 12.5 (final)	

Cation Exchange Capacity [meq/100g]	8.6
pH[100 mM KCI]	5.7
Maximum Water Holding Capacity [g H_2O /100g dry soil]	44.1
Maximum Water Holding Capacity [g H_2O /100g dry soil] at applied pressure (0.33 bar)	15.0
Supplied Moisture Content [g H_2O /100g dry soil]	18.9

Experimental design :
Soil samples were treated with [^{14}C]-metconazole at a concentration of 0.230 mg/kg dry soil. The samples were incubated under aerobic conditions in the dark at 10 ± 2°C, 50% MWHC.
The test system had continuous aeration (CO_2-free air) and contained 1,2-ethanediol and 0.5M sodium hydroxide traps for capturing organic volatiles and CO_2.

Analytical methods :
At various time intervals, duplicate samples were removed from the test system and the soils were extracted three times with acetonitrile:water (7:3, v/v). Soil extracts were analyzed for metconazole and soil metabolites by HPLC and/or TLC. Extracted soil samples were combusted to determine the quantity of bound residues. Approximately 10g of the 120-day soil sample were extracted with 0.5M sodium hydroxide to further characterize the bound residues.

Findings :
Table B.8.1.1.1-4: Recovery of radioactivity in % AR and distribution of metabolites after application of [^{14}C]-metconazole to a sandy loam soil and incubation under aerobic conditions at 10°C

Days	Extractable residue						Bound residues	Total balance
	a.s.	CL 382389	Unknown metabolites (A and B)	Polar unknowns	CO_2	Other volatiles		
0	99.98	Nd	Nd	Nd	Nd	Nd	2.75	102.73
15	94.75	0.36	Nd	0.55	0.06	0.03	6.26	101.99
30	88.45	2.32	Nd	1.97	0.26	0.02	7.20	100.21
45	90.82	2.55	0.43	2.59	0.31	0.03	9.20	105.91
60	86.22	3.39	0.63	1.52	0.37	0.04	9.41	101.46
90	85.83	3.65	Nd	1.54	0.56	0.09	11.56	103.23
120	84.79	3.98	Nd	1.55	0.81	0.11	14.27	105.49

Nd : not detected

Conclusions :
The rate of degradation of the a.s. was calculated using linear regression assuming first order kinetics. The DT_{50} (10°C) = 564 days.
Several minor metabolites were detected (CL382389, unknown metabolites). Mineralization accounts for 0.81% AR at day 120. The amount of bound residues increased steadily from 2.75 % AR at day 0 to 14.27 % AR at day 120. Further analysis of the bound residues at 90 days showed 5.85, 3.29 and 1.96% of the applied radioactivity was associated with the humin, fulvic acid and humic acid fractions, respectively.

B.8.1.1.2 Anaerobic degradation in soil (Annex IIA 7.1.1.1.2)

Metconazole (BAS 555 F): Degradation in soil under anaerobic conditions (Gedik L., Keirs D. C., Fang C. 2001)
Guidelines :
SETAC Europe, Procedures for Assessing the Environmental Fate and Ecotoxicity of Pesticides, Part 1, Section 1.2 (March 1995)
GLP :
Yes
Material and Methods :
Test substance : [^{14}C-3, 5-triazole]-metconazole, 81.5/18.5 cis/ trans ratio, 30.86 pCi/mg with a chemical and radiochemical purity of 99.2 and 99.8%, respectively.
Soil :

Table B.8.1.1.2-1: Characteristics of the soil

Soil designation	Levington Soil Code PT 190	
Textural class (UK and USDA)	sandy loam	
Origin	Ipswich, UK	
Particle size distribution [%]:	UK	USDA
Sand	65.8	66.6
26.7Silt	26.9	26.7
Clay6.7	7.3	6.7
Organic Matter [%]	1.6	
Organic C [%]	0.9	
Microbial biomass [mg C/100g dry soil]	25.8	
Cation Exchange Capacity [meq/100g]	9.7	
pH[100 mM KCI]	6.5	
Field Capacity [g H_2O /100g dry soil], 0 bar	43.4	
Field Capacity [g H_2O /100g dry soil], 0.33 bar	11.8	

Experimental design :
Soil (100 g dry weight) was placed into glass flasks and flooded with deionised water to create a depth of approximately 3 cm over the soil. Flooded soils were pre-incubated under an atmosphere of nitrogen for 35 days in the dark at 20±2°C in order to achieve anaerobic conditions. At the end of the pre-incubation, the number of viable bacteria and the redox potential of the system were measured to confirm that anaerobic conditions were achieved before applying the test substance.
Flooded soil samples were treated with ^{14}C- metconazole at a rate of 0.237 mg/kg soil, similar to the application rate used in the aerobic soil metabolism study at 20±2°C. The ^{14}C-metconazole-application solution was applied dropwise to the surface of the water for each sample. The test system was continually flushed with O_2-free nitrogen, and this gas mixture was passed through the 1,2-ethanediol and sodium hydroxide trapping system to collect the organic volatiles and evolved ^{14}C- CO_2. Samples were incubated up to 120 days in the dark at 20± 2°C under anaerobic conditions.

Analytical methods :
The surface water was decanted, and the soil was extracted with acetonitrile:water (7:3, v/v). The soil extracts and surface water were analyzed by HPLC to determine the quantity of metconazole and metabolites. Aliquots of the extracted soils were combusted to determine the bound radioactivity in the soil. A ten-gram aliquot of the 120-day soil sample was exhaustively extracted with sodium hydroxide to quantify the radioactivity within the humin, fulvic acid, and humic acid fractions.

Findings:
Table B.8.1.1.2-2: Recovery of radioactivity in % AR and distribution of metabolites after application of [^{14}C]-metconazole to a sandy loam soil and incubation under anaerobic conditions at 20°C

Days	Extractable residue			Volatile traps		Bound residues	Total balance
	a.s.	CL 382389	Unknown A	CO_2	Other volatiles		
0	99.59	Nd	Nd	Ns	Ns	0.01	99.60
3	97.14	Nd	Nd	0.02	Nd	1.66	98.82
7	92.70	Nd	Nd	0.04	0.01	3.42	96.17
14	91.63	Nd	Nd	0.05	0.02	4.31	96.01
28	87.71	0.59	0.38	0.05	0.04	6.76	95.53
56	81.81	Nd	1.13	0.11	0.02	10.03	93.10
91	87.71	Nd	Nd	0.24	0.27	9.98	98.20
120	89.19	Nd	Nd	0.26	0.06	8.58	98.09

Ns : no sample; nd : not detected

Conclusions :
The rate of degradation of the a.s. under anaerobic conditions could not be determined : DT_{50} and DT_{90} > 120 days.
Levels of radioactivity associated with the non-extractable residue increased over the incubation period to approximately 10% AR after Day 56 and remained at this level in the subsequent samples.
Further analysis of the bound residues in the 120-day sample showed the radioactivity associated with the humin, fulvic acid, and humic acid fractions accounted for means of approximately 6, 1, and 0.1 % AR, respectively.
Low levels of CL 382389 (benzyl ketone) and a minor unidentified component were detected between day 28 and Day 56.

B.8.1.1.3 Soil photolysis (Annex IIA 7.1.1.1.2)

Photodegradation study of ^{14}C-WL 136184 on soil. (Baranowski D., Van Dijk A., 1992)
Guidelines :
U.S. EPA, Subdivision N, Section 161-3
GLP :
Yes
Material and Methods :
Test substance [^{14}C-3-5-triazole]-metconazole, 95-cis, 39.89 µCi/mg, radiochemical purity = 99%
Soil :
B.8.1.1.3-1: Characteristics of the soil

	BBA Standard Soil Speyer 2.2
Soil type	Loamy sand
Particle size (USDA)	
% sand	84.8
% silt	8.8
% clay	6.4
PH	6.0
% organic carbon	2.6
Cation Exchange Capacity (meq/ 100 g soil)	10.0
Maximum Water Holding Capacity (%)	39.4

Experimental design :
The test substance was applied at an application rate of 6.7 mg/kg soil. Soil slurry was then applied on the glass plates. The soil plates continuously illuminated for 30 days at 22°C; the light intensity of the Hanau Suntest apparatus (Xenon lamp with UV filter 290 nm) amounts 94 kLux and was comparable to the light intensity of

natural day-light in summer. Dark samples were incubated at 22 ± 1°C. Ethylene-glycol and sodium hydroxide trapping systems were used to collect the organic volatiles and evolved ^{14}C- CO_2.

Analytical methods :
The soils samples were extracted with acetonitrile, followed by acetonitrile:water (8:2, v/v). The samples were further extracted by reflux with acetonitrile. The soil extracts were analyzed by TLC and HPLC to determine the quantity of metconazole and metabolites. The radioactivity in each extract was determined by LSC. Non-extracted radioactivity was determined by combustion.

Findings :

B.8.1.1.3-2 : Recovery of radioactivity in % AR and distribution of metabolites during soil photolysis

Days	Extractable residue					CO_2	Bound residues	Total balance
	Extract (room T°)	Extract (reflux)	a.s.	Unknown 1	Unknown 2			
Irradiated								
0	96.0	2.0	96.0	Nd	nd	Nd	0.6	98.6
2	92.5	4.5	90.9	Nd	1.6	< 0.05	1.4	98.4
4	90.3	3.5	89.0	Nd	1.3	< 0.05	3.5	97.3
8	91.7	2.7	88.6	0.5	2.6	< 0.05	6.7	101.1
16	78.4	2.8	73.9	0.9	3.6	< 0.05	9.7	90.9
30	76.1	7.6	70.3	1.5	4.3	< 0.05	7.8	91.5
Dark control								
0	96.0	2.0	96.0	Nd	nd	Nd	0.6	98.6
2	91.9	2.8	91.3	Nd	0.6	0	0.6	95.3
4	94.7	2.2	94.7	Nd	nd	0	1.4	98.3
8	101.6	2.5	100.1	Nd	1.5	0	2.0	106.1
16	88.5	3.3	87.1	Nd	1.4	0	1.6	93.4
30	89.1	4.0	88.1	Nd	1.0	< 0.05	1.1	94.2

Conclusions :
Metconazole was photolyzed on soil with an estimated half-life of approximately 63 days assuming average daylight of 12 hours (first order kinetics).
Mineralisation is negligible. Bound residues reached a maximum of 9.7% AR, under irradiation, at day 16.
Unknown metabolites were detected at low level (max 4.3% AR, under irradiation at day 30)
According to the author of the study, Unknown metabolite 2, which is found in the dark samples and in the stock and treatment solutions, represented a hydrolysis product rather than a photolysis and/or soil degradation product.

Photochemical degradation of metconazole (CL 900768) in soil (Bissinger, HJ, 1996)
Guidelines :
U.S. EPA, Subdivision N, Section 161-3
GLP :
Yes
Material and Methods :
Test substance [^{14}C-3-5-triazole]-metconazole, 82.8:17.2 cis:trans ratio , 34.17 µCi/mg, radiochemical purity = 99%
Soil :

B.8.1.1.3-3 : Characteristics of the soil

	BBA Standard Soil Speyer 2.2
Soil type	Loamy sand
Particle size (USDA)	
% sand	81.2
% silt	13.4
% clay	5.5
PH	5.6
% organic carbon	2.32
Cation Exchange Capacity (meq/ 100 g soil)	10.9
Maximum Water Holding Capacity (%)	48

Experimental design :
The test substance was applied to the soil on glass plates, at an application rate corresponding to 90 g/ha. The soil plates were continuously illuminated for 15 days at 20°C; the light intensity of the Hanau Suntes apparatus (Xenon lamp with UV filter 290nm) amounts 1000W/m^2 at 6000K. Dark samples were incubated at 20 ± 1°C. 2-methoxy-ethanol and potassium hydroxide trapping systems were used to collect the organic volatiles and evolved ^{14}C- CO_2.

Analytical methods :
The soils samples were extracted either with acetonitrile, followed by methanol, either twice with methanol followed by water. The samples were further extracted by reflux with acetonitrile. The soil extracts were analyzed by TLC and GC to determine the quantity of metconazole and metabolites. Further determination was made by LC/MS/MS. The radioactivity in each extract was determined by LSC. Non-extracted radioactivity was determined by combustion.

Findings :
B.8.1.1.3-4 : Recovery of radioactivity in % AR and distribution of metabolites during soil photolysis

Days	Extractable residue							CO_2	Bound residues	Total balance
	Extractable	a.s.	Unk 1	Unk 2	Unk 3	Unk 4	Unresolved background			
Irradiated										
0	98.4	90.9	0.0	0.0	0.0	0.0	9.1	0.0	0.8	99.1
1	93.2	77.7	0.0	0.0	0.0	0.0	22.4	<0.1	7.4	100.5
2	94.7	73.4	1.8	1.3	0.6	5.8	17.3	0.1	4.9	99.6
4	93.6	66.6	2.2	1.3	1.0	6.7	22.5	0.1	5.2	98.8
7	93.2	59.9	2.5	2.1	1.0	3.0	31.6	0.2	6.3	99.7
10	85.6	56.9	5.5	2.2	0.9	2.7	31.8	0.6	7.5	99.5
15	87.6	57.2	5.0	2.8	1.0	3.0	31.1	1.0	9.0	97.6
Dark control										
1	99.7	91.5	nd	nd	nd	nd	8.5	0.0	1.8	101.5
2	100.7	92.6	nd	nd	nd	nd	7.4	0.0	1.7	102.4
4	96.6	81.5	nd	nd	nd	nd	18.5	0.0	1.8	98.4
7	97.7	82.4	nd	nd	nd	nd	17.6	0.0	1.0	98.7
10	100.2	85.1	nd	nd	nd	nd	14.9	0.0	0.8	101.0
15	99.6	84.9	nd	nd	nd	nd	15.1	0.0	1.0	100.6

Conclusions :
Metconazole was photolyzed on soil with an estimated half-life of approximately 73 days assuming average daylight of 12 hours (first order kinetics).
Mineralisation is negligible. Bound residues reached a maximum of 9.0% AR, under irradiation, at day 15. At least 4 photoproducts were formed (max 6.7% AR, under irradiation at day 4). No structure elucidation of these photoproducts was possible.

B.8.1.2 Rate of degradation (Annex IIA 7.1.1.2.1; Annex IIIA 9.1.1.1.1)

B.8.1.2.1 Aerobic degradation

WL148271 (KNF-S-474m). Degradation rate in five soils. (Edwards V.T. 1990)
Calculation of DTSO and DT9o values of metconazole (BAS 555F) in five soils. (Rice P. 2002b)
Guidelines :
German BBA guideline Part IV, 4.1
GLP :
Yes
Material and Methods :
Test substance [^{14}C-cyclopentanol]-metconazole, 79/21 cis/ trans ratio, 31.3 µCi/mg, radiochemical purity > 98%

Soils :
Table B.8.1.2.1-1: Characteristics of the soils

Textural class (USDA)	Sandy loam	Silty clay loam	Sandy loam (II)	Clay	Sand
Origin	Bog Farm Kent	Chestnut street Kent	Elm Farm Kent	Woodstock Kent	Speyer soil 2.2
Particle size distribution [%]:					
Sand	68	15	57	22	87
Silt	16	51	29	38	11
Clay	16	34	14	40	2
Organic C [%]	1.98	2.39	1.99	1.97	2.31
Microbial biomass [mg C/100g dry soil] (day 0)	41.8	44.7	60.3	52.2	59.0
Microbial biomass [mg C/100g dry soil] (day 112)	30.2	50.0	29.6	42.0	18.9
Cation Exchange Capacity [meq/100g]	19.5	25.2	16.3	26.9	12.2
pH	7.4	8.0	6.7	6.6	5.3
Maximum Water Holding Capacity [g H_2O /100g dry soil]	66.4	70.1	56.9	63.9	63.1

Experimental design :
The test substance was applied to the soils at an application rate of 0.5 mg/kg soil. Samples were incubated at 22 ± 2°C in the dark, 40% MWHC for up to 112 days. The volatiles that formed during the study were not trapped in this test system (use of glass jars that contained lids with two small holes to allow gaseous exchange)

Analytical methods :
Soil samples were extracted (acetonitrile:water (7:3 v/v), acetonitrile, diethylether) and the concentrated soil extracts were analyzed by thin layer chromatography (TLC) and high performance liquid chromatography (HPLC). Non-extractable residues were determined by combusting the extracted soil samples.

Findings :
Table B.8.1.2.1-2: Recovery of radioactivity in % AR and distribution of metabolites after application of [^{14}C]-metconazole to 5 soils and incubation under aerobic conditions at 20°C

Days	a.s.	Metabolite I	Metabolite II	Metabolite III	Bound residue	Total balance
Sandy loam						
0	97.5	0.7	0.0	1.1	2.0	101.3
7	91.9	0.8	0.0	0.9	5.3	98.6
14	92.1	1.1	0.0	1.5	5.0	99.5
28	86.5	1.7	0.0	2.0	6.8	96.5
56	82.1	3.6	0.0	2.5	14.1	101.6
112	71.4	3.9	1.5	2.6	18.5	96.1
Silty clay loam						
0	96.6	0.0	0.0	0.7	1.3	98.6
7	88.5	1.2	0.0	1.4	7.0	97.9
14	87.1	1.1	0.0	1.6	8.3	97.9
28	81.3	1.3	0.0	2.2	10.4	94.6
56	73.3	2.6	0.0	2.6	17.9	95.3
112	62.9	3.9	0.0	3.2	22.6	90.4
Sandy loam (II)						
0	96.2	0.0	0.0	0.9	1.8	98.9
7	86.3	1.0	0.0	1.6	9.0	97.6
14	87.4	1.2	0.0	1.1	9.2	98.8
28	73.1	1.5	0.0	1.6	15.8	91.2
56	70.8	2.2	0.0	0.0	22.5	94.8
112	63.1	1.7	0.0	1.9	28.3	93.8
Clay						
0	95.5	0.9	0.0	1.1	1.3	98.6
7	90.0	1.0	0.0	1.2	6.5	98.5
14	88.6	1.0	0.0	1.2	6.6	97.1
28	84.0	0.9	0.0	1.2	9.4	95.2
56	79.3	2.1	0.0	2.0	15.6	98.3
112	69.1	4.2	1.4	2.8	17.3	92.7
Sand						
0	96.3	0.0	0.0	0.9	1.2	98.4
7	92.8	0.8	0.0	1.1	2.7	97.4
14	94.6	0.7	0.0	1.2	3.2	99.6
28	87.9	1.1	0.0	1.1	6.1	96.0
56	86.9	1.9	0.0	1.7	8.9	98.9
112	84.2	1.3	0.0	1.4	12.5	99.0

Table B.8.1.2.1-3: First-order DT_{50} and DT_{90} of metconazole

Soil	First order DT_{50} at 22°C, 40% MWHC (days)	First order at 22°C, 40% MWHC (days)	R^2	First order DT_{50} corrected to 20°C (days)	First order DT_{50} corrected to 20°C and pF2 (days)
Sandy loam	263	872	0.972	305	204
Silty clay loam	186	617	0.957	216	122
Sandy loam II	185	614	0.835	215	144
Clay	253	841	0.969	294	165
Sand	598	1987	0.797	695	598

Conclusions :
The DT_{50} which were determined in this study (185-598 days) are considerably higher than the DT_{50} determined in the metabolism study (84 days). All soils had good levels of microbial activity at study initiation (42-60 mg C/100 g soil); A drop in microbial biomass was observed in 4 of the 5 soils which was especially marked for the German Standard soil and the Elm farm soil. The average first order DT_{50} corrected to 20°C and pF2 was 247 days.

The mineralization has not been evaluated but can be considered as negligible (the total balances were close to 100% indicating that CO_2 loss was limited). Bound residue reached level of 12.5-28.3% AR at day 112. Three metabolites were recovered at 2.3-6.4% at day 112. These metabolites were not identified.

B.8.1.2.2 Anaerobic degradation

See point B.8.1.1.2

B.8.1.3 Field studies (Annex IIA 7.1.1.2.2; Annex IIIA 9.1.1.2)

B.8.1.3.1 Soil dissipation testing

The laboratory rate studies showed that the half-lives of metconazole in soil were greater than 60 days. Therefore field soil dissipation studies were conducted.

Metconazole (CL 900768) 60 G a.i./L SL (SF 09381): soil dissipation study (Germany 1995) (Bissinger H. J., Blobel R., Dombo P. 1996)
Metconazole (CL 900768) 60 g a.i./L SL (SF 09381): soil dissipation study (UK 1995) (Bissinger H. J.,Burgess J. 1996)
GLP :
Yes
Experimental design :
"Two field soil dissipation studies were performed to investigate the degradation and dissipation of metconazole in soil and to determine the DT_{50} and DT_{90} values. Four field trials were conducted in Northern Europe with two field trials in the UK and two trials located in Germany.

Trials were conducted using the soluble concentrate formulation of metconazole (SL, 60g a.i./L, formulation code SF09381, 80/20 cis/trans ratio). The test compound was applied to bare soil at a rate of 225g a.i./ha. The recommended application rate is 90g a.i./ha for each of two applications, with minimum application interval of 21 days. Thus, the chosen application rate was above the recommended total annual application rate. Applications were conducted using plot sprayers with flat fan nozzles. "

Findings :
The individual data can be found in the appendix.

B.8.1.3.1-1 : Field dissipation studies

Trial location	Soil type	Soil pH	CEC	Organic C content (%)	application rate (kg a.s./ha)	DT_{50} (days)	DT_{90} (days)	kinetics
Schwabenheim, Germany	silty loam	5.7	10	0.96	SL, 0.225 kg/ha	40	442	square root first order
Kloppenheim, Germany	silty clay loam	6.1	13	1.11	SL, 0.220 kg/ha	33	363	square root first order
Ardley / Bicester, Oxon, UK	silty loam	6.1	23	1.83	SL, 0.225 kg/ha	34	370	square root first order
Wood Enderby / Horncastle, Lincs, UK	sandy loam	7.2	18	1.78	SL, 0.225 kg/ha	138	457	First order

Conclusions :
Cis and trans isomers were determined individually in these 4 field experiments : There was no modification of the cis/trans ratio through time.
The field DT_{50} were in the range 33-138 days; The field DT_{90} were in the range 363-457 days. The average field DT_{50} and DT_{90} were 61 days and 408 days respectively.

The a.s. soil concentrations in the 10-20 and 20-30 cm layers were < 0.01 mg/kg after 520-540 days, indicating the low mobility of the a.s.

Metconazole (WL 136184, KNF-S-474c): the dissipation from soil at six field sites in the UK, France and Germany following application of 60 g/l soluble liquid and 100 g/l emulsifiable concentrate formulations, SF07455 and SF07355 –1991/1992 (Davies E.H. 1993, study summarizing the results of Bosio 1992, Wright 1992a and 1992b)
Residues of metconazole in soil from France treated with KNF-S-474, 1991 second year long term trials (Bosio P.G. 1992)
Metconazole: residues in soil following application of WL136184 (KNF-S-474c) as EC formulation SF07355 and SL formulation SF07455 – UK trials, 1991/92 (Wright D. R. 1992b)
Metconazole: residues in soil following application of WL136184 (KNF-S-474c) as EC formulation SF07355 and SL formulation SF07455 – Germany 1991/1992 (Wright D.R. 1992a)
GLP :
Yes
Experimental design :

"Six field trials were conducted in the UK, France, and Germany (two trials per country) to determine the persistence of metconazole and the quantity of residues at various soil depths. Metconazole (cis-isomer) was applied to plots of bare soil, as 60 g/l SL and 100 g/l EC formulations with a boom and nozzle sprayer. The 60 g/l SL formulation was applied to fresh plots of soil at 175 and 350 g a.s./ha. The 100 g/l EC formulation was applied at 175 and 350 g a.s./ha to fresh plots of soil at sites in Germany, and rates of 250 and 350 g a.s./ha at sites in the UK and France. Samples of soil were taken at intervals up to 52 weeks after application and analyzed for residues of metconazole. The 0-15 cm soil layer was collected at approximately 0, 2, 4, 8, 16, 32, and 52 weeks after application. Additional samples at the 15-30 cm soil depth were also collected at the last two sampling intervals.

Soil samples were analyzed according to SAMS 504-1 (France) and modified conditions and procedures based on SAMS 523-1 (UK and Germany) as detailed in the separate analytical reports. Soil samples were extracted with either acetone or acetone/hexane solvent mixture. The soil extracts were cleaned up by either solvent

partitioning and/or elution through a cartridge or HPLC column. The cleaned up extracts were concentrated and analyzed by gas chromatography (GC)

Statistical analysis of the residue data was performed by the statistic and mathematics section at Sittingbourne Research Centre. A first-order decay model was assumed for all the data, and used to calculate the DT_{50} and DT_{90} field dissipation values with 95% confidence intervals (C.I.)."

Findings :

The individual data can be found in the appendix.

B.8.1.3.1-2 : Field dissipation studies

Trial location	Soil type	Soil pH	CEC	Organic C content (%)	application rate (kg a.s./ha)	DT_{50} (days)	DT_{90} (days)	kinetics
Hoath, Kent, UK	clay loam	8	-	1.57	SL, 0.175 kg/ha	133	434	First order
					SL, 0.350 kg/ha	182	609	
					EC, 0.250 kg/ha	161	539	
					EC, 0.350 kg/ha	147	483	
Reculver, Kent, UK	sandy loam	4.1	-	0.52	SL, 0.175 kg/ha	112	371	First order
					SL, 0.350 kg/ha	203	665	
					EC, 0.250 kg/ha	231	770	
					EC, 0.350 kg/ha	259	854	
Quincieux, Genay, France	Sandy silt loam	-	-	-	SL, 0.175 kg/ha	28	98	First order
					SL, 0.350 kg/ha	28	98	
					EC, 0.250 kg/ha	7	28	
					EC, 0.350 kg/ha	14	42	
Espiet, Bordeaux, France	Silty clay loam	-	-	-	SL, 0.175 kg/ha	70	238	First order
					SL, 0.350 kg/ha	70	238	
					EC, 0.250 kg/ha	70	231	
					EC, 0.350 kg/ha	49	168	
Schwabenheim, Germany	sandy loam	7.5	-	1.04	SL, 0.175 kg/ha	77	259	First order
					SL, 0.350 kg/ha	154	504	
					EC, 0.175 kg/ha	133	441	
					EC, 0.350 kg/ha	112	371	
Schonau, Bayern, Germany	silty clay loam	7.0	-	1.33	SL, 0.175 kg/ha	70	224	First order
					SL, 0.350 kg/ha	91	287	
					EC, 0.175 kg/ha	56	189	
					EC, 0.350 kg/ha	56	189	

Conclusions :

In Quincieux and Espiet (France), the cis and trans isomers were individually determined. These experiments confirm that the cis isomer is not converted to trans isomer through time (all trans isomers determinations were below the LOD of 0.01mg/kg)

The field DT_{50} were in the range 7-259 days; The field DT_{90} were in the range 28-854 days. The average field DT_{50} and DT_{90} were 105 days and 347 days respectively. The variability of the DT_{50} within one soil cannot be attributed to the application rate or to the formulation type.

The a.s. soil concentrations in the 15-30 cm layer were < 0.01 mg/kg after 224-365 days, indicating the low mobility of the a.s.

B.8.1.3.2 Soil residue testing - soil accumulation testing

Field DT_{90} values of metconazole in soil were greater than one year, therefore one soil accumulation study was conducted in UK.

BAS 555 F (Metconazole) (BAS 555 00 F, Caramba 60 g/L SL): soil accumulation study (UK, 1995) (Smalley R. 2002)

GLP :

Yes

Experimental design :

"The potential accumulation of residues of metconazole following typical applications of BAS 555 00 F CARAMBA (metconazole 60 g a.s./L SL, SF 09381, 80/20 cis/trans ratio) to cereals was studied on a clay loam soil near Weston on the Green (Bicester, Oxfordshire/UK) during 1995 through 2000. Two applications were made to the crop (either winter wheat or winter barley) at the intended maximum use rate of 90 g as/ha with a spray interval of approximately 3-4 weeks to simulate the field application timings for metconazole on cereals (BBCH 39 and BBCH 63; flag leaf stage and flowering stage).

In view of the fact that some farmers may harvest straw and leave it in the field, the protocol was modified in 1998 to include incorporation of straw into the soil in order to assess the impact on the accumulation of metconazole residues in soil. The straw was collected at harvest and then incorporated into a sub-plot of the soil, prior to sampling and analysis of soil in the autumn. A specimen of the straw was also taken for analysis. "

Findings and conclusions :

The individual data can be found in the appendix.

Metconazole residues were detected either close to or below the LOQ of 0.01 mg a.s./kg soil. A trend was observed where residue levels increased slightly following the second application and then decreased to essentially below the LOQ in the later October and March samplings.

The soil residues increase up to 0.03 mg a.s./kg soil after the incorporation of straw containing 0.11-0.10 mg a.s./kg in 1998, 1999 and 2000. Nonetheless, the level of metconazole residues in soil with and without incorporation of straw was below the LOQ (<0.01 mg a.s./kg) 300 days after the last application.

Metconazole (KNF-S-474): Evaluation of residues, stability in soil under deep-freeze storage conditions (Clements B. 1994)

Guidelines :

No guideline is specified in the report, however, the procedure essentially follows IVA Guideline Residue Chemistry Part II Storage Stability 1992, EPA 171-4

GLP :

Yes

Material and Methods :

Test substance [^{14}C-3(5) triazole]-metconazole, 39.89 µCi/mg, radiochemical purity = 99%

Experimental design :

The storage stability of metconazole in soil was studied at three concentrations (nominally 0.1, 0.5, and 5.0 µg/g) The soil used for this stability study was from the Hoath field dissipation site. Soils were dosed with the test article and stored under deep-freeze conditions (nominally –18 ^{o}C) in the dark for periods up to 52 weeks.

Findings and conclusions:

As expected there was no observable degradation of the test substance during the 52-week storage in deep freeze storage conditions. These results demonstrate that ^{14}C-metconazole is stable in soil during storage at nominally –18°C for 1 year.

B.8.2 Adsorption, desorption and mobility in soil (Annex IIA 7.1.2 and 7.1.3; Annex IIIA 9.1.2)

B.8.2.1 Adsorption and desorption of the active substance and relevant metabolites (Annex IIA 7.1.2)

[triazole-^{14}C] WL136184 (KNF-S-474c): Adsorption and desorption for a range of soils (Webb J.D. 1991)
Guideline :
OECD Guideline 106, US-EPA Guideline 163-1
GLP :
Yes
Material and Methods :
Test substance [^{14}C-3(5)triazole]-metconazole, 100% Cis, 39.89 µCi/mg, radiochemical purity > 99%

Soils :
Table B.8.2.1.-1: Characteristics of the soils

Soil designation	Godstone	Elm Farm	Woodstock	Keycol
Textural class (German scheme)	sand	sandy loam	silty clay	loamy sand
Particle size distribution [%] (German scheme): 0.063 – 2 mm 0.002 – 0.063 mm < 0.002 mm	 91 5 4	 58 27 15	 18 46 36	 72 17 11
Organic C [%]	0.6	1.8	3.1	1.4
CEC [mVal/100g]	1.0	10.9	25.7	8.5
pH[$CaCl_2$]	6.7	7.1	6.8	6.7

Experimental design :
A solution soil ratio of 5:1 was used : 2 g dry soil/ 10 ml 0.01 M CaCl2. Dose solutions of the test articles were 0.034, 0.218, 1.038 and 4.755 mg/l; the equilibration time was 24 hours; the test temperature was 20°C. 2 desorption steps of 16 hours were applied.

Analytical methods :
The aqueous portion was removed and the soil was extracted 3 times with acetone. Soil solutions and extracts were analyzed by LSC and/or HPLC.

Findings :
It is not expected that the a.s. would degrade during the experiment. Mass balances were in the range 98.4-101%

Table B.8.2.1-2: Adsorption and desorption of [^{14}C-triazole]metconazole in 4 soils

Soil designation	Textural class	Adsorption constant K_F [ml/g]	Adsorption constant K_{oc} [ml/g]	Adsorption exponent 1/n	% Desorbed material from adsorbed fraction
Godstone	Sand	9.6	1592	1.020	38.3
Elm Farm	sandy loam	21.9	1217	0.746	19.5
Woodstock	silty clay	31.6	1019	0.666	15.4
Keycol	loamy sand	17.0	1214	0.813	24.2

Conclusions :
Metconazole is strongly adsorbed to soil. The Koc of this study were not used for PEC gw calculation (1/n rather low in several soils)

Adsorption/desorption of Metconazole (AC900768) (cis/trans/ approx. 85:15) on five soils (Bissinger H.-J. 1995b)

Guideline :

OECD Guideline 106, US-EPA Guideline 163-1

GLP :

Yes

Material and Methods :

Test substance [^{14}C-3(5)triazole]-metconazole, 85/15 cis/ trans ratio, 34.17 µCi/mg, radiochemical purity = 96.17%

Soils :

Table B.8.2.1-3: Characteristics of the soils

Soil designation	Engelstadt / Benz	Ingelheim Flur 43 Nr. 153 ("Moers")	Nieder-Ingelheim Auf dem Sand	Schwabenheim Schlag III/B	Speyer 2.2
Textural class (German scheme)	silt loam	sandy loam	loamy sand	silt loam	loamy sand
Textural class (USDA scheme)	silt loam	Loam	sand	silt loam	nd
Particle size distribution [%] (German scheme):					
0.063 – 2 mm	26.5	21.9	6.8	18.5	5.1
0.002 – 0.063 mm	60.8	35.0	9.8	68.2	13.0
< 0.002 mm	12.7	43.1	83.4	13.3	82.0
Particle size distribution [%] (USDA scheme):					
0.050 – 2 mm	26.5	21.9	6.8	18.5	nd
0.002 – 0.050 mm	57.2	31.8	8.0	60.6	nd
< 0.002 mm	16.3	46.3	85.2	20.9	nd
Organic C [%]	2.24	1.33	0.74	1.09	2.29
CEC [meq C/100g]	17	15	4	9	9.7
PH	7.4	7.6	7.1	5.9	5.8

Experimental design :

A solution soil ratio of 5:1 was used : 4 g dry soil/ 20 ml 0.01 M CaCl2. Dose solutions of the test articles were 0.051, 0.101, 0.504 and 1.025 mg/l and the equilibration time was 2 hours in 4 soils, 8 hours for Engelstadt / Benz soil. 2 desorption steps of 16 hours were applied. “The test temperature was not stated in the report but is believed to be conducted at room temperature between 20-25°C”.

Analytical methods :

The aqueous portion was removed and analyzed by LSC and TLC (following evaporation to dryness and concentrated in methanol). Soil samples were extracted with acetone, methanol:water (4:1, v:v), and water. Soil extracts were concentrated and analyzed by TLC.

Findings :

It is not expected that the a.s. would degrade during the experiment. Mass balances were in the range 91.6-106.3% (based on individual samples)

Table B.8.2.1-4: Adsorption and desorption of [^{14}C-triazole]metconazole in 5 soils

Soil designation	Textural class	Adsorption constant K_F [ml/g]	Adsorption exponent 1/n	Adsorption constant K_{oc} [ml/g]	% Desorbed material from adsorbed fraction
Engelstadt Benz	silt loam	18.72	0.917	836	29.2
Ingelheim / Moers	sandy loam	10.80	0.928	812	45.3
Nieder- Ingelheim	loamy sand	6.74	0.983	911	61.3
Schwabenheim III/B	silt loam	7.91	0.911	726	34.0
Speyer 2.2	loamy sand	39.35	0.950	1718	12.7

Conclusions :
Metconazole is quickly and strongly adsorbed to soil. Mean Koc = 1000.6 l/kg, mean 1/n = 0.938

B.8.2.2 Column leaching studies with the active substance and relevant metabolites (Annex IIA 7.1.3.1; Annex IIIA 9.1.2.1)

The mobility of WL 136184 (KNF-S-474c) in soil – soil thin layer chromatography (Richardson K.A. 1989)
Guidelines :
EPA Pesticide Assessment Guideline 163-1, Subdivision N
GLP :
yes
Material and Methods :
Test substance [^{14}C- triazole]-metconazole, 98% cis, 23.2 µCi/mg, radiochemical purity > 98%
Soils :
Table B.8.2.3-1: Characteristics of the soils

Soil designation	Woodstock	Keycol	Blindley Heath	Godstone
Textural class	clay loam	sandy loam	silty clay loam	loamy sand
Particle size distribution [%]				
Sand	22	74	8	86
Silt	48	17	72	9
Clay	30	9	20	5
Organic C [%]	2.61	0.70	3.31	0.55
CEC [meq C/100g]	21	6.9	not measured	not measured
PH	7.7	5.8	6.2	6.8

Experimental design :
"Soil TLC plates were prepared with a soil slurry consisting of 2-mm sieved soil and de-ionized water. The soil slurry was evenly applied to glass plates at a thickness of approximately 0.76 mm and allowed to air dry for 24 h. The test substance and several ^{14}C -radiolabeled reference compounds (DDT, atrazine, 2,4-D, diuron, and glucose) were dissolved in various organic solvents and applied to the origin of the plates at equally spaced intervals. The various reference substances were selected based on the classification for mobility in soil. The plates were developed with de-ionized water by placing a wet filter paper wick along the bottom edge of the soil

TLC plate. Once the water had ascended to the solvent front, the plates were removed and air-dried. Analysis was conducted by applying X-ray film to the surface of the dry TLC plates for 3-15 days. "

Analytical methods :
The soil corresponding to metconazole was scrapped and extracted with acetonitrile:water (7:3). Soil extracts were analyzed by LSC and TLC. The extracted soil was combusted to determine the percent recovery of the applied radioactivity.

Findings and Conclusions :
This study is considered as additional information confirming the low mobility of metconazole.

TLC analysis of the soil extracts showed only the presence of metconazole indicating the test substance was stable throughout the duration of the study. The retention time of metconazole compared to the reference substances indicate metconazole has little to no tendency for mobility within these soils (Rf of 0.04 to 0.14) (According to the classification of Helling and Turner (1968), immobile compounds have Rf of 0.0-0.09, low mobility compounds have Rf of 0.10-0.34)

B.8.2.3 Aged residue column leaching (Annex IIA 7.1.3.2; Annex IIIA 9.1.2.1)

WL148271 (KNF-S-474-m): Leaching of aged residue (Croucher A., Hill A.D., 1992)
Guidelines :
German BBA guideline Part IV 4-2
GLP :
yes
Material and Methods :
Test substance [^{14}C- triazole]-metconazole, 78/22 cis/ trans ratio, 20.4 µCi/mg, radiochemical purity = 98.5%
Soil :
Table B.8.2.3-1: Characteristics of the soil

	BBA Standard Soil Speyer 2.1
Soil type	Sand
Particle size (German scheme)	
% sand (0.063 – 2 mm)	89.4
% silt (0.002 – 0.063 mm)	6.2
% clay (< 0.002 mm)	4.4
PH	6.2
% organic carbon	0.65
Cation Exchange Capacity (meq/ 100 g soil)	5
Maximum Water Holding Capacity (%)	29.8

Experimental design :
Soil samples containing labeled metconazole (at rates equivalent to about 0.5 mg/kg dry soil, corresponding to about 50 µg per column) were incubated in the dark for 90 days at 22°C ± 2°C with a 40% water holding capacity. After aging, the soil was transferred to the top of a column (length 40 cm, inner diameter 5 cm, 2 replicates) containing untreated soil. Approximately 393 ml of water was applied to simulate a 200-mm rainfall (393 ml). The leachates were collected in 40 fractions of about 10 ml and analyzed for radioactive residues.

Analytical methods :
Leachates were extracted with dichloromethane. Soil from the leached columns and from additional 90-day aged soil samples were sequentially extracted with acetonitrile:water (7:3, v:v), acetonitrile, diethyl ether, and 0.01 M $CaCl_2$, respectively. Extracted soils were later air-dried and combusted. Leachates, soil extracts, and

combusted samples were analyzed by LSC. Reverse phase HPLC was used to determine the radiochemical purity of the test substance and the contents of the soil extracts. Normal phase HPLC with a fraction collector system was utilized for the analysis of the leachate samples. Fractions were collected and these samples were analyzed by LSC.

Findings :
Table B.8.2.3-2: Leaching behaviour of aged soil residues of [triazole-^{14}C]-labeled metconazole

Compartment	% of applied radioactivity	
	Replicate Identification	
	A	B
1. Volatiles		
$^{14}C\text{-}CO_2$	0.0	0.0
2. Soil column fraction		
Segment 1	88.17	92.42
Segment 2	3.83	1.24
Segment 3	0.19	0.39
Segment 4	0.10	0.14
Segment 5	0.03	0.09
Segment 6	0.04	0.06
Quartz sand	0.01	0.01
Soil (total)	92.36	94.35
3. Leachate (total)	0.54	0.87
TOTAL RECOVERY (1 - 3)	92.90	95.22

Conclusions :
The 90-day residue in soil is only one component, namely metconazole.
The total radioactivity recovered in the leachate from the 2 columns was 0.54 and 0.87%. The radioactivity recovered in the 2 first soil segments is 92.0 % and 93.66 %. This experiment confirms the low mobility of the a.s. in soil.

B.8.2.4 Lysimeter and field leaching studies (Annex IIA 7.1.3.3; Annex IIIA 9.1.2.2)

Not required. PECgw modelling reveal that leaching of the a.s. at level > 0.1 µg a.s./l is not expected.

B.8.3 Predicted environmental concentration in soil (PECs) (Annex IIIA 9.1.3)

PEC soil calculations performed by the Rapporteur Member State

Assumptions :
Six field trials were conducted in the UK, France, and Germany., The maximum DT_{50} was 259 days
Adsorption studies, column leaching studies and field dissipation studies show that the active substance will remain in the soil top layer. A soil layer of 5 cm and a soil density of 1.5 kg/dm3 have been considered.

The representative formulation CARAMBA 60 SL is applied in cereals and oilseed rape at a rate equivalent to 90 g a.s./ha, 2 applications with an interval of 14 days.

A correction for crop interception was applied using the crop interceptions figures proposed in the FOCUS guidance document.

	Application stages	Interception
Cereals	BBCH 29	50%
	BBCH 69	70%
Oilseed rape	BBCH 14	40%
	BBCH 73	80%

Findings :

B.8.3-1 : PEC soil

Method of calculation	DT_{50} (d): *259* days Kinetics: 1st order representative worst case from field studies.
Application rate	Crop: cereals 60 % plant interception: Number of applications: 2 Interval (d): 14 application : 90 g as/ha

PEC$_{(s)}$		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.048 mg a.s./kg		0.094 mg a.s./kg	
Short term	24h	0.048	0.048	0.094	0.094
	2d	0.048	0.048	0.094	0.094
	4d	0.047	0.048	0.093	0.094
Long term	7d	0.047	0.048	0.092	0.093
	28d	0.045	0.046	0.087	0.091
	50d	0.042	0.045	0.082	0.088
	100d	0.037	0.042	0.072	0.083

The maximum concentration just after the last application, the mean plateau average, the maximum plateau average were calculated for an annual application of 180 g a.s./ha in monoculture (practical worst case), mean crop interception of 60%. The maximum field DT50 of 259 days was considered for this long term PEC

B.8.3-2: Long term PEC soil

	Worst case field DT_{50},	maximum concentration just after the last application (mg a.s./kg soil)	mean plateau average (mg a.s./kg soil)	maximum plateau average (mg a.s./kg soil)
Hamburg, Okehampton, Chateaudun	259	0.15	0.1	0.15

Conclusions :

Initial PEC (multiple application) of 0.094 mg a.s./kg soil were calculated. PEC short term were also determined.

The PEC were calculated for an annual application of 180 g a.s./ha in cereals monoculture. Initial PEC of 0.094 mg a.s./kg soil (after second application of 90 a.s./ha, assuming no degradation between applications) and the mean plateau average PEC of 0.1 mg a.s./kg soil are in the same range as the concentrations recovered in the accumulation study (maximum level of 0.03 mg a.s./kg considering a 10 cm soil layer).
'Maximum concentration just after last application' and 'maximum plateau average' figures indicate that the a.s. would not accumulate after repeated applications.

PEC soil calculations submitted by the notifier

Predicted environmental concentrations of BAS 555 F (metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU (Rice P. 2002)
Method of calculation :
The calculations were performed assuming a soil layer of 5 cm with a bulk density of 1.5 g cm^{-3}, crop interception values taken from the FOCUS Groundwater report, and a soil first-order half-life of 598 days (highest DT_{50} value of the laboratory degradation of metconazole [mixture of cis:trans isomers] in 6 soils, corrected to FOCUS reference temperature and soil moisture conditions of 20ºC and pF2. This standardized DT_{50} still represents a conservative assumption in comparison with the field dissipation rates (DT_{50} = 33-138 days). The $PEC_{soil,ini}$, $PEC_{soil,act}$ and $PEC_{soil,twa}$ (in mg a.i. kg $soil^{-1}$, or ppm) were calculated according to first order kinetics equations.

For multiple applications, the maximum time-weighted average concentrations for exposure periods of 1, 2, 4, 7, 14, 28, 50, and 100 days were calculated using a moving time-frame Excel spreadsheet. For a given exposure period, the spreadsheet calculates the time-weighted average concentrations for period start times ranging from day of first application to day of last application (moving time-frame), and scans for the highest value.

The following worst-case application scenarios were considered:

Cereals (winter and spring): 2 application of CARAMBA at 90 g a.s./ha, equivalent to a load on soil of 67.5 g a.s./ha after 25% interception (conservative estimate for the first possible visible signs of infection, growth stage BBCH 10-19, leaf development)
Oilseed rape (winter and summer): 2 application of CARAMBA at 90 g a.s./ha, equivalent to a load on soil of 54 g a.s./ha after 40% interception (conservative estimate for potential first signs of infection, growth stage BBCH 10-19, leaf development)

B.8.3-3: Calculated PECs values for two applications (90 g a.s./ha, 14-day interval) of CARAMBA 60 SL to winter and spring cereals

Days	Actual Conc. (mg a.s./kg)	Time Weighted Average Conc. (mg a.s./kg)
0	0.179	0.179
1	0.178	0.178
2	0.178	0.178
4	0.178	0.178
7	0.177	0.178
14	0.176	0.177
28	0.173	0.176
50	0.168	0.173
100	0.159	0.169

B.8.3-4: Calculated PECs values for two applications (90 g a.s./ha, 14-day interval) of CARAMBA 60 SL to winter and summer oilseed rape

Days	Actual Conc. (mg a.s./kg)	Time Weighted Average Conc. (mg a.s./kg)
0	0.143	0.143
1	0.143	0.143
2	0.143	0.143
4	0.142	0.143
7	0.142	0.142
14	0.141	0.142
28	0.138	0.141
50	0.135	0.139
100	0.127	0.135

Conclusions :
The PEC soil which were calculated by the notifier and by the rapporteur are similar, except for minor differences due to slight differences in input parameters (crop interception). The accumulation of the active substance through years was not considered in this evaluation.

Estimation of the accumulation potential of BAS 555 F (metconazole) in northern European soils following applications of CARAMBA 60 SL to cereals and oilseed rape using the FOCUS groundwater scenarios shell PEARL (Beigel C. 2001)

Method of calculation :

"The accumulation of metconazole in soil was predicted with the model shell FOCUS_PEARL, version 1.1.1, using the relevant northern FOCUS groundwater standard scenarios Châteaudun, Hamburg, Jokionen, Kremsmünster and Okehampton for applications of CARAMBA 60 SL to spring and winter cereals, Châteaudun, Hamburg, Kremsmünster and Okehampton for applications to winter oilseed rape, and Jokionen and Okehampton for applications to summer oilseed rape.

The predicted field accumulation concentrations (in mg a.s. kg dry soil^{-1}) were derived from detailed output function in the FOCUS_PEARL shell (version 1.1.1., January 2001) for the aeric mass of active substance in the 1 m deep FOCUS target layer (in kg a.s./ha), assuming as a conservative estimate that all the active substance would remain in the 0-10cm layer.

The degradation of metconazole in soil was modeled using an average laboratory half-life of 247 days at 20°C and pF2 moisture content, average from measurements in 5 soils (Edwards, 1990). The sorption of metconazole in soil was modeled using a K_{OM} of 580.4 l/kg (Koc of 1000.6 l/kg) the average of study measurements in 5 soils, and the average 1/n value of 0.938 (Bissinger, 1995b).

The simulations were performed based on the maximum recommended use-pattern of two applications per year, each at the maximum application-rate of 90 g a.s./ha, for both crops. Application dates on winter cereals in the Okehampton location were selected to match the applications dates used in the UK field accumulation study. The dates for the other locations were then adapted based on the different planting, emergence and harvest dates in the locations given in Appendix A of the FOCUS groundwater report. A correction for crop interception was applied using the crop interception estimates listed in FOCUS and the recommended BBCH growth stage numbers for each application of metconazole. The actual soil loading for the first and second application, respectively, were 45g and 27g (50% and 70% interception, respectively) for winter and spring cereals, and 18g and 18g (80% interception) for winter and summer oilseed rape. "

Table B.8.3-5: Predicted accumulation of metconazole in soil over a 26-year period for two yearly applications as 0.09 kg a.s./ha on various crops

Crop	Location	Mean annual Temperature (^oC)	Average plateau aeric mass in FOCUS layer (kg/ha)	Average plateau concentration in 0-10 cm layer (mg/kg)
Winter cereals	Chateaudun	11.3	0.13	0.093
	Okehampton	10.2	0.14	0.1
	Hamburg	9	0.166	0.118
	Kremsmunster	8.6	0.154	0.11
	Jokionen	4.1	0.23	0.164
Spring cereals	Chateaudun	11.3	0.132	0.094
	Okehampton	10.2	0.143	0.102
	Hamburg	9	0.169	0.121
	Kremsmunster	8.6	0.157	0.112
	Jokionen	4.1	0.235	0.168
Winter oilseed rape	Chateaudun	11.3	0.065	0.047
	Okehampton	10.2	0.07	0.05
	Hamburg	9	0.082	0.059
	Kremsmunster	8.6	0.076	0.055
Winter oilseed rape	Okehampton	10.2	0.072	0.051
	Jokionen	4.1	0.119	0.085

Table B.8.3-6: Maximum predicted concentration of metconazole in soil during the 26-year simulation period for 2 yearly applications 0.09 kg a.s./ha on the various crops

Crop	Location	Peak aeric mass (mg/kg)	Peak concentration in 0-10 cm layer (mg/kg)
Winter cereals	Chateaudun	0.176	0.126
	Okehampton	0.185	0.132
	Hamburg	0.211	0.151
	Kremsmunster	0.206	0.147
	Jokionen	0.282	0.201
Spring cereals	Chateaudun	0.178	0.127
	Okehampton	0.187	0.134
	Hamburg	0.213	0.152
	Kremsmunster	0.21	0.15
	Jokionen	0.287	0.205

Winter oilseed rape	Chateaudun	0.089	0.063
	Okehampton	0.093	0.066
	Hamburg	0.107	0.076
	Kremsmunster	0.105	0.075
Winter oilseed rape	Okehampton	0.094	0.067
	Jokionen	0.145	0.104

Conclusions :
The endpoints were chosen properly by the notifier (Koc, laboratory DT_{50}, correction of DT_{50} to 20°C and pF2, GAP, worst case interception parameters, monoculture scenario). The rapporteur considers that a 5 cm soil layer should be used for the calculation (not 10 cm).
The mean laboratory DT_{50} of metconazole (247 days) were higher than the mean field dissipation rate (105 days). This element could explain that the PEC calculations (0.06-0.13 mg a.s./kg in Central-European scenarios) are higher than the concentrations measured in the accumulation study (max level of 0.03 mg a.s./kg). Nevertheless they are in the same range.

The results which were obtained with this calculation method are similar to the results obtained by the rapporteur (table B.8.3-1).

B.8.4 Fate and behaviour in water (Annex IIA 7.2.1; Annex IIIA 9.2)

B.8.4.1 Hydrolysis rate of relevant metabolites, degradation and reaction products (Annex IIA 7.2.1.1)

WL148271 (KNF-S-474m): Hydrolysis as a function of pH (Fisk P. R. 1991)
Guidelines :
EEC C.7
GLP :
yes
Material and Methods, Findings :
Test material : technical a.s., 95.3% pure (79.8% cis, 15.5% trans) (batch 89-01) :
Preliminary tests at 50°C at pH 4, 5, 7 and 9 :

- at pH 4, 5 and 7 : hydrolytic stability (<10% hydrolysis of both isomers in 5 d)

⇒ no further tests required

- at pH 9 : results are inconclusive mainly due to inefficiency of extraction process

⇒ additional preliminary test at pH 9 on separate isomers, using direct analysis by HPLC

purified cis-isomers, 96.9% pure (batch 3454/078),
purified trans isomers, 97% pure (batch 88-08) :
Preliminary test at 50°C at pH 9 :
hydrolytic stability of both cis- and trans-isomers (<10% hydrolysis in 5 d)
⇒ no further tests required
Conclusions :
Acceptable. Metconazole is hydrolytically stable under environmentally relevant conditions.
Purity of test substance being less than 98% is not considered to have an impact on the conclusions of the study because of the analytical procedure (GC) used for quantification (impurities were not quantified or included in any calculation). Moreover, test results from hydrolysis study are confirmed by results from dark control samples in aqueous photolysis study

B.8.4.2 Direct phototransformation of relevant metabolites, degradation and reactions products in water (Annex IIA 7.2.1.2)

Determination of the Aqueous Photolysis Rate with AC 900768 (WL 148271) (Williams M.D., Heim L.G. 1996)
Guidelines :
US-EPA Subdivision N Series 161-2 ((xenon arc light source with UV filter (cut off λ < 290 nm))
GLP :
Yes
Findings and conclusions:
^{14}C-labelled a.s., radiochemical purity 97.41% (stated) – 99.8% (determined by HPLC) :
at 25°C; in pH 5, 7 and 9 buffer (sterile conditions), continuous irradiation for 30d :
Material balance :
total recoveries of applied radioactivity ranged from resp. 98.6 to 100.0% (pH5), 98.4 to 100.7% (pH 7) and 96.4 to 101.8% (pH 9) for the exposed test systems, and from resp. 98.0 to 100.6% (pH 5), 96.3 to 100.0% (pH 7) and 95.0 to 100.0% (pH 9) for the dark controls
Photolysis rate :
pH 5 : k = 0.0252 d^{-1}; DT_{50} = 27.5 d
pH 7 : k = 0.0191 d^{-1}; DT_{50} = 36.3 d
pH 9 : k = 0.0194 d^{-1}; DT_{50} = 35.8 d
Dark control samples displayed no appreciable loss of metconazole throughout the study
Major photolysis products (> 10% of applied radioactivity) :

metconazole photolyzed to multiple more polar degradation products; the only photodegradate exceeding 10% of applied radioactivity was identified as hydroxymetconazole (14.5% after 30 d at pH 7)

Conclusions :

Study is acceptable.

Method is in accordance with SETAC-procedures.

Metconazole is moderately (pH 5) to slightly (pH 7 and 9) degradable by direct photolysis.

Metconazole (^{14}C-BAS 555 F): Natural Water Photolysis (Fang C. 2002)

Guidelines :

US-EPA Subdivision N Series 161-2

GLP :

Yes

Material and Methods :

Test substance :

[^{14}C-3] or [^{14}C-5]-triazole-metconazole, 81.5/18.5 cis/trans ratio, specific radioacitivity = 30.86 µCi/mg; radiochemical purity of 99.8%.

Experimental design :

The photolysis of metconazole was investigated in natural water collected from a creek, without sterilization. The samples at a concentration of 5 mg/l were maintained for 15 days under continuous irradiation.

The irradiated samples were maintained at 22 ± 1°C in a photolysis chamber exposed to light from a xenon arc lamp. The lamp was filtered to remove UV light under 290 nm to simulate sunlight. The output of the lamp was set to 0.35 W/m^2 at 360 nm (total irradiation: 326.9 W/m^2), which is comparable to late September sunlight in New Jersey. Water pH in the range 7.19-8.06. Dark control samples were wrapped in aluminum foil and placed in a chamber maintained at 22 ± 1°C.

Analytical methods :

Samples were analyzed by LSC and HPLC

Findings :

Table B.8.4.2-1: Recovery of radioactivity in % AR and distribution of metabolites – Photolysis of metconazole in natural water at 20°C.

Time after treatment (days)	% of Applied Radioactivity (AR)					
	a.s.	Sum of peaks in polar fraction	Adsorption to wall	CO_2 + other volatiles	Others[a]	Total Recovery
0	98.80	0.00	ns	ns	1.20	100
3	92.59	5.49	0.66	0.00	3.60	102
7	89.49	8.92	0.18	0.01	5.57	104
10	84.59	13.11	0.24	0.01	4.67	102
13	85.06	13.79	0.29	0.01	5.14	104
15	81.32	16.63	0.23	0.02	5.94	104
15 (dark)	99.38	ns	ns	ns	1.64	101

a = Sum of all other components in supernatant in addition to metconazole and polar fraction : No identification of these components has been performed. ns - no sample.

Conclusion:

Metconazole degraded slowly under test conditions (not sterile conditions, temperature 22 °C, light intensity 0.35 W/m^2) in natural water with a first order DT_{50} of 58 days of continuous irradiation (r^2 = 0.943). The major degradation product was a polar fraction, which accounted for 17% of total applied radioactivity (AR) at day 15. Further analysis of this fraction indicated multiple components, none of which exceeded 10% of the applied

radioactivity. The mineralization of metconazole in natural water was <0.1% AR. No degradation was observed in the dark control samples.

Metconazole (AC900768): Determination of the Direct Phototransformation in Buffered Medium at pH 7 (Knoch E., Martin C.A. 1999)

GLP :

yes

Guideline :

OECD Guidance doc. on direct phototransformation of chemicals in water (1997)

Findings :

(Heraeus Suntest apparatus : xenon arc lamp with UV-filter (cut off λ < 290 nm) + uranyl nitrate/oxalic acid actinometer))

^{14}C-labelled a.s., radiochemical purity 99.2% :
at 20°C, in pH 7 buffer (sterile conditions, 0.1% acetonitrile co-solvent) :
quantum yield :

$\phi = 2.19 \times 10^{-7}$

(calculated by QUANTAUS program)

environmental direct photolysis half-life :

using Frank & Klöpffer model (simulation conditions : stagnant water with area of 100 m² and depth of 1 m, no suspended sediment, pH 5.5, 10^{-7} mol/L ROO-radical, 10^{-14} mol/L OH-radical, 10^{-10} mol/L RO-radical, 10^{-10} mol/L singlet oxygen, assumed irradiation time of 16.5 hrs for June and 7.6 hrs for December, assumed water temperatures of 20°C for June and 3°C for December) :

$t_{1/2}$ ranges from 2.7×10^{9} d for ROO-radical to 2.7×10^{23} d for OH-radical in June and from 3.6×10^{10} d for ROO-radical to 3.6×10^{24} d for OH-radical in December

Conclusions :

Acceptable. Method is in accordance with ECETOC Technical reports 3 and 12.
ϕ-value confirms that photodegradation is not expected to be a major route of dissipation of Metconazole in aquatic systems.

B.8.4.3 Ready biodegradability of the active substance (Annex IIA 7.2.1.3.1)

WL148271 (KNF-S-474M): an assessment of ready biodegradability (Battersby N.S. 1990)

Guidelines :

EC Test Method C.5 (L 251/179)

GLP :

Yes

Material and Methods :

Tests substance : metconazole, 83.7/16.3 cis/trans ratio, chemical purity 95.3 and 96.3%

Experimental design :

Modified Sturm test : The inoculum was activated sludge from a sewage plant. 20 mg a.s./l were incubated in Sturm test vessels at 20°C. The extent of biodegradation at 2, 5, 6, 9, 13, 21 and 28 days was measured by determining CO_2 evolution. Sodium benzoate was used as control.

Inhibition test with *Pseudomonas fluorescens*: Due to poor solubility, a water-leachate of the test solution was prepared by stirring the a.s. in inhibition medium at 20°C overnight. The incubation temperature was 30°C. Microbial growth was followed over 6 hours by monitoring the increase in optical density at 610 nm.

Findings and Conclusions :

The a.s. is not readily biodegradable in the Sturm test (2 - 5% Theoretical CO_2 being evolved in 28 days).
The inhibition medium inhibited microbial medium by 17%

KNF-S-474 cis isomer (WL136184): an assessment of "ready biodegradability" (Battersby N.S. 1991)
Guidelines :
EC Test Method C.5 (L 251/179)
GLP :
Yes
Material and Methods :
Test substance : metconazole, cis isomer, chemical purity 95.2 %
Experimental design :
Modified Sturm test : The inoculum was activated sludge from a sewage plant. 20 mg a.s./l were incubated in Sturm test vessels at 20°C. The extent of biodegradation at 2, 5, 6, 9, 13, 21 and 28 days was measured by determining CO_2 evolution. Sodium benzoate was used as control.

Inhibition test with *Pseudomonas fluorescens*: Due to poor solubility, a water-leachate of the test solution was prepared by stirring the a.s. in inhibition medium at 20°C overnight. The incubation temperature was 30°C. Microbial growth was followed over 6 hours by monitoring the increase in optical density at 610 nm.

Findings and Conclusions :
The a.s. is not readily biodegradable in the Sturm test (3 - 11% Theoretical CO_2 being evolved in 28 days).
The inhibition medium inhibited microbial medium by 2%

B.8.4.4 Water/sediment study (Annex IIA 7.2.1.3.2)

^{14}C-Metconazole (CL 900768): Degradation in Water/Sediment Systems (Steinführer T. 1996)
Calculation of DT_{50} and DT_{90} values of metconazole (BAS 555 F) in two water-sediment systems (Rice P. 2002a)

Guidelines :
BBA Guideline, Part IV, 5-1
GLP :
Yes
Material and Methods :
Test substance [^{14}C- triazole]-metconazole, 83.7/13.7 cis/trans ratio, 34.17 µCi/mg, radiochemical purity > 97%
Sediments, waters :

Table B.8.4.4-1: Characteristics of the sediments and waters

Designation Origin		Glan/Odernheim Rhineland-Palatinate, FRG	Hellersberger Weiher Rhineland-Palatinate, FRG
Sediment	sand [%]	96.3	7.1
	silt [%]	2.6	52.1
	clay [%]	1.1	40.8
	textural class (German scheme)	sand	silty clay loam
	pH	6.8	7.4
	organic C [%]	0.17	5.2
	total N [%]	<0.07	0.65
	total P [%]	0.12	0.21
	CEC [meq/100g]	4	20
	biomass [mg C/100 g]	8	192

Designation Origin		Glan/Odernheim Rhineland-Palatinate, FRG	Hellersberger Weiher Rhineland-Palatinate, FRG
Water	PH	7.8	7.7
	hardness [mmol/L]	1.2	1.8
	TOC [mg/L]	4.5	11.0
	total N [mg/L]	3	1.5
	total P [mg/L]	0.17	0.12

Experimental design :

Metconazole was applied at a concentration of 0.03 mg a.s./l water. For the isolation and identification of degradation products, one test vessel per system was additionally treated at a 10x application rate . The test vessels were incubated in the dark at a temperature of 20 ± 2 °C. Aeration was achieved by applying a constant stream of air over the water surface and gently shaking the water phase without disturbing the sediment. Reductive conditions were maintained in the sediment. Duplicate samples were taken at different intervals up to 182 days after application.

Analytical methods :

The water and sediment phases were separated by decanting. Water samples were partitioned with dichloromethane.

The sediment samples were extracted with acetonitrile/water (7/3), followed by acetonitrile/water (1/1), acetonitrile and then diethyl-ether. Bound residues of some sediment samples were investigated by a NaOH-based method.

The extracts were analyzed by TLC. Some of the solvent extracts were also analyzed by HPLC/MS to further confirm the identity of the degradation products. Extracted sediment was combusted to determine the quantity of bound radioactivity.

Findings :

Table B.8.4.4-2: Recovery of radioactivity in % AR and distribution of metabolites after application of [^{14}C]-metconazole to water/sediment systems and incubation at 20°C

	CO_2	Water phase							Sediment phase								Total balance
		a.s.	M30	M21	M11	M15	M13	unkn	a.s.	M30	M21	M11	M15	M13	unkn	Bound residue	
Glan river system																	
0	0.0	56.3	0.0	0.0	0.0	0.0	0.0	1.7	10.5	0.0	0.0	0.0	0.0	0.0	1.0	0.1	69.6
1	0.0	69.8	0.0	0.0	0.0	0.0	0.0	2.2	21.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	95.1
2	0.0	62.4	0.0	0.0	0.0	0.0	0.0	5.2	20.3	0.0	0.0	0.0	0.0	0.0	4.8	0.6	93.3
7	0.0	44.9	0.0	0.3	0.0	0.0	0.0	2.3	36.5	0.0	0.0	0.0	0.0	0.0	3.3	2.2	89.4
14	0.0	34.1	0.0	0.6	0.5	0.0	0.0	3.2	49.4	0.0	0.3	0.2	0.0	0.0	2.5	4.1	94.7
30	0.0	20.7	1.7	3.4	1.5	0.0	0.8	2.9	51.0	1.6	2.2	0.4	0.0	0.0	2.8	6.1	95.1
62	0.0	15.5	2.4	1.9	0.0	0.0	1.7	3.4	49.4	3.0	1.6	0.7	0.0	0.2	1.9	13.1	94.7
100	0.0	9.2	2.1	1.7	0.7	0.5	1.8	1.8	43.7	4.1	1.9	0.4	0.3	1.1	2.0	18.9	96.2
152	0.0	5.1	2.0	2.8	1.0	1.2	9.0	7.7	31.3	5.1	5.2	0.0	0.6	1.9	4.2	18.3	95.4
182	0.0	4.4	1.8	2.0	0.7	0.9	8.5	6.1	33.0	4.7	3.5	1.0	1.2	1.8	3.2	19.7	92.4
Hellersberger Weiher pond system																	

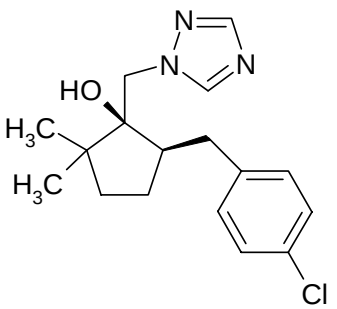
	CO_2	Water phase							Sediment phase								Total balance
		a.s.	M30	M21	M11	M15	M13	unkn	a.s.	M30	M21	M11	M15	M13	unkn	Bound residue	
0	0.0	78.4	0.0	0.0	0.0	-	0.0	2.0	12.0	0.0	0.0	0.0	-	0.0	2.0	1.6	96.0
1	0.0	36.5	0.0	0.0	0.0	-	0.0	1.4	42.7	0.0	0.0	0.0	-	0.0	1.8	6.9	89.3
2	0.0	13.5	0.0	0.0	0.0	-	0.0	0.7	67.8	0.0	0.0	0.0	-	0.0	2.2	10.7	94.8
7	0.0	8.2	0.0	0.2	0.3	-	0.0	2.2	73.5	0.2	0.3	0.4	-	0.0	2.1	10.5	97.8
14	0.0	1.7	0.2	0.2	0.1	-	0.0	0.1	61.7	0.0	1.1	0.8	-	0.0	2.2	28.5	96.6
30	0.0	0.6	0.1	0.1	0.1	-	0.0	0.1	64.8	0.0	1.7	1.5	-	0.0	4.2	23.0	96.2
62	0.0	1.4	0.3	0.3	0.2	-	0.0	0.2	72.0	3.2	2.9	2.8	-	0.0	2.2	14.5	100.0
100	0.0	1.1	0.2	0.2	0.0	-	0.0	0.2	78.4	0.0	2.8	1.6	-	0.0	3.5	11.8	99.6
152	0.0	1.5	0.3	0.3	0.0	-	0.0	0.3	67.8	2.3	3.2	1.4	-	0.5	3.7	12.4	93.5
182	0.0	1.8	0.2	0.3	0.0	-	0.0	0.4	67.4	2.2	3.7	2.7	-	0.0	6.0	14.6	99.2

Ns : no sample; nd : not detected

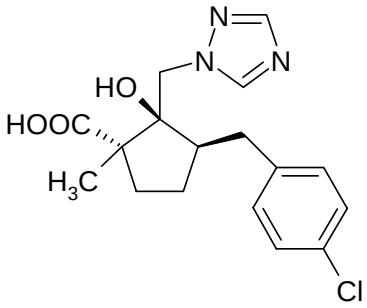
Table B.8.4.4-3: DT_{50} and DT_{90} in water/sediment systems (recalculated by ModelMaker 4.0) (Rice, 2002)

Test system	Phase	DT_{50} (days)	DT_{90} (days)	r^2	Kinetics
Glan River	Water	15	49	0.915	First order
	Water	13	112	0.910	Biphasic first order
	Total system	116	384	0.922	First order
Hellersberger Weiher pond	Water	1	3	0.932	First order
	Total system	814	> 1000	0.923	First order

"The structure of metabolite M13 (CL 359139) is very similar to metconazole only differing in the formation of a carboxylic acid. In general, the formation of carboxylic acid groups to a compound makes it more water soluble and easier for animals to excrete from their bodies. Since metconazole and M13 structures are so similar we can assume a worst case and consider the toxicity of M13 equivalent to metconazole and estimate an initial PEC and TER for M13 based on information from the water/sediment study."



Metconazole
cis-metconazole (CL 354801), racemic



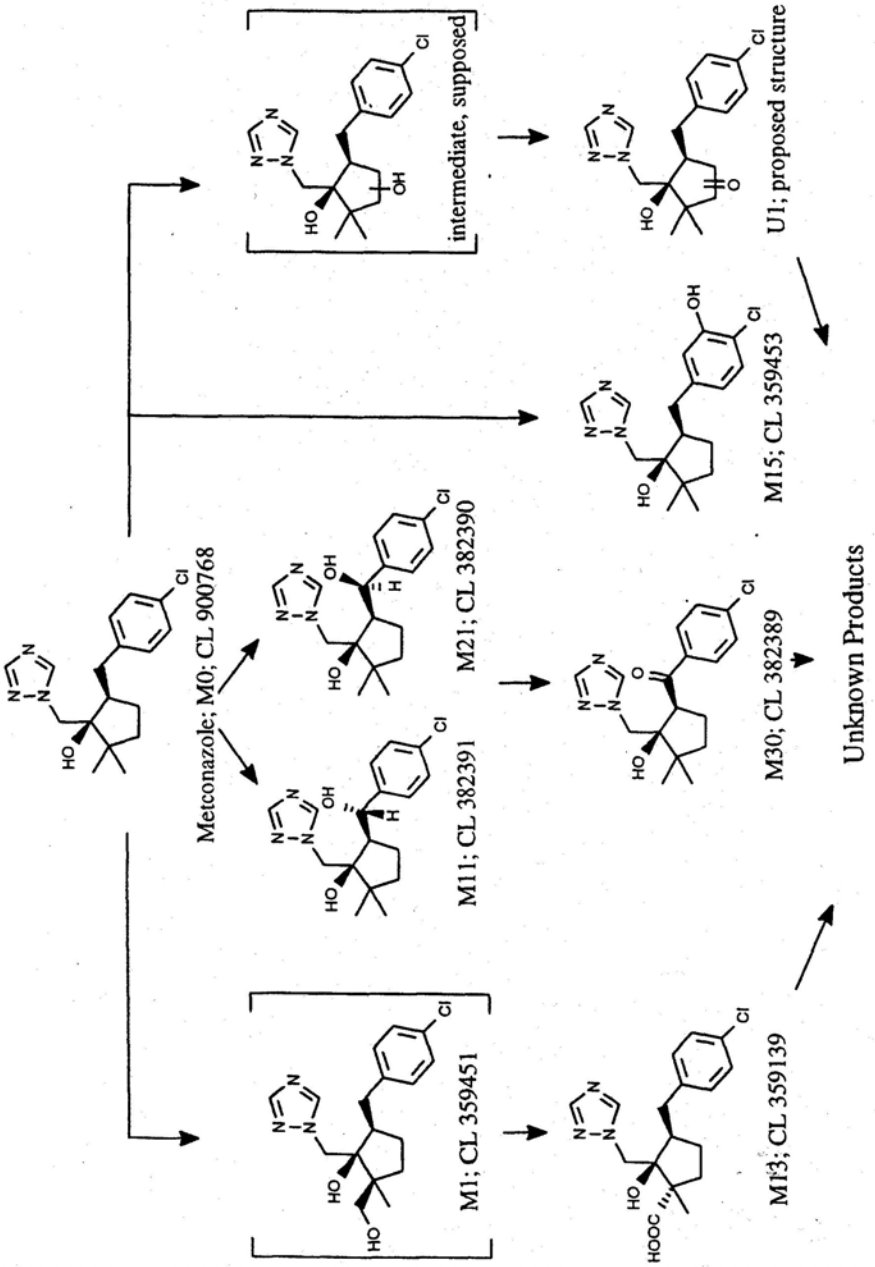
M13 (CL 359139)

Conclusions :

The active substance was rapidly adsorbed to sediment (DT_{50} water of 1-15 days). The active substance is slowly degraded in the sediment (DT_{50} total system of 116-814 days)

No mineralization occurred. Bound residue reached maximum level of 19.7 and 28.5% AR , respectively in the river and in the pond systems. The metabolites were recovered at low level in both water/sediment systems (one occurrence of M13 at maximum level of 9.0 % in water, at day 152, in one water/sediment system; the notifier provided additional information on this metabolite)

Figure B.8.4.4-1 : Proposed degradation pathway of metconazole in water/sediment systems



B.8.4.5 Degradation in the saturated zone of active substance, metabolites, degradation and reaction products (Annex IIA 7.2.1.4)

Not required; the soil mobility of the a.s. and its metabolites is low.

B.8.5 Impact on water treatment procedures (Annex IIIA 9.2.2)

Due to its mode of use (fungicide in cereals and oilseed rape), it is not expected that metconazole will contaminate water treatment plants.

B.8.6.1 Predicted Environmental Concentrations in surface water and sediment (PECsw) (Annex IIIA 9.2.3)

Table B.8.6.1-1 : PEC surface water determined by the rapporteur

Method of calculation	First order kinetics, maximum DT_{50} of 15 days (water/sediment study)
Application rate	2 applications of 90 g a.s./ha, with an interval of 14 days, (cereals, oilseed rape)
Main routes of entry	Spray drift at 1 m (2.77% drift), 30 cm water body

PEC$_{(sw)}$	Single application Actual	Single application Time weighted average	Multiple application Actual (after second application)	Multiple application Time weighted average (after second application)
Initial	0.8 µg a.s./L	0.8 µg a.s./ L	1.2 µg a.s./ L	1.2 µg a.s./ L
Short term 24h 2d 4d	0.8 µg a.s./L 0.8 µg a.s./L 0.7µg a.s./L	0.8 µg a.s./ L 0.8 µg a.s./ L 0.8 µg a.s./ L	1.1 µg a.s./ L 1.1 µg a.s./ L 1.0 µg a.s./ L	1.2 µg a.s./ L 1.1 µg a.s./ L 1.0 µg a.s./ L
Long term 7d 14d 21d 28d 42d	0.6 µg a.s./L 0.4 µg a.s./L 0.3 µg a.s./L 0.2 µg a.s./L 0.1 µg a.s./L	0.7µg a.s./ L 0.6 µg a.s./ L 0.5 µg a.s./ L 0.4 µg a.s./ L 0.3 µg a.s./ L	0.9 µg a.s./ L 0.6 µg a.s./ L 0.5 µg a.s./ L 0.3 µg a.s./ L 0.1 µg a.s./ L	0.9 µg a.s./ L 0.7 µg a.s./ L 0.5 µg a.s./ L 0.3 µg a.s./ L 0.2 µg a.s./ L

Table B.8.6.1-2: PEC sediment determined by the rapporteur

Method of calculation	First order kinetics, maximum DT_{50} = 814 days (water/sediment study)
Application rate	2 applications of 90 g a.s./ha, with an interval of 14 days, (cereals, oilseed rape)
Main routes of entry	Spray drift at 1 m (2.77% drift), 1 cm sediment layer, 1.3 kg/dm^3

PEC$_{(sed)}$	Single application Actual	Single application Time weighted average	Multiple application actual	Multiple application Time weighted average
Initial	0.019 mg a.s/kg sediment (1 application)	-	0.038 mg a.s/kg sediment (after 2nd application)	-
Long term – accumulation through years	-	-		0.12 mg a.s/kg sediment (plateau average)

Table B.8.6.1-3 : PEC surface water and sediment determined by means of Focus Suface water tool for exposure predictions step (Klein, 2001)

Method of calculation	First order kinetics, maximum DT_{50} water : 15 days (water/sediment study) DT_{50} soil : 247 d DT_{50} sediment : 814 d Solubility : 30.4 mg/ L Koc : 1000 l/kg
Application rate	2 applications of 90 g a.s./ha, with an interval of 14 days, (cereals, oilseed rape)
Main routes of entry	Spray drift at 1 m (2.77% drift), 30 cm water body + runoff + drainage (2%)

PEC$_{(sw)}$	2 applications Actual (µg/l water)	2 applications Time weighted average (µg/l water)	2 applications Actual (µg/kg dry sediment)	2 applications Time weighted average (µg/kg dry sediment)
Initial (max after 18 days)	2.08 µg a.s./ L	1.98 µg a.s./ L	19.77 µg a.s./ L	19.77 µg a.s./ L
Short term + 24h + 2d + 4d	1.89µg a.s./ L 1.85µg a.s./ L 1.78 µg a.s./ L	1.98µg a.s./ L 1.93µg a.s./ L 1.87 µg a.s./ L	19.39 µg a.s./ L 19.00µg a.s./ L 18.26 µg a.s./ L	19.58 µg a.s./ L 19.40µg a.s./ L 19.00 µg a.s./ L
Long term + 7d + 14d + 21d + 28d + 42d	1.68 µg a.s./ L 1.46 µg a.s./ L 1.27 µg a.s./ L 1.10 µg a.s./ L 0.83 µg a.s./ L	1.81 µg a.s./ L 1.69 µg a.s./ L 1.58 µg a.s./ L 1.48 µg a.s./ L 1.30 µg a.s./ L	17.19 µg a.s./ L 14.94 µg a.s./ L 12.99 µg a.s./ L 11.29 µg a.s./ L 8.52 µg a.s./ L	18.46 µg a.s./ L 17.25 µg a.s./ L 16.15 µg a.s./ L 15.14 µg a.s./ L 13.37 µg a.s./ L

PEC (surface water, sediment) submitted by the notifier

Predicted environmental concentrations of BAS 555 F (metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU (Rice P. 2002)

Method of calculation :
The *PEC surface water* from spray drift were calculated based on a volume of the water body per ha of 3,000,000 L, and surface water loadings taken from the 90th percentile drift values published by Kohsiek (2000) adapted from Ganzelmeier et al. (1995) for field crops. In the case of multiple applications, the overall 90th percentile risk was taken and this was achieved by equally distributing the risk to all the applications.
A three-compartment model was adapted from for the calculation of the, $PEC_{sw,act}$ of metconazole resulting from spray drift. An event component was included in the model to account for the introduction of material in the water-sediment system from spray drift resulting from applications of CARAMBA. Direct overspray and 1m buffer zones were considered for the field crops (cereals and oilseed rape). The dissipation and degradation of metconazole from the water was modeled conservatively, using the slowest rate of transfer from water to sediment, and the slowest rate of degradation from water to sink i.e. kWater_Sediment = 0.0531 and kWater_Sink = 0.0001 (equivalent to an overal DT_{50} of 13 days). Finally, the $PEC_{sw,act}$ were calculated in the model as a variable, from the percentage of applied metconazole in the water (Water compartment)

The $PEC_{sw,twa}$ were calculated using a moving time-frame Excel spreadsheet, which for a given exposure period, calculates time-weighted average concentrations with a moving starting time, from day of first application to day of last application, and scans for the highest value. The exposure periods of 1, 2, 4, 7, 14, 21, 28, 42, 50, and 100 days were calculated for $PEC_{sw,act}$ and $PEC_{sw,twa}$.

*PEC sediment :*The same three-compartment model used to calculate the $PEC_{sw,act}$ (was also adapted for the calculation of the $PEC_{sed,act}$ of metconazole resulting from spray drift. The transfer to and dissipation from the sediment is modeled conservatively, using the fastest rate of transfer from water to sediment (first-order kinetics), and the slowest rate of dissipation from sediment to sink from the water/sediment study, i.e. kWater_Sediment = 0.8115, kWater_Sink = 0, and kSediment_Sink = 0.0007. Finally, the $PEC_{sed,act}$ were calculated in the model as a variable, from the percentage of applied metconazole in the sediment (Sediment compartment)

Due to the transfer of material from the water phase to sediment phase, the highest predicted concentration in the sediment occurs after the last application. The time of the highest predicted concentration depends on the number of applications and interval between applications. The $PEC_{sed,act}$ for a single and multiple applications are reported starting from the highest predicted concentration, which is therefore noted $PEC_{sed,ini}$. The $PEC_{sed,twa}$ were calculated using a moving time-frame Excel spreadsheet, which, for a given exposure period, calculates time-weighted average concentrations with a moving starting time, from day of first application to day of last application, and scans for the highest value. The $PEC_{sed,act}$ and $PEC_{sed,twa}$ were calculated for the 1, 2, 4, 7, 14, 21, 28, 42, 50, and 100 day exposure periods.

PEC_{sed} values were calculated for field crops (which include cereals and oilseed rape) at the highest application rate (90 g a.s./ha) and for the maximum number of applications (2) with the minimal time interval between applications (14 days). ‘
Findings :

Table B.8.6.1-3 : Calculated PECsw values for two applications (90 g a.s./ha, 14-day interval) of CARAMBA 60 SL to field crops with a 1 meter buffer (2.38% drift)

Days	Actual Conc. (µg a.s./ L)	Max Time Weighted Average Conc. (µg a.s. / L)
0	0.894	0.894
1	0.848	0.871
2	0.804	0.849
4	0.725	0.806
7	0.694	0.768
14	0.628	0.716
21	0.568	0.677
28	0.513	0.643
42	0.420	0.584
50	0.374	0.561
100	0.183	0.444

Single applications and overspray scenarios were also considered by the notifier. They are not reported here.

Table B.8.6.1-4 : Calculated PECsed values for two applications (90 g a.s./ha, 14-day interval) of CARAMBA to field crops with a 1 meter buffer (2.38% drift)

Days	Actual Conc. (mg a.s./kg wet sediment)	Max Time Weighted Average Conc. (mg a.s. /kg wet sediment)
0	0.033	0.033
1	0.033	0.033
2	0.033	0.033
4	0.033	0.033
7	0.032	0.033
14	0.032	0.032
21	0.032	0.032
28	0.032	0.032
42	0.032	0.032
50	0.031	0.032
100	0.030	0.032

Single applications and overspray scenarios were also considered by the notifier. They are not reported here.

Remarks on the PEC sediment calculated by the notifier : Due to the very long DT_{50} of the a.s. in sediment, the rapporteur considers that a PEC taking into account the possible accumulation of the a.s. through years is representative of the actual residue situation. See Table B.8.6.1-2

Conclusions :
The PEC sw and PEC sediment which were calculated by the notifier and by the rapporteur are similar, except for minor differences due to slight differences in input parameters .

B.8.6.2 Predicted Environmental Concentrations in in ground water (PECgw) (Annex IIIA 9.21)

Predicted environmental concentrations of BAS 555 F (metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU (Rice P. 2002)

Method of calculation :

"The simulations were performed with FOCUS_PELMO version 2.2 for all the relevant crop-location scenarios (northern EU), using the following pesticide input parameters, selected following FOCUS (2000) recommendations: molecular weight (M.W.) of 319.8 g mol^{-1}, Henry constant of 0.0 Pa m^3 mol^{-1} (assuming no volatilization), average K_{OC} and 1/n values of 1000.6 L kg^{-1} and 0.938, respectively (mixture of cis:trans isomers), and average laboratory half-life of 247 days (average of the first-order laboratory degradation DT_{50} values of metconazole from five soils, corrected separately to the FOCUS reference temperature and soil moisture conditions of 20ºC and pF2, which were significantly longer than the half-life values measured in the field).

Irrigation was not applied to the cereals and oilseed rape in the northern EU location scenarios, as recommended in FOCUS. The amount of metconazole reaching the soil after crop interception (soil load) was calculated by subtracting the amount of pesticide intercepted by the crop at the time of application from the application rate. Crop interception values of 25% for cereals (conservative estimate for the first possible visible signs of infection, growth stage BBCH 10-19, leaf development) and 40% for oilseed rape (conservative estimate for potential first signs of infection, growth stage BBCH 10-19, leaf development) were used. The simulations were performed with the maximum number of applications for each crop, at the highest application rate (two applications of 90 g a.s./ha, 14-day interval). The total soil load after crop interception was 67.5 g a.s./ha and 54 g a.s./ha per application for cereals and oilseed rape, respectively. Application dates were based on the GAP and the emergence dates in the different FOCUS location scenarios."

Findings :

B.8.6.2-1 The predicted 80th percentile concentrations of metconazole in shallow groundwater (1m depth) following two applications (90 g a.s./ha, 14-day interval)

Application	1 m depth (80%)
Location	(mg/l)
	Winter Cereals
Châteaudun	0.000
Hamburg	0.002
Jokionen	0.000
Kremsmünster	0.001
Okehampton	0.008
	Spring Cereals
Châteaudun	0.000
Hamburg	0.000
Jokionen	0.000
Kremsmünster	0.000
Okehampton	0.001
	Winter Oilseed Rape
Châteaudun	0.000
Hamburg	0.003
Kremsmünster	0.002
Okehampton	0.016
	Summer Oilseed Rape
Jokionen	0.000
Okehampton	0.001

Conclusions :
The endpoints which have been used were chosen in accordance with the FOCUS guidance (Koc, laboratory DT_{50}, correction of DT_{50} to 20°C and pF2, GAP, worst case interception parameters, monoculture scenario)
All the estimated concentrations were well below the 0.1 µg/l EU trigger value. PEC were not calculated for Southern scenarios. However it can be expected that PEC under these pedo-climatic conditions will be below 0.1 µg/l

B.8.7 Fate and behaviour in air (Annex IIA, 7.2.2; Annex IIIA 9.3)

Metconazole (CL 900768) 60 g/l SL (SF 09381): the volatilization behaviour from soil and plant (Bissinger H.J. 1996b)
Guidelines :
BBA Guideline Level IV part 6-1
GLP :
Yes
Material and Methods :
Test substance : formulation SL 60 g/l of metconazole
Experimental design :
The BBA standard soil 2.1 (sandy soil, 87.4% sand, 0.7% OC), and beans (*Phaseolus vulgaris L.*) var. Saxa, green, were used as substrates. The soil was sieved to 2mm, and its moisture adjusted to approximately 60% MWHC. The plants were in the state of blooming (approximate height 35 cm). The application rate was approximately 90 g a.s./ha.
The application solution was sprayed evenly onto the surface of the respective substrate. Following application, the samples were placed on the volatilization equipment. A constant stream of air at ambient temperature (20 ± 2 °C) was passed over the test systems. The air velocity was between 1 and 2 m/s. The air humidity was between 42.1 and 55.6% (average 50.1%) in case of the volatilization from soil, and 29.2 to 45.3% (average 34.4%) during the volatilization from plants.

Soil and plant samples were collected at 0, 1, 3, 6, and 24 hours after application. Triplicate samples were extracted, concentrated, and analyzed by HPLC.

Findings :
Measurements of the amount of test substance remaining in the soil or on the plant leaves revealed that recovery rates between 80 to 89% (average 85%) in the case of soil, and between 68 and 95% (average 82%) in case of the plants was obtained. The variation in recoveries between the various sampling intervals, especially between the 0 and 24 hour samples, was within the experimental variation.

At the 0 and 24 hour sampling intervals, 87 and 86% of the applied metconazole remained in the soil and 95 and 87% remained on the plants, respectively.

Conclusions:
This study is made according to the BBA guideline; at this time, no specific study is required at EU level.
After 24 hours >85% of the applied metconazole remained on the substrates (plant, soil). Therefore, no significant losses of metconazole due to volatilization would be expected during the first 24 hours after application.

Henry's Law Constant BAS 555 F (Metconazole): Calculation of Henry's law constant (Martin C. 2002)
Findings and conclusions :
purified a.s. :
vapour pressure at 20°C : 2.1 x 10^{-8} Pa
water solubility at 20°C : 30.4 mg/L = 0.095 mol/m^3

⇒ H at 20°C = 2.21 x 10^{-7} Pa.m^3.mol^{-1}

Metconazole (AC 900768): Estimation of the photochemical oxidation rate in the atmosphere (Mangels G. 1996a)
Findings and conclusions :
Estimation by the Atkinson calculation method
overall OH rate constant K_{OH} = 19.6914 x 10^{-12} cm^3/molecules.sec
⇒ estimated half-life in troposphere = 6.5 hr or 0.543 d
(using a 12 hr day with global OH-concentration of 1.5 x 10^6 OH radicals/cm^3)

B.8.8 Summary of behaviour in air and predicted environmental concentrations in air (PECa) (Annex IIIA 9.3)

The DT_{50} of metconazole in air due to photochemical oxidative degradation is less than 6.5 hours. Therefore, no detailed assessment of atmospheric concentrations of metconazole is necessary.

B.8.9 Definition of the residue (Annex IIA 7.3)

Residue in soil : metconazole alone, sum of cis- and trans-isomer
Residue in water : metconazole alone, sum of cis- and trans-isomer
Residue in sediment : metconazole alone, sum of cis- and trans-isomer

B.8.10 References relied on

Active substance (Annex IIA 7)

Annex point(s)	Author(s)	Year	Title Source BASF Document No. GLP or GEP status Published or not	Data Protection Claimed Y/N	Owner
II A 7.1.1.1.1/1	Gedik L.,Fullard D.C.	2002	Metconazole (BAS 555 F): Degradation in soil under aerobic conditions Inveresk Research International Ltd.; Tranent, EH33 2NE; United Kingdom MK-620-020 Yes unpublished	Y	BASF
II A 7.1.1.1.1/2	Edwards V.T.	1990	WL148271 (KNF-S-474m): Degradation rate in five soils Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-002 Yes unpublished	N	BASF
II A 7.1.1.1.2/1	Gedik L. et al.	2001	Metconazole (BAS 555F): Degradation in soil under anaerobic conditions Inveresk Research International Ltd.; Tranent, EH33 2NE; United Kingdom MK-620-018 Yes unpublished	Y	BASF
II A 7.1.1.1.2/2	Baranowski D.,VanDijk A.	1992	Photodegradation study of 14C-WL 136184 on soil RCC Umweltchemie AG; Itingen; Switzerland MK-620-005 Yes unpublished	N	BASF
II A 7.1.1.1.2/3	Bissinger H.J.	1996a	Photochemical degradation of Metconazole (CL900768) in soil Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-620-013 Yes unpublished	N	BASF
II A 7.1.1.2.1/1	Edwards V.T.	1990	WL148271 (KNF-S-474m): Degradation rate in five soils Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-002 Yes unpublished	N	BASF
II A 7.1.1.2.1/2	Rice P.	2002b	Calculation of DT50 and DT90 values of Metconazole (BAS 555 F) in five soils BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-620-021 No unpublished	Y	BASF
II A 7.1.1.2.1/3	Gedik L.,Fullard D.C.	2002	Metconazole (BAS 555 F): Degradation in soil under aerobic conditions Inveresk Research International Ltd.; Tranent, EH33 2NE; United Kingdom MK-620-020 Yes unpublished	Y	BASF
II A 7.1.1.2.1/4	Hall B.E.,Lowrie C.	2002	Metconazole (BAS 555 F): Rate of degradation in soil under aerobic conditions at 10 degrees C BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-620-019 Yes unpublished	N	BASF

Annex point(s)	Author(s)	Year	Title Source BASF Document No. GLP or GEP status Published or not	Data Protection Claimed Y/N	Owner
II A 7.1.1.2.1/5	Gedik L. et al.	2001	Metconazole (BAS 555F): Degradation in soil under anaerobic conditions Inveresk Research International Ltd.; Tranent, EH33 2NE; United Kingdom MK-620-018 Yes unpublished	Y	BASF
II A 7.1.1.2.2/1	Bissinger H. et al.	1996	Metconazole (CL 900768) 60 g a.i./L SL (SF09381): Soil dissipation study (Germany, 1995) Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-790-011 Yes unpublished	N	BASF
II A 7.1.1.2.2/2	Bissinger H.J.,Burgess J.	1996	Metconazole (CL900768) 60 g a.i./L SL (SF09381): Soil dissipation study (UK, 1995) Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-790-012 Yes unpublished	N	BASF
II A 7.1.1.2.2/3	Davies E.H.	1993	Metconazole (WL136184, KNF-S-474c): The dissipation from soil at 6 field sites in the UK, France and Germany following application of 60 g/l SL and 100 g/l EC formulations, SF07455 and SF07355 - 1991/1992 Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-010 Yes unpublished	N	BASF
II A 7.1.1.2.2/4	Bosio P.G.	1992	Residues of Metconazole in soil from France treated with KNF-S-474 Shell Chimie France; ; France MK-790-004 Yes unpublished	N	BASF
II A 7.1.1.2.2/5	Wright D.R.	1992b	Metconazole: Residues in soil following application of WL136184 (KNF-S-474c) as EC formulation SF07355 and SL formulation SF07455 - UK trials, 1991/92 Hazleton UK; Harrogate North Yorkshire; United Kingdom MK-790-016 Yes unpublished	N	BASF
II A 7.1.1.2.2/6	Wright D.R.	1992a	Metconazole: Residues in soil following application of WL136184 (KNF-S-474c) as EC formulation SF07355 and SL formulation SF07455 - Germany 1991/92 Hazleton UK; Harrogate North Yorkshire; United Kingdom MK-790-008 Yes unpublished	N	BASF
II A 7.1.1.2.2/7	Smalley R.	2002	BAS 555 F (Metconazole) (BAS 555 00 F, Caramba 60g/l SL): Soil accumulation study (UK, 1995) BASF Agro Research Gosport; Gosport; United Kingdom MK-790-015 Yes unpublished	Y	BASF
II A 7.1.1.2.2/8	Beigel C.	2001	Estimation of the accumulation potential of BAS 555 F (Metconazole) in Northern European soils following applications of Caramba 60 SL to cereals and oilseed rape using the Focus groundwater scenarios shell Pearl BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-902-014 No unpublished	Y	BASF

Annex point(s)	Author(s)	Year	Title Source BASF Document No. GLP or GEP status Published or not	Data Protection Claimed Y/N	Owner
II A 7.1.1.2.3/1	Clements B.	1994	Metconazole (KNF-S-474): Evaluation of residues stability in soil under deep-freeze storage conditions Hazleton UK; Harrogate North Yorkshire; United Kingdom MK-326-002 Yes unpublished	N	BASF
II A 7.1.2/1	Webb J.D.	1991	[Triazole-14C] WL136184 (KNF-S-474c): Adsorption and desorption for a range of soils Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-003 Yes unpublished	N	BASF
II A 7.1.2/2	Bissinger H.J.	1995b	Adsorption / desorption of Metconazole (cis / trans approx. 85:15) Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-620-012 Yes unpublished	N	BASF
II A 7.1.3.1/1	Richardson K.A.	1989	The mobility of WL136184 (KNF-S-474c) in soil - soil thin layer chromatography Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-001 Yes unpublished	N	BASF
II A 7.1.3.2/1	Croucher A.,Hill A.D.	1992	WL148271 (KNF-S-474m): Leaching of aged residues Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-620-007 Yes unpublished	N	BASF
II A 7.2.1.1/1	Fisk P.R.	1991	WL148271 (KNF-S-474m): Hydrolysis as a function of pH Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-322-001 Yes unpublished	N	BASF
II A 7.2.1.2/1	Williams M.D.,Heim L.G.	1996	Determination of the aqueous photolysis rate with AC 900,768 (WL 148,271) ABC Laboratories Inc.; Columbia, Missouri 65202; United States of America MK-324-001 Yes unpublished	N	BASF
II A 7.2.1.2/2	Fang C.	2002	14C-Metconazole (BAS 555 F): Natural water photolysis BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-630-005 Yes unpublished	Y	BASF
II A 7.2.1.2/3	Knoch E.,Martin C.A.	1999	Metconazole AC (900768): Determination of the direct phototransformation in buffered medium at pH 7 Institut Fresenius, Chemische und Biologische Laboratorien GmbH; Taunusstein; Germany Fed. Rep. MK-324-003 Yes unpublished	N	BASF
II A 7.2.1.3.1/1	Battersby N.S.	1990	WL148271 (KNF-S-474M): An assessment of ready biodegradability Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-690-001 Yes unpublished	N	BASF

Annex point(s)	Author(s)	Year	Title Source BASF Document No. GLP or GEP status Published or not	Data Protection Claimed Y/N	Owner
II A 7.2.1.3.1/2	Battersby N.S.	1991	KNF-S-474 cis isomer (WL136184): An assessment of ready biodegradability Sittingbourne Research Centre; Kent ME9 8AG; United Kingdom MK-690-002 Yes unpublished	N	BASF
II A 7.2.1.3.2/1	Steinfuhrer T.	1996	14C-Metconazole (CL 900768): Degradation in water/sediment systems Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-630-002 Yes unpublished	N	BASF
II A 7.2.1.3.2/2	Rice P.	2002a	Calculation of DT50 and DT90 values of Metconazole (BAS 555 F) in two water-sediment systems BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-630-006 No unpublished	Y	BASF
II A 7.2.2/1	Martin C.A.	2002	BAS 555 F (Metconazole): Calculation of Henry's law constant BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-336-001 Yes unpublished	Y	BASF
II A 7.2.2/2	Bissinger H.J.	1996b	Metconazole (CL 900768) 60 g/l SL (SF09381): The volatilization behaviour from soil and plant surface Cyanamid Forschung GmbH; Schwabenheim; Germany Fed.Rep. MK-640-005 Yes unpublished	N	BASF
II A 7.2.2/3	Mangels G.	1996a	Metconazole (AC 900768): Estimation of the photochemical oxidation rate in the atmosphere American Cyanamid Company; Princeton NJ 08543-0400; United States of America MK-324-002 No unpublished	N	BASF

Formulation (Annex IIIA 9)

Annex point(s)	Author(s)	Year	Title Source BASF Document No. GLP or GEP status Published or not	Data Protection Claimed Y/N	Owner
III A 9.1.3/1	Rice P.	2002	Predicted environmental concentrations of BAS 555 F (Metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (Metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-601-003 No unpublished	Y	BASF
III A 9.2.1/1	Rice P.	2002	Predicted environmental concentrations of BAS 555 F (Metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (Metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-601-003 No unpublished	Y	BASF
III A 9.2.3/1	Rice P.	2002	Predicted environmental concentrations of BAS 555 F (Metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (Metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-601-003 No unpublished	Y	BASF
III A 9.2.4/1	Rice P.	2002	Predicted environmental concentrations of BAS 555 F (Metconazole) in soil, groundwater, surface water, and sediment following applications of CARAMBA (Metconazole 60 g a.s./l SL) to cereals and oilseed rape in the EU BASF Corporation Agro Research; Princeton NJ 08543-0400; United States of America MK-601-003 No unpublished	Y	BASF