Cows. In a study in the UK during 1994, 11 lactating Friesian cows were dosed twice daily with kresoxim-methyl at 120, 360 or 1200 mg/cow/day, equivalent to 6, 18 or 60 ppm in the feed, for 28 or 29 days with an undosed control for each group. Three cows from each group were slaughtered on the day of the final dose. Two additional cows from the high-dose group were fed the basal diet for 2 or 7 days after the last dose.

Milk samples, taken twice daily and combined to give daily samples, were stored at 4°C before mixing and overnight before analysis. On days 1, 14 and 28 only, additional 5-litre samples were retained from the total 24-hour milk production of each cow and separated by centrifugation into cream and skimmed milk. Changes in milk yield were reported to be within normal limits. Residues of 490M2 and 490M9 in whole milk, cream and skimmed milk were all <0.002 mg/kg (<2 µg/l).

The residues in the tissues are shown in Table 54. The parent compound was not sought. Samples were stored up to 175 days before analysis. The highest residues occurred in the kidneys, principally as 490M1 which was present at slaughter in all cows. 490M1 also occurred in the highest dose group in the liver, peritoneal fat and subcutaneous fat, and in the 360 ppm group in the liver and peritoneal fat. 490M9 was found in the liver and kidneys at the higher doses. 490M2 residues were all <0.01 mg/kg. Residues generally increased with increasing dose.

After 2 days withdrawal only 490M1 was still present in the liver and kidneys. By seven days there were no residues of 490M1 or 490M9 above 0.01 mg/kg in the liver, but a single residue was found in the kidneys (Redgrave, 1994).

Table 54. Residues of kresoxim-methyl metabolites in cow tissues after dosing at 120, 360 and 1200 mg/day.

Metabolite	Group	Dose level	Residue concentration , mg/kg				
		mg/day	Liver	Kidney	Muscle	Subcutaneous fat	Peritoneal fat
490M1	A	0	nd	<0.01	nd	nd	nd
	B	120	nd	0.021-0.028	<0.01	<0.01	<0.01
	C	360	0.012-0.028	0.054-0.13	<0.01	<0.01	<0.01-0.033
	D	1200	<0.01-0.036	<0.01-0.29	<0.01	<0.01-0.02	<0.01-0.091
490M2	A	0	nd	nd	nd	nd	nd
	B	120	<0.01	nd	<0.01	nd	nd
	C	360	<0.01	<0.01	nd	nd	nd
	D	1200	<0.01	<0.01	<0.01	<0.01	<0.01
490M9	A	0	nd	nd	nd	nd	nd
	B	120	nd	nd	<0.01	nd	nd
	C	360	<0.01-0.015	0.014-0.023	<0.01	nd	nd
	D	1200	<0.01-0.024	<0.01-0.049	<0.01	<0.01	<0.01

nd: not detectable, <0.002 mg/kg

FATE OF RESIDUES IN STORAGE AND PROCESSING

In storage

No information.

In processing

Residues in processed products were determined in some of the residue trials on apples and grapes. The results are repeated, together with the corresponding processing factors, in Table 55.

Table 55. Residues of kresoxim-methyl in processed products of apples and grapes.

Residue, mg/kg, and (calculated processing factor)						
Raw apple	Washed apple	Apple juice	Wet pomace	Apple sauce		
0.16	0.19 (1.19)	<0.05 (<0.31)	<0.05 (<0.31)	<0.05 (<0.31)		
0.19	0.07 (0.37)	<0.05 (<0.26)	0.09 (0.47)	<0.05 (<0.26)		
0.08	0.16 (2)	<0.05 (<0.63)	0.17 (2.1)	<0.05 (<0.63)		
<0.05	-	<0.05	<0.05	-		
Mean factor	1.2	<0.4	≤1	<0.4		
Grapes	Must 1 after heating	Must 2 after pressing	Wet pomace	Wine	Rosé wine	Red wine
0.25	<0.05 (<0.2).	<0.05	0.57	<0.05 (<0.2). <0.05 (<0.2)	<0.05 (<0.2)	<0.05 (<0.2)
0.73	0.06 (0.08)	0.19	1.4			
0.44	0.07 (0.16).	0.08	0.38	<0.05 (<0.11)		
0.17	<0.05 (<0.29)	0.09	0.52		<0.05 (<0.29)	<0.05 (<0.29)
Mean factor	0.1	0.1	0.7	0.2	<0.2	<0.2
Grapes	Juice	Raisins				
0.16	<0.05 (<0.31)	0.26 (1.63)				
1.82	0.13 (0.071)	2.82 (1.55)				
Mean factor	0.07	1.6				

In a brewing study barley was treated at 0.25 kg ai/ha (twice the GAP application rate) with kresoxim-methyl. Two malts were used to prepare an ale beer in a 1:100 scale pilot brewery. Three brews were carried out for each malt with serial repitching of the yeast into the next brew of the series. Residues in the initial grain and in the beer were all <0.05 mg/kg (BASF, 1997).

Residues in the edible portion of food commodities

The only information on residues in the edible portion of commodities apart from the processing studies was on residues in the kernels of pecans (Table 53). The residues were all <0.05 mg/kg.

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

No information.

NATIONAL MAXIMUM RESIDUE LIMITS

The national MRLs shown below were reported (BASF, 1998). There are no harmonised EU MRLs.

Country	MRL, mg/kg, and commodity
Austria	-
Belgium	0.05 pome fruits, other vegetable food
Brazil	-
Denmark	-
European Union	-
Finland	-
France	0.5 grapes 0.1 apple & pear 0.05 cereals
Germany	0.05 other vegetable food
Hungary	0.50 wine grapes, table grapes 0.05 apple
Ireland	-
Israel	0.5 wine grapes, table grapes 0.1 strawberries
Italy	0.05 apple, pear
Japan	15 grapes 10 orange & apricot 5 barley, kaki plum, apple & pear 2 mandarin, sweet pepper & welsh onion 1 kiwifruit 0.5 peach, cucumber & summer squash 0.1 wheat, sugar beet & garlic
Luxembourg	-
Netherlands	0.05 all vegetable food
Norway	-
Portugal	-
South Africa	0.10 apple, pear
Spain	0.5 grapes 0.05 apple, pear
Sweden	-
Switzerland	1 wine grapes, table grapes 0.05 cereals (grain), pome fruits
Taiwan	-
UK	0.05 barley (grain), wheat (grain) Estimated by UK on the basis of the trials data but not established in statute.
USA	-

- No MRLs

The definition of the residues for plant commodities is kresoxim-methyl for all the MRLs listed. Various definitions of the residue in animal products were reported by the manufacturer, all based on one or more of the metabolites 490M1, 490M2 and 490M9.

APPRAISAL

Kresoxim-methyl was considered for the first time by the current Meeting. It is used as a broad spectrum fungicide structurally related to Strobilurin A, a natural product of the wood-decaying fungus *Strobilurus tenacellus*. It is a member of a new class of biologically active compounds, the strobilurins, and is formulated as an SC, WG or SE.

Pure kresoxim-methyl is a white crystalline solid with a melting point of *c.* 102°C and low volatility. It has limited solubility in water with medium-high solubility in certain organic solvents. The log octanol-water partition coefficient of 3.4 suggests bioaccumulation may occur. Kresoxim-methyl does not dissociate at neutral pH, but the acid dissociation constant of the free acid 490M1 (pKa 4.2) indicates dissociation at neutral pH.

The main metabolites are identified by code numbers as shown below.

Code	Chemical name
parent	methyl (*E*)-methoxyimino[∀-(*o*-tolyloxy)-*o*-tolyl]acetate
490M0	methyl (*Z*)-methoxyimino[∀-(*o*-tolyloxy)-*o*-tolyl]acetate
490M1	(*E*)-methoxyimino[∀-(*o*-tolyloxy)-*o*-tolyl]acetic acid
490M2	∀-[(*o*-hydroxymethyl)phenoxy]-*o*-tolyl(methoxyimino)acetic acid
490M4	∀-(*o*-carboxyphenoxy)-*o*-tolyl(methoxyimino)acetic acid
490M8	∀-[*p*-hydroxy-(*o*-hydroxy)methylphenoxy]-*o*-tolyl(methoxyimino)acetic acid
490M9	α-(*p*-hydroxy-*o*-tolyloxy)-*o*-tolyl(methoxyimino)acetic acid
490M15	methyl α-(*p*-hydroxy-*o*-tolyloxy)-*o*-tolyl(methoxyimino)acetate
490M48	methyl hydroxyimino[∀-(2-methoxyphenoxymethyl)phenyl]acetate

Animal metabolism and environmental fate

Animal metabolism

Metabolism of absorbed kresoxim-methyl in rats was rapid and produced a large number of metabolites of which 34, including conjugates, were identified in the tissues and/or excreta. Ester cleavage to form the free acid 490M1 is a fast and important initial reaction. Other reactions involve cleavage of the oxime and benzyl ether bonds, ring hydroxylation, side chain oxidation and several conjugation reactions.

Goats were given daily doses of radiolabelled kresoxim-methyl equivalent to 7.1 or 450 ppm diet for 5 or 8 days respectively. Most of the dose was excreted (59-69% in the urine, 18-24% in the faeces). Apart from the excreta, the highest residue levels were in the kidneys and bile. Transfer into the milk and other edible tissues was low. The total radioactive residue (TRR) from the low dose was below 0.01 mg/kg as kresoxim-methyl in the milk, muscle and fat: 0.038 mg/kg in the liver and 0.142 mg/kg in the kidneys. The main metabolites identified in the liver and kidney extracts were 490M9 (1.9 and 4.0 mg/kg respectively), 490M1 (0.8 and 2.9 mg/kg) and 490M2 (0.5 and 4.6 mg/kg). 490M6, 490M18 and 490M19 were minor products. Three metabolites in the goats had not been identified in rats, of which the minor metabolite 490M18 was at the highest concentration (0.12 mg/kg in the ethyl acetate extract of the liver from the high-dosed goat), but the Meeting agreed that in practice concentrations of 490M18 would be very low (<0.01 mg/kg) in commodities of animal origin. Kresoxim-methyl itself was detected only in the faeces and fat.

Hens were given radiolabelled kresoxim-methyl in six daily doses equivalent to 10 or 180 ppm in the diet. 71-82.6% of the radioactivity recovered from the low dose was excreted and the total radioactive residue levels in the skin, kidneys and liver were 0.009, 0.065 and 0.082 mg/kg kresoxim-methyl equivalents respectively. The ^{14}C in eggs sampled at the end of the study was equivalent to 0.012 mg/kg and 0.215 mg/kg from the low and high doses respectively and did not appear to have reached a plateau. Metabolites were identified only in the high-dose group. A number of metabolites were produced, of which 490M9 was the most prominent with residues of 1.35 mg/kg in the liver. Two major metabolites in goats were 490M2 and 490M9. 490M2 was not identified in hens and 490M9 was found only in the eggs at 0.005 mg/kg. The parent compound was identified in the eggs, skin, muscle and fat at 0.01, 0.08, 0.005 and 0.31 mg/kg respectively.

Apples were sprayed with [p*henyl*-^{14}C]kresoxim-methyl at (1) 6 x 0.4 kg/ha, PHI 14 days (2) 2 x 0.4 kg ai/ha, PHI 149 days, or (3) 2 x 0.8 kg/ha, PHI 14 days. The total radioactive residues (TRR) in or on the apples were 0.36 mg/kg from (1), 0.04 mg/kg from (2) and 0.84 mg/kg from (3). When trees were sprayed with fruit present the radioactivity remained mainly on the peel (89%-98% of the TRR) and translocation to the pulp was low after 14 days. Extracts from all three experiments showed similar patterns of metabolites, containing predominantly unchanged kresoxim-methyl (74%-93% of

the TRR). The extracts from (1), in which the fruit was present at the time of treatment, contained kresoxim-methyl (78.3% of the TRR), 490M0 (3.3% of the TRR), the acid 490M1 (3.0%) and conjugates of the alcohol-acid 490M2 (1.8%) and phenol-acid 490M9 (2.1%). Kresoxim-methyl appeared to be translocated within the apple tree and to be persistent, since it was found in the fruit above the limit of determination 149 days after an early treatment when the fruit would not have been present. However, the Meeting concluded that this was not entirely consistent with the low water-solubility and the relatively low residues of the parent compound in crops shortly after treatment, and drew attention to the possibility that the parent compound found in the fruit 149 days after treatment may have been the result of methylation of the metabolite 490M1 during methanol extraction of the samples.

The metabolism of [*phenyl*-^{14}C]kresoxim-methyl was investigated in wheat treated twice at 0.25 kg ai/ha at an interval of 56 days. The total radioactive residues were 0.06 mg/kg in the grain and 9.21 mg/kg in the straw 64 days after the second application, and 1.31 mg/kg in the forage 55 days after the first. 30-99% of the TRR could be extracted with methanol, the extractability from mature grain being low. Subsequent extraction with dilute aqueous ammonia released an additional 31% of the TRR from grain and 16% from straw. Unextractable residues were 0.27 mg/kg in straw (2.9% of the TRR) and 0.025 mg/kg in grain (38.8% of the TRR).

Most of the radioactivity was due to unchanged parent compound at levels of 5.9 mg/kg in the straw after both treatments and 0.98 mg/kg in the forage one day before second (-1 day forage). Other compounds identified in the straw and -1 day forage were 490M0, the acid 490M1 and conjugates of the alcohol-acid 490M2 and the phenol-acid 490M9. The grain extract contained 0.011 mg/kg kresoxim-methyl and a variety of other metabolites constituting 0.3-5.6% of the TRR. Enzymatic treatment of conjugate fractions yielded 0.03 mg/kg 490M2 and 0.103 mg/kg 490M9 in -1 day forage, and 0.39 mg/kg 490M2 and 1.04 mg/kg 490M9 in straw. Samples from a 1.25 kg ai/ha treatment contained higher relative and absolute amounts of the parent compound. No cleavage of the phenyl or phenoxy rings was observed. Kresoxim-methyl was apparently translocated within the plant since grain contained determinable residues of the parent compound after two treatments although the grain was not present at the time of the second treatment (growth stage 52). As with apples the Meeting noted the possibility that the residues of kresoxim-methyl found in the grain at harvest may have been the result of methylation of 490M1 during methanol extraction. No experimental clarification was reported.

Grapes. The metabolism of phenyl- and phenoxy-labelled kresoxim-methyl was investigated in grapes treated at rates equivalent to a total dose of 2.5 kg/ha. The total radioactive residues from the phenoxy and phenyl labels were equivalent to 3.8-4.0 mg/kg and 3.6-4.7 mg/kg respectively. Kresoxim-methyl was the main compound in the residue: 55-57% of the TRR, 2.2-2.7 mg/kg. Conjugated 490M2 accounted for 8.8-13.8% of the TRR. After treatment with β-glucosidase, 490 M9 accounted for 4.4-5.7% of the TRR and 490 M54 for 1.4-2.1%. Unextractable residues accounted for 4.0-4.1%. There were no major qualitative differences between the metabolism of the phenyl and the phenoxy labels and no ring cleavage was observed. The metabolite 490 M54 was not identified as a product of wheat, apple or rat metabolism. The Meeting concluded that in practice concentrations of 490 M54 would be very low (<0.01mg/kg) in grapes treated according to GAP.

In studies carried out to assess metabolism in rotational crops, phenyl-labelled kresoxim-methyl was applied to bare soils at a rate of 0.3 kg/ha. After being aged for 30 days, the soils were diluted with untreated soils at a ratio of 1:9 to simulate ploughing, and spring wheat, green beans, carrots and lettuce were planted. The highest total radioactive residues at harvest, expressed as mg/kg kresoxim-methyl, were 0.15 in wheat straw, 0.007 in wheat grain, 0.21 in bean forage, 0.009 in green beans, 0.006 in carrot roots, 0.047 in carrot foliage and 0.01 in lettuce leaves. In bean forage, carrot forage and lettuce, conjugates constituted the main radioactive residue, accounting for 0.071 mg/kg, 0.015 mg/kg and 0.012 mg/kg respectively. Enzymatic cleavage yielded mainly the aglycones 490M2

and 490M9. Lettuce contained 0.003 mg/kg kresoxim-methyl and carrot forage 0.005 mg/kg 490M1. Wheat straw contained the free hydroxy metabolites 490M2 and 490M9 (together 0.011 mg/kg). Enzyme treatment of extracts of wheat straw produced 4.8% of the TRR as 490M2 and 10.4% as 490M9. No parent compound was detected in wheat, bean or carrot forage. Metabolites in grain extracts were not characterized. The results confirm the expectation that significant residues of kresoxim-methyl would not occur because of its rapid degradation in soil. (Half-lives in soils were 1-3 days for kresoxim-methyl and 38-131 days for 490M1, and DT90s for combined parent compound and 490M1 in the field were 18-25 days; see below).

Environmental fate in soil and water/sediment systems

Both aerobic and anaerobic degradation of kresoxim-methyl in soil produced 490M1 (the free acid) in amounts representing 66-84% of the applied radioactivity (AR). In aerobic conditions this was then degraded to CO_2 (27-43% of the AR in 180 days and 24% of the AR in 1 year in different experiments) or bound residues (a maximum of 36-47% of the AR) with 490M4 found in very small amounts as an intermediate. The bound radioactivity still unextractable after treatment with aqueous alkali was largely associated with the humin fraction.

In sterile conditions some degradation of kresoxim-methyl occurred but the rate was considerably slower than that in anaerobic or aerobic conditions. In anaerobic and sterile conditions the degradation of 490M1 was too slow to measure and levels of CO_2 and bound residues were considerably lower.

In aerobic conditions at 20°C and average moisture contents (usually 40% of the maximum water-holding capacity) the degradation of kresoxim-methyl, largely to 490M1, was extremely rapid with DT90 values of 2-3 days. The 490M1 was subsequently degraded with a half-life of 38-131 days.

In anaerobic conditions the DT90 for kresoxim-methyl was also <3 days. In photolysis studies degradation was more rapid in the dark controls than in the irradiated samples, which could have been caused by loss of moisture in the irradiated soil resulting in slower aerobic degradation.

In field studies undertaken in Germany in May, the DT50 values for the combined dissipation of kresoxim-methyl and 490M1 were 8-38 days and the DT90 values 18-125 days. The dissipation of 490M1 was mainly measured since substantial dissipation of kresoxim-methyl had already occurred in the samples taken on day 0 and no residues were determinable after 14 days.

The K_{oc} of kresoxim-methyl in four soils was found to be 219-372, indicating moderate mobility, although degradation to 490M1 occurred during the experiment. In a separate experiment the K_{oc} of 490M1 was found to be 17 and 24 in two soils, but sorption to two other soils was too low for quantification measurement. In column leaching studies with three standard soils up to 77% of the applied dose was leached as a mixture of kresoxim-methyl and 490M1. When the study was repeated with aged soil about 60% of the AR was found in the leachate and most of this was associated with 490M1.

Leaching was examined in more realistic conditions in a lysimeter study where a crop was planted and kresoxim-methyl was applied twice at 150 g ai/ha. No kresoxim-methyl was found in the leachate during the two years of the study and the annual average concentrations of 490M1 were <0.01-0.04 µg/l.

In a study of aqueous hydrolysis half-lives assuming first-order kinetics were 875, 34 and 0.29 days at pH 5, 7 and 9.

Methods of residue analysis

Satisfactory validation data were submitted for analytical methods for a number of commodities of plant and animal origin. Determinations of kresoxim-methyl and the metabolites 490M2 and 490M9 in apples, cereal grain, straw, soil and water were usually by GLC with an ECD after extraction with a variety of solvents and clean-up by solid-phase extraction. Commodities of animal origin were analysed by HPLC with UV detection. Limits of determination were 0.01-0.05 mg/kg in plant commodities, 0.01 mg/kg in soil, 0.05 µg/l in water, 0.001-0.002 mg/kg in milk and 0.01 mg/kg in animal products.

Stability of residues stored analytical samples

Kresoxim-methyl residues in samples of wheat (immature plants, grain and straw) and apples stored at –18°C were stable for the duration of the studies, namely up to 214 days for grain, 91 days for straw, 168 days for forage and 295 days for apples. There was no marked change in the qualitative or quantitative composition of radioactive residues in wheat samples stored frozen for 21 months, apple samples for 14 months, grape samples for 8 months or poultry samples for 21 months.

Definition of the residue

On the basis of the metabolism in apples, wheat and grapes, the Meeting agreed that the definition of the residue for compliance with MRLs for plant commodities should be kresoxim-methyl since this is the major component of the residue in primary crops. In several of the residue trials the metabolites 490M2 and 490M9 were also found but the Meeting considered these metabolites to be of low toxicity.

In ruminants the metabolite 490M9 is a major component of the residue and the parent compound is present only at very low relative concentrations. In poultry 490M9 would also be a suitable indicator compound since it was the main compound found in the liver.

The Meeting agreed to recommend the following residue definitions for both compliance with MRLs and the estimation of dietary intake.

Commodities of plant origin: *kresoxim-methyl*
Commodities of animal origin: α-*(p-hydroxy-o-tolyloxy)-o-tolyl(methoxyimino)acetic acid, expressed as kresoxim-methyl*

Supervised trials

Pome fruit. GAP for apples was reported for Austria, Belgium, Brazil, Chile, France, Germany (pome fruit), Hungary, Israel, Italy, Japan, The Netherlands, New Zealand, Norway, Poland, Slovakia, South Africa, Spain, Sweden, Switzerland, the UK and Uruguay.

Four Italian, four French and two Spanish trials were considered to comply with French and Spanish GAP (max. 0.1 kg ai/ha, PHI 35 days). The residues in all ten trials were <0.05 mg/kg. Seven German, two Belgian, six UK and two Dutch trials complied with GAP for Austria, Belgium, Hungary, Poland and the UK (also 0.1 kg ai/ha, PHI 35 days) with residues of <0.05 (11), 0.05 (3), 0.06 and 0.11 (2) mg/kg. Two New Zealand trials complied with New Zealand GAP (0.1 kg ai/ha; PHI 14 days) with residues in both of 0.04 mg/kg. Three South African trials according to South African GAP (0.01 kg ai/hl; PHI 45 days) yielded residues of 0.06, 0.09 and 0.11 mg/kg. Other trials were reported from the USA and Canada which included determinations of the metabolites 490M2 and 490M9, but no GAP was reported for the North American continent. The Meeting agreed that all

the results could be combined, as they were essentially from one population, to give residues of 0.04 (2), <0.05 (11), 0.05 (3), 0.06 (2), 0.09 and 0.11 (3) mg/kg.

GAP for pears was reported for Austria, Belgium, Chile, France, Germany, Hungary, Italy, Japan, The Netherlands, Norway, Poland, South Africa, Spain, Sweden, Switzerland and Uruguay. Separate GAP for "oriental pear" was reported for Japan.

Four Spanish trials were according to Spanish and French GAP (max. 0.1 kg ai/ha, PHI 35days) all with residues of <0.05 mg/kg. Two South African trials were reported, one of which complied with South African GAP for apples and the other with GAP for pears. The residues were 0.06 and 0.01 mg/kg respectively. The Meeting agreed that the data on pears and apples could be combined.

The combined residues in apples and pears were 0.01, 0.04 (2), <0.05 (15), 0.05 (3), 0.06 (3), 0.09 and 0.11 (3). The Meeting estimated a maximum residue level of 0.2 mg/kg and an STMR of 0.05 mg/kg for pome fruit.

Grapes. GAP was reported for Austria, Chile, Germany, Hungary, Israel, Japan, Slovakia, South Africa, Spain and Switzerland.

Seven Italian trials were according to Spanish GAP (max 0.015 kg ai/hl, PHI 35 days) with residues of <0.05 (6) and 0.15 mg/kg. Several French and German trials were reported at applications of 0.025-0.038 kg ai/hl which were higher than the German or Swiss GAP concentration of 0.0075 kg ai/hl and the Austrian concentration of 0.0125 kg ai/hl. Five French and seven German trials were considered to comply with the maximum Austrian GAP equivalent of 0.125 kg ai/ha however, with residues of 0.06, 0.09, 0.15, 0.17, 0.18, 0.20, 0.21, 0.23, 0.25, 0.36, 0.44 and 0.73 mg/kg. Three trials complied with South African GAP (0.023 kg ai/hl, PHI 14 days), with residues of 0.09, 0.14 and 0.27 mg/kg. Trials in the USA included analyses for the metabolites 490M2 and 490M9, but no GAP was reported for the North American continent. The Meeting agreed that the residues resulting from Austrian and South African GAP could be combined, since they appeared to be from the same population, to give 0.06, 0.09 (2), 0.14, 0.15, 0.17, 0.18, 0.20, 0.21, 0.23, 0.25, 0.27, 0.36, 0.44 and 0.73 mg/kg. The residues from the trials according to Spanish GAP were considered to be from a different population since six of the seven results were below the limit of determination. The Meeting estimated a maximum residue level of 1 mg/kg and an STMR of 0.2 mg/kg.

Onions. GAP for onions was reported for Nicaragua and for Welsh onions for Japan, but as trials were reported only from Germany and The Netherlands there was no basis for an evaluation.

Cucumbers. GAP was reported for Brazil, Japan, Spain and Norway.

The residues in eight Spanish indoor trials which complied with Spanish GAP (0.01-0.015 kg ai/hl; PHI 3 days) were all <0.05 mg/kg, and in seven of the trials <0.05 mg/kg even on the day of application. The Meeting estimated a maximum residue level of 0.05* mg/kg and an STMR of 0.05 mg/kg.

Melons. No GAP was reported.

Tomatoes, sweet peppers. Eight indoor trials in Spain on each commodity complied with Spanish glasshouse GAP (max. 0.025 kg ai/hl; PHI 3 days), with residues of 0.09, 0.13, 0.14, 0.20, 0.23, 0.25, 0.27 and 0.31 mg/kg in tomatoes, and 0.10 (2), 0.15, 0.19, 0.21, 0.37, 0.39 and 0.44 mg/kg in peppers. As none of the trials were identified as complying with GAP until late in the Meeting however, neither maximum residue levels nor STMRs were estimated.

Wheat. GAP for wheat was reported for Belgium, Ireland, Luxembourg, The Netherlands, Poland, Slovakia and the UK, and for cereals for Germany and Japan.

The residues in winter and spring wheat were evaluated together because the levels were similar and the latest time of application was described as a pre-harvest interval not a growth stage. Seven German, three Belgian and five French trials accorded with Belgian, Polish, German, Dutch and Luxembourg GAP (0.105-0.150 kg ai/ha, PHI 35 days) with residues all <0.05 mg/kg in the grain or ears and <0.05, 0.05, 0.08, 0.09, 0.12, 0.13, 0.18, 0.19, 0.26, 0.28, 0.50, 1.27, 1.45, 2.59 and 4.00 mg/kg in the straw or haulm. Residues of the metabolites 490M9 and 490M2 were also measured and the total residue calculated. The Meeting estimated maximum residue levels of 0.05* and 5 mg/kg and STMRs of 0.05 and 0.19 mg/kg for the grain and straw respectively.

Barley. GAP for barley was reported for Belgium, France, Germany, Luxembourg, Norway, Switzerland, Ireland, The Netherlands, Poland and the UK, and for cereals for Germany and Japan.

The trials on winter and spring barley were evaluated together for the reasons given above. Three Dutch, two French and six German trials complied with GAP in Belgium, France, Germany, Luxembourg, The Netherlands, Norway and Poland (max. rate 0.105 or 0.125 kg ai/ha, PHI 35 or 42 days) with residues of <0.05 (9) and 0.06 (2) mg/kg in the grain or ears and 0.07, 0.08, 0.14 0.20, 0.22, 0.26, 0.28, 0.45, 0.79 and 0.92 mg/kg in the straw or haulm. The Meeting estimated maximum residue levels of 0.1 and 2 mg/kg and STMRs of 0.05 and 0.24 mg/kg for grain and straw respectively.

Rye. GAP was reported for Belgium, France, Germany, Luxembourg, Poland, Switzerland and The Netherlands, with maximum application rates of 0.105 or 0.125 kg ai/ha and PHIs of 35 days.

Only two trials were reported, both in Germany and according to GAP, with residues of <0.05 mg/kg in the ears and 0.08 and 0.11 mg/kg in the haulms. The Meeting agreed that the data for wheat could be extrapolated to rye, giving combined residues of <0.05 (17) mg/kg in the grain and <0.05, 0.05, 0.08 (2), 0.09, 0.11, 0.12, 0.13, 0.18, 0.19, 0.26, 0.28, 0.50, 1.27, 1.45, 2.59 and 4.00 mg/kg in the straw or haulm. The Meeting estimated maximum residue levels of 0.05* and 5 mg/kg, and STMRs of 0.05 and 0.18 mg/kg for grain and straw respectively.

The Meeting agreed that it was appropriate to recommend a group MRL for cereal straws rather than separate MRLs for the individual straws. Accordingly the Meeting recommended an MRL of 5 mg/kg and estimated an STMR of 0.24 mg/kg for “straw and fodder (dry) of cereal grains” since these represented the highest estimates for any individual cereal.

Pecans. A number of trials in the USA were reported but the Meeting was informed that there was no current GAP for pecans.

Processing studies

Apples were processed to washed fruit, apple juice, wet pomace and apple sauce, and grapes to juice, must, wine, wet pomace, and raisins. The mean processing factors were <0.4, <1 and <0.4 for apple juice, wet apple pomace and apple sauce, and 0.1, 0.7, <0.2 and 1.6 for must, wet grape pomace, wine and raisins respectively.

From these factors the Meeting estimated a maximum residue level of 2 mg/kg for dried grapes and STMRs of 0.05, 0.02 and 0.02 mg/kg for wet apple pomace, apple sauce and apple juice and 0.14, 0.02, 0.04 and 0.32 mg/kg for wet grape pomace, grape must, wine and dried grapes respectively. A study of the effects of brewing on residues in barley was difficult to interpret since

the residues were <0.05 mg/kg in the initial grain although the barley had been treated at twice the GAP rate.

Farm animal feeding studies

Dairy cows were dosed twice daily with kresoxim-methyl at rates equivalent to 6, 18 and 60 ppm in the feed for 28 or 29 days. Residues of 490M2 and 490M9 in whole milk, cream and skimmed milk were <0.002 mg/kg; 490M1 was not determined. Residues in the tissues of the low-dose group were all <0.01 mg/kg, except those of 490M1 which appeared in the kidneys at 0.021-0.028 mg/kg. In the high-dose group the highest residue concentrations were 490M1 in the kidneys (<0.01-0.29 mg/kg) and peritoneal fat (<0.01-0.091 mg/kg), and 490M9 in the liver (<0.01-0.024 mg/kg) and kidneys (<0.01-0.049 mg/kg).

The highest residue levels in the feed items were in wheat straw for which the Meeting estimated a maximum residue level of 5 mg/kg. This leads to a theoretical maximum dietary level of 2.5 ppm, based on a 50% level of straw in the diet. The Meeting concluded that no residues above the practical limits of determination (0.01 mg/kg for milk and 0.05 mg/kg for other animal products) would occur in animal commodities from this dietary level. The Meeting estimated maximum residue levels of 0.01* mg/kg for milks and 0.05* mg/kg for mammalian meat, edible offal and fats, and corresponding STMRs of 0.002 and 0.01 mg/kg. The STMRs are based on the validated limits of determination of the analytical methods for these commodities.

The only poultry feed item containing determinable residues was barley grain with residues in the trials of ≤0.06 mg/kg and an estimated maximum residue level of 0.1 mg/kg. The Meeting concluded that the intake for poultry would be ≤0.1ppm in the feed. In the poultry metabolism study TRRs were very low in the skin (0.009 mg/kg), kidneys (0.065 mg/kg) and liver (0.082 mg/kg) at doses equivalent to 10 ppm in the feed. The Meeting concluded that no residues above the practical limit of determination (0.05 mg/kg) would occur in edible poultry tissues, and estimated a maximum residue level of 0.05* mg/kg and an STMR of 0.01 mg/kg for poultry meat. The STMR is based on the validated limit of determination for the reported methods of analysis.

RECOMMENDATIONS

On the basis of data from supervised trials the Meeting estimated the maximum residue levels and STMRs listed below. The maximum residue levels are recommended for use as MRLs.

Definition of the residue for compliance with MRLs and for the estimation dietary intake for plant commodities: kresoxim-methyl.

For compliance with MRLs and for the estimation dietary intake for animal commodities: α-(*p*-hydroxy-*o*-tolyloxy)-*o*-tolyl(methoxyimino)acetic acid, expressed as kresoxim-methyl

Commodity		Recommended MRL, mg/kg		STMR
CCN	Name	New	Previous	
JF 0226	Apple juice			0.02
	Apple pomace, wet			0.05
JF 0226	Apple sauce			0.02
GC 0640	Barley	0.1		0.05
VC 0424	Cucumber	0.05*		0.05
DF 0269	Dried grapes (= currants, raisins and sultanas)	2		0.32
MO 0105	Edible offal (Mammalian)	0.05*		0.01
	Grape must			0.02

Commodity		Recommended MRL, mg/kg		STMR
CCN	Name	New	Previous	
	Grape pomace, wet			0.14
FB 0269	Grapes	1		0.2
MF 0100	Mammalian fats (except milk fats)	0.05*		0.01
MM 0095	Meat (from mammals other than marine mammals)	0.05*		0.01
ML 0106	Milks	0.01*		0.002
FP 0009	Pome fruits	0.2		0.05
PM 0110	Poultry meat	0.05*		0.01
GC 0650	Rye	0.05*		0.05
AS 0081	Straw and fodder (dry) of cereal grains	5		0.24
GC 0654	Wheat	0.05*		0.05
	Wine			0.04

FURTHER WORK OR INFORMATION

Desirable

1. Information on residues in food in commerce or at consumption (monitoring or total diet data).

2. Experimental determination of whether (*E*)-methoxyimino[∀-(*o*-tolyloxy)-*o*-tolyl]acetic acid (490M1) is methylated to kresoxim-methyl when methanol is used as an extractant in metabolism studies or the analysis of samples from supervised trials.

DIETARY RISK ASSESSMENT

STMRs have been estimated for 18 commodities of which the 11 commodities for which there are consumption data have been used in the estimate of dietary intake.

The International Estimated Dietary intakes for the five GEMS/Food regional diets were 0% of the ADI. The Meeting concluded that the intake of residues of kresoxim-methyl resulting from its uses that have been considered by the JMPR is unlikely to present a public health concern.

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