PROCHLORAZ (142)

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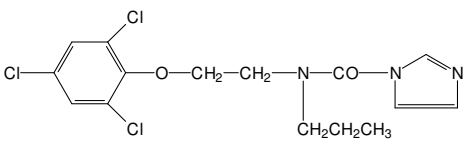
EXPLANATION

Prochloraz was first evaluated in 1983 for residues and toxicology, and subsequently for residues in 1985, 1987, 1988, 1989, 1990 and 1992 and for toxicology in 2001 under the CCPR Periodic Review Programme. It was tentatively scheduled for residue review in 2002 by the 29th Session of the CCPR (ALINORM 97/24A). It was subsequently re-scheduled for residue re-evaluation by the 2004 JMPR. Information on prochloraz metabolism and environmental fate, methods of residue analysis, freezer storage stability, national registered use patterns, supervised residue trials, farm animal feeding studies, fate of residues in processing and national MRLs was reported to the present Meeting. Information on GAP and national MRLs was submitted by the governments of Australia and Japan.

The 2001 JMPR had confirmed the existing ADI of 0-0.01 mg/kg bw and established an acute RfD of 0.1 mg/kg bw for prochloraz.

Prochloraz is a broad-spectrum imidazole fungicide, inhibiting ergosterol biosynthesis and active against a range of diseases caused by ascomycetes and fungi imperfecti in field crops, fruit and vegetables and is also used on mushrooms and as a seed treatment on cereals.

IDENTITY

ISO common name:	prochloraz
Company code numbers:	BTS 40542
Chemical names	
IUPAC:	*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy)ethyl]imidazole-1-carboxamide
CA:	*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy)ethyl]-1*H*-imidazole-1-carboxamide
CAS number:	67747-09-5
CIPAC number:	Not yet allocated
Molecular formula:	$C_{15}H_{16}Cl_3N_3O_2$
Relative molecular mass:	376.69
Structural formula:	

PHYSICAL AND CHEMICAL PROPERTIES

Pure active ingredient

Property		Reference
Minimum purity:	99%	
Appearance:	white crystals	Anon, 1991 [A86998]
Melting point:	46.5–49.3°C	Scott and Bright, 1988 [A87240]
Boiling point:	None at atmospheric pressure, decomposition (from 220°C) before boiling point	Franke, 2001 [C015717]
Relative density	1.42 ± 0.01 g /cm^3 at 20ºC	Scott and Bright, 1989a [A87246]
Vapour pressure:	3.1–10^{-2} Pa at 80ºC 8.8–10^{-3} Pa at 65ºC 9 10^{-5} Pa at 20ºC	Bright, 1990a [A87301]
Henry's law constant:	1.64 × 10^{-3} Pa m^3 mol^{-1} (calculated)	Bright, 1993 [A87482]
Solubility in water:	34.4 mg/l at 25°C	Bright and Scott, 1989 [A87256]
Solubility in organic solvents	>600 g/l at 25ºC in acetone, dichloromethane, dimethylsulfoxide, ethanol, ethyl acetate, methanol, 2-propanol, toluene and p-xylene 7.5 g/l at 25ºC in hexane	Lowes and Bright, 1988 [A87221], Bright and Scott, 1988 [A87222]
Octanol/water partition coefficient:	log P_{ow} 3.50 at 21°C and pH 4.3 log P_{ow} 4.12 at 25°C and pH 6.2 log P_{ow}3.53 at 21°C and pH 6.7 log P_{ow} 3.52 at 21°C and pH 7.8	Bright and Stalker, 1990 [A87320], Bright, 1999a [C003260]
Hydrolysis:	pH 4.95: no degradation at 22°C after 30 days pH 6.98: no degradation at 22°C after 30 days pH 9.18: t½ 79 days at 22°C	Kelly, 1982 [A88568]
Photo-stability in water	Half-life 1.7 days (extrapolated to 9.5 days under natural sunlight) at pH 5 and 25°C	Hawkins *et al*., 1989 [A88640]
Dissociation constant	pKa 3.8 at 20°C	Scott and Bright 1988 [A87236]

Technical material

Property		Reference
Minimum purity	95%	
Appearance:	Light brown, low melting, semi-solid	Anon., 1991 [A86998]
pH	5.8–5.9	Scott and Bright, 1989 [A87285]

Formulations

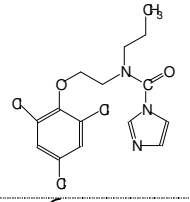
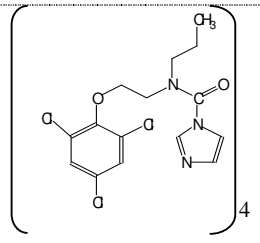
Prochloraz is available mainly as emulsifiable concentrates (EC) or suspo-emulsions (SE) for foliar and post-harvest uses and also as wettable powder formulations of a 4:1 co-ordination complex of prochloraz and manganese chloride, used when crops are susceptible to phytotoxicity and on mushrooms. A number of co-formulated emulsifiable concentrates, suspo-emulsions and suspension concentrates also exist, mainly for foliar use on cereals, and specific formulations for seed treatments are available with and without co-formulants such as carboxin and carbendazim. The main formulations available are shown in Table 1.

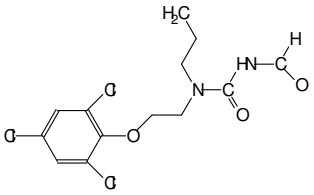
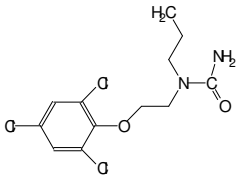
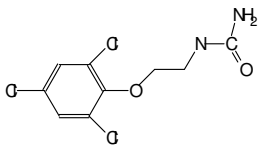
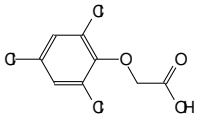
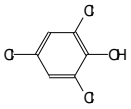
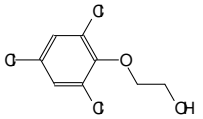
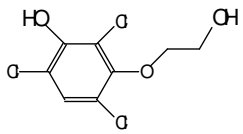
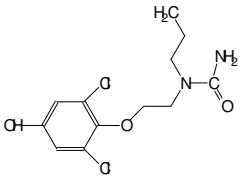
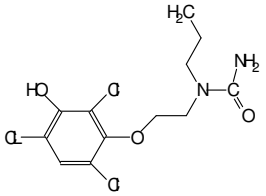
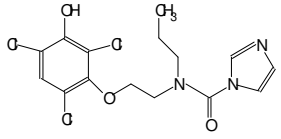
Table 1. Prochloraz formulations and major co-formulants.

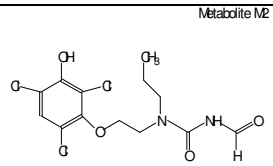
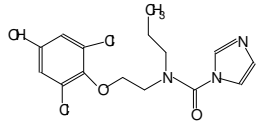
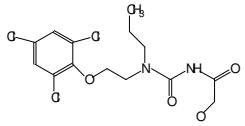
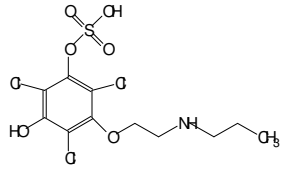
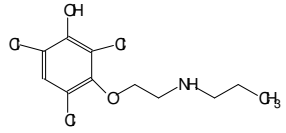
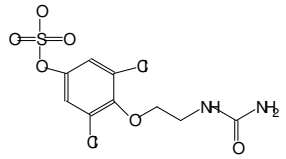
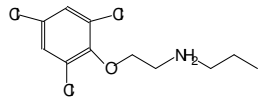
Formulation	**Concentration**	**Co-formulant**	**Notes**
Emulsifiable concentrates (EC)	250, 400, 450 g ai/l		
Emulsifiable concentrates (EC) or Suspo-emulsions (SE)	300–360 g ai/l 250 g ai/l 213, 250, 400 g ai/l 200, 225 g ai/l 250 g ai/l 450 g ai/l 133 g ai/l 200–312 g ai/l	cyproconazole fenpropadin fenbuconazole fenpropimorph fenpropidin mancozeb tebuconazole fluquinconazole	
Wettable powders	500 g ai/kg		as $MnCl_s$ complex (460 g ai prochloraz)
Wettable powders	224.5 g ai/kg 150–500 g ai/kg	copper mancozeb	
Suspension concentrates	267–318 g ai/l 150 g ai/l	carbendazim phthalide	
Water dispersible powder (WS)	108 g ai/kg	carbendazim	for slurry seed treatment
Liquid solution (LS)	80, 108 g ai/l	carboxin	for seed treatment

METABOLISM AND ENVIRONMENTAL FATE

Prochloraz and its metabolites were given various trivial and systematic names and code numbers in study reports. These are summarised below.

Term used in this evaluation	Structural formula	Chemical name (generally CAS) Other names, codes or descriptions	Occurrence
prochloraz		N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]-1H-imidazole-1-carboxamide BTS 40542 free prochloraz	Animals Plants Soil Water
prochloraz manganese complex	 $MnCl_2$	BTS 46828	Animals Water Soil

Term used in this evaluation	Structural formula	Chemical name (generally CAS) Other names, codes or descriptions	Occurrence
BTS 44596		*N'*-formyl-*N*-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]urea AE C444596 the formyl urea metabolite of prochloraz	Animals Plants Soil Water
BTS 44595		*N*-propyl-*N*-2-(2,4,6-trichlorophenoxy)ethylurea 2,4,6-trichlorophenoxyurea the urea metabolite of prochloraz	Animals Plants Soil Water
BTS 44770		*N*-2-(2,4,6-trichlorophenoxy)ethylurea the phenoxy ethyl urea	Animals
BTS 9608		2,4,6-trichlorophenoxyacetic acid M12a	Animals Plants
BTS 45186		2,4,6-trichlorophenol M3	Animals Plants Soil
BTS 3037		2-(2,4,6-trichlorophenoxy)ethanol	Animals
BTS 54906		2-(2,4,6-trichloro-3-hydroxyphenoxy)ethanol M15a AE C533208	Animals
BTS 54907		*N*-2-(2,6-dichloro-4-hydroxyphenoxy)ethyl-*N*-propylurea the deschloro-4-hydroxyamide the dichlorophenyl metabolite	Animals
BTS 54908		*N*-2-(2,4,6-trichloro-3-hydroxyphenoxy)ethyl-*N*-propylurea the 3-hydroxyamide M5b AE C533210	Animals
M1	No proposed structure		Animals (rats)
M2		Tentative structure	Animals (rats)

Term used in this evaluation	Structural formula	Chemical name (generally CAS) Other names, codes or descriptions	Occurrence
M4a			Animals (rats)
M4b			Animals (rats)
M6			Animals (rats)
M8	No proposed structure		Animals (rats)
M10	No proposed structure		Animals (rats)
M18			Animals (rats)
M19a			Animals (rats)
M19b		Tentative structure	Animals (rats)
M27			Animals (rats)

Note. 1. In some structures the terminal CH_3 of the *N*-propyl group appears as CH_2.
2. The H is missing from the terminal OH group of metabolite M6.

Animal metabolism

Studies on rats, lactating goats, lactating cows and laying hens were reported to the Meeting.

Rats. The 2001 JMPR concluded that after oral administration to rats prochloraz was rapidly and completely excreted in urine and faeces. There was a noticeable sex difference in that faecal excretion predominated in females. After administration of a single oral dose of 5 mg/kg bw [^{14}C]prochloraz to male and female rats with cannulated bile ducts, the radiolabel was recovered quantitatively with no apparent sex difference, a mean of 74% of the dose being recovered in the bile, urine, cage washings, and carcasses. Biliary excretion was the main route of elimination. Concentrations in the tissues were low: only the liver contained > 0.1 mg/kg 96 h after the 5 mg/kg

dose, but 96 h after a dose of 100 mg/kg bw the concentrations in the liver, kidneys, blood, and plasma of animals of either sex, and in the lungs and adrenals of females, were > 1 mg/kg.

The 2001 JMPR also concluded that the main metabolic pathways in rats at both doses involved cleavage of the imidazole ring and initial loss of small fragments, to give BTS 44595 and BTS 44596, which, together with a considerable quantity of unchanged prochloraz, were the main compounds found in the faeces. Further metabolism yielded the phenoxy ethyl urea (BTS 44770), which was excreted mainly in the faeces or further metabolized to the phenoxyethanol (BTS 3037) and then to the acid (BTS 9608). These latter compounds were excreted mainly in the urine in free or conjugated forms, with trichlorophenoxyacetic acid (BTS 9608) the main metabolite in the urine.

A more recent study by Gedick and Kidd, 2003 [Ref: C035922] generally confirmed the above conclusions, although the sex differences in the excretion were less pronounced and a more complex metabolic pattern was described. In this study rats each received either a single dose or multiple daily oral doses of [^{14}C]prochloraz at a target level of 5 mg/kg/day for 3 to 14 days.

The main route of excretion in the first 24 hours was in the faeces, which accounted for a mean of 56% and 65% of the administered dose in male and female rats, and in the urine for a mean of 22% in both sexes. A similar pattern of excretion was seen in the multiple-dose group, in which the main route was in the faeces.

The distribution of total radioactivity was similar for both sexes. Tissue and blood levels of radiolabelled residues of prochloraz in the multiple dose group were not substantially higher than those observed in the single-dose group, indicating that plateaux are reached quickly following repeat administration. These residues had decreased by at least an order of magnitude within 7 days (168 h) of discontinuing treatment, demonstrating rapid clearance. There was no evidence of bioaccumulation in any tissues.

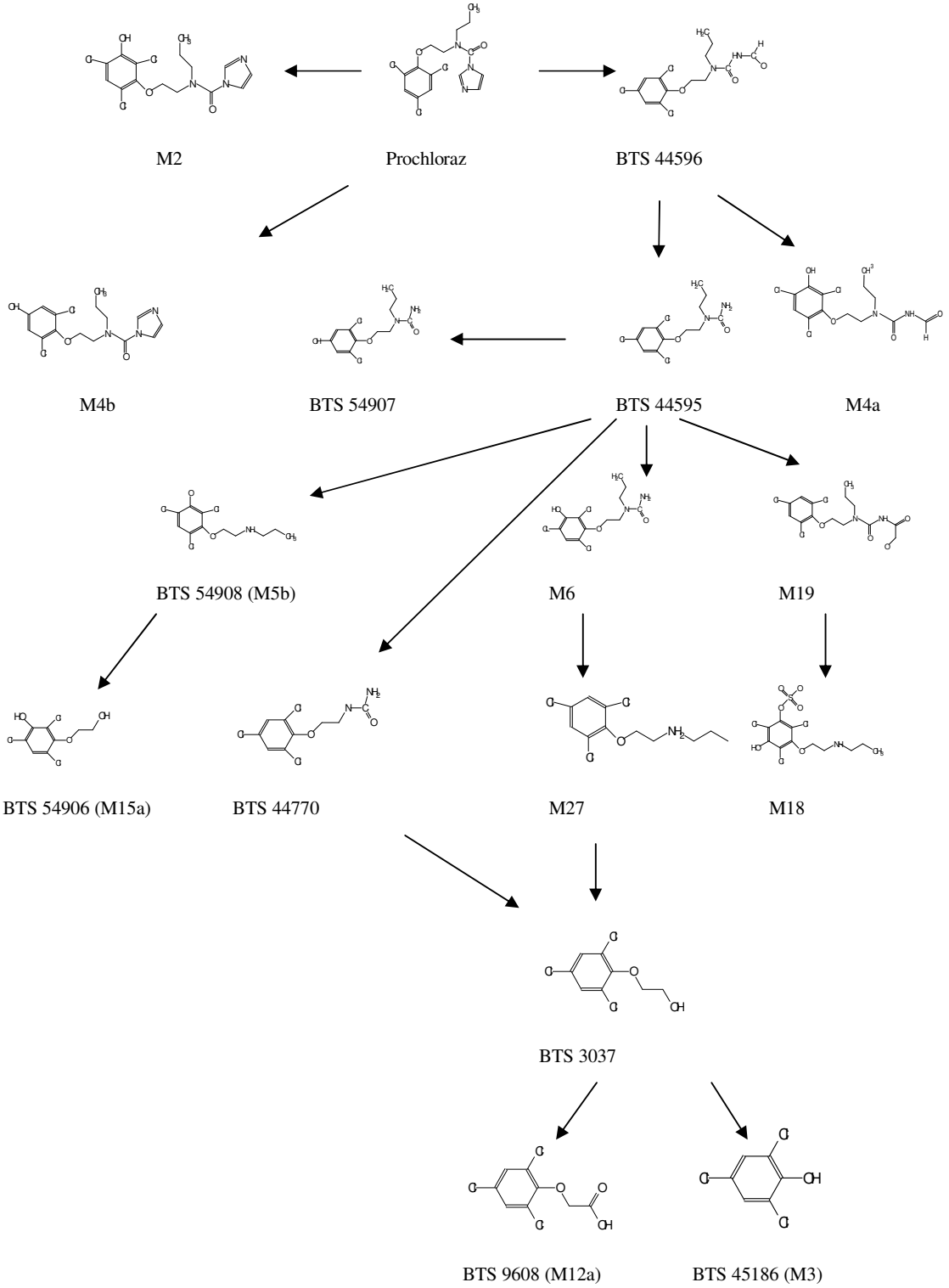
Table 2. Mean concentrations of radioactivity in the tissues and organs of male and female rats after single and repeated oral doses of prochloraz at 5 mg/kg bw/day.

Dose	Mean residue concentration, µg prochloraz equiv/g tissue (3 rats per group)					
	Kidney	Liver	G I Tract	Plasma	Whole blood	Other tissues
Single dose						
male	6.12	2.41	2.73	11.21	2.93	0.13-1.25
female	1.23	1.78	3.71	3.84	1.04	0.07-0.69
Repeat dose (3 d)						
male	6.39	3.96	8.20	4.86	2.90	0.16-1.52
female	3.93	4.75	18.21	3.95	2.16	0.13-1.46
Repeat dose (6 d)						
Male	3.48	4.16	6.12	2.97	2.37	0.13-1.51
female	2.52	4.19	6.40	1.93	1.18	0.12-1.51
Repeat dose (10 d)						
Male	3.25	4.90	8.62	3.36	1.75	0.15-1.20
female	3.21	5.21	7.76	3.76	2.18	0.20-1.59
Repeat dose (14 d)						
Male	6.19	6.81	10.82	7.02	3.32	0.22-2.08
female	3.03	5.19	12.61	2.84	1.55	0.13-1.82

Dose	Mean residue concentration, µg prochloraz equiv/g tissue (3 rats per group)					
	Kidney	Liver	G I Tract	Plasma	Whole blood	Other tissues
Repeat dose (14+7 d) Male female	 0.40 0.45	 0.62 0.64	 0.19 0.10	 0.13 0.17	 0.16 0.22	 0.03-0.19 0.04-0.14 Except:- adrenals 0.21 (m) 0.39 (f) lungs 0.21 (m) 0.26 (f)

Proposed metabolic pathways are shown in Figure 1. In some of the structures the terminal CH_3 of the *N*-propyl cgroup appears as CH_2. It was not possible to change them.

Figure 1. The main metabolic pathways in the biotransformation of prochloraz in rats.



The metabolic patterns were shown to be similar in the urine from the single dose and multiple dose groups. In males BTS 9608 (M12a) was the main component (c. 34% of the TRR) and in females M18 reached a maximum of 11% of the TRR. M18 was a major compondnet, representing up to 25.7% of the TRR and 16.6% of the TRR on days 1 and 14 respectively with BTS 9608 (M12a)

12.9% of the TRR, 19.6% of the TRR at days 1 and 14. The metabolic profiles were also similar in the days 1 and 14 faeces samples. Procloraz accounted for 48.4% of the TRR in males and 41.5% in females on day 1 and on day 14 for 9.3% of the TRR in males and 4.7% in females, and metabolites M2 and M4 on day 14 for 22.4-28.1% and 17.2-26.8% of the TRR respectively.

Lactating goats. Campbell, 1983 [Ref: A87711], reported a study on the metabolism of prochloraz in a Saanen lactating goat fed on straw containing residues of radioactive prochloraz from field plots treated with [^{14}C]prochloraz (40% EC) at a rate equivalent to 0.94 kg ai/ha harvested at maturity (11 weeks after treatment). Weighed aliquots of the chopped and dried straw containing the equivalent of 19 mg prochloraz/kg were offered daily to the goat for four days and any straw remaining at the end of the day was weighed so that the weight of straw eaten could be recorded.

Milk and blood samples were collected twice daily at each milking and the goat killed 24 hours after the fourth day. Analysis was by liquid scintillation counting. The maximum residues in plasma and milk were 0.079 mg/l and 0.006 mg/l respectively, and in tissues were highest in the liver (0.05 mg equiv/kg), kidney fat (0.04 mg/kg) and rumen wall (0.04 mg/kg). All other tissues contained 0.03 mg/kg or less.

Table 3. Straw consumption and residues in the plasma and milk of a goat fed prochloraz-treated straw for 4 days.

Day		Straw consumption (g/day)	Plasma residue (mg equiv/l)	Milk residue (mg equiv/l)
1	am	400	0.002	0.002
	pm		0.079	0.005
2	am	270	0.008	0.005
	pm		0.013	0.006
3	am	281	0.009	0.004
	pm		0.014	0.006
4	am	301	0.010	0.005
	pm		0.014	0.006
5	am	-	0.009	0.001

Table 4. Residues (as prochloraz equivalents) in the tissues of a goat fed prochloraz-treated straw for 4 days.

Sample	Residue (mg equiv/kg)	Sample	Residue (mg equiv/kg)
Liver	0.05	Brain	<0.02
Kidney	<0.02	Eyes	<0.02
Heart	<0.02	Tongue	<0.02
Lung	<0.02	Kidney fat	0.04
Spleen	0.03	Omental fat	0.03
Adrenals	<0.02	Rumen	0.04
Thyroid	<0.02	Reticulum	<0.02
Gonads	<0.02	Omasum	0.02
Uterus	<0.02	Abomasum	<0.02
Mammary glands	0.03	Large intestine	0.02
Skin	<0.02	Small intestine	0.03
Shoulder muscle	<0.02	Pancreas	<0.02
	<0.02	Rumen contents	0.13
		Bile	0.12

Lactating cows. In a study by Phillips and Swalwell, 1989, [Ref: A87720], [^{14}C]prochloraz was administered in gelatin capsules to a cow twice daily (morning and evening) for 3 days at a rate of 1.5 mg/kg bw/day. The information provided was not sufficient to enable an equivalent concentration of prochloraz in the diet to be calculated. Milk was collected twice daily immediately after dosing and urine collected on urination on days 2 and 3, and blood was sampled at regular intervals. The cow was slaughtered 16 hours after the last dose and tissues samples were minced and frozen.

The levels of radioactivity in the blood showed that a peak plasma level had not been reached 8 hours after the first dose when the second dose was administered. This slow rate of absorption resulted in a slight accumulation of the compound in the circulation, with levels steadily increasing for 48 hours. Most of the radioactivity remained in the plasma, with levels in the cellular fraction of blood increasing at a slower rate.

Table 5. Levels of total radioactivity in plasma and cellular fraction of blood collected from a cow during twice daily oral administration of [^{14}C]prochloraz (1.5 mg/kg/day) for 3 days.

Time (hours)	Plasma (mg equivalents prochloraz/l)	Cellular fraction (mg equivalents prochloraz/l)
Pre-dose	0	0
0.5	0	0
1	0.003	0
2	0.021	0.01
3	0.038	0.017
4	0.056	0.014
6	0.078	0.031
8	0.103	0.041
24	0.6	0.142
32	0.816	0.147
48	1.232	0.253
56	1.307	0.282
72	1.47	0.474

Methanol extraction of the plasma recovered 70–75% of the TRR in the 8- and 24-hour samples but increased protein binding was observed in the 72-hour sample resulting in a lower extraction rate of 51%. Over 50% of the recovered radioactivity was characterised in the first two time point samples but this decreased to 26% for the 72 hour sample. The profile of metabolites varied with time. Levels of BTS 44596, BTS 44595 and BTS 44770 decreased from 34% of total plasma radioactivity at 8 hours to 19.7% at 72 hours. The more polar metabolites (e.g. BTS 9608), the polar baseline chromatographic material (‘origin’) and ‘bound’ residue rose in later samplings.

Table 6. Metabolites in the plasma of a cow dosed orally twice daily with [^{14}C]prochloraz (1.5 mg/kg/day) for 3 days.

Component	% of TRR in the plasma		
	8 hours	24 hours	72 hours
extracted	72.4	73.6	51.1
unextracted	27.6	26.4	48.9
BTS 44596	16	8.9	15.3
BTS 44595	15.2	6.8	2.6

Component	% of TRR in the plasma		
	8 hours	24 hours	72 hours
BTS 44770	2.8	6.3	1.8
BTS 54908	5.5	4.8	2.7
BTS 9608	12.9	21.8	3.8
origin	19.9	25.1	25.1

Levels of total radioactivity in the milk reached a sustained plateau of about 0.14 mg equiv/l by 24 hours and increased to 0.18 mg/l by 72 hours. There was no direct relationship between the levels in the plasma and the levels in milk. Hexane and methanol extraction of the milk yielded 90% of the TRR which was largely characterised, mainly as the polar phenolic metabolite BTS 54906 (58.2% of the TRR) together with BTS 44596 (23%) and BTS 54908 (8.7%).

In tissues the highest residues were found in the liver (10 mg equiv/kg) and kidney (1.7mg equiv/kg) reflecting the significance of these organs in the metabolism and excretion of prochloraz. Residues in muscle and renal fat were substantially lower at 0.07 mg/kg and 0.21 mg/kg respectively.

In liver 67% of the residue was extractable with hexane and methanol, and enzymatic digestion of the bound residue released a further 14% of the TRR, giving a total extractable recovery of 81%. Approximately 92% was characterised. The main metabolites were the apolar products of imidazole ring opening BTS 44596, BTS 44595 and BTS 44770, together with BTS 45186, BTS 9608 and the phenolic metabolites BTS 54906 and BTS 54908.

In kidney, 57% of the TRR was solvent-extractable and enzymatic digestion yielded a further 21%, giving a total extractable recovery of 78%. About 70% of this was characterised, with BTS 44596, BTS 44595 and BTS 9608 predominant. All the residues in fat were extractable into hexane and acetonitrile and were mainly BTS 44596 with a lower amount of BTS 44595, the apolar metabolites of imidazole ring opening. Solvent extraction with hexane and methanol released 76% of the TRR in muscle, mostly BTS 44596 with minor amounts of BTS 44595.

In the heart hexane and methanol extraction yielded 76% of the TRR and enzymatic digestion released a further 16%, yielding an overall recovery of 92%. About 76% of this was characterised, with BTS 44596 being the most significant, with lesser amounts of BTS 44595, BTS 54906, BTS 54908 and BTS 9608. Lung yielded 66% of the TRR by hexane and methanol extraction and enzymatic digestion released almost all the remainder. Approximately 76% of the extracted residue was characterised as BTS 44596, BTS 44595, BTS 54906, BTS 54908, and BTS 9608.

The parent compound was not found in any of the samples, and, except for fat, all tissues contained residues which were unextractable with hexane and methanol (24 to 42%). Enzymatic digestion released almost all the ‘bound’ residues, mostly consisting of the phenolic metabolites BTS 54906 and BTS 54908 together with BTS 45186 and BTS 9608, which may be breakdown products of digestion.

Table 7. Extraction of metabolites from the tissues of a cow dosed orally twice daily with [^{14}C]prochloraz (1.5 mg/kg/day) for 3 days and slaughtered 16 hours after the final dose.

Sample	% of total recovered radioctivity			% of extracted residue characterised
	Solvent extraction before enzymatic digestion	Solvent extraction after enzymatic digestion	Total solvent extracted residue	
Liver	67	14	81	92
Kidney	57	21	78	70
Fat	100	-	100	93

Sample	% of total recovered radioctivity			% of extracted residue characterised
	Solvent extraction before enzymatic digestion	Solvent extraction after enzymatic digestion	Total solvent extracted residue	
Muscle	76	Not analysed	76	100
Heart	76	16	92	76
Lung	66	30	96	76

Table 8. Metabolites in the tissues of a cow dosed orally twice daily with [^{14}C]prochloraz (1.5 mg/kg/day) for 3 days and slaughtered 16 hours after the final dose.

	% total recovered radioactivity					
	Liver	Kidney	Muscle	Renal fat	Lung	Heart
Extracted	81.2	78	75.9	100	95.6	91.9
Unextracted	5.3	2.6	24.0[1]	-	4.4	0.6
BTS 44596	12.2	30.9	62.1	65.9	32.1	61.4
BTS 44595	13.4	15.7	13.5	19.2	23.1	6.8
BTS 44770	4.9	-	-	-	-	-
BTS 54906	8.3	5.6	-	-	6.3	11.8
BTS 54908	6.5	4.5	-	-	4.4	-
BTS 45186	18.8	-	-	-	-	3.1
BTS 9608	10.3	12.9	-	8.2	10.4	7.9
Unidentified	14	21.4	-	-	-	7.6
Origin	6.9	6.5	-	6.8	19	1.3

[1] residues too low for enzymatic digestion

The rumen fluid contained mainly metabolites formed by opening of the imidazole ring, BTS 44595, BTS 44596 and a small amount of BTS 549608. The parent compound was not found. In the abomasum there was evidence of further breakdown of prochloraz before absorption. The main component was the same but there were increasing levels of BTS 9608 and with smaller amounts of BTS 44596 and BTS 44770. The pattern in the bile was the same as in the gut contents, but in the urine 37% of the activity was accounted for by the phenolic metabolites in conjugated form (BTS 54906, BTS 54907 and BTS 9608) and 28% by BTS 9608. About 22% was polar and unidentified, and small amounts of BTS 44596, BTS 44595 were found. The dichlorophenyl metabolite BTS 54907 was observed only in the urine.

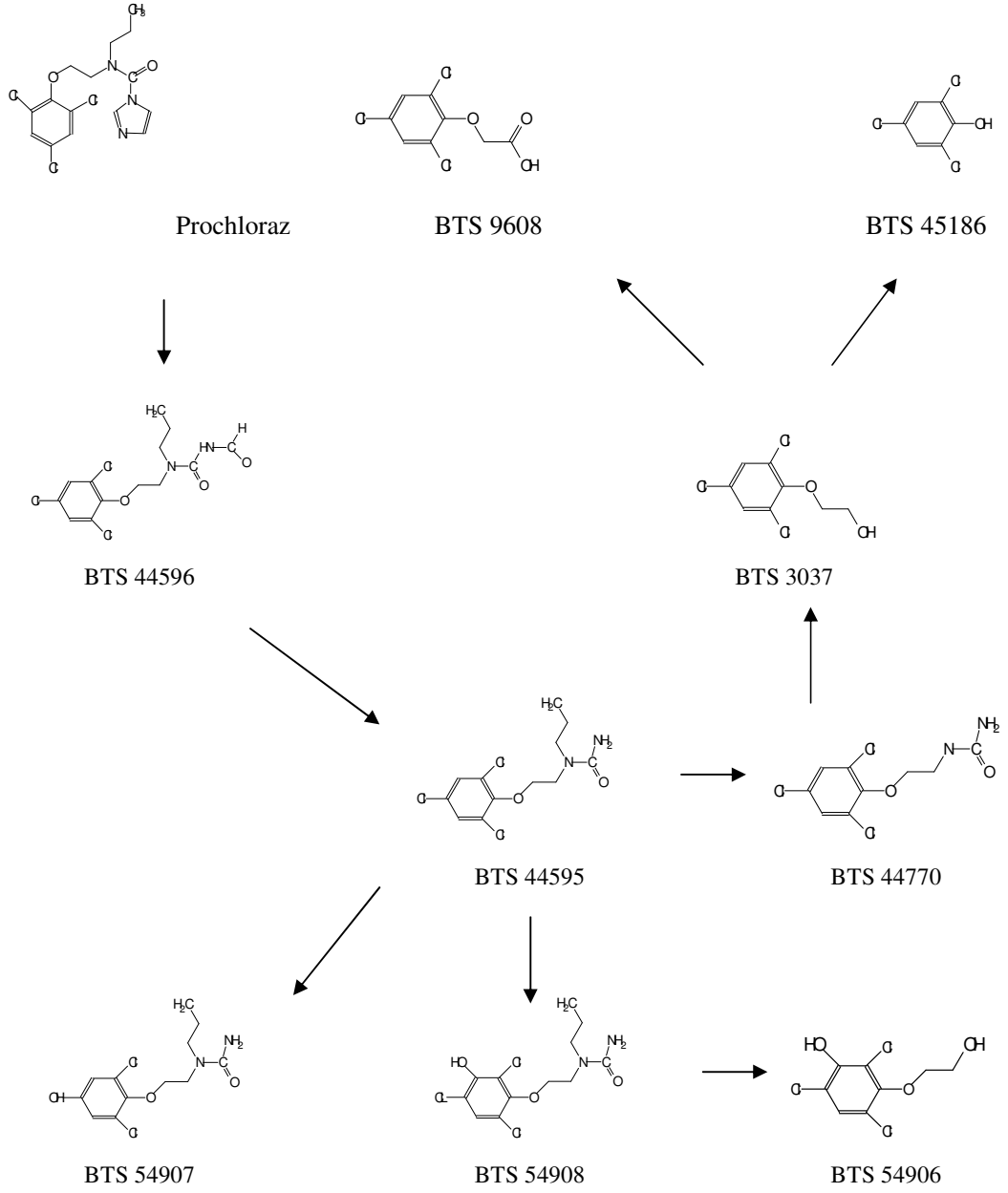
Table 9. Metabolites in the rumen and abomasal fluids, bile and urine of a cow dosed orally twice daily with [^{14}C]prochloraz (1.5 mg/kg/day) for 3 days and slaughtered 16 hours after the final dose.

Fraction	% of total residue			
	Rumen fluid[1]	Abomasal fluid[1]	Bile[1]	Urine[2]
Extracted	96.9	97.7	100	100
BTS 44596	11.3	4.9	8.7	9.1
BTS 44595	82.8	64	25.4	4.3
BTS 44770	-	2.1	50.5	-
BTS 54906	-	-	-	5.9
BTS 54907	-	-	-	6.7
BTS 54908	-	-	-	24.5
BTS 9608	2.4	26.2	15.4	27.8
Origin	-	-	-	21.7

[1] collected post mortem
[2] collected on urination on days 2 and 3.

The proposed metabolic pathways in cows, involving cleavage of the imidazole ring and oxidation of the side chain, significantly so before absorption, followed by ring hydroxylation and conjugation, are shown in Figure 2.

Figure 2. Proposed metabolic pathways of prochloraz in lactating cows.



Laying hens. Mayo (1994) [Ref: A87725] administered [14C]prochloraz in gelatin capsules by intubation to a group of 7 hens once daily for 14 days at a nominal level of 1.5 mg/hen/day (equivalent to a dietary intake of approximately 10 ppm prochloraz), and dosed two additional hens at a nominal level of 5 ppm (0.75 mg prochloraz/hen/day) over the same time period to study distribution.

The radioactivity in the excreta increased from about 88% (day 1) to about 96% of the cumulative dose (day 14). The hens were killed within 24 hours of the fourteenth dose and about 98% of the cumulative dose was recovered in the excreta and tissues with small amounts in the gastrointestinal tract (0.7% cumulative dose) and liver (0.2% cumulative dose). Radioactivity in the cage washes accounted for a cumulative 0.9%.

During the 14 daily doses at 10 ppm concentrations of radioactivity in egg yolks increased steadily from < 0.01 mg/kg on day 1 to reach a plateau of about 1.6 mg/kg on day 8, and in the whites from <0.01 mg/kg on day 1 to a plateau of about 0.1 mg/kg on day 8. Concentrations in the yolks from hens dosed daily at 5 ppm for 14 days increased from 0.01 mg/kg during day 1 to reach a plateau of about 0.7 mg/kg from day 9 onwards, and in the whites were approximately 0.05 mg/kg throughout the dosing period. The residues found show good correlation with the dose of prochloraz administered. Generally over 90% of the total residues in the eggs was found in the yolk.

Table 10. Concentration of radioactivity in the egg yolks and whites of hens after daily administration of ^{14}Cprochloraz nominally equivalent to 10 ppm or 5 ppm in the diet for 14 days.

Day	Residues, 10 ppm in diet[1]					Residues, 5 ppm in diet[2]				
	yolk (µg equiv/g)		white (µg equiv/g)		whole egg	yolk (µg equiv/g)		white (µg equiv/g)		whole egg
	mean	highest	mean	highest	mean[3,]	individual	mean	individual	mean[3,]	
Pre-dose	<0.01	0.01	<0.01	<0.01						
1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01, 0.01	0.01	<0.01, 0.06	0.04	0.03
2	0.04	0.06	0.06	0.09	0.05	0.01, 0.04	0.03	0.05, 0.06	0.06	0.05
3	0.28	0.4	0.07	0.1	0.14	0.08, 0.2	0.14	0.06, 0.06	0.06	0.09
4	0.58	1.13	0.07	0.11	0.25	0.17, 0.33	0.25	0.04, 0.02	0.03	0.11
5	0.9	1.25	0.07	0.11	0.36	0.39, NS	0.39	0.06, NS	0.06	0.18
6	1.23	1.54	0.07	0.09	0.48	0.48, 0.56	0.52	0.05, 0.04	0.05	0.21
7	1.36	1.7	0.07	0.08	0.52	0.53, 0.73	0.63	0.06, 0.06	0.06	0.26
8	1.59	1.84	0.12	0.2	0.63	0.58, NS	0.58	0.05, NS	0.05	0.24
9	1.61	2.07	0.12	0.18	0.64	0.67, 0.84	0.76	0.05, 0.02	0.04	0.29
10	1.57	1.89	0.08	0.11	0.6	0.68, 0.8	0.74	0.04, 0.04	0.04	0.29
11	1.64	1.93	0.08	0.1	0.63	0.51, 0.81	0.66	0.06, 0.05	0.06	0.27
12	1.59	1.92	0.09	0.09	0.62	NS, 0.71	0.71	NS, 0.04	0.04	0.27
13	1.61	1.83	0.07	0.09	0.61	0.61, 0.79	0.7	0.05, 0.04	0.05	0.28
14	1.59	1.84	0.09	0.12	0.62	0.63, 0.81	0.72	0.03, 0.07	0.05	0.28
14[4]	0.81	1.62	1.36	2.0	1.17	0.66, NS	0.66	0.06, NS	0.06	0.27

NS: not sampled
[1] mean of 5 birds and two additional birds
[2] mean of 2 birds
[3] calculated on the basis of 35% yolk, 65% white
[4] eggs taken at post mortem, mean of 5 birds

In the 10 ppm group concentrations of radioactivity were highest in the liver (0.9 mg/kg), with lower levels in skin (0.2 mg/kg), subcutaneous fat (0.08 mg/kg) and muscle (0.05-0.07 mg/kg). A similar distribution pattern was observed in the tissues of the 5ppm dose group with levels showing good correlation with the dose rate.

Table 11. Concentration of radioactivity (mg equivalents/kg) in the tissues of hens given 14 daily doses of ^{14}Cprochloraz nominally equivalent to either 10 ppm or 5 ppm in the diet.

Sample	Residues, 10 ppm in diet		Residues, 5 ppm in diet	
	individual[1] (mg equiv/kg)	mean (mg equiv/kg)	individual (mg equiv/kg)	mean (mg equiv/kg)
Breast	0.05, 0.054, 0.064, 0.049, 0.03, 0.041, 0.042	0.047	0.017, 0.019	0.018
Thigh	0.067, 0.076, 0.11, 0.073, 0.045, 0.06, 0.074	0.072	0.019, 0.02	0.02
Liver	0.98, 0.9, 1.0, 0.78, 0.74, 0.9, 0.88	0.88	0.27, 0.41	0.34
Fat	0.086, 0.074, 0.12, 0.08, 0.074, 0.072, 0.073	0.08	0.026, 0.029	0.028
GI tract	0.73, 0.56, 1.3, 0.69, 0.62, 0.58, 0.63	0.73	0.27, 0.38	0.33
Skin	0.22, 0.16, 0.25, 0.2, 0.12, 0.17, 0.21	0.19	0.067, 0.083	0.075
Whole-blood	0.64, 0.52, 0.7, 0.45, 0.24, 0.4, 0.44	0.48	0.2, 0.19	0.2
Plasma	0.79, 0.7, 1.3, 0.67, 0.41, 0.69, 0.64	0.74	0.2, 0.27	0.24

[1] consolidated from the initial 5 birds and two additional birds

Solvent extraction of tissues yielded 45 to 50% of the TRR and of egg yolk and white 80 to 90%, and protease treatment a further 20 to 23% (leaving 22 to 37% unextracted) and 10 to 14% respectively.

Table 12. Extraction of radioactivity from hen tissues and eggs.

Sample	Concentration of radioactivity[1] (mg equiv/kg)	% of tissue radioactivity			
		Untreated extracts	Treated extracts	Unextracted residues	Total recoveries
Liver	0.88	49.5	23.4	22.2	95
Breast muscle	0.05	45.3	22.9	37.2	105.4
Thigh muscle	0.074	48.3	21.2	24	93.5
Fat	0.087	80.5	NS	NS	80.5
Egg yolk	1.51	79.3	13.7	NS	93
Egg white	0.09	88.6	12.1	NS	100.7

NS: no sample
[1] mean of 5 birds

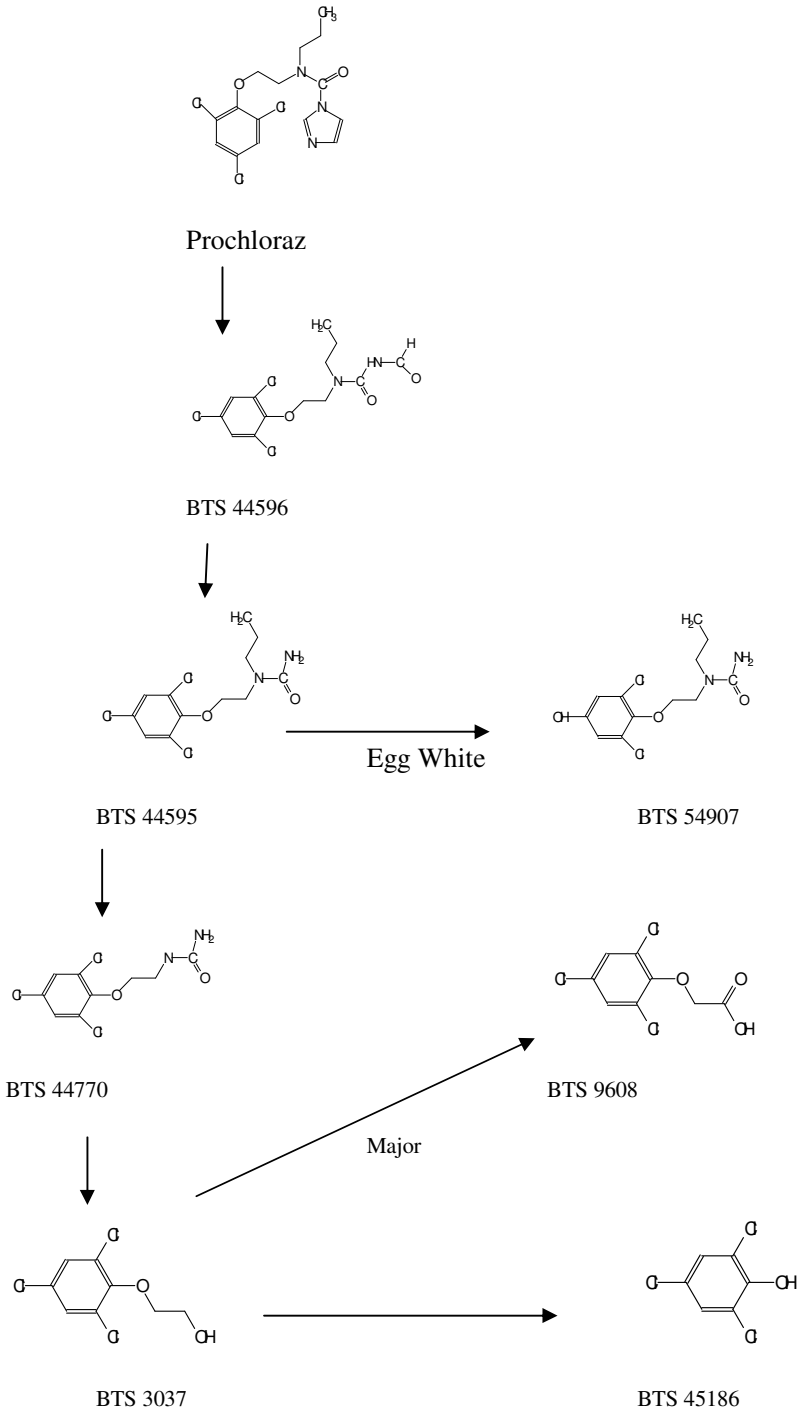
In a representative sample of excreta extracts one major polar radioactive component accounted for 37% of the extracted radioactivity (27% of the cumulative dose) which could not be hydrolysed by treatment with β-glucuronidase/sulfatase enzymes and remained unidentified. Minor components accounting for 6-11% of the extracted radioactivity (5-8% of the cumulative dose), corresponded to BTS 44770, BTS 45186, BTS 3037 and BTS 44596.

The study demonstrated that prochloraz is well absorbed after repeated oral administration to laying hens (1.5 mg/kg/day for 14 days) and rapidly excreted (at least 85% within 24 hours of dosing). Levels of radioactivity in eggs reached a plateau by day 8 (yolk 1.6 mg/kg; white 0.1 mg/kg) with over 90% of the total egg residue in the yolk. After the hens were killed the majority of the residue was found in the liver (0.9 mg/kg) and gastrointestinal tract (0.8 mg/kg) and was low in the fat and breast and thigh muscles (up to 0.09 mg/kg).

The parent compound was not found in excreta, eggs or tissues. The main metabolites were BTS 9608 in liver (16%), muscle (36 to 39%), fat (14%) and egg white (9%), and BTS 44596 in egg yolk (55%), egg white (16%), liver (16%), muscle (11 to 15%) and fat (17%). The minor metabolites in the tissues and eggs were BTS 45186 and BTS 3037, and egg whites also contained BTS 44595 (8%), BTS 44770 (13%), and BTS 54906 (4%) at very low levels.

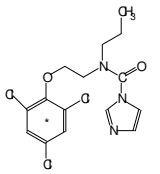
The metabolism of prochloraz in laying hens progresses through opening of the imidazole ring and degradation of the side chain. The proposed pathways are shown in Figure 3.

Figure 3. Proposed pathways of prochloraz in laying hens.

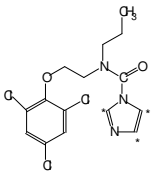


Plant metabolism

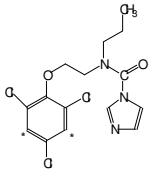
Studies on wheat, oilseed rape and mushrooms conducted between 1978 and 1997, using three radiolabelled forms of prochloraz, were reported to the Meeting:



* [^{14}C]phenyl label



* [^{14}C]imidazole label



* [^{3}H]prochloraz

In early studies on wheat, 1980–1981, the tritium phenyl label was used, and in more recent trials on wheat, oilseed rape and mushrooms the [^{14}C]phenyl label. These later studies demonstrated that the metabolism of prochloraz is primarily associated with cleavage of the imidazole ring and oxidation of the side-chain to 2,4,6-trichlorophenol, thus supporting the use of phenyl ring-labelled prochloraz.

Foliar treatment

Wheat. McDougall (1979) reported an initial study on the metabolism of [^{3}H]phenyl-labelled prochloraz in wheat plants [Ref: A87692]. [^{3}H]-prochloraz was applied to plants grown under glass at the sixth leaf stage at a rate equivalent to 0.25 kg ai/ha and the plants were harvested 19 days after treatment and analysed by HPLC.

About 80% of the total radioactivity recovered from the foliage was extractable with acetone. The main metabolites detected were free BTS 44596 (32% of the extracted radioactivity), and free and conjugated BTS 44595 (31%) and BTS 45186 (8%). Only 1% of unchanged prochloraz remained in the tissue and some conjugated BTS 9608 (0.2%) was detected. Together these compounds accounted for 87% of the extracted radioactivity.

In a further study by Kelly (1980) [Ref: A87688] using the same label a 5 m² field plot of wheat at the flag leaf sheath opening growth stage (Zadocks 47) was treated with labelled prochloraz at 1 kg ai/ha and the mature wheat was harvested 13 weeks later.

In grain 77.0% of the total radioactivity at harvest was extracted. Free BTS 45186 (2,4,6-trichlorophenol) was identified but accounted for only 3.4% of the total radioactivity. A further 53.9% was characterised as stable polar conjugates containing the 2,4,6-trichlorophenyl moiety. The unidentified extracted radioactivity contained no single metabolite accounting for above 7% of the total residue. In straw 77.5% of the total radioactivity was extracted; 5.2% was free BTS 45186 and 58.4% was associated with stable polar conjugates containing the 2,4,6-trichlorophenyl moiety, and the unidentified extracted radioactivity contained no single metabolite accounting for more than 5% of the total radioactivity.

In a follow-up study [Ref: 87690] involving phenyl tritium- and imidazole carbon-labelled prochloraz, Kelly and Krepski (1980) treated a 5 m² field plot of wheat at the same growth stage as before with [^{3}H]phenyl-labelled prochloraz at 1 kg ai/ha and a second 5 m² plot in an identical manner with [^{14}C]imidazole-labelled prochloraz. The mature wheat was harvested 13 weeks later.

In the grain from wheat treated with [^{3}H]prochloraz 80% of the radioactivity was extracted. Of the TRR 8.4% was free BTS 45186 and 39.5% stable polar conjugates containing the 2,4,6-trichlorophenyl moiety; no other compounds were identified. In the straw a very similar pattern was observed: 76% of the total radioactivity, 4.1% was associated with free BTS 45186 and 37.9% with stable polar conjugates containing the 2,4,6-trichlorophenyl moiety.

In the grain from wheat treated with [^{14}C-imidazole]prochloraz 32.4% of the total radioactivity was directly incorporated into starch. No free imidazole was detected indicating that cleavage of this ring system is not an important metabolic route. The high level of radiocarbon found in the starch suggests that the imidazole ring is readily broken down into small carbon fragments that can be incorporated into natural products.

In a more recent study Fordham and Allen (1998) investigated the metabolic profile of [^{14}C]phenyl-labelled prochloraz (45% EC) in wheat grown in a glasshouse [Refs: A91229, C000601 and C001387]. The wheat was sprayed at growth stage Zadoks 39 at a rate corresponding to 386 g ai/ha, and plants were sampled 20 and 98 days after treatment at maturity.

The total residues in plant samples were determined by solvent wash and combustion. Tissues were washed with acetone then sequentially extracted with acetone, acetonitrile and acetonitrile/water (50:50). Extracts containing polar metabolites were hydrolysed with pyridinium chloride and hydrochloric acid. Fibre was Soxhlet-extracted with acetonitrile/water (80:20) for 16 h, then hydrolysed with concentrated hydrochloric acid for 16 h to liberate bound residues. Extracted radioactivity was characterised by co-chromatography against reference standards (TLC and HPLC) and compounds were identified by mass spectrometry.

As part of the development of an analytical method for prochloraz and its metabolites, the quantitative conversion of these residues in the solvent extracts to the common moiety, 2,4,6-trichlorophenol (BTS 45186) was investigated. Each extract was reduced to dryness and refluxed with pyridinium chloride for 1.5 hours. On cooling, the pyridinium chloride was dissolved in distilled water, concentrated hydrochloric acid added and the mixture refluxed for 4 h. The released trichlorophenol was trapped in a liquid-liquid extractor containing distilled water and petroleum ether. The organic phase from the extractor was cleaned up by partitioning into potassium hydroxide and back-partitioned between acid and hexane. The hexane phase was analysed by normal-phase HPLC.

The TRR in the immature tissue at day 20 was 6.91 mg equivalents prochloraz/kg, and in grain, chaff and straw at harvest 0.023 mg, 0.13 mg and 20.91 mg equivalents prochloraz/kg respectively. The residues in the grain and chaff were about 0.1% and 0.6% of those in the straw indicating that very little is translocated from the foliage to the grain during or after seed formation.

In the straw at final harvest 84.3% of the residue was extractable into solvent, whereas in the immature tissue 95.1% was extractable, indicating that binding to fibre increases with maturity. A very high proportion of the residue in grain, and to a lesser extent in chaff, was fibre-bound but the levels were generally too low to warrant extraction and characterisation (<0.05 mg/kg).

Table 13. Distribution of radioactivity in harvested wheat tissues after a field-rate application of [^{14}C]prochloraz.

Sample	Harvest	Total residue (mg/kg)	Distribution of residue (%)				
			Acetone wash	Acetone extract	Acetonitrile extract	Acetonitrile/ water	fibre
Foliage	immature	6.91	92.7	6.2	0.2	-	1.0
Grain	mature	0.023	1.7	ND	ND	14.2	84.2
Chaff		0.13	5.2	5.5	1.5	52.0	36.0
Straw		20.91	29.2	15.7	2.2	36.9	16.1

The immature foliage was found to contain very low levels of parent prochloraz (0.6%) together with BTS 44596 (37.8%) and BTS 44595 (8.0%). The remaining extractable radioactivity was associated with unknowns (4.1%) and unidentified polar material at the origin of TLC plates

(44.6%). Levels of prochloraz in the straw at harvest were <0.1% of the TRR, and extracts contained BTS 44596 (25.8%) and BTS 44595 (8.1%) with unidentified components and origin material accounting for the remaining extractable radioactivity (8.2% and 42.2% respectively).

Table 14. Characterisation of radioactivity in the extractable residue from wheat folage and straw after field-rate application of [^{14}C]prochloraz.

Fraction	Radioactive residues in wheat (% of TRR and mg equiv/kg)			
	Immature foliage		Straw	
	% of TRR	mg/kg	% of TRR	mg/kg
Prochloraz	0.6	0.04	<0.1	<0.02
BTS 44595	8	0.55	8.1	1.69
BTS 44596	37.8	2.61	25.8	5.39
Sum identified	46.4	3.21	33.9	7.09
Polar origin	44.6	3.08	42.2	8.82
Other unknowns	4.1	0.28	8.2	1.71
Unextractable	5.2	0.36	16.1	3.37
Total	100	6.91	100	20.91

The acetonitrile/water (50:50) extract of the straw sample at final harvest was found to contain 36.9% of the TRR. This extract, containing mainly origin material, was subjected to pyridinium chloride hydrolysis yielding BTS 45186 (18.6%) with the remainder unidentified.

A significant proportion of the residue in the straw (about 16% of the TRR) remained associated with the fibre. Acetonitrile/water Soxhlet extraction released a further 7.1% consisting mainly of origin material (29.5%), BTS 44595 (4.8%), BTS 44596 (3.4%) and prochloraz (1.4%), and acid hydrolysis released a further 1.9%, of which 0.5% was found to break down to BTS 45186 after pyridinium chloride hydrolysis. 5.7% of the total residue remained fibre-bound.

Acid hydrolysis of the acetone wash, acetone extract and acetonitrile extract of the straw sample converted 84.0%, 73.3% and 74.8% respectively of the radioactive residue to BTS 45186. This provides quantitative support for an important stage in the analytical method (based on the common moiety BTS 45186) developed for the analysis of plant materials for prochloraz and its metabolites.

Seed treatment

Wheat. Krepski (1982) [Ref: A87697] investigated the translocation of [^{14}C]phenyl-labelled prochloraz when applied to wheat seeds as a liquid dressing. A 20% EC formulation of prochloraz was applied individually to 50 seeds at a rate equivalent to 0.4 g ai/kg seed. After treatment the seeds were individually sown in pots, germinated and grown under glass. Three to six plants were harvested 2, 6 and 9 weeks after sowing and at maturity (29 weeks after sowing), and analysed for ^{14}C by combustion.

During the first six weeks of growth 5.6% of the total applied radioactivity was translocated from the seed into the aerial portions of the plant, and from six weeks to maturity no further translocation occurred.

At maturity radioactivity in the aerial portions of the plant represented 0.23 mg/kg in the straw and 0.04 mg/kg in chaff (expressed as prochloraz equivalents). The bulk of radioactivity was found in the soil (58.3% of that applied) with a further 15.1% of the AR associated with the root system. No translocation of radioactivity into the grain of mature wheat germinated from the treated wheat seeds was observed.

Oilseed rape. Phillips (1993a) [Ref: 87724] investigated the metabolism of [^{14}C]phenyl-labelled prochloraz under glasshouse conditions. [^{14}C]prochloraz was applied at 0.66 kg ai/ha (approximating the field rate) or at a tenfold rate (6.13 kg/ha) as discrete droplets onto individual leaves at the 5-8 leaf growth stage. Plants were sampled after 19 and 18 days respectively, and at maturity (after 90 and 83 days) and divided into seeds, seed pods, treated leaves, top growth (foliage above treated leaves) and bottom growth (foliage below treated leaves). The quantitative conversion of these residues in the solvent extracts to the common moiety 2,4,6-trichlorophenol (BTS 45186) was investigated.

At maturity about 97% of the TRR was detected at the site of application: only 3% was translocated to other plant parts, and in seeds accounted for 0.1%. Similar trends were observed for plants treated at the tenfold rate.

Table 15. Distribution of radioactive residues in oilseed rape after leaf spot treatment with [^{14}C]prochloraz at the field application rate (0.66 kg ai/ha).

Days after application	Sample	Prochloraz equivs (mg/kg)	% of TRR
0	Foliage	31.1	
19	Foliage	4.7	
90 (Harvest)	Total residue	36.4	100
	Seeds	0.05	0.1
	Seed pods	0.38	1
	Treated leaves	35.1	96.6
	Untreated leaves–top growth	0.47	1.3
	Untreated leaves–bottom growth	0.37	1

The acetone wash of foliage contained 90% of the total residue at day 0. The amount recovered from surface washes declined so that only 38% was present in the wash of treated leaves at maturity. Further extraction of mature leaves with acetone, acetonitrile and acetonitrile/water recovered a further 45%, with approximately 17% remaining unextracted.

Table 16. Distribution of radioactivity in oilseed rape after a field-rate application of prochloraz (0.66 kg ai/ha).

Days after application	Sample	Total residue (mg/kg)	Distribution of residue (% of TRR for each sample)				
			Acetone wash	Acetone extract	Acetonitrile extract	Acetonitrile/ water extract	Fibre
0	Foliage	31.1	90.0	3.8	4.1	NE	2.2
19	Foliage	4.7	70.3	10.6	0.72	5.7	12.7
90 (harvest)	Seeds	0.046	2.5	24.0	6.3	23.7	43.5
Final	Pods	0.38	1.9	6.6	1.8	29.5	60.0
Final	Top growth	0.47	1.2	4.7	1.8	19.1	73.3
Final	Treated leaves	35.0	38.1	31.1	1.8	12.1	16.8
Final	Bottom leaves	0.36	1.5	2.8	1.3	17.3	77.1

NE: not extracted

Prochloraz was rapidly degraded so that 19 days after treatment less than 3% of the total residue remained as the parent. The main products were BTS 44596 (19.8%), BTS 44595 (28.8%) and polar origin material (29.7%). At harvest a similar pattern was observed with the three components decreasing to 19.0%, 26.1% and 27.5% of the residue recovered from the treated leaves. Small quantities of unknown components were detected initially (0.8%) and in mature plants (2.5% in treated leaves).

Solvent extracts of seeds at maturity contained very low levels of radioactivity, but chromatographic analysis detected prochloraz, BTS 44595, BTS 44596 and BTS 45186 together with low levels of unknown components and polar origin material. Extract of treated leaves contained significant amounts of polar residues which remained at the origin of TLC plates. When the extracts were hydrolized with pyridinium hydrochloride all these residues were converted quantitavely to BTS 45186 (2,4,6-trichlorophenol).

About 19% of the TRR remained associated with the fibre from mature treated leaves after sequential solvent extraction. Microwave solvent extraction released 10.4% of the total residue (55% of the fibre). Although a large proportion of this residue was associated with polar origin material (6.5%), quantitative conversion to BTS 45186 by pyridinium hydrochloride hydrolysis indicated that these polar residues contained the trichlorophenoxy moiety. Further microwave extraction of the fibre residue with hydrochloric acid released 3.6% of the total residue (19% of the fibre) leaving only 4.9% of the total radioactivity bound to fibre. The radioactivity extracted by acid hydrolysis was shown to contain BTS 44595, BTS 44596, BTS 45186 and polar origin material. Pyridinium hydrochloride hydrolysis of the polar material again released further quantities of BTS 45186.

Table 17. Characterisation of radioactivity in extracts of oilseed rape tissues after field-rate application of [^{14}C]prochloraz (0.66 kg ai/ha).

Sample	Foliage	Foliage	Seeds	Pods	Top growth	Treated leaves	Bottom growth
Time	Day 0	Day 19	Maturity				
Total residue (mg/kg)	31.1	4.7	0.05	0.47	0.46	35.05	0.35
	Distribution of residue (% of TRR)						
Origin[1]	3.0	29.7	10.5	28.7	5.2	27.5	2.8
BTS 44595	0.04	28.8	8.7	ND	0.9	26.1	1.1
BTS 44596	3.8	19.8	3.5	0.7	0.5	19.0	0.3
BTS 45186	ND	0..2	2.9	1.1	1.5	0.5	ND
Prochloraz	87.5	2.8	11.0	ND	0.5	2.2	0.8
Unknowns	ND	0.8	1.2	0.4	0.8	2.5	0.5
Fibre bound[2]	2.2	12.7	60.1	65.6	88.5	17.8	92.9
Remainder	3.5	2.5	2.2	3.6	2.0	4.4	0.8

[1] polar material found at the origin of TLC plates or solvent front material on HPLC
[2] radioactivity bound to fibre or in solvent extracts not characterised by TLC.
ND: not detectable

Acetone was highly efficient in extracting the non-polar residue containing prochloraz, BTS 44596 and BTS 44595. The hydrolysis of these extracts showed good conversion (>99%) of the residue to the common moiety 2,4,6-trichlorophenol (BTS 45186).

Table 18. Conversion of residues in acetone extracts of treated leaves of oilseed rape to 2,4,6-trichlorophenol by pyridinium chloride hydrolysis (final harvest,field rate).

Extract	Total residue (mg/kg)	% Extracted residue	% Extracted residue containing BTS 45186	% Conversion
Acetone wash	13.4	38.1	37.9	99.5
Acetone extract	10.8	31.2	31.0	99.4

Mushrooms. The metabolism of [^{14}C]phenyl-labelled prochloraz as the manganese chloride complex (BTS 46828) was studied by Campbell and Powles (1991) [Ref: A87723]. After a single post-emergence application of a 50% WP formulation of prochloraz (3 g ai/square m) to the first crop grown under standard commercial conditions, mushrooms were sampled 8, 16, 23, 30 and 37 days after treatment. Eight days after application the residues were equivalent to 0.53 mg prochloraz/kg,

and after 30 days equivalent to 0.82 mg/kg, but samples and all other intervals contained only 0.12 to 0.31 mg/kg. 77 to 100% of the residue was extractable with acetone.

Table 19. Concentrations of radioactivity in mushroom crops after a single application of [^{14}C]prochloraz (3 g ai/square m).

Days after application	TRR as mg/kg prochloraz[1]	% extracted with acetone	% unextractable
8	0.53	88.1	8.9
16	0.31	82.9	9.4
23	0.27	102.2	1.5
30	0.82	77.2	15.5
37	0.13	82.7	11.8

[1] mean of three results

Unchanged prochloraz accounted for 75.0% (day 8) and 85.3% (day 30) of the extracted radioactivity and an unknown metabolite with similar retention characteristics to BTS 9608 accounted for c. 9-10%. No free BTS 45186 was detected and conjugated residues containing this moiety accounted for <1% of the extracted radioactivity. A component unidentified but less polar than BTS 45186 was found at both sampling intervals.

Good agreement was obtained between the residues in mushrooms determined by radioactive measurement and the gas chromatographic method, supporting the use of the 'common moiety' analytical method to determine total residues of prochloraz and its metabolites in treated mushroom crops.

Table 20. Residues of prochloraz and its metabolites in mushrooms after single applications of [^{14}C]prochloraz as the manganese chloride complex (3 g ai/square m).

Days after application	Lot no.	Residue (mg prochloraz equivalents/kg)	
		Total radioactivity	Residues hydrolysed to BTS 45186
8	1	0.339	0.35
	2	0.558	0.52
	3	0.696	0.78
16		0.31	0.22
23		0.273	0.36
30		0.822	0.7
37		0.127	0.08

Prochloraz is metabolised to BTS 44596 by cleavage of the imidazole ring and this is followed by deformylation to generate BTS 44595. Low levels of conjugates of both these metabolites are formed, which are resistant to the initial extraction solvents, only being released under more exhaustive microwave acetonitrile/water extraction. Conversion of polar material to BTS 45186 by pyridinium hydrochloride hydrolysis indicates that it contains the trichlorophenoxy moiety. The metabolic fate of prochloraz in oilseed rape is similar to that observed in wheat. In mushrooms prochloraz manganese complex undergoes dissociation to free prochloraz and subsequent metabolism to BTS 9608 and conjugates containing the BTS 45186 moiety.

Table 21. Summary of metabolism following foliar application of prochloraz at field application rates (compounds and fractions as % of the TRR).

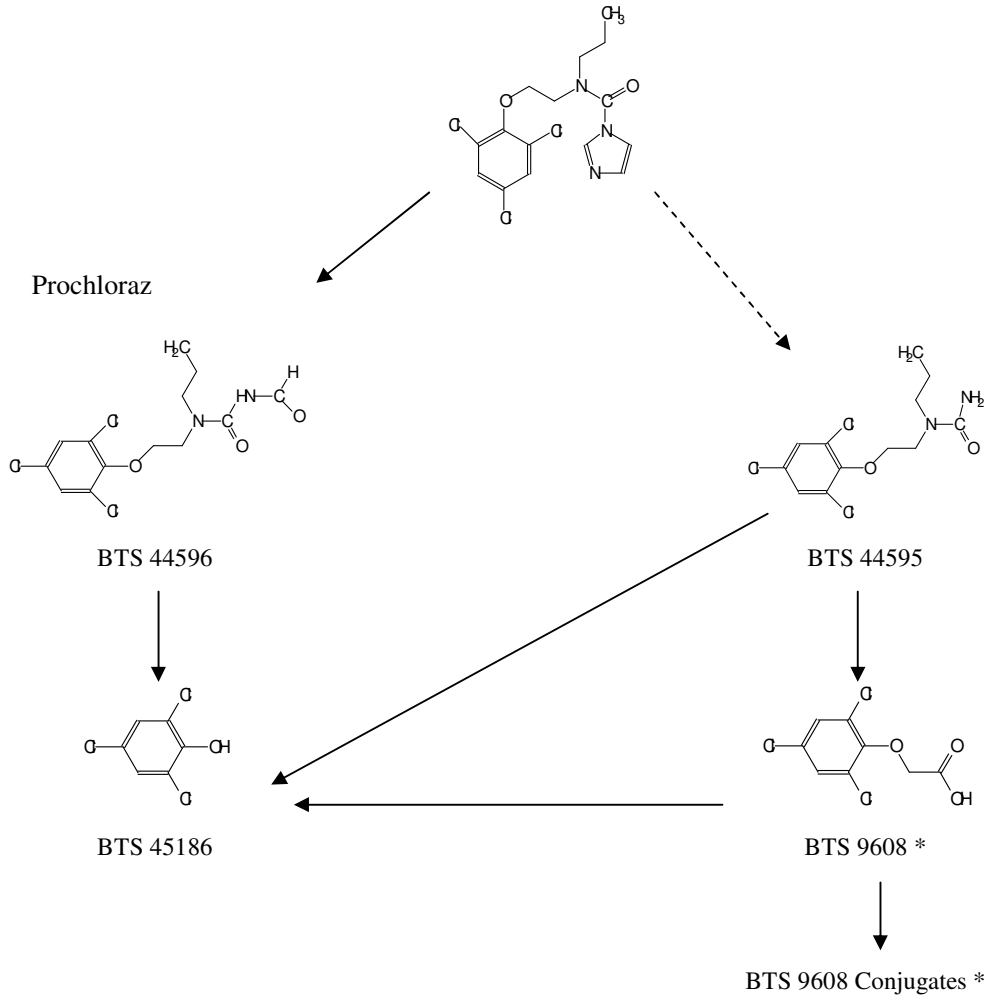
Compound or fraction	% of TRR								
	Wheat			Oilseed rape				Mushrooms	
	Foliage Day 20	straw	grain	Foliage Day 19	Foliage harvest	Seeds	Pods	Day 8	Day 30
prochloraz	0.6	<0.1	1.7	2.8	2.2	11.0	ND	66.1[1]	65.9[1]
BTS 44495	8.0	8.1		28.8	26.1	8.7	ND	ND	ND
BTS 44496	37.8	25.8		19.8	19.0	3.5	0.7	ND	ND
BTS 45186	ND	ND		0.2	0.5	2.9	1.1	0.4	0.5
BTS 9608	ND	ND		ND	ND	ND	ND	8.0[1]	7.6[1]
Polar origin	44.6	42.2	14.2	29.7	27.5	10.5	28.7		
Other unknowns	4.1	8.2		0.8	2.5	1.2	0.4	6.1[1]	4.9[1]
Other activity				5.2	5.4	18.7	9.1	10.5	5.6
Extracted radioactivity[2]	95.1	84.3	15.9	82.1	83.1	56.5	39.8	88.1	77.2
Sum identified	46.4	33.9	<1.7	51.6	47.8	26.1	1.8	74.5	74.0
Unextractable	5.2	16.1	84.2	12.7	16.8	43.5	60.0	8.9	15.5
Total residue (mg/kg)	6.91	20.91	0.023	4.7	35.05	0.05	0.47	0.53	0.82

ND: not detected
[1] corrected from % extracted to provide % of TRR
[2] cold solvent extraction with acetone, acetonitrile and acetonitrile/water of wheat and oilseed rape and acetone only of mushrooms

Proposed metabolic pathways

The available studies indicate that the prochloraz manganese complex rapidly dissociates to free prochloraz in mushrooms, and that there is limited metabolism of the parent compound in that crop. In oilseed rape and wheat, the metabolism of prochloraz appears to proceed by a common pathway, involving cleavage of the imidazole ring to form the formyl urea (BTS 44596), oxidation of the side chain to form the urea (BTS 44595), the phenoxyacetic acid (BTS 9608 mainly conjugated), and eventually the phenol BTS 45186 which occurs almost entirely as water-soluble conjugates or is strongly bound to plant fibre (Figure 4).

Figure 4. Proposed metabolic pathways of prochloraz in plants.



* mushrooms and rotational crops only.

Rotational crops

A study by Mislankar and Tull (2003) [Ref: B004283] was conducted to determine the extent and nature of residue uptake by crops grown in soil previously treated with [^{14}C]prochloraz at the maximum expected annual rate and planted at various intervals. Bare sandy loam soil from North Carolina, USA, was treated at a rate of 1.1 kg [^{14}C]prochloraz/ha (uniformly labelled in the phenyl ring), equal to the annual maximum application rate. The treated soil, in two 84cm x 152 cm tanks buried to within about 5 cm of the rim, was covered to control irrigation and prevent flooding. A leafy vegetable (lettuce), a root crop (radishes) and a small grain (wheat) were planted 30 days, 120 days and 365 days after treatment.

The TRR in all the crops was 0.28 mg/kg or less at all rotations, except in wheat straw (1.14 mg/kg at day 30, decreasing to 0.21 mg/kg at day 120 and then increasing to 0.43 mg/kg at day 365). The uptake in grain was 0.02 mg/kg or less at all rotations.

Table 22. The TRR in rotational crops grown in soil treated with [^{14}C]prochloraz and aged for 30, 120 and 365 days before sowing.

Crop or part	TRR (mg prochloraz equivalents/kg)		
	30 Day	120 Day	365 Day
Lettuce	0.03	0.016	0.02
Radish tops	0.155	0.057	0.052
Radish roots	0.051	0.018	0.024
Immature wheat	0.281	0.027	0.049
Wheat grain	0.02	0.006	0.017
Wheat straw	1.137	0.208	0.427

More than 70% of the TRR was extracted from all 30-dqy samples except wheat grain where the initial TRR was only 0.02 mg/kg. Similarly more than 70% was extracted from all 120- and 365-day samples except lettuce whose initial TRR was only 0.012 mg/kg in both cases and 365-day wheat grain where it was 0.017 mg/kg. The low extraction from wheat grain at days 30 (37% TRR) and 365 (16%) echoed that observed in the wheat metabolism study (16%).

Table 23. Distribution of radioactivity in rotational crops grown in soil treated with [^{14}C]prochloraz (1.1 kg ai/ha) and aged for 30, 120 and 365 days before sowing.

Day	Sample	Extractable residue (mg prochloraz equivalent/kg)	Extractable residue (% total)	% Extractable residue unidentified
30	Lettuce	0.024	70.6	5.1
	Radish tops	0.170	91.1	25.5
	Radish roots	0.049	84.7	11.3
	Wheat forage	0.251	89.4	19.1
	Wheat grain	0.007	37.4	
	Wheat straw	0.861	75.7	21.9
120	Lettuce	0.012	65.8	30.5
	Radish tops	0.048	88.8	28.6
	Radish roots	0.012	72.7	28.1
	Wheat forage	0.023	85.7	17.8
	Wheat grain	Not analysed		
	Wheat straw	0.172	82.8	1.9
365	Lettuce	0.012	61.0	14.1
	Radish tops	0.046	86.1	31.2
	Radish roots	0.022	82.6	10.2
	Wheat forage	0.039	79.4	8.4
	Wheat grain	0.003	16.0	
	Wheat straw	0.306	71.6	17.5

Prochloraz was metabolised to BTS 44596, BTS 44595, BTS 9608 and ultimately to BTS 45186. Low concentrations of the parent were detected accounting for a maximum of 0.004 mg/kg. In all samples 70-98% of the extractable residues were identified.

Table 24. Prochloraz metabolites in rotational crops grown in soil treated with [^{14}C]prochloraz (1.1 kg ai/ha) and aged for 30, 120 and 365 days before sowing.

Day	Sample	Prochloraz		BTS 44595		BTS 44596		BTS 45186		BTS 9608		Conjugates[2]	
		% of TRR	mg/kg[1]	% of TRR	mg/kg[1]	% of TRR	mg/kg[1]	% of TRR	mg/kg[1]	% of TRR	mg/kg[1]	% of TRR	mg/kg[1]
30	Lettuce			7.6	0.003	2.0	0.001	23.2	0.008	34.2	0.011		
	Radish tops	2.2	0.004			4.4	0.008	17.3	0.032	23.8	0.044	20.2	0.038
	Radish roots	6.7	0.004	31.7	0.018	4.9	0.003	9.1	0.005	23.1	0.013		
	Wheat forage	1.5	0.004	14.1	0.040	3.0	0.008	7.3	0.021	27.3	0.077	19.1	0.054
	Wheat straw			11.1	0.126	1.5	0.017	12	0.136	17.7	0.201	16.8	0.190
120	Lettuce			18.9	0.004	3.2	0.001	17.8	0.004	15.8	0.003		
	Radish tops	1.8	<0.001	8.2	0.004	2.0	0.001	18.3	0.010	14.4	0.008	18.7	0.010
	Radish roots	1.3	<0.001	24.0	0.004	2.5	<0.001	5.1	0.001	19.4	0.003		
	Wheat forage	3.1	0.001	22.1	0.006	3.7	0.001	15.9	0.004	25.6	0.007		
	Wheat straw			18.0	0.038			16.7	0.035	46.5	0.097		
365	Lettuce			4.7	0.001	2.3	<0.001	13.3	0.003	32.1	0.006		
	Radish tops	4.0	0.002	7.1	0.004	--	--	17.8	0.01	30.3	0.016	--	--
	Radish roots			40.3	0.011	4.1	0.001	9.2	0.003	20.6	0.006		
	Wheat forage			17.0	0.008			20.5	0.010	35.2	0.017		
	Wheat straw			7.0	0.030			9.6	0.041	42.5	0.182		

[1] Expressed as mg prochloraz equivalents/kg
[2] 30-day wheat straw treated with pyridinium chloride to convert residues to trichlorophenol.

Potatoes. In a study by Kelly (1985) [Ref: A88602] a one square metre plot of wheat was treated at Zadoks growth stage 47 with 0.94 kg [^{14}C]phenyl-labelled prochloraz/ha and potato tubers were planted 9 months after the treatment after the wheat was harvested. Tubers were sampled close to maturity (6 months after planting) and, after combustion, were analysed by liquid scintillation counting.

At planting significant prochloraz-derived residues were present in the soil (0.035-0.567 mg/kg dry weight) but residues in the harvested tubers were negligible although statistically greater than those in the control plot. The mean residue detected (0.0056 mg/kg) was less than twice the mean background level (0.003 mg/kg).

Sugar beet. In a study by McGibbon (1982) [Ref: A88567] the soil of a one square m plot was treated with [^{14}C]phenyl-labelled prochloraz at 395 g ai/ha, and the beet seed sown 41 days after treatment, after the soil had been hand-cultivated to a depth of about 15 cm. Seedlings were collected 27 days after sowing and mature plants (roots and tops) were taken at harvest (157 days after sowing).

At planting 94.1% of the radioactivity in the 0-20 cm soil layer was found in the upper 15 cm (the cultivation zone) with a mean concentration of 0.26 mg prochloraz equivalents/kg dry weight. Twenty-three days after sowing residues in the seedlings (0.07 mg/kg) were significantly greater than those from the control plot (0.006 mg/kg). This initial uptake was diluted by later growth of the plant. At harvest there were no significant residues in the root. Some uptake of radioactivity into the foliage occurred but the quantity was very low (0.005 mg/kg), less than twice the background level of 0.003 mg/kg.

Wheat. In a study by Krepski (1981) [Ref: A88554] plots of spring wheat (5 m²) were sprayed in the spring of 1978 with either [^{14}C]imidazole-labelled or [^{3}H]phenyl-labelled prochloraz (25% EC) at a rate equivalent to 1 kg ai/ha. After harvest in the autumn, winter wheat was sown in these plots in November and grown to maturity the following season. At harvest the ^{14}C and ^{3}H residues in the soil

were 0.11 and 0.43 mg/kg respectively, and in the grain and straw at or below 0.01 mg prochloraz equivalents/kg.

RESIDUE ANALYSIS

Analytical methods

Information on methods of analysis for free and total prochloraz (parent plus metabolites containing the 2,4,6-trichlorophenoxy moiety) in plant material and animal tissues, together with methods for analysing specific metabolites in milk was reported to the Meeting.

Enforcement methods

Plant materials. The 'common moiety' method involving hydrolysis of prochloraz and metabolites to 2,4,6-trichlorophenol has been used for many years for enforcement purposes, as multi-residue methods, unlikely to give satisfactory recovery rates, have not been investigated. Method RESID/88/72 (Manley, 1989) [Ref: A87791] can be used for a wide range of plant materials to measure residues of prochloraz and its metabolites containing the 2,4,6-trichlorphenoxy moiety.

In this method samples are Soxhlet-extracted with acetone, and after concentration the extract is hydrolysed with pyridine hydrochloride to convert all components to 2,4,6-trichlorophenol, then extracted into petroleum ether by steam distillation. Further clean-up is by partition into base and back partition between acid and toluene. Total 2,4,6-trichlorophenol residues are determined by gas chromatography with sensitive electron capture detection (GC/ECD), and expressed as prochloraz equivalents (correction factor of 1.906). Similar recoveries were obtained from all types of sample, with an overall mean of 90% from approximately 1500 tests with untreated samples at fortification levels between 0.02 and 20 mg/kg prochloraz and metabolites BTS 44595 and BTS 44596. The standard deviation was 15%. The limit of quantification for most plant materials is estimated as 0.05 mg/kg equivalent prochloraz, with 0.10 mg/kg for selected plant materials such as cereal immature plants and straw and fruit peels. The results for all plant materials reported between 1982 and 1988 are shown in Table 25.

Table 25. Recoveries determined by method RESID/88/72 for the total residue of prochloraz (determined as 2,4,6-trichlorophenol) in a range of crops.

Crop category	Sample	Recoveries (corrected for residues in UTC), %	
		No.	Mean, SD
Root & tuber vegetables	Sugar beet (roots & tops) Potatoes	31 33	92.6 ± 16.3 91.9 ± 10.9
Bulb vegetables	Onions, garlic & shallots	25	89.2 ± 11.4
Leafy vegetables	Lettuce	68	87.6 ± 15.1
Legume vegetables	Field beans Peas	30 43	96.6 ± 13.1 88.9 ± 16.5
Fruiting vegetables	Egg plants, peppers, tomatoes & chillies Maize	30 61	88.9 ± 15.8 90.8 ± 12.1
Citrus	Citrus fruit	72	93.3 ± 17.2
Pome, small fruit and berries	Apples & strawberries	13	82.5 ± 15.3
Stone fruit	Apricots, nectarines, peaches, plums & cherries	60	88.9 ± 13.3
Assorted fruits, inedible peel	Avocados, mangoes, papayas & pineapples Bananas	128 121	87.6 ± 13.6 82.4 ± 14.3
Cereal grains	Barley, oats, rye, wheat, grass seed	216	91.0 ± 15.8
Other cereal products	Straw immature plants	163 118	90.8 ± 16.7 84.2 ± 15.1

Crop category	Sample	Recoveries (corrected for residues in UTC), %	
		No.	Mean, SD
	ears & chaff	72	89.5 ± 12.7
	processed products	17	92.1 ± 19.5
Tree nuts and tropical seeds	Almonds, coffee beans & sugar cane	29	95.0 ± 7.9
Oilseed	Rape seed	146	97.1 ± 13.4
	Sunflower	44	96.5 ± 15.6
Overall		1520	90.1 ± 15.2

A statistical analysis of recovery data with the individual metabolites has shown that each analyte is quantitatively hydrolysed to 2,4,6-trichlorophenol, and that there is no difference between recoveries (Table 26).

Table 26. Recoveries of each analyte determined by method RESID/88/72 for the total residue of prochloraz (determined as 2,4,6-trichlorophenol) from several important crops.

Component	No. of recoveries	Mean	Standard deviation
Prochloraz	510	88.6	15.6
BTS 44595	402	90.5	14.7
BTS 44596	353	88.7	14.7
Overall	1265	89.3	15.1

An independent validation study has been reported by Taylor, 1999 [Ref: C003813], in which samples of whole citrus fruit, cereal grain and oilseed rape were fortified with either prochloraz, BTS 44595 or BTS 44596, and worked up using method RESID/88/72. The final extracts were analysed by gas chromatography with electron capture detection (GC/ECD), and confirmation was achieved by injecting the same samples onto a GC with a mass selective detector (MSD). The overall mean prochloraz recoveries were 108% and 107% for ECD and MSD respectively. The limit of quantification was 0.05 mg/kg, although recoveries were not conducted at that level in this study. The lowest fortification level was 0.20 mg/kg. The results are shown in Table 27.

Table 27. Recoveries determined with GC/ECD and GC/MSD analysis of total residues of prochloraz (determined as 2,4,6-trichlorophenol) in cereal grain, oilseed rape and citrus fruit.

Sample	Analyte	Fortification (mg/kg)	% Recovery (ECD)	% Recovery (MSD)
Cereal grain	Prochloraz	0.20	114	101
			94	109
			-	109
			113	119
	BTS 44595	0.20	112	100
			116	105
			110	99
	BTS 44956	0.20	91	105
			91	98
			101	105
Oilseed rape	Prochloraz	0.50	114	106
			112	112
			110	118
	BTS 44595	0.50	105	89
			109	95
			105	111

Sample	Analyte	Fortification (mg/kg)	% Recovery (ECD)	% Recovery (MSD)
	BTS 44956	0.50	95 112 124[1] 101	110 - 111 106
Citrus	Prochloraz	10.0	118 116 119	111 124[1] 105
	BTS 44595	10.0	91 119 103	93 105 108
	BTS 44956	10.0	112 109 117	116 114 114

[1] High recovery accepted as overall mean and standard deviation not significantly affected by its inclusion

Method RESID/88/72 was also validated in cereals in an independent laboratory study (Zietz & Klimmek, 2002) [Ref: C026109] in which the mean recovery rates ranged from 77% to 92%, and the relative standard deviations from 4% to 14%. The limits of quantification of prochloraz, BTS 44595 and BTS 44596 were 0.05 mg/kg in wheat grain, and 0.1 mg/kg in wheat shoots and straw. No residues above the LOQ were determined in any of the untreated specimens, with apparent concentrations not exceeding 30% of the LOQ. The recovery rates for all substrates are shown in Table 28.

Table 28. Recoveries in a validation study of RESID/88/72 for the total residue of prochloraz (determined as 2,4,6-trichlorophenol) in cereals.

Sample	Analyte	Fortification (mg/kg)	No. of replicates	Individual recoveries	Mean recovery	Overall mean value ± rsd (%)
Wheat grain	Prochloraz	0.05 0.5	2 2	87, 86 97, 99	87 98	92 ± 7
	BTS 44595	0.05 0.5	2 2	71, 89 96, 97	80 96	88± 14
	BTS 44596	0.05 0.5	2 2	93, 84 88, 87	89 87	88 ± 4
Wheat shoots	Prochloraz	0.10 1.0	2 2	91, 83 89, 89	87 89	88 ± 4
	BTS 44595	0.10 1.0	2 2	82, 91 88, 81	86 84	85 ± 6
	BTS 44596	0.10 1.0	2 2	100, 83 88, 77	91 82	87 ± 11
Wheat straw	Prochloraz	0.10 5.0	2 2	85, 87 75, 75	86 75	81 ± 8
	BTS 44595	0.10 5.0	2 2	84, 83 72, 69	83 70	77 ± 10
	BTS 44596	0.10 5.0	2 2	83, 81 77, 69	82 73	77 ± 8

Animal tissues. Residues of total prochloraz can be determined by method RESID/90/89 (Godfrey *et al*., 1990) [Ref: A88072]. Samples are freeze-dried and hydrolysed directly with pyridine hydrochloride which converts all metabolites containing the 2,4,6-trichlorophenoxy moiety to 2,4,6-trichlorophenol. The latter is then steam-distilled with simultaneous extraction into petroleum ether. After further clean-up by partition into base and then back into toluene, the final extracts are analysed by GC-MSD. For all components converted to 2,4,6-trichlorophenol, the overall mean recoveries

from tissues of dairy cows were 80% for muscle, 90.6% for liver, 90.7% for kidney, 93.8% for subcutaneous fat and 80.3% for peritoneal fat. Fortifications were with BTS 44595 and BTS 44596, the two main metabolites in tissue hydrolysable to 2,4,6-trichlorophenol. The limit of quantification was 0.05 mg/kg total prochloraz-derived residue for all types of sample.

Table 29. Recoveries determined by RESID/90/89 for the total residue of prochloraz (as 2,4,6-trichlorophenol) in animal samples.

Fortification (mg/kg)	Recovery (%)				
	Liver	Muscle	Kidney	Subcutaneous fat	Peritoneal fat
0.01			108[2]		
0.25	92[2]		94[1], 98[1]	88[1], 97[2]	92[2]
0.50	90[1], 95[2], 83 [2]	77[2], 83[1]	97[2], 67[1]	95[2]	85[1]
1.0			80[2]	95[1]	64[2]
10.0	91[1]				
Mean	90.2	80	90.7	93.8	80.3
Overall summary	Mean Std. Dev. No.		88.7 10.6 20		

[1] Fortified with BTS 44595
[2] Fortified with BTS 44596

RESID/90/89 was validated in an independent laboratory (Covance Laboratories Ltd) and reported by Croucher, 1999 [Ref: C004483]. Control samples of muscle, milk and egg were fortified in quintuplet with prochloraz at 0.05 and 0.5 mg/kg, and analysed using method RESID/90/89. Interference from control samples was shown to be below 30% of the limit of quantification for all three substrates. For muscle and milk a limit of quantification of 0.05 mg/kg was demonstrated, with mean recoveries within the acceptable range of 70 to 110%. The recoveries from eggs were also within 70 to 110% at the 0.5 mg/kg level. At 0.05 mg/kg recoveries were lower, although precision was good at both levels. On the basis of this study, the limit of quantification for eggs could only be demonstrated at 0.5 mg/kg.

Table 30. Recoveries of the total residue of prochloraz (determined as 2,4,6-trichlorophenol) from animal samples using method RESID/90/89.

Sample	Fortification (mg/kg)	Recovery (%)	No. of replicates	Mean recovery	SD	Precision RSD
Muscle	0.05	75, 85, 82, 79, 85	5	81	4.3	5.3
Muscle	0.5	84, 85, 82, 76	4	82	4.0	4.9
	Overall:		9	81	3.9	4.8
Milk	0.05	99, 92, 97, 66, 86	5	88	13.3	15.1
Milk	0.5	83, 78, 79, 74, 80	5	79	3.3	4.1
	Overall:		10	83	10.3	12.4
Egg	0.05	62, 65, 64, 54, 56, 63, 48, 51, 57, 59	10	58	5.7	9.9
Egg	0.5	74, 102, 95, 80, 98	5	90	12.1	13.5
	Overall:		15	69	17.5	25.3

Data collection methods

Plant material. An early method of analysis (AX 79001), measuring only the free prochloraz in wheat was reported by Hayto in 1978 [Ref: A87749]. Samples of grain and straw were extracted with acetone, filtered, acidified with hydrochloric acid, the acetone evaporated, more acid added and the

extract partitioned with petroleum ether discarding the organic layer. The aqueous extract was neutralised, then extracted with petroleum ether, the petroleum ether evaporated and the residue dissolved in ethyl acetate. Prochloraz was determined by GC/ECD. The limit of determination was 0.01 mg/kg. Recoveries were 73.2-97.1% from straw (fortified at 0.10 to 0.51 mg/kg, n=9), and 67.3-92.6% from grain (fortified at 0.10 to 5.0 mg/kg, n=13).

A minor refinement of this method for wheat and barley, using reduced quantities of acetone for the extraction step was reported by Hato, 1979 [Ref: A87747], with a limit of determination of 0.01 mg/kg and recoveries of 64.7-99.6% from straw (fortified at 0.05-0.50 mg/kg, n=30), and 62.9–98.6% from grain (fortified at 0.05-0.50 mg/kg, n=28).

A method for determining free and conjugated residues of prochloraz and its metabolites containing the 2,4,6-trichlorphenol moiety in grain (Method AX 79007) was reported by Kelly, 1979 [Ref: A87744]. Samples were milled and extracted with acetone/sodium carbonate, the extract evaporated, hydrochloric acid and water added, and the mixture hydrolysed with liquid/liquid extraction (petroleum ether) for 1 hour. The petroleum ether extract (containing any 2,4,5,6-trichlorophenol) was saved. The acid digest was made basic with NaOH and extracted with diethyl ether, and the extract dried and evaporated. The residue was treated with pyridinium hydrochloride at 230ºC for 16 h, cooled and partitioned between hydrochloric acid and diethyl ether. The ether extract was added to the saved petroleum ether extract, and sodium carbonate/KOH added. Organic solvents were evaporated, hydrochloric acid was added, and the residue extracted with water/petroleum ether. The petroleum ether extract was partitioned into sodium carbonate solution, which was then acidified and partitioned into toluene. The residue was quantified by GC/ECD. The limit of determination was 0.01 mg/kg equivalents of BTS 45186. The mean recovery was 87±12% from grain fortified at 0.099 to 0.506 mg/kg, n=12.

In a related report Kelly, 1979b [Ref: A87742], described a similar method for analysing wheat straw, with a slight modification in the extraction procedure. The limit of determination was 0.01 mg/kg equivalents of BTS 45186. Recoveries from grain were 86 ± 17% (fortification 0.100 to 0.205 mg/kg, n=6), and from straw 73 ± 7% % (fortification 0.202 to 6.72 mg/kg, n=6).

Kelly, 1979c [Ref: A87739], reported a further refinement of the above method for cereal grain and straw involving a simplified extraction in which samples were milled and Soxhlet-extracted with acetone before being evaporated and reacted with pyridinium hydrochloride as described above. The limit of determination of this method (AX 79020) was 0.01 mg/kg equivalents of BTS 45186 for grain and 0.1 mg/kg for straw. Recoveries were 60-110% from grain (fortified at 0.200 to 0.501 mg/kg, n=13), and 64-100% from straw fortified at 0.616 to 5.02 mg/kg (n=11).

A minor modification, using different equipment, was reported by Reary, 1981 [Ref: A87759], for cereals. In this method (RESID/81/13) the pyridinium hydrochloride hydrolysis time was reduced to 30 min at 215ºC. The LOQs were 0.02 mg/kg for grain, 0.1 mg/kg for straw and 0.2 mg/kg for immature plant parts. Mean recoveries were 75.8 ± 23.8% from immature plants (fortified at 1.0 to 4.0 mg/kg), 73.6 ± 13.8% from green ears (fortified at 1.0 to 4.0 mg/kg), 71.5 ± 16.9% from grain (fortified at 0.10 to 0.2 mg/kg, n=11), and 70. ± 19.5% from straw (fortified at 2.0 to 4.0 mg/kg).

A combined method (RESID/81/51) measuring both the parent compound and total prochloraz-derived residues containing the 2,4,6-trichlorophenoxy moiety has been reported by Browne and Reary, 1981 [Ref: A87766] for apples and potatoes. Residues are extracted with acetone, filtered, and dried. One-half of the extract is used to determine free prochloraz as in method AX 79001 (see above), and the other half analysed for total prochloraz residues using method RESID/81/13 (also above). The limits of determination of free prochloraz were 0.05 and 0.02 mg/kg and of total residues 0.1 and 0.05 mg/kg in apples and potatoes respectively. The overall recoveries

from apples were 81.1 ± 14.7% (n=15) and from potatoes 83.5 ± 13.0% (n=34) in the fortification range 0.25 to 20 mg/kg.

The most usual common moiety methods for determining total prochloraz residues in plant material residue trials have been RESID/82/88 and RESID/88/72 [recommended for enforcement, see above] reported by Manley and Snowdon, 1982 [Ref: A88030] and Manley, 1989 [Ref: A87791] respectively. Minor changes in RESID/88/72 included a longer acetone extraction time than in method RESID/82/88 and the omission of the sodium sulfate filtration.

RESID/82/88 was validated by Manley and Snowdon, 1982 [Ref: A87965], for residues of prochloraz and its main metabolites in cereals (winter and spring barley, winter and spring wheat, oats and rye), using information from studies between 1984 and 1986. The mean recovery was 92%. The apparent residues in green plants ranged from ND to 0.23 mg/kg (mean 0.065 mg/kg), in ears from 0.004 to 0.126 mg/kg, (mean 0.042 mg/kg), in straw from ND to 0.239 mg/kg (mean 0.062 mg/kg), and in grain from ND to 0.04 mg/kg (mean 0.011 mg/kg). The limits of determination, based upon the apparent residues in untreated samples, were typically 0.30 mg/kg (green plants), 0.20 mg/kg (ears), 0.20 mg/kg (straw) and 0.05 mg/kg (grain).

Table 31. Recoveries of residues of prochloraz and metabolites from cereals using method RESID/82/88.

Sample	Fortification range, mg/kg	No. of determinations, fortified with:				Recovery (%)	
		Prochloraz	BTS 44595	BTS 44596	Total	Range	Mean ± S.D.
Green plants	0.05 to 10.0	18	15	7	40	63 to 123	89 ± 14
Immature ears	0.05 to 10.0	12	14	15	41	69 to 123	91 ± 13
Straw	0.04 to 10.0	31	29	25	85	60 to 125	94 ± 15
Grain	0.02 to 2.0	36	36	25	97	66 to 123	93 ± 15
Total		97	94	72	223	60 to 125	92 ± 13

Animal tissues. Chambers *et al.,* 1985 [Ref: A87907], described method RESID/85/52 for determining residues of prochloraz, based on the method developed for plant material. Samples were first freeze-dried, except for fat which was first extracted with hot acetonitrile and the solvent evaporated. All samples were then hydrolysed with pyridine hydrochloride to convert metabolites containing the 2,4,6-trichlorophenoxy moiety to 2,4,6-trichlorophenol. The latter was then steam-distilled with simultaneous extraction into petroleum ether. After further clean-up by partition into base and then back into toluene, final extracts were analysed by gas chromatography with electron-capture detection (GC-ECD). Samples were fortified with BTS 9608, the major animal metabolite as free prochloraz is not found in animal tissues. Fortifications ranged from 0.015 to 5 mg/kg BTS 9608 in tissues and milk. The overall mean recovery was 92% from fat and 103% from tissues including milk. Expressed as a total prochloraz-derived residue, the limit of quantification was 0.03 mg/kg for tissues and milk.

Individual results are shown in Table 32. Mean recoveries, corrected for apparent residues in control samples, were 0.03 mg/kg (heart), 0.023 mg/kg (liver), 0.017 mg/kg (kidney), 0.017 mg/kg (muscle), 0.015 mg/kg (fat) and 0.024 mg/kg (milk).

Table 32. Recoveries by method RESID/85/82 for the total residue of prochloraz (determined as 2,4,6-trichlorophenol) from milk and animal tissues.

Fortification (mg/kg)[1]	Recovery (%)						
	Heart	Liver	Kidney	Hind-leg muscle	Shoulder muscle	Milk	Fat
0.015				105			

Fortification (mg/kg)[1]	Recovery (%)						
	Heart	Liver	Kidney	Hind-leg muscle	Shoulder muscle	Milk	Fat
0.020				92		101	
0.025							93
0.05	100			88	106, 87	118	120, 85
0.10	101	88		120, 91	140	104, 119	68
0.15						116	94
0.25	96	91	111				90
0.50			110				
5.0		85					
Mean	99	88	111	99	111	112	92
Overall mean (S.D.)	103 (14)						92 (17)

[1] As BTS 9608

In a more recent method (RESID/95/15, Peatman and Godfrey, 1995 [Ref: A88182]) using GC/MS determination but with extraction and hydrolysis procedures similar to RESID/85/52 and RESID/90/89, samples of tissues, milk and eggs, fortified with prochloraz, were extracted with acetone and hydrolysed with pyridine hydrochloride. Liberated 2,4,6-trichlorophenol was extracted into petroleum ether, derivatised with acetic anhydride, and then determined by GC/MS. Recoveries (after subtraction of apparent residues in untreated samples) are shown in Table 33. Apparent residues in all control samples except fat ranged from undetectable to 0.007 mg/kg (mean 0.002 mg/kg) and in fat undetectable to 0.03 mg/kg (mean 0.009 mg/kg). The limits of quantification were 0.025 mg/kg for eggs, muscle, liver and kidney, 0.05 mg/kg for fat and 0.02 mg/kg for milk.

Table 33. Recoveries determined by method RESID/95/15 of total residue of prochloraz (determined as 2,4,6-trichlorophenol) in animal samples.

Fortification (mg/kg)	Prochloraz recovery (%)					
	Milk	Eggs	Kidney	Liver	Muscle	Fat
0.02	113, 112, 111, 94, 91, 104					
0.025		59, 100, 88	113, 77, 95	107, 137, 102	98, 100, 108	
0.05	113, 100, 80, 59, 69	84, 65, 63, 57	95, 79, 96	89, 97, 97	90, 103, 94	83, 91, 95
0.1	95, 95, 107	68, 65	91, 75, 77	97, 99, 95	92, 95, 99	93, 90, 96, 82
0.2						86, 73, 73
0.4						99, 80, 92
Mean	96	72	89	102	98	87
Overall mean ± SD	91 ± 15					
No.	63					
Range	57-137%					

Method CLE 1905/079-02V for measuring prochloraz and its metabolites BTS 44596, BTS 54906 and BTS 54908 in milk was reported by Heal and Beck, 2003 [Ref: C038443]. The milk was sonicated with acetonitrile, centrifuged, the acetonitrile removed, and aliquots washed with hexane, diluted with water, and partitioned with MTBE. The MTBE extracts were evaporated to dryness, reconstituted in acetonitrile and water, and filtered. Residues were quantified and confirmed by LC/MS/MS using both positive- and negative-ion chemical ionisation modes. The limit of quantification was 0.01 mg/kg for prochloraz and 0.005 mg/kg for each metabolite.

Table 34. Recoveries determined by method CLE 1905/079-02V of residues of prochloraz and BTS 44596, 54906 and 54908 in bovine milk.

Analyte	Fortification (mg/kg)	No. of replicates	Mean % recovery	Standard deviation	Precision RSD (%)
Prochloraz	0.01	5	82	5.2	6.3
	0.10	5	74	2.3	3.1
overall		10	78	6	7.7
BTS 44596	0.005	5	87	4.6	5.3
	0.050	5	76	1.7	2.3
overall		10	81	7	8.1
BTS 54906	0.005	5	81	6.4	7.9
	0.050	5	82	1.1	1.3
		10	82	4	5.4
BTS 54908	0.005	5	91	4.6	5.0
	0.050	5	84	1.3	1.6
overall		10	88	5	5.8

Stability of residues in stored analytical samples

Information on the stability of methamidophos residues during storage of frozen analytical samples of cereal grains, sugar beet roots and leaves, maize leaves, oilseed rape grain and animal items (muscle, milk, eggs) were reported to the Meeting.

Manley, 1988 [Ref: A87968], studied the stability of incurred residues of prochloraz and its metabolites in samples of UK field-treated winter barley and wheat grain stored for up to 3 years at –20°C. Samples were removed at intervals for immediate analysis using method RESID/88/72 (involving hydrolysis of all components to 2,4,6-trichlorophenol, solvent partition clean-up and GC-ECD determination). A mean recovery of 98% was reported for all components and the limit of determination was 0.05 mg/kg equivalent prochloraz. The results, summarised in Table 35, indicated that residues in barley grain were stable over periods up to 23 months, while those in wheat grain were showed 75-80% remaining after 24 months, and 65% after 30 and 34 months.

Table 35. Freezer storage stability of prochloraz-derived residues in field-treated cereal grain.

Crop	Approx. period (months)	Total prochloraz residues[1] in stored samples		
		Individual (mg/kg)	Mean (mg/kg)	Remaining (%)
Winter wheat	1	0.18, 0.20, 0.21	0.20	
	5-6	0.13, 0.12, 0.11	0.12	60
		0.09, 0.08, 0.09	0.12	60
		0.12, 0.13, 0.18, 0.13, 0.13, 0.13	0.14	70
	9	0.16, 0.16	0.16	80
		0.15, 0.13, 0.16	0.15	75
	12	0.14, 0.14, 0.16	0.15	75
	15	0.16, 0.15, 0.17	0.16	80
	18	0.15, 0.18, 0.18	0.17	85
	22	0.16, 0.16, 0.14	0.15	75
	24	0.17, 0.16. 0.16	0.16	80
	30	0.15, 0.12, 0.13	0.13	65
	34	0.14, 0.13, 0.12	0.13	65
Winter barley	2	0.50	0.50	
	6	0.55, 0.52, 0.53	0.53	106
	12	0.43, 0.23, 0.32, 0.25, 0.35, 0.41	0.33	66
	16	0.47, 0.46, 0.39, 0.46	0.45	90

Crop	Approx. period (months)	Total prochloraz residues[1] in stored samples		
		Individual (mg/kg)	Mean (mg/kg)	Remaining (%)
	19	0.62, 0.56, 0.42	0.53	106
	23	0.43, 0.54, 0.40	0.46	92

[1] Measured as 2,4,6-trichlorophenol, expressed as equivalent prochloraz by correcting for the molecular weight factor of 1.906.

Sugar beet from a field trial in Italy was used in a study by Chambers and Longland, 1987 [Ref: A87952], to determine the stability of incurred prochloraz-derived residues under standard deep-freeze conditions. Mature roots and leaves were macerated and stored at -20°C, and samples removed at intervals of up to 13.6 months for analysis using method RESID82/88 (hydrolysis to 2,4,6-trichlorophenol and GC-ECD determination). The mean recovery was 88% and residues did not decrease noticeably during storage up to 13.6 months.

Another study was reported by Longland and Adams, 1988, on the stability of incurred prochloraz-derived residues under standard deep freeze conditions [Ref: A87987]. Maize leaves field-treated with prochloraz were chopped, mixed and stored at -20°C. Samples were removed at 3-month intervals for 2 years. The analytical method (RESID/82/88) gave an overall mean recovery of 104% and the prochloraz-derived residues were stable throughout the 24 months of the study.

Table 36. Freezer storage stability of prochloraz-derived residues in field-treated sugar beet and maize plants [Ref: A87952 and A87987].

Crop	Approximate storage period (months)	No. of replicates	Total prochloraz residues[1] in stored samples	
			Mean (mg/kg)	Remaining (%)
Sugar beet	0	6	5.5	
	2.9	3	5.0	91
	7.6	3	6.9	125
	10.5	3	5.8	105
	13.6	3	5.5	105
Maize green plants	0	6	2.8	
	3	3	2.82	101
	6	3	2.48	89
	10.4	3	2.68	96
	12.6	3	2.44	87
	18.3	3	2.82	101
	24.4	3	2.99	107

[1] Measured as 2,4,6-trichlorophenol, expressed as equivalent prochloraz by correcting for molecular weight factor of 1.906.

Peatman and Godfrey, 1999, reported on the stability of prochloraz-derived residues in oilseed rape grain stored frozen for up to 36 months [Ref: C003154]. Aliquots of ground grain were fortified with either prochloraz, BTS 44595 or BTS 44596 at a level of 1.0 mg/kg and then stored at a nominal ≤-18°C, and samples were analysed at intervals using method RESID/88/72 involving hydrolysis to 2,4,6-trichlorophenol and GC-ECD determination. The overall mean recovery for all compounds was 95.8% (range 63-148.6%). The apparent occurrence of recovery rates above 100% was attributed to the enhancement of the chromatographic peaks by associated matrix effects. The results of this study, corrected for recovery are shown in Table 37. No significant degradation of residues during storage for up to 3 years was observed.

Table 37. Freezer storage stability of prochloraz-derived residues in oilseed rape fortified with 1.0 mg/kg prochloraz, Methods BTS 44595 or 44596.

Compound	Storage months/ days	Residues[1] in stored samples					
		Uncorrected			Corrected [2]		
		Individual (mg/kg)	Mean (mg/kg)	Mean % remaining	Individual (mg/kg)	Mean (mg/kg)	Mean % remaining
Prochloraz	0/0	1.03, 0.92, 0.88	0.94	100	1.05, 0.94, 0.89	0.96	96
	1/30	0.78, 0.74, 0.70	0.74	74	0.97, 0.93, 0.87	0.92	92
	3/89	0.80, 0.78, 0.78	0.79	79	0.86, 0.84, 0.84	0.85	85
	6/181	1.06, 0.97, 1.09	1.04	104	1.06, 0.97, 1.09	1.04	104
	9/275	0.89, 0.79, 0.75	0.81	81	0.90, 0.80, 0.76	0.82	82
	16/489	0.76, 0.64	0.70	70	0.86, 0.72	0.79	79
	36/1090	0.99, 0.99, 0.97	0.98	98	1.03, 1.03, 1.01	1.02	102
BTS 44595	0/0	0.71, 0.69, 0.64	0.68	68	1.12, 1.08, 1.00	1.07	107
	1/30	1.05, 1.06, 1.01	1.04	104	1.22, 1.24, 1.18	1.21	121
	3/89	1.11, 1.10, 1.09	1.10	110	1.11, 1.10, 1.09	1.10	110
	6/181	1.16, 1.15, 1.22	1.18	118	1.16, 1.15, 1.22	1.18	118
	9/275	1.11, 1.13, 0.94	1.06	106	1.11, 1.13, 0.94	1.06	106
	16/489	0.85, 0.87	0.86	86	0.97, 0.99	0.98	98
	36/1090	1.00, 1.00, 0.99	1.00	100	1.01, 1.01, 1.00	1.01	101
BTS 44596	0/0	0.98, 0.85, 0.82	0.88	88	1.22, 1.07, 1.02	1.10	110
	1/31	0.78, 0.33[5], 0.73	0.76	76	0.91, 0.39[3], 0.85	0.88	88
	3/90	0.97, 0.91, 0.97	0.95	95	0.97, 0.91, 0.97	0.95	95
	6/182	1.11, 1.12, 1.09	1.11	111	1.11, 1.12, 1.09	1.11	111
	9/276	0.73, 0.87, 1.41[3]	0.80	80	1.01, 1.20, 1.96[3]	1.11	111
	12/360	1.06, 1.02, 1.18	1.09	109	1.06, 1.02, 1.18	1.09	109
	16/490	0.88, 0.89	0.89	89	1.00, 1.01	1.01	101
	36/1090	0.33, 0.38, 0.33	0.35	35	0.72, 0.82, 0.73	0.76	76

[1] As 2,4,6-trichlorophenol but expressed as prochloraz (correction factor 1.91), BTS 44595 (correction factor 1.64) or BTS 44596 (correction factor 1.78)
[2] Corrected for mean procedural recovery at time of analysis (unless mean >100%)
[3] Not used to calculate mean

A study by Croucher and Peatman, 2002, on the stability of prochloraz-derived residues in animal tissues [Ref: C024781] analysed fortified samples of muscle, milk and eggs after storage at –20°C for 0, 3, 6, 9 and 12 months. In method RESID/90/89 residues were measured as 2,4,6-trichlorophenol. The GC/MS response was linear and acceptable procedural recoveries were obtained between 0 and 9 months. The procedural recoveries from the 12-month samples were lower, possibly due to a fortification error, but the uncorrected results for the stored samples were all above 70% indicating that the method was satisfactory. The results, as shown in Table 38, indicate that residues of prochloraz in muscle, milk and eggs are stable when stored at a nominal –20°C for up to 12 months.

Table 38. Freezer storage stability of prochloraz-derived residues in muscle, milk and eggs.

Sample	Storage period, months	Total prochloraz residue				
		Uncorrected			Corrected[1]	
		Residue (mg/kg)	% residue remaining	Mean % residue remaining	% residue remaining	Mean % residue remaining
Muscle	0	0.4143 0.4100 0.3920	82.9 82.0 78.4	81.1	101.0 100.0 95.6	98.8
	3	0.4252 0.4338 0.4446	85.0 86.8 88.9	86.9	104.1 106.2 108.8	106.4

Sample	Storage period, months	Total prochloraz residue				
		Uncorrected			Corrected[1]	
		Residue (mg/kg)	% residue remaining	Mean % residue remaining	% residue remaining	Mean % residue remaining
	6	0.4354 0.4465 0.4477	87.1 89.3 89.5	88.6	106.6 109.3 109.6	108.5
	9	0.3891 0.4006 0.3952	77.8 80.1 79.0	79.0	108.3 111.5 110.0	90.9
	12	0.4075 0.4423 0.3953	81.5 88.5 79.1	83.0	123.3 133.9 119.6	125.6
Milk	0	0.4305 0.4028 0.4246	86.1 80.6 84.9	83.9	101.5 95.0 100.1	98.9
	3	0.4714 0.4782 0.4611	94.3 95.6 92.2	94.0	96.2 97.6 94.1	96.0
	6	0.4232 0.4788 0.4247	84.6 95.8 84.9	88.4	112.1 126.9 112.5	117.2
	9	0.4104 0.4269 0.4010	82.1 85.4 80.2	82.6	118.7 123.5 116.0	119.4
	12	0.3799 0.3783 0.3803	76.0 75.7 76.1	75.9	110.5 110.1 110.7	110.4
Eggs	0	0.4372 o.4158 0.4200	87.4 83.2 84.0	84.9	98.5 93.7 94.7	95.6
	3	0.4415 0.4863 0.4314	88.3 97.3 86.3	90.5	83.9 92.4 81.9	86.1
	6	0.3958 0.6055 0.4981	79.2 121.1[2] 99.6	89.4	89.4 - 112.5	100.9
	9	0.4539 0.3723 0.3512	90.8 74.5 70.2	78.5	122.2 100.2 94.5	105.7
	12	0.3757 0.3917 0.3844	75.1 78.3 76.9	76.8	120.2 125.3 122.9	122.8

[1] Corrected for mean procedural recovery at time of analysis (unless mean >100%)

[+y2] Poor internal standard response, value not used in calculation.

USE PATTERN

Information reported to the Meeting on registered uses of prochloraz relating to the uses under consideration are summarised in the following Tables.

Table 39. Registered uses of prochloraz–post-harvest treatments.

Crop	Country	Form	Application		Comments, notes
			Method	Rate (kg ai/hl)	
Avocado	Australia	EC	30 sec spray	0.025	
Avocado	New Zealand	EC	30 sec dip or 1 min spray	0.025	
Avocado	South Africa	EC	spray	0.05	

Banana	Australia	EC	30 sec spray	0.025	
Banana	China	EC	1 min dip	0.025-0.05	Provisional approval
Banana	Philippines	EC/EW	spray	0.09	
Banana	South Africa	EC	5 sec dip	0.014	
Citrus	Argentina	EC	dip	0.05-0.07	
Citrus	Argentina	EC	spray	0.2-0.29	
Citrus	China	EC	1 min dip	0.025-0.05	Provisional approval
Citrus	China	WP	1 min dip	0.025-0.05	
Citrus	Greece	EC	not specified	0.07-0.09	
Citrus	South Africa	EC	brush	0.15	
Citrus	Spain	EC	30 sec dip	0.08	
Citrus	Uruguay	EC	1 min dip	0.04-0.07	
Mango	Australia	EC	30 sec spray	0.025	
Mango	Brazil	EC	2 min dip	0.05	
Mango	China	EC	1 min dip	0.05-0.1	
Mango	China	WP	1 min dip	0.05-0.1	
Mango	Colombia	EC	not specified	0.025	
Mango	Peru	EC	not specified	0.02-0.045	
Mango	South Africa	EC	20 sec dip	0.08	
Mango	South Africa	EC	2 min dip	0.04	
Papaya	Australia	EW	1 min spray	0.025	includes ‘Pawpaw’
Papaya	Brazil	EC	2 min dip	0.034	
Papaya	Colombia	EC	not specified	0.025	
Pineapple	Australia	EC	1 min dip	0.025	

Table 40. Registered uses of prochloraz–foliar applications.

Crop	Country	Form	Application			PHI, days	Comments, notes
			Rate (kg ai/ha)	Spray (kg ai/hl)	No.		
Barley	Belgium	EC/EW	0.45		1-2	42	[2]
Barley	Bolivia	EC	0.45		1	35	
Barley	Brazil	EC	0.45			32	
Barley	Chile	EC	0.4			35	
Barley	Denmark	EC/EW	0.23-0.45		1-2	28	
Barley	Ethiopia	EC	0.45		1	42	
Barley	France	EC	0.45		2	NS	
Barley	France	EC/EW	0.45-0.6		1-2	NS	
Barley	Germany	EC	0.48		1	35	
Barley	Greece	EC	0.06-0.19	0.03-0.047	1-2	56	
Barley	Ireland	EC	0.32-0.33		1-2	35	
Barley	Ireland	EC/EW	0.4		1-2	42	[2]
Barley	Italy	EC/EW	0.4-0.8		1-2	40	[2]
Barley	Kenya	EC	0.45			28	
Barley	Mexico	EC	0.45-0.7			NS	
Barley	Morocco	EC	0.36		1	42	with cyproconazole
Barley	Netherlands	EC/EW	0.45		1	42	
Barley	New Zealand	EC	0.45		1	42	
Barley	Portugal	EC	0.45		1-2	35	
Barley	Saudi Arabia	EC	0.4		2	60	
Barley	South Africa	EC	0.36			NS	with cyproconazole
Barley	Spain	EC	0.4-0.72		1	60	
Barley	Sweden	EC	0.45		1	NS	
Barley	Sweden	EC	0.23		2	NS	
Barley	Switzerland	EC	0.45		1	NS	[2]
Barley	Tunisia	EC	0.45			NS	
Barley	UK	EC/EW	0.32-0.4		2	42	[2]
Barley	UK	EC/EW	0.3-0.4		1-2	42	[1]
Barley	UK	EC	0.3-0.45		1-2	42	[2]
Barley	Uruguay	EC	0.45		1	35	

Crop	Country	Form	Application			PHI, days	Comments, notes
			Rate (kg ai/ha)	Spray (kg ai/hl)	No.		
Barley	Latvia	EC	0.45		1-2	20	
Bean	Cent. America	WP	0.15-0.29			10-15	[3]
Beet	Spain	EC	0.5-0.8		1-2	30	
Cereals	Austria	EC	0.45		1	35	
Cereals	Belgium	EC	0.45		1-2	GS	
Cereals	Croatia	EC	0.45		2	35	
Cereals	Denmark	EC	0.45		1-2	35	
Cereals	Germany	EC	0.45		1	35	
Cereals	Poland	EC	0.4-0.45		1	20	
Cereals	Romania	EC	0.6		1	NS	
Citrus	Brazil	EC		0.07		7	
Legumes	Cent. America	EC	0.13-0.26			10-15	[3]
Legumes	Costa Rica	EC	0.13-0.26			10-15	
Lettuce	Australia	WP	0.18	0.023		7	head lettuce
Lettuce	Cent. America	EC	0.13-0.26			10-15	[3]
Lettuce	Cent. America	WP	0.15-0.29			10-15	[3]
Lettuce	Costa Rica	EC	0.13-0.26			10-15	
Mango	Australia	WP		0.046		GS	
Mango	Cent. America	EC		0.02-0.036		10-15	[3]
Mango	Cent. America	WP		0.02-0.036		10-15	[3]
Mango	China	EC		0.025-0.05	5	10	
Mango	China	WP		0.025-0.05	5-6	10	
Mango	Costa Rica	EC		0.025-0.045		10-15	
Mango	Malaysia	WP		0.056	3	15	
Mango	Peru	EC		0.016-0.034	1	NS	
Melon	Cent. America	EC	0.23-0.45			10-15	[3]
Melon	Cent. America	WP	0.25-0.5			10-15	[3]
Melon	Costa Rica	EC	0.23-0.45			10-15	
Melon	Spain	EC	0.9		4	15	
Mushroom	Australia	WP	1.5 g ai/sq metre			After 1st flush	casing spray
Mushroom	Australia	WP	33 g ai/cu metre			Before casing	peat mix
Mushroom	Belgium	WP	1.5 g ai/sq metre			Before casing	casing spray
Mushroom	China	WP	0.4-0.6 g ai/sq metre		2	NS	casing spray
Mushroom	Denmark	WP	1.5 g ai/sq metre			10	casing spray
Mushroom	France	WP	0.5 g ai/sq metre		2	8	casing spray
Mushroom	Germany	WP	1.5 g ai/sq metre			14	casing spray
Mushroom	Italy	WP	1.5 g ai/sq metre			10	casing spray
Mushroom	Netherlands	WP	1.5 g ai/sq metre			10	casing spray
Mushroom	New Zealand	WP	1.5 g ai/sq metre			10	casing spray
Mushroom	Poland	WP	1.5 g ai/sq metre			10	casing spray
Mushroom	Switzerland	WP	1.5 g ai/sq metre			10-14	casing spray
Mushroom	UK	WP	0.3 g ai/sq metre		3	2	casing spray
Mushroom	UK	WP	0.6 g ai/sq metre		2	2	casing spray
Oats	Ireland	EC	0.4		1-2	GS	with cyproconazole
Onion	Brazil	EC	0.68			7	
Onion	Cent. America	EC	0.13-0.19			10-15	[3]
Onion	Cent. America	WP	0.15-0.22			10-15	[3]
Onion	Costa Rica	EC	0.13-0.19			10-15	
Papaya	Cent. America	EC		0.02-0.04		10-15	[3]
Papaya	Cent. America	WP		0.02-0.04		10-15	[3]
Papaya	Costa Rica	EC		0.025-0.045		10-15	
Peppercorn	Malaysia	WP	0.5	0.05	6	30	
Peppercorn	Thailand	WP		0.05		14	
Rape	Chile	EC	0.4-0.6			42	
Rape	Denmark	EC/EW	0.45-0.7		2	28	

Crop	Country	Form	Application			PHI, days	Comments, notes
			Rate (kg ai/ha)	Spray (kg ai/hl)	No.		
Rape	France	EC/EW	0.45-0.6		1	GS	[2]
Rape	Germany	EC	0.6		1-2	56	
Rape	Ireland	EC	0.5		1-2	42	
Rape	Latvia	EC	0.6-0.68		1	20	
Rape	Poland	EC	0.63		1	21	
Rape	UK	EC	0.2-0.5		2-3	42	max 1 kgai/ha, [2]
Rice	Brazil	EC	0.45		2	14	
Rice	Cent. America	EC	0.13-0.16			10-15	[3]
Rice	Cent. America	WP	0.28-0.35			10-15	[3]
Rice	Colombia	WP	0.15			NS	
Rice	Spain	EC		0.5-1.0	1	15	
Rice	Venezuela	SC	0.18-0.19		1	7	with phthalide
Rye	Denmark	EC/EW	0.23		2	28	
Rye	Denmark	EC/EW	0.45		1	28	
Rye	Germany	EC	0.48		1-2	35	[3]
Rye	Ireland	EC	0.4		1-2	GS	[1]
Rye	Poland	EC	0.45		1	35	
Rye	Sweden	EC	0.45		1	NS	
Rye	Sweden	EC	0.23		2	NS	
Rye	Switzerland	EC	0.3		1	NS	with cyproconazole
Rye	UK	EC	0.3-0.4		2	42	[1]
Rye	UK	EC/EW	0.32-0.45		1-2	42	
Soyabean	Cent. America	WP	0.15-0.29			10-15	[3]
Sugar beet	Italy	EC	0.48-0.8		1-2	20	
Sugar beet	Italy	EW	0.59-0.8		1-2	20	
Sunflower	Croatia	EC	0.6		2	63	
Sunflower	France	EC	0.32-0.6		1-2	NS	with carbendazim
Tomato	Brazil	EC	0.36-0.45	0.045	2-3	14	
Tomato	Cent. America	EC	0.13-0.19			10-15	[3]
Tomato	Cent. America	WP	0.14-0.2			10-15	[3]
Tomato	Costa Rica	EC	0.13-0.19			10-15	
Tomato	Spain	EC	0.9		4	15	
Triticale	Belgium	EC	0.45		1-2	GS	up to earing stage
Watermelon	Brazil	EC	0.34-0.45			7	
Watermelon	Cent. America	EC	0.23-0.45			10-15	[3]
Watermelon	Cent. America	WP	0.25-0.5			10-15	[3]
Watermelon	Costa Rica	EC	0.23-0.45			10-15	
Watermelon	Spain	EC	0.9		4	15	
Wheat	Austria	EC	0.45		1	35	[2]
Wheat	Belgium	EC	0.33-0.4		1-2	56	with fluquinconazole
Wheat	Belgium	EC/EW	0.45		1-2	42	[2]
Wheat	Bolivia	EC	0.45		1	35	
Wheat	Brazil	EC	0.45			40	
Wheat	Chile	EC	0.4			35	[2]
Wheat	Denmark	EC/EW	0.23		2	28	
Wheat	Denmark	EC/EW	0.45		1	28	
Wheat	Ethiopia	EC	0.45			42	
Wheat	France	EC	0.45-0.5		1-2	NS	with fenbuconazole
Wheat	France	EC/EW	0.45-0.6		2	GS	[2]
Wheat	Germany	EC	0.45-0.48		1	35	[2]
Wheat	Greece	EC	0.06-0.19	0.029-0.047	1-2	56	
Wheat	Ireland	EC/EW	0.4		1-2	GS	[2]
Wheat	Italy	EC/EW	0.4-0.8		1-2	40	[2]
Wheat	Japan	EC		0.042	1-2	30	
Wheat	Kenya	EC	0.45			28	
Wheat	Latvia	EC	0.45		1-2	20	
Wheat	Mexico	EC	0.45-0.7			NS	
Wheat	Morocco	EC	0.36		1	42	with cyproconazole

Crop	Country	Form	Application			PHI, days	Comments, notes
			Rate (kg ai/ha)	Spray (kg ai/hl)	No.		
Wheat	Netherlands	EC/EW	0.45		1	42	
Wheat	New Zealand	EC	0.45		1-3	42	
Wheat	Portugal	EC	0.45		1-2	35	
Wheat	Saudi Arabia	EC	0.4		2	60	
Wheat	South Africa	EC					with cyproconazole
Wheat	Spain	EC	0.4-0.72		1	60	
Wheat	Sweden	EC	0.23		2	NS	
Wheat	Sweden	EC	0.45		1	NS	
Wheat	Switzerland	EC	0.45		1	NS	[2]
Wheat	Tunisia	EC	0.36-0.45			NS	[2]
Wheat	UK	EC	0.3-0.4		2	42	[1], [2]
Wheat	UK	EC/EW	0.4-0.45		1-2	42	[2]
Wheat	Uruguay	EC	0.45		1	35	

[1] Temporary or provisional approval, permission to market
[2] Co-formulations also exist, with equivalent or lower application rates of prochloraz
[3] Common uses in Belize, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama and Peru

Table 41. Registered uses of prochloraz–seed treatments.

Crop	Country	Form	Application, g ai/kg seed	Comments, notes
Barley	Denmark	LS	0.2	
Barley	Germany	LS	0.2	with carboxin
Barley	Ireland	LS	0.14	with fluquinconazole
Barley	Italy	WP	0.33	with mancozeb
Barley	UK	LS	0.14	with fluquinconazole
Cereals	Italy	WP	0.15-0.2 g/l	24 hr soak
Cereals	Italy	WP	0.15-0.33	[2]
Cereals	Italy	WP	0.2-0.25	
Cereals	Mexico	EC	0.45-0.68	
Cereals	Morocco	EC	0.33	with fluquinconazole
Cereals	Tunisia	EC	0.33	with fluquinconazole
Linseed	Belgium	LS	0.4	
Linseed	France	LS	0.4	
Linseed	Netherlands	LS	0.5	
Linseed	UK	LS	0.4	[1]
Oats	Germany	LS	0.2	with carboxin
Oats	Poland	WS	0.2	with carbendazim
Rice	China	EC	0.06-0.08 g/l	[1], 3-5 day soak
Rice	China	EC	0.08-0.13 g/l	[1], 1-3 day soak
Rice	Italy	WP	0.15-0.2 g/l	24 hr soak, with mancozeb
Rice	Japan	EC	0.25 g/l	24 hr soak
Rice	Japan	EC	2.5 g/l	10 min soak
Rice	Thailand	WP	0.1-0.15	
Rye	Germany	LS	0.2	with carboxin
Rye	Poland	WS	0.2	with carbendazim
Wheat	Germany	LS	0.2	with carboxin
Wheat	Ireland	LS	0.14	with fluquinconazole
Wheat	Poland	WS	0.2	with carbendazim
Wheat	UK	LS	0.14	with fluquinconazole

[1] Temporary or provisional approval, permission to market
[2] Co-formulations also exist, with equivalent or lower application rates of prochloraz

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting received information on supervised field trials for the following crops.

Table 42	Lemons	Post-harvest	Italy, Spain
Table 43	Mandarins	Post-harvest	Spain
Table 44	Oranges	Post-harvest	Argentina, Australia, Greece, Italy, Morocco, South Africa, the UK
Table 45	Avocado	Post-harvest	Australia, Columbia, South Africa
Table 46	Avocado	Foliar	Australia, South Africa
Table 47	Banana	Post-harvest	Australia, Canary Islands, Philippines, South Africa, West Indies
Table 48	Banana	Foliar	Camaroons, South Africa
Table 49	Mango	Post-harvest	Australia, Columbia, Israel, South Africa
Table 50	Mango	Foliar	Israel, Malaysia, South Africa, Taiwan
Table 51	Papaya	Post-harvest	Australia, Brazil, South Africa
Table 52	Pineapple	Post-harvest	Australia, Kenya
Table 53	Onion	Foliar	The Netherlands, Thailand
Table 54	Onion	Post-harvest	Australia
Tables 55-56	Melon	Foliar/soil	Spain
Table 57	Melon	Post-harvest	Australia, Columbia
Table 58	Mushrooms	Foliar	Australia, Germany, Greece, The Netherlands, Switzerland, the UK
Table 59	Tomatoes	Foliar	Israel, USA
Table 60	Tomato	Soil	Spain
Tables 61-62	Lettuce	Foliar	Australia, the UK
Table 63	Beans	Foliar	Germany
Table 64	Beans	Seed treat	Brazil
Table 65	Peas	Foliar	Germany
Table 66	Sugar Beet	Foliar	Italy
Table 67-68	Rape Seed	Foliar	Canada, Denmark, France, Germany, Sweden, the UK
Table 69	Sunflower Seed	Foliar	France
Table 70	Sunflower Seed	Seed treat	France
Table 71	Linseed	Seed treat	UK
Table 72	Soya Bean	Foliar	France
Table 73	Soya Bean	Seed treat	Brazil
Tables 74-75	Barley	Foliar	Austria, Belgium, Brazil, Canada, Czechoslovakia, Denmark, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden, the UK
Table 76	Barley	Seed treat	Denmark, Germany
Table 77	Oats	Foliar	Denmark
Table 78	Oats	Seed treat	Germany
Tables 79-80	Rice	Foliar	Japan, Spain, Taiwan
Table 81	Rye	Foliar	Denmark, Germany
Table 82	Rye	Seed treat	Germany
Tables 83-85	Wheat	Foliar	Austria, Belgium, Brazil, Czechoslovakia, Denmark, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden, the UK, the USA
Table 86	Wheat	Seed treat	Denmark, Germany, Greece, the UK
Table 87	Pepper, Black	Foliar	Malaysia

Tables 88-89	Barley straw	Foliar	Austria, Belgium, Brazil, Canada, Czechoslovakia, Denmark, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden, the UK
Table 90	Barley straw	Seed treat	Denmark, Germany
Table 91	Oats straw	Foliar	Denmark
Table 92	Oats straw	Seed treat	Germany
Table 93	Rye straw	Foliar	Denmark, Germany
Table 94	Rye straw	Seed treat	Germany
Tables 95-97	Wheat straw	Foliar	Austria, Belgium, Brazil, Czechoslovakia, Denmark, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden, the UK, the USA
Table 98	Wheat straw	Seed treat	Denmark, Germany, Greece, the UK

Recent trials were generally well documented, with full laboratory and field reports. The former generally included method validation, batch recoveries with spiking at residues similar to those in samples from the supervised trials, and dates of analyses or duration of residue sample storage. Although control plots were included in the trials no data are recorded in the Tables except where such residues exceeded the LOQ (or in the earlier trials the LOD) when the residues are listed in brackets and are preceded by the letter ‘c’. Residues are recorded unadjusted for recovery but corrected where necessary to account for apparent residues in untreated samples.

Unless specified all results are reported as the total free and conjugated residues of prochloraz, BTS 44595, BTS 44596 and other minor metabolites containing the 2,4,6-trichlorophenoxy moiety expressed as prochloraz (using a conversion factor of 1.9).

Where residues were undetected they are shown as below the LOQ or, in the early trials, as below the LOD (e.g. <0.1 mg/kg). Residues, application rates and spray concentrations have generally been rounded to two significant figures or for residues near the LOQ to one significant figure. Residues from the trials conducted according to maximum GAP have been used for the estimation of maximum residues, STMRs and HRs. These results are double-underlined.

Multiple results are recorded in the Tables when separate samples have been identified as being from replicate plots, and residues in control samples are also noted when significantly above the LOQ.

Intervals between sampling and analysis were reported for most trials and were within the acceptable proven storage stability duration.

Citrus fruits

Supervised trials were conducted on lemons (Italy, Spain), mandarins (Spain) and oranges (Argentina, Australia, Greece, Morocco, Italy, South Africa, Spain and the UK). Treatments used involved dipping the fruit for 30-120 seconds in water-diluted solutions of prochloraz, spraying in combination with wax and treatment using a brush application. Except in two Italian trials [Ref: 87783] EC formulations were used and all included only single dip, spray or brush treatments. Unless specified, the treated fruit were stored at ambient temperature until sampled.

Residues of the free as well as total prochloraz (using combined method RESID/81/51) were reported in several trials. Fruit from the remaining trials were analysed using methods RESID/82/88 or 88/72. In many trials residues were measured in the peel and pulp, as well as calculated in the whole fruit, and in some cases both actual and calculated whole fruit residues have been reported. Average recoveriesfor free prochloraz ranged from 90-100% in the pulp and 72-94% in peel,

although in trial A8770 a recovery rate of 62% was reported in the pulp. Maximum apparent residues of free prochloraz in untreated pulp samples ranged from 0.008 to 0.034 mg/kg and from 0.04 to 0.08 mg/kg in peel, and total average recoveries of prochloraz from 70-100% (pulp) and 78-97% in peel, with maximum residues of 0.14 mg/kg (pulp) and 0.12 mg/kg in peel, except two trials where residues were 0.42 mg/kg [A88069] in the peel and 0.32 mg/kg [A87857] in the fruit in control samples.

Table 42. Residues of prochloraz in lemons from supervised post-harvest dip or spray application trials.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg						Ref
	type	kg ai/ hl		peel		pulp		whole fruit[1]		
Italy, 1979 Catania (Primofiore)	dip	0.05[2]	57[3]	5.9		0.12		2.6		A87783
Italy, 1979 Catania (Primofiore)	dip	0.05	57[2]	3.5		0.1		1.6		A87783
Spain, 1981 Murcia (Verna)	wax spray	0.3	12	Total 9.4	Free 8.1	Total 0.16	Free 0.29	Total 3.8	Free 2.6	A87778
Spain, 1981 Murcia (Verna)	wax spray	0.3	16	13	9.8	0.23	0.28	4.5	4.1	A87778

[1] residues calculated from relative weights and residues in peel and pulp
[2] WP formulation
[3] fruit stored at 7°C

Table 43. Residues of prochloraz in mandarins from supervised post-harvest dipping trials in Spain.

Year (variety)	Application		PHI (days)	Total residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
1990 Alcacer (Clemenules)	30sec dip	0.1	0	6.2	0.31	2.3	A88131 A88132
1990 Alcacer (Clemenules)	30sec dip	0.2	0	9.6	0.35	3.5	A88131 A88132
1990 Alcacer (Hernandina)	30sec dip	0.1	0	6.2	0.07	3.2	A88131 A88132
1990 Alcacer (Hernandina)	30sec dip	0.2	0	8.7	0.1	2.1	A88131 A88132
1991 Picasent (Oroval)	30sec dip	0.04	15	7.8	0.06	1.2	A88152
1991 Picasent (Oroval)	30sec dip	0.08	15	12	0.1	2.1	A88152
1991 Villamarchante (Clemenules)	30sec dip	0.04	15	5.4 (c0.13)	<0.05	1.5	A88152
1991 Villamarchante	30sec dip	0.08	15	19 (c0.13)	0.07	5.9	A88152

Year (variety)	Application		PHI (days)	Total residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
(Clemenules)							
1991 Villamarchante (Satsuma)	30sec dip	0.04	15	3.9 (c0.43)	0.07	0.48	A88152
1991 Villamarchante (Satsuma)	30sec dip	0.08	15	8 (c0.43)	0.09	4.3	A88152
1994 Alcacer (Clementina fina)	30sec dip	0.08	0 7 15			5.4 5.3 4.0	A89448
1994 Alcacer (Clementina)	30sec dip	0.04	8	5.6 (c0.21)	<0.05	0.82	A88152
1994 Alcacer (Clementina)	30sec dip	0.08	8	9 (c0.21)	0.26	2.0	A88152
1994 Alcacer (Fortuna)	30sec dip	0.08	0 7 15			2.4 3.5 1.9	A89448
1994 Alcacer (Fortuna)	30sec dip	0.08	0 7 15			2.7 3.4 1.1	A89448
1994 Alcacer (Hernandina)	30sec dip	0.04	15	6.7	0.19	1.9	A88152
1994 Alcacer (Hernandina)	30sec dip	0.08	0 7 15			1.2 2 4.6	A89448
1994 Alcacer (Hernandina)	30sec dip	0.08	0 7 15	17	0.12	2.9 2.0 3.9	A89448
1994 Alcacer (Hernandina)	30sec dip	0.08	15	14	0.09	2.1	A88152
1994 Alcacer (Satsuma)	30sec dip	0.04	8	8.2 (c0.11)	<0.05	1.2	A88152
1994 Alcacer (Satsuma)	30sec dip	0.08	8	6.3 (c0.11)	0.09	2.1	A88152

Table 44. Residues of prochloraz in oranges from supervised trials involving post-harvest treatments.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
Argentina, 1989 Paz Corientes (Hamilton)	1 min dip	0.075	11	15 (c0.42)	0.33	3.7[1] (c0.12)	A88069
Argentina, 1989 Paz Corientes (Hamilton)	1 min dip	0.1	11	22 (c0.42)	0.56	5.9[1] (c0.12)	A88069
Argentina, 1989 Paz Corientes (Hamilton)	1 min dip	0.15	11	17 (c0.42)	0.6	5.3[1] (c0.12)	A88069

Country, year (variety)	Application type	Application kg ai/ hl	PHI (days)	Total residues, mg/kg peel Total	peel Free	pulp Total	pulp Free	whole fruit Total	whole fruit Free	Ref
Australia, 1981 Kulnura (Late Washington)	30 sec dip	0.025	1 2 4 8 16	2.9 1.4 2.9 2.3 2.4	2.2 1.4 3.7 3.3 3.1	<0.05 <0.05 <0.05 <0.05 <0.05	0.04 0.03 0.05 0.1 0.04			A87773
Australia, 1981 Kulnura (Late Washington)	30 sec dip	0.05	1 2 4 8 16	2.5 3.2 1.5 3.3 2.3	3.2 2.1 2.4 3 2.6	<0.05 <0.05 <0.05 <0.05 <0.05	<0.02 0.04 <0.02 0.05 0.04			A87773
Australia, 1983 Gosford (Late Valencia)	30 sec hand-dip	0.1	0	22		0.92		6.8[1]		A87836
Australia, 1983 Gosford (Late Valencia)	spray	0.05	0	1.8		0.15		0.64[1]		A87836
Greece, 1987 Arta	spray	0.18[7]	44-72	6.7		0.27				A88011
Greece, 1987 Arta	spray	0.32[7]	44-72	8.8		0.13				A88011
Italy, 1979 Catania (Tarocco)	dip[3]	0.05	57[2]	1.6		0.05		0.7[1]		A87783
Italy, 1979 Catania (Tarocco)	dip	0.05	57[2]	4.9		0.12		1.9[1]		A87783
Morocco, 1983 Casablanca (Maroc Late)	spray	0.2[8]	5[5] 34[5]	4.0 1.4		0.11 0.12		0.61 0.64 c0.32		A87857 8 g ai/ tonnne
Morocco, 1983 Casablanca (Maroc Late)	spray	0.26[9]	5[5] 34[5]	3.4 2.4		<0.05 0.68		0.7 0.95 c0.32		A87857 8 g ai/ tonnne
Morocco, 1983 Casablanca (Maroc Late)	spray	0.3[9]	5[5] 34[5]	2.5 1.4		0.43 <0.05		<0.3 <0.3 c0.32		A87857 9.3 g ai/ tonne
South Africa, 1982 Letaba Estates	brush	0.1	44	1.5		0.05		0.44[1]		A87800
South Africa, 1982 Letaba Estates	brush	0.2	44	2.4		0.07		0.72[1]		A87800
South Africa, 1982 Swaziland (Tambor)	brush	0.05	60[11]	0.31 c0.11		<0.05		0.09		A87814
South Africa, 1982 Swaziland (Tambor)	brush	0.1	60[11]	0.43 c0.11		<0.05		0.15		A87814
South Africa, 1982 Swaziland (Tambor)	brush	0.2	60[11]	1.7 c0.11		<0.05		0.37		A87814
South Africa, 1982 Swaziland (Tambor)	brush	0.4	60[11]	2.8 c0.11		0.06		0.66		A87814
Spain, 1980 Valencia (Washington navel)	2 min dip	0.05	1[4] 5[4] 10[4]	2.6 3.2 1.8		0.03 0.05 0.03				A87770
Spain, 1980 Valencia (Washington navel)	2 min dip	0.05	10[5] 20[5] 60[5]	2.0 1.7 1.5		0.02 0.02 0.03				A87770

Country, year (variety)	Application type	Application kg ai/ hl	PHI (days)	Total residues, mg/kg peel		Total residues, mg/kg pulp		Total residues, mg/kg whole fruit		Ref
Spain, 1980 Valencia (Washington navel)	2 min dip	0.1	1[4] 5[4] 10[4]	2.7 3 1.4		0.02 0.02 0.06				A87770
Spain, 1980 Valencia (Washington navel)	2 min dip	0.1	10[5] 20[5] 60[5]	2.5 4.1 1.7		- 0.02 0.02				A87770
Spain, 1991 Alcacer (Navel)	30 sec dip	0.04	15	2.9		<0.1		1.3		A88162
Spain, 1991 Alcacer (Navel)	30 sec dip	0.08	15	6.3		0.26		1.5		A88162
Spain, 1991 Picasent (Navelina)	30 sec dip	0.04	15			<0.1 (c0.12)		0.96		A88162
Spain, 1991 Picasent (Navelina)	30 sec dip	0.08	15			<0.1 (c0.12)		2.0		A88162
Spain, 1991 Villa-marchante (Navel)	30 sec dip	0.04	15	2.7		<0.1		0.82		A88162
Spain, 1991 Villa-marchante (Navel)	30 sec dip	0.08	15	5.7		≤0.1		1.4		A88162
Spain, 1991 Villa-marchante (Navelina)	30 sec dip	0.08	15	4.1		≤0.1		1.3		A88162
Spain, 1991 Villa-marchante (Navelina)	30 sec dip	0.04	15	3.1		<0.1		0.96		A88162
Spain, 1980 Valencia (Valencia Late)	spray	0.2[7]	 7[4] 14[4]	Total	Free 6.1 2.8	Total 0.03 0.14	Free	Total	Free	A87753 2.7 g ai/ tonne
Spain, 1980 Valencia (Valencia Late)	spray	0.25[7]	7[4] 14[4]		7.3 5.1	0.05 0.1				A87753 3.3 g ai/ tonne
Spain, 1980 Valencia (Valencia Late)	spray	0.3[7]	7[4] 14[4]		5.9 5.9	0.07 0.03				A87753 4 g ai/ tonne
Spain, 1980 Valencia (Washington Navel)	spray	0.3[7]	7[4] 14[4]		3.3 4.7	0.2 0.17				A87755 4 g ai/ tonne
Spain, 1981 Valencia (Valencia Late)	spray	0.3[7)]	14 20 27	6.8 6.5 6.0	5.0 6.4 2.7	0.13 0.15 0.2	0.14 0.21 0.15	1.7[1] 1.7[1] 1.6[1]	1.4[1] 1.8[1] 0.8[1]	A87772 3 g ai/ tonne
UK, 1981 Chesterford	30 sec dip	0.07	1[6] 7[6] 21[6] 35[6] 70[6]	6.5 7.4 6.4 7.6 5.6	3.5 4.7 3.3 4.8 3.8	0.06 0.06 0.05 0.08 0.1	0.05 0.04 0.05 0.08 0.1	1.6[1] 1.7[1] 1.5[1] 1.7[1] 1.1[1]	0.99[1] 1.2[1] 0.88[1] 1.2[1] 0.89[1]	A87776

[1] calculated from relative weights and residues in peel and pulp
[2] stored at 7°C
[3] WP formulation
[4] stored at 20-22°C
[5] stored at 3-5°C
[6] in cold store after draining
[7] applied in wax solution

[8] applied in water-soluble wax solution
[9] applied in hydrocarbon wax solution
[10] treated July, shipped under refrigeration, kept at ambient temperature until sampling in September

Avocado. Supervised post-harvest dip and spray trials were reported from Australia, Columbia and South Africa . Treatment involved dipping the fruit in 0.025-0.05 kg ai/hl prochloraz (EC formulations) or spraying at brushing, involving either a 10-second (Australia) or a low-volume at 0.75 kg ai in 1.5 litres per tonne of fruit (South Africa). In most trials residues in the total fruit without stones were analysed, with peel and pulp analysed separately in some trials. Unless specified treated fruit were stored at ambient temperature until sampled using either method RESID/81/51, RESID/82/88 or RESID/88/72 to report total prochloraz residues. Average recoveries ranged from 73-103% in the pulp and 77-94% in peel, with maximum apparent residues of 0.01-0.03 mg/kg in untreated pulp samples and 0.02-0.1 mg/kg in peel.

Table 45. Residues of prochloraz in avocados from supervised post-harvest dip and spray trials.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg				Ref
	type	kg ai/ hl		peel	pulp	whole fruit[1]	whole fruit[2]	
Australia, 1987 Queensland (Tambor)	30 sec dip	0.025	5			1.4 (c0.09)	1.2[4]	A88062
Australia, 1987 Queensland (Tambor)	30 sec dip	0.05	5			2.7 (c0.09)	2.3[4]	A88062
Australia, 1983 Mareeba (Fuerte)	60 sec dip	0.025	0			2.8	2.4	A87830
Australia, 1983 Mareeba (Fuerte)	60 sec dip	0.05	0			4.1	3.5	A87830
Australia, 1983 Alstonville (Fuerte)	30 sec dip	0.025	0 7[3]	4.1, 3.3	0.12, <0.1	0.97, 1.2	0.81, 1.0 0.4, 0.44	A87830
Australia, 1983 Alstonville (Fuerte)	10 sec spray	0.025	0 7[3]	3.5, 2.5	≤0.1, <0.1	0.19, 0.45	0.16, 0.37 0.39, 0.24	A87830
Australia, 1983 Alstonville (Fuerte)	10 sec spray	0.05	0 7[3]	1.8, 3.0	0.11, <0.1	0.52, 0.41	0.42, 0.34 0.23, 0.28	A87830
Australia, 1981 Alstonville (Fuerte)	30 sec dip	0.025	8[3]			1.1	0.92[4]	A87775
Australia, 1981 Alstonville (Fuerte)	30 sec dip	0.05	8[3]			1.2	1.0[4]	A87775
Columbia, 1986	10 sec dip	0.025	7			0.7		A88064
Columbia, 1986	10 sec dip	0.05	7			1.3		A88064

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg				Ref
	type	kg ai/ hl		peel	pulp	whole fruit[1]	whole fruit[2]	
South Africa, 1987 Nelspruit	30 sec dip	0.025	7[5]			1.0	0.83[6]	A88054
South Africa, 1987 Nelspruit	30 sec dip	0.05	7[5]			1.6	1.3[6]	A88054
South Africa, 1985 Bronpro Brondal (Haas)	dip	0.013	10	1.6	0.13	0.79	0.63	A87888
South Africa, 1985 Bronpro Brondal (Haas)	dip	0.025	10	5.4	≤0.1	1.0	0.87	A87888
South Africa, 1985 Bronpro Brondal (Haas)	dip	0.025	10	10	≤0.1	1.5	1.2	A87888
South Africa, 1985 Bronpro Brondal (Haas)	dip	0.05	10	7.4	≤0.1	1.2	1.0	A87888
South Africa, 1985 West Falia (Fuerte)	spray	0.5	36	6.8 (c1.0)	0.12	0.63[7]	0.48	A87888 0.75 kg ai/tonne

[1] without stone
[2] with stone
[3] stored at 23°C
[4] calculated using mean stone weight of 16.5% derived from trials in A87830
[5] stored refrigerated
[6] calculated using mean stone weight of 17.1% from trials in A87888
[7] calculated residues in whole fruit without stone

In seven foliar application trials in Australia and South Africa avocados were sprayed up to 7 times with a wettable powder (manganese chloride complex) formulation or twice with an EC formulation. Residues in the pulp and in peel, calculated residues in the whole fruit (with and without the stone) and in some cases residues in total fruit (without stones) were analysed for total prochloraz, using METHOD/82/88, with average recoveries of 73-87% in the pulp and 74-88% in peel, and maximum apparent residues of 0.03-0.12 mg/kg in untreated pulp and from 0.07 to 0.16 mg/kg in peel.

Table 46. Residues of prochloraz in avocados from supervised foliar application trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.		peel	pulp	whole fruit[2]	
Australia, 1981 Alstonville (Fuerte)	WP[1]		0.05	30 l/tree	7	7	9.1, 10, 9, 6, 7.2, 7.3	0.08, 0.1, 0.11, 0.09, 0.24, 0.21	1.6, 2.3, 1.9, 1.2, 1.5, 1.6	A87808
South Africa 1982 Nelspruit (Haas)	WP[1]		0.02	2000	7	63	0.29	<0.1	0.07	A87887
South Africa 1982 Nelspruit (Haas)	WP[1]		0.03	2000	7		0.79	<0.1	0.1	A87887
South Africa 1982 Nelspruit (Haas)	WP[1]		0.04	2000	7		0.89	<0.1	0.31	A87887
South Africa 1982 RICSTF (Fuerte)	EC		0.025		2	14 48 63	1.3 1.0 0.84	0.1 <0.1 <0.1	0.04[3] 0.28[3] 0.23[3]	A87815
South Africa 1982 RICSTF (Fuerte)	EC		0.038		2	14 48 63	1.6 1.2 0.69	<0.1 <0.1 <0.1	0.5[3] 0.3[3] 0.18[3]	A87815
South Africa 1982 RICSTF (Fuerte)	EC		0.05		2	14 48 63	2.3 1.7 1.9	0.12 0.13 0.1	0.69[3] 0.48[3] 0.49[3]	A87815

[1] manganese chloride complex
[2] calculated including stone from relative weights and residues in peel and pulp
[3] calculated excluding stone

Banana. Supervised post-harvest trials were reported from Australia, the Canary Islands, the Philippines, South Africa and the West Indies. Bananas were dipped or drenched in 0.005-0.1 kg ai/hl solutions of prochloraz (EC formulations), with pulp and peel sampled at intervals up to 36 days after treatment. In some South African trials fruit were stored refrigerated before sampling. Residues in the whole fruit were also analysed, except in the Australian trials, where they were calculated. Unless specified, the treated fruit were stored at ambient temperature until analysis using method RESID/82/88 or RESID/88/72. Average recoveries ranged from 78-112% in the pulp and 74-103% in peel, and maximum apparent residues in untreated pulp samples from 0.016 to 0.14 mg/kg and in peel from 0.03 to 0.35 mg/kg.

Table 47. Residues of prochloraz in bananas from supervised post-harvest dip or drench trials.

Country, year (variety)	Application		PHI (days)	Residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
Australia, 1983 Coffs Harbour (Cavendish)	dip	0.025	0	4.1	≤0.1	1.7[1]	A87836
Australia, 1983 Coffs Harbour (Cavendish)	dip	0.05	0	8.1	≤0.1	2.7[1]	A87836

Country, year (variety)	Application		PHI (days)	Residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
Australia, 1981 Kulnura (Cavendish)	30 sec dip	0.025	9 10 12 16	5.9 5.0 6.5 5.0	0.02 0.03 0.02 0.03	2.1[2] 1.8[2] 2.3[2] 1.8[2]	A87777
Australia, 1981 Kulnura (Cavendish)	30 sec dip	0.05	9 10 12 16	4.2 6.1 8.2 6.2	0.03 0.03 0.04 0.04	1.5[2] 2.2[2] 3.0[2] 2.2[2]	A87777
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.005	15	0.75 (c0.13)	0.05	0.31	A87853
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.01	15	1.5 (c0.13)	0.11	1.1	A87853
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.015	15	1.5 (c0.13)	0.07	1.3	A87853
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.02	15	1.9 (c0.13)	0.06	1.1	A87853
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.025	15	2.3 (c0.13)	0.13	1.7	A87853
Philippines, 1984 Panabo (Valery)	drench with 1% NH4 alum	0.03	15	1.7 (c0.13)	0.21	≤0.1[3]	A87853
South Africa, 1984 Nelspruit	1-2 min dip	0.02	0 36[4]	3.4 2.6	<0.1 0.1	2.4 1.4	A87893
South Africa, 1984 Nelspruit	1-2 min dip	0.03	0 36[4]	6.3 3.9	<0.1 0.21	3.4 1.8	A87893
South Africa, 1983	dip	0.013	1 10 14 21	2.8 1.5 1.2 1.3	0.09 0.08 0.07 0.07	1.1 0.62 0.49 0.57	A87847 summary
South Africa, 1983	dip	0.027	1 10 14 21	4.4 2.9 2.9 2.4	0.08 0.05 0.14 0.07	2.7 1.1 0.99 1.0	A87847 summary
South Africa, 1992 Nelspruit (Williams)	dip	0.025	4	19	0.64	8.7[1]	A87838 sample identity
South Africa, 1992 Nelspruit (Williams)	dip	0.05	4	10	0.73	5.9[1]	A87838 sample identitiy
South Africa, 1982 (Cavanaus)	dip	0.025	7[6]	6.9 (c0.11)	0.12	2.9[1]	A87813
South Africa, 1982 (Cavanaus)	dip	0.05	7[6]	13 (c0.11)	0.17	5.1[1]	A87813
South Africa, 1982 (Williams)	dip	0.025	7[6]	6.9 (c0.28)	0.12	3.0[1]	A87813
South Africa, 1982 (Williams)	dip	0.05	7[6]	13 (c0.28)	0.17	3.5[1]	A87813
West Indies, 1985 Martinique (Poyo)	dip	0.023	14	2.8	0.08	0.69[1]	A87956
West Indies, 1985 Martinique (Poyo)	dip	0.045	14	7.4, 7.9	0.12, 0.12	1.7, 2.6[1]	A87956

Country, year (variety)	Application		PHI (days)	Residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
West Indies, 1985 Martinique (Poyo)	dip[7] (ripe)	0.023	19	3.7, 2.8	0.07, 0.05	1.3, 1.0[1]	A87956
West Indies, 1985 Martinique (Poyo)	dip[7] (ripe)	0.045	19	7.0	0.11	2.5[1]	A87956
West Indies, 1985 St Lucia (Robusta)	dip[7]	0.025	not listed	2.0	0.05	0.85[1]	A87956
West Indies, 1985 St Lucia (Robusta)	dip[7]	0.05	not listed	8.0	0.05	3.3[1]	A87956
Canary Islands, 1984 Santa Cruz (Dwarf Cavendish)	drench	0.025	7 14 21	3.2 2.6 1.2	0.1 0.1 <0.1	1.6[1] 1.2[1] 0.61[1]	A87890
Canary Islands, 1984 Santa Cruz (Dwarf Cavendish)	drench	0.05	7 14 21	4.4 2.5 2.3	<0.1 0.1 <0.1	1.8[1] 1.3[1] 0.98[1]	A87890

[1] calculated in whole fruit
[2] calculated using mean peel/pulp ratio of 36/64 derived from trials in A87836
[3] anomalous result attributed to sample mislabelling
[4] stored at approx 4°C
[5] 4 foliar sprays applied, up to 24 days before harvest and dip treatment
[6] stored at approx 8°C
[7] stored for 1 month before dipping

In six foliar application trials (WP manganese chloride formulation) 4-8 applications (Cameroons) or four applications either mixed with 0.5% oil or in conjunction with a post-harvest dip (South Africa) were made. Residues in the pulp and in peel, with calculated residues in whole fruit were analysed for total prochloraz using METHOD/82/88. Average recoveries ranged from 76-84% in the pulp and 74-77% in peel, with maximum apparent residues of 0.02-<0.05 mg/kg in untreated pulp samples and from 0.05 to 0.35 mg/kg in peel.

Table 48. Residues of prochloraz in bananas from supervised foliar application trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.		peel	pulp	whole fruit[2]	
Cameroons, 1985 PAT.65XM.EV (unspecified) Green fruit	WP[1]	0.18			6	46			0.1	A87957
Cameroons, 1985 PAT.65XM.EV (unspecified)	WP[1]	0.18			8	46	0.11	<0.05	0.04	A87957
South Africa 1982 Burgershall (Cavendish or Williams)	WP[1]	1.1	0.03		4 +dip	24 3	9.3 (c0.35)	0.27	5.9	A87838
South Africa 1982 Burgershall (Cavendish or Williams)	WP[1]	1.7	0.03		4 +dip	24 3	13 (c0.35)	0.45	4.8	A87838

South Africa 1982 Nelspruit (Williams)	WP[1] +0.5% oil	1.1	0.02		4	26	0.72	<0.1	0.4	A87834
South Africa 1982 Nelspruit (Williams)	WP[1] +0.5% oil	2.2	0.04		4	26	0.8	0.12	0.46	A87834

[1] manganese chloride complex
[2] calculated in whole fruit

Mango. Supervised pre-harvest foliar spray trials from Israel, Malaysia, South Africa and Taiwan, together with post-harvest dipping trials from Australia, Columbia, Israel and South Africa were reported to the Meeting.

In trials carried out in Australia, Columbia, and Israel mangos were dipped in solutions of 0.013-0.05 kg ai/hl prochloraz (EC formulations) and sampled 0-14 days after treatment. In the Australian and South African trials, residues in the peel and pulp residues were measured, and total residues (with and without the stone) were calculated using method RESID/82/88 or 88/72.

Table 49. Residues of prochloraz in mangos from supervised post-harvest dipping trials.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg				Ref
	type	kg ai/ hl		peel	pulp	whole fruit[1]	whole fruit[2]	
Australia, 1983 Gympie (Kensington Pride)	dip	0.025	0	2.6	0.1	0.87 (calc)	0.68	A87836
Australia, 1983 Gympie (Kensington Pride)	dip	0.05	0	4.2	0.18	1.5 (calc)	1.2	A87836
Columbia, 1986	10 sec dip	0.025	7				0.48	A88064
Columbia, 1986	10 sec dip	0.05	7				1.0	A88064
Israel, 1982 Mishmar	30 sec dip	0.04	0			1.6	1.3	A87812
South Africa, 1982 Nelspruit	30 sec dip	0.013	14	4.7	0.16	0.71	0.61	A87838
South Africa, 1982 Nelspruit	30 sec dip	0.025	14	13.0	0.47	2.1	1.8	A87838
South Africa, 1987 Nelspruit	30 sec dip	0.05	14	7.0	0.44	1.6	1.4	A87838

[1] without stone
[2] with stone

In the pre-harvest foliar spray trials, prochloraz, as the WP manganese chloride complex was applied at rates up to 2.1 kg ai/ha, with fruit sampled 15-35 days after the last treatment. In the Malaysian and South African trials, single tree plots were used, replicated 4-5 times, with 5-7 fruit from each replicate combined, sub-sampled and analysed by method RESID/82/88 or RESID/88/72. In most trials, pulp and peel were analysed separately and residues calculated for whole fruit including stone. Average recoveries were 73-102% in pulp and 80-89% in peel, and maximum apparent residues in untreated pulp samples ranged from 0.01 to 0.04 mg/kg and in peel from 0.2 to 0.5 mg/kg. In one trial apparent residues of 0.74 mg/kg in untreated peel samples were reported, with the comment that this may have been a result of sample mis-labelling.

Table 50. Residues of prochloraz in mangos from supervised trials (foliar treatments with a WP formulation of a prochloraz-manganese chloride complex).

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg			Ref
	kg ai/ ha	kg ai /hl	water, l/ha	no.		peel	pulp	whole fruit[1]	
Israel, 1982 Zikim		0.05		3	15	3.1	<0.1	0.62	A87812
Israel, 1982 Mishmar		0.05		3	15	3.7	<0.1	0.8	A87812
Malaysia, 1989 Dusun Habu (Apple)	0.25	0.08	300	16	21			0.57	A88067 A88068
Malaysia, 1987 Dusun Habu (Apple)	1.0	0.33	300	1	33	1.2 (c0.74)	0.09	0.44 (c0.39)	A88004
Malaysia, 1987 Dusun Habu (Apple)	1.1	0.37	300	1	33	0.16 (c0.74)	<0.05	0.09 (c0.39)	A88004
Malaysia, 1987 Dusun Habu (Harumanus)	2.1	0.25	850	1	6	1.8 (c0.74)	0.07	0.43 (c0.39)	A88004
South Africa, 1983 Schoemanskloof (Long green)		0.04		5	25	<0.1	<0.1	<0.1	A87887
South Africa, 1983 Schoemanskloof (Long green)		0.06		5	25	0.53	<0.1	0.17	A87887
South Africa, 1983 Schoemanskloof (Long green)		0.08		5	25	0.64	0.17	0.27	A87887
South Africa, 1982 Nelspruit (Saber)	0.51			3	19	0.59	<0.1	<0.2	A87834
South Africa, 1982 Nelspruit (Saber)	0.77			3	19	3.1	<0.1	0.5	A87834
South Africa, 1982 Nelspruit (Saber)	1.02			3	19	3.0	0.1	0.42	A87834
Taiwan, 1988 Tainan (Cantonment)	0.14	0.009	1500	8	35			<0.1	A88007

[1] including stone

Papaya (pawpaw). In supervised post-harvest trials in Australia, Brazil and South Africa fruit were dipped in 0.013-0.09 kg ai/hl prochloraz (EC formulations) and 10-15 fruit sampled 0-14 days after treatment. In the South African trials pulp (without pips) and peel were analysed separately and whole fruit with pips residues calculated. In most other trials peel and pulp with pips were analysed as well as whole fruit. Methods RESID/82/88 or 88/72 were used giving average recoveries of 79-84% in pulp and 84-94% in peel with maximum apparent residues in untreated pulp samples of <0.02 to 0.09 mg/kg and from <0.2 to 0.07 mg/kg in peel.

Table 51. Residues of prochloraz in papaya from supervised post-harvest dipping trials.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg	Ref
	type	kg ai/ hl			

				peel	pulp	whole fruit	
Australia, 1982 Gympie	60 sec dip	0.025	0	2.3	<0.1	0.41[1]	A87811
Australia, 1982 Gympie	60 sec dip	0.05	0	3.3	<0.1	0.67[1]	A87811
Brazil, 1997 Cosmopolis (Formosa)	10 min dip	0.045	0 1 3 7	2.64 2.24 1.45 0.41	0.07 0.04 0.04 0.03		C007002
Brazil, 1997 Cosmopolis (Formosa)	10 min dip	0.09	3	6.0	0.12		C007002
Brazil, 1999 Rinopolis (Formosa)	dip	0.045	0	0.3	0.05	0.08	C007965
Brazil, 1999 Rinopolis (Formosa)	dip	0.09	0	0.94	0.08	0.21	C007965
Australia, 1987 Gympie	60 sec dip	0.025	5			0.61	A88063
Australia, 1987 Gympie	60 sec dip	0.05	5			1.2	A88063
South Africa, 1982 Nelspruit	dip	0.013	14	3.0	0.4	0.5[1]	A87838
South Africa, 1982 Nelspruit	dip	0.025	14	11.0	0.7	1.4[1]	A87838
South Africa, 1982 Nelspruit	dip	0.05	14	14.0	0.89	1.4[1]	A87838

[1] including pips

Pineapple. In supervised trials in Australia 6-15 pineapples were dipped post-harvest for 1 minute in solutions of an EC formulation of 0.025-0.1 kg ai/hl prochloraz and analysed either as whole fruit (after removal of crowns) or as pulp and skin separately (with calculated total fruit residues reported). In two trials reported from Kenya higher dip concentrations (0.75 kg ai/hl of wax solution) were used, and whole fruit taken for analysis after 33 days and transported to the UK under refrigeration. The analytical method used was RESID/82/88. Average recoveries were 88% and maximum apparent residues in untreated pulp samples were 0.02-0.05 mg/kg and in peel a maximum of 0.07 mg/kg.

Table 52. Residues of prochloraz in pineapple from supervised post-harvest dipping trials.

Country, year (variety)	Application		PHI (days)	Total residues, mg/kg			Ref
	type	kg ai/ hl		peel	pulp	whole fruit	
Australia, 1988 Wakawara (Smoothleaf)	60 sec dip	0.05	5			3.2	A87999
Australia, 1982 Wakawara (Smoothleaf)	60 sec dip	0.1	5			3.8	A87999
Australia, 1982 Beerwah (Smoothleaf)	60 sec dip	0.025	0	2.6	0.18	1.1[1]	A87999
Australia, 1982 Beerwah (Smoothleaf)	60 sec dip	0.05	0	3.1	0.26	1.5[1]	A87999
Kenya, 1988	in 5% wax dip	0.75	33[2]			0.98	A88047
Kenya, 1988	in 11% wax dip	0.75	33[2]			1.5	A88047

[1] calculated residues, based on residues in peel and pulp.
[2] fruit shipped under refrigeration

Onions. In five trials in The Netherlands in 1987 and 1988 8-10 foliar applications of between 0.23 and 0.25 kg ai/ha at weekly intervals were made to plots of 15 sq m and in each trial four replicate samples of bulbs were bulked for analysis by Method RESID/88/72 or RESID82/88. In four trials in Thailand, 1987-88, onions were sprayed at 5-day intervals up to 14 days before harvest at rates of 0.3-1.0 kg ai/ha. Four replicate foliar treatments were made to 6 square metre plots and bulbs were combined for analysis using Method RESID/82/88. Average recoveries ranged from 85 to 92% with maximum apparent residues in untreated samples from 0.002 to 0.14 mg/kg.

Table 53. Residues of prochloraz in onion bulbs from supervised trials (foliar treatments).

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Netherlands, 1988 Negele (Highway)	WP[1]	0.25		300	10	7 13 20	<0.05[4] <0.05[4] <0.05[4]	A88042
Netherlands, 1988 Ursem (Not specified)	WP[1]	0.25		300	10	7 13 21	<0.05[4] <0.05[4] <0.05[4]	A88042
Netherlands, 1987 Colijnsplaat (Hyton)	EC	0.225		400	8	18	0.17, 0.12, <0.1, <0.1	A88012
Netherlands, 1987 Colijnsplaat (Hyton)	EC	0.225		400	8	18	0.31, 0.16, 0.14, <0.1	A88012
Netherlands, 1987 Ursem (Hyton)	EC	0.225		300	9	18	<0.1[4]	A88012
Thailand, 1988 Kanjanaburi (Asgro-429)	WP[2]	0.3		1200	15	14	<0.05	A88010
Thailand, 1988 Kanjanaburi (Asgro-429)	WP[2]	0.6		1200	15	14	<0.05	A88010
Thailand, 1988 Kanjanaburi (Asgro-429)	WP[2]	0.9		1200	15	14	<0.05	A88010
Thailand, 1988 Kanjanaburi (Asgro-429)	WP[2]	1.0		1200	15	14	<0.05	A88010

[1] prochloraz-manganese chloride complex co-formulated with chlorothalonil
[2] prochloraz-manganese chloride complex

In a post-harvest dipping trial in Australia in 1987 mature onions were dipped for 30 seconds in a solution of 0.5g ai/l or 1.0 g ai/l prochloraz, air-dried and stored at ambient temperature until sampled for analysis using Method RESID82/88. Recovery was 81.3% ± 9.7% (n=11) and apparent residues in untreated samples ranged from <0.01 to 0.014 mg/kg.

Table 54. Residues of prochloraz in white onion bulbs from supervised post-harvest dipping trials in Australia in 1987.

Application				PHI (days)	Total residues, mg/kg	Ref
Form	kg ai/ha	kg ai/hl	no.			

Application				PHI (days)	Total residues, mg/kg	Ref
Form	kg ai/ha	kg ai/hl	no.			
EC		0.05	1	0 14 28 40 66 89	3.3 1.5 1.5 0.52 1.1 0.65	A88042
EC		0.1	1	0 14 28 40 66 89	3.5 2.4 0.71 1.0 0.53 0.82	A88042

Melon. A residue trial on honeydew melons was reported from Spain in which foliar drenching sprays were applied at 2-4 week intervals at rates ranging from 2-4 kg ai/ha to 2 replicate plots (5440 sq m) and whole fruit analysed using method RESID/88/72. The mean recovery was 86% ± 11 % (n=7) and apparent residues in untreated samples were <0.05 mg/kg.

Table 55. Residues of prochloraz in Albor honeydew melons from supervised foliar (drench) application trials in Sollana, Spain, in 1990.

Application					PHI (days)	Total residues, mg/kg	Ref
Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
WP[1]	2.0			4	31	<0.05	A88159
WP[1]	3.0			4	31	<0.05	A88159 A88160
WP[1]	4.0			4	31	<0.05	A88159 A88160

[1] prochloraz-manganese chloride complex

In six further trials in Spain honeydew melon crops were flood-irrigated to achieve 30% coverage of the total soil area four times at three different rates during the growing season, and mature fruit analysed by METHOD/88/72 with a mean recovery of 89% ± 12% (n=15) and apparent residues in control samples below the LOQ of 0.05 mg/kg.

Table 56. Residues of prochloraz in honeydew melons from supervised foliar (drench) application trials in Spain in 1990.

(Variety)	Application			PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	no.		Skin	Pulp	Whole fruit	
Liria I (Rocket)	WP[1]	2.0	4	20	0.05	<0.05	<0.05	A88157 A88158
Liria I (Rocket)	WP[1]	3.0	4	20	0.09	<0.05	<0.05	A88157 A88158
Liria I (Rocket)	WP[1]	4.0	4	20	0.1	<0.05	<0.05	A88157 A88158
Liria II (Piel de Sapo)	WP[1]	2.0	4	20	<0.05	<0.05	<0.05	A88157 A88158
Liria II (Piel de Sapo)	WP[1]	3.0	4	20	0.06	<0.05	<0.05	A88157 A88158
Liria II (Piel de Sapo)	WP[1]	4.0	4	31	0.07	<0.05	<0.05	A88157 A88158

[1] prochloraz-manganese chloride complex

In four post-harvest dipping trials in Australia and Columbia rock and honeydew melons were dipped in prochloraz EC solutions at concentrations of 0.01-0.075 kg ai/hl. Whole fruit from single replicate treatments (duplicate analyses) were analysed for total prochloraz using METHOD/88/72, with a mean recovery of 89% ± 11 % (n=7) and apparent residues in untreated samples of 0.016 mg/kg to 0.047 mg/kg.

Table 57. Residues of prochloraz in melon from supervised post-harvest dipping trials.

Country, year (variety)	Application			PHI (days)	Total residues, mg/kg (whole fruit)	Ref
	type	kg ai/hl	no.			
Australia, 1987 Adelaide (Jumbo) Rock melon	60 sec dip	0.025	1	0	2.8	A88077
Australia, 1987 Adelaide (Jumbo) Rock melon	60 sec dip	0.05	1	0	2.0	A88077
Australia, 1987 Adelaide (Jumbo) Rock melon	60 sec dip	0.075	1	0	2.4	A88077
Columbia, 1986 La Tupia (not specified) Honeydew melons		0.01	1	0	0.1, <0.1	A88076
Columbia, 1986 La Tupia Honeydew melons		0.15	1	0	0.13, 0.14	A88076

Mushrooms. Trials were carried out in Australia, Germany, Greece, The Netherlands, Switzerland and the UK which included a combinations of growing media treatments (before inoculation or addition of the casing material) and one or more sprays of the mushroom beds after the addition of casing and between flushes. Plot sizes ranged from 0.16-2.5 sq m and samples from 500g to 2kg with analysis by methods RESID/81/51, RESID/82/88 or RESID/88/72. Average recoveriesranged from 83% to 101% and maximum apparent residues in untreated samples from <0.01 to 0.045 mg/kg, except in one trial [A87870] where residues in control samples were reported at 0.11 mg/kg to 0.18 mg/kg.

Table 58. Residues of prochloraz in mushrooms from supervised trials after spray applications to the mushroom beds.

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	g ai/ sq metre	treatment	no.			
Australia, 1982 Rydalmere	WP[1]	0.63	after 1st flush	1	3	2.0	A87786
Australia, 1982 Rydalmere	WP[1]	1.25	at casing	1	20 27 45	<0.1 <0.1 <0.1	A87786
Australia, 1982 Rydalmere	WP[1]	1.25	after 1st flush	1	3	4.5	A87786
Australia, 1982 Rydalmere	WP[1]	1.25+ 0.63	at casing after 1st flush	1+ 1	3 21	0.55 0.22	A87786
Australia, 1982 Rydalmere	WP[1]	1.25+ 0.63	after 1st flush after 2nd flush	1+1	14	0.29	A87786

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	g ai/ sq metre	treatment	no.			
Australia, 1982 Rydalmere	WP[1]	2.5	at casing	1	20 27 45	0.23 0.13 0.14	A87786
Australia, 1982 Rydalmere	WP[1]	2.5+ 1.25	at casing after 1st flush	1+ 1	21	1.4	A87786
Australia, 1982 Rydalmere	WP[1]	2.5+ 1.25	after 1st flush after 2nd flush	1+1	14	0.37	A87786
Australia, 1982 Rydalmere	WP[1]	2.5+ 2.5	at casing after 1st flush	1+ 1	21	<0.1	A87786
Australia, 1984 Rydalmere (621/649)	WP[1]	0.75	at casing after 1st flush	1+ 1	4 21	0.53 0.22	A87889
Australia, 1984 Rydalmere (621/649)	WP[1]	1.5	at casing	1	19 40	0.1 0.1	A87889
Australia, 1984 Rydalmere (621/649)	WP[1]	1.5	after 1st flush	1	4 21	1.4 0.72	A87889
Germany, 1998 Esslington (Le lion C9)	WP[1]	0.6	at casing after 1st flush	1+ 1	0 2	47 37	C002193 C002194
Greece, 1988 Athens	WP[1]	0.75	7d after 1st flush	1	14	0.11, 0.13	A88035
Greece, 1988 Athens	WP[1]	1.5	7d after 1st flush	1	14	0.15, 0.18	A88035
Netherlands, 1980 (Le lion B92)	WP[1]	0.75	before inoculation 14d later	1+ 1	5	0.14, 0.22, 0.18, 0.18	A87785
Netherlands, 1980 (Le lion B92)	WP[1]	0.75	before inoculation after 1st flush	1+ 1	3	1.06, 0.42, 0.8, 0.8	A87785
Netherlands, 1980 (Le lion B92)	WP[1]	1.5	before inoculation	1	10	0.15, 0.24, 0.25, 0.1	A87785
Switzerland, 1983	EC	1.0	after casing	1	12	0.09, 0.21	A87758
Switzerland, 1983	WP[1]	1.5	after casing	1	13 20[2]	0.1, 0.19 0.38, 0.48	A87758
Switzerland, 1983	WP[1]	1.5	mixed into casing	1	13 14 19[2] 21[2]	<0.05 0.14 0.16 0.13	A87758
Switzerland, 1983	WP[1]	1.5+ 1.0	mixed into casing after 1st flush	1+ 1	5 6 13[3] 14[3]	0.5 0.51 0.44 0.42	A87758
UK, 1980 Selby (Le lion B92)	WP[1]	0.18	7d after casing	1	19	0.02	A87793
UK, 1980 Selby (Le lion B92)	WP[1]	0.18	7d after casing after 1st flush	1+ 1	7	0.05	A87793
UK, 1980 Selby (Le lion B92)	WP[1]	0.18	7d after casing after 1st flush after 2nd flush	1+ 1+ 1	4	0.04	A87793
UK, 1980 Warrington (Somycel 22)	WP[1]	0.6	at casing	1	22 28[2]	0.02 0.02, 0.06	A87763
UK, 1980 Warrington (Somycel 22)	WP[1]	0.6	at casing after 2nd flush	1+ 1	4[3] 12[4]	0.72, 0.83 <0.01	A87763

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	g ai/ sq metre	treatment	no.			
UK, 1982 ADAS	WP[1]	0.3	7d after casing	1	14 16 18	0.31, 0.13 0.16, 0.19 0.56, 0.88	A87793
UK, 1982 ADAS	WP[1]	0.3	7d after casing	1	13 15	0.23, 0.24 0.15, 0.11 (c0.16)	A87793
UK, 1982 ADAS	WP[1]	0.3	7d after casing 21d after casing	1+ 1	3 7 10 13 16	0.84, 0.71, 0.71, 0.32 0.18, 0.25 0.23, 0.2 0.21, 0.26 0.24, 0.82 (c0.16)	A87793
UK, 1982 ADAS	WP[1]	0.3	7d after casing 21d after casing 38d after casing	1+ 1+ 1	2 4 7 10	2.2[5], 2.2[5], 1.1, 0.94 0.66, 0.45 0.44, 0.37 0.74, 0.36 (c0.16)	A87793
UK, 1982 ADAS	WP[1]	0.3	7d after casing 25d after casing	1+ 1	3 5 7 10 12 14	0.48, 0.3, 0.36 0.25, 0.29 0.21, 0.34 0.22, 0.72, 0.24, 0.15 0.26, 0.15 0.14, 0.79	A87793
UK, 1982 ADAS	WP[1]	0.3	7d after casing 25d after casing 39d after casing	1+ 1+ 1	2 3 7 9 12 14 17	0.27, 0.51 0.25, 0.35 1.1, 0.79 0.45, 0.14 0.31, 0.11 0.27, 0.23 0.2, 0.19	A87793
UK, 1982 ADAS	WP[1]	1.25	7d after casing	1	13 15 18 22 25 28 31 34 36 39 42	0.4, 0.26 0.24, 0.22 0.23, 0.36 0.29, 0.25 0.16, 0.2 0.33, 0.36 0.35, 0.41 0.24, 0.26 0.71, 0.27 0.17, 0.22 0.26, 0.34	A87793
UK, 1983 Rustington (Strain 21)	WP[1]	0.6	at casing after 1st flush	1+ 1	5 11[3] 16[3] 31[4]	0.11, 0.17 0.15 (c0.16) 0.11 0.15	A87870 (DML)
UK, 1983 Rustington (Strain 21)	WP[1]	0.6	at casing after 1st flush after 2nd flush	1+ 1+ 1	3 8 23[4]	0.2 (c0.16) 0.25 0.11	A87870 (DML)
UK, 1983 Rustington (Strain 649	WP[1]	0.6	at casing after 1st flush after 2nd flush	1+ 1+ 1	15[4]	0.19	A87870 (DML)
UK, 1983 Rustington (Strain 649)	WP[1]	0.6	at casing after 1st flush	1+ 1	2 21	0.81, 0.48 0.13	A87870 (DML)
UK, 1983 Wrington	WP[1]	0.3	7d after casing after 1st flush	1+ 1	2-4	0.65, 0.31	A87870 (English)
UK, 1983 Wrington	WP[1]	0.3	after 4th flush	1	1 2 3	2.6, 3.6 1.8, 1.6 (c0.18) <0.1	A87870 (Decline)

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	g ai/ sq metre	treatment	no.			
UK, 1983 Wrington	WP[1]	0.3	7d after casing after 1st flush after 3rd flush	1+ 1+ 1	4-6	0.18, 0.19	A87870 (English)
UK, 1983 Wrington	WP[1]	0.6	after 4th flush	1	1 2 3	6.4, 3.2 3.6 (c0.18) 0.25	A87870 (Decline)
UK, 1983 Wrington	WP[1]	0.6	after 2nd flush	1	3-5 5-7	0.44, 0.48 0.3, 0.26, 0.14 (c0.11)	A87870 (CKF)
UK, 1983 Wrington	WP[1]	0.6	after 2nd flush after 3rd flush	1+ 1	2-3 4-6 9-14[5]	2.2 (c0.6) 0.68, 0.64 (c0.14) 0.25, 0.61 (c0.11)	A87870 (CKF)
UK, 1983 Wrington	WP[1]	1.5	8d after casing	1	12-15 13-17	0.32, 0.32, 0.2 0.74, 0.22, 0.2	A87870 (Dutch)
UK, 1987 Angmering	WP[1]	0.6	at casing after 1st flush	1+ 1	5[2] 14[3]	0.21 1.1	A87983
UK, 1987 Angmering	WP[1]	15 g ai/m^3 0.6	mixed with compost at casing	1+ 1	21	0.12	A87983
UK, 1987 Angmering	WP[1]	15 g ai/m^3 0.6	mixed with compost after 1st flush	1+ 1	5[2] 14[3]	0.14 1.6	A87983
UK, 1987 Angmering	WP[1]	15 g ai/m^3 0.6	mixed with compost at casing after 1st flush	1+ 1 1	5[2] 14[3]	0.42 0.83	A87983
UK, 1987 Angmering	WP[1]	3.75 g ai/m^3	mixed with compost	1	33	0.03	A87983
UK, 1987 Angmering	WP[1]	3.75 g ai/m^3	at casing	1	21	0.04	A87983
UK, 1987 Angmering	WP[1]	3.75 g ai/m^3 0.6	mixed with compost at casing	1+ 1	21 29[2] 38[3]	0.08, 0.04 0.12 0.79	A87983
UK, 1987 Angmering	WP[1]	3.75 g ai/m^3 0.6	mixed with compost at casing after 1st flush	1+ 1 1	5[2] 14[3]	0.5 1.0	A87983
UK, 1987 Angmering	WP[1]	30 g ai/m^3 0.6	mixed with compost at casing	1+ 1	21	0.15	A87983
UK, 1987 Angmering	WP[1]	30 g ai/m^3 0.6	mixed with compost at casing after 1st flush	1+ 1 1	5[2] 14[3]	0.08 0.71	A87983
UK, 1987 Angmering	WP[1]	7.5 g ai/m^3 0.6	mixed with compost at casing	1+ 1	21	0.09	A87983
UK, 1987 Angmering	WP[1]	7.5 g ai/m^3 0.6	mixed with compost at casing after 1st flush	1+ 1 1	5[2] 14[3]	0.27 0.49	A87983
UK, 1998 Thakeham (Syluvan)	WP[1]	0.6	at casing after 1st flush	1+ 1	0 2	16 6.2	C002193 C002194

[1] prochloraz-manganese chloride complex
[2] from 2nd flush
[3] from 3rd flush
[4] from 4th flush

[5] unemerged at time of treatment

Tomatoes. In trials in Israel and the USA 3-9 foliar sprays at rates ranging from 0.15 to 1.0 kg ai/ha, were applied at 7-10 day intervals. Plot sizes in the US of 9 sq m were treated with a tractor-mounted 2-row boom sprayer, and samples consisting of 30 fruit were pooled from 4 replicate plots for analysis by method RESID/82/88. Recoverieswere 95% ± 11% (n=6) and 93% ± 11% (n=7) respectively and maximum apparent residues in untreated samples 0.09 mg/kg in the US and 0.11 mg/kg in Israel.

Table 59. Residues of prochloraz in tomatoes from supervised foliar application trials in 1984 in Israel and the USA.

Location, (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Israel Jat (244)	WP[1]	0.5		5	4	0.25 (c0.11)	A87882
Israel Jat (244)	WP[1]	0.75		5	4	0.31 (c0.11)	A87882
Israel Jat (Marmond)	WP[1]	0.5	1000	9	14	0.67	A87882
Israel Jat (Marmond)	WP[1]	0.75	1000	9	14	1.5	A87882
USA Florida (Cantonment)	WP[1]	0.15	526		13	<0.1	A87871
USA Florida (Cantonment)	WP	0.15	526		13	0.1	A87871
USA Florida (Cantonment)	WP	0.15	526		13	<0.1	A87871
USA Florida (Cantonment)	WP[1]	0.24	526		13	0.11	A87871
USA Florida (Cantonment)	WP	0.24	526		13	0.1	A87871
USA Florida (Cantonment)	WP	0.24	526		13	0.11	A87871
USA Florida (Cantonment)	WP[1]	0.38	526		13	<0.1, 0.16	A87871
USA Florida (Cantonment)	WP[1]	0.6	526		13	0.13	A87871

[1] prochloraz-manganese chloride complex

In two trials in Spain dilute solutions of prochloraz were applied as a soil drench (1 l/plant) to the base of each tomato plant three times at two different rates during the six weeks before harvest and mature fruit were analysed by METHOD/88/72. The mean recovery in these trials was 92.5%, with apparent residues in control samples ranging from 0.02 to 0.06 mg/kg.

Table 60. Residues of prochloraz in tomatoes from supervised soil-drench application trials in Spain in 1990.

Location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Hoyo Cuenca (Daniela)	WP[1]	1.0	14300	3	5 15	<0.05 <0.05	A88173
Hoyo Cuenca (Daniela)	WP[1]	2.0	14300	3	5 15	<0.05 <0.05	A88173
La Cumbre (Rambo)	WP[1]	1.0	2000	3	5 15	<0.05 0.06	A88173
La Cumbre (Rambo)	WP[1]	2.0	2000	3	5 15	<0.05 <0.05	A88173

[1] prochloraz-manganese chloride complex

Lettuce. In eight field trials conducted in Australia (1995) between 0.13 and 0.37 kg ai/ha, 5-7 times at 7-10 day intervals, was applied to plots of 1.4 sq m and replicate samples (1kg) were analysed using Method RESID/88/72, and in nine trials in the UK (1984-1987) between 0.025-0.05 kg ai/hl, was applied 4 times at 14-day intervals, with two of these involving longer spray intervals (4 weeks). In an additional UK trial residues in trimmed and untrimmed field lettuce were analysed after 12 applications of 0.4 kg ai/ha. For the UK trials Method RESID/82/88 was used. Average recoveriesranged from 79% to 92%, with maximum apparent residues of <0.02 mg/kg to 0.05 mg/kg in untreated samples.

Table 61. Residues of prochloraz in field head lettuce from supervised foliar application trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Australia, 1995 Murray Bridge (Greenway)	WP[1]	0.18	0.023	800	5	0 2 7 14	5.0, 2.7 1.8, 0.99 0.59, 0.36 0.22, 0.14	A88083
Australia, 1995 Murray Bridge (Greenway)	WP[1]	0.37	0.046	800	5	7 13 21	7.5, 5.2 1.6, 1.2 0.7, 0.45 0.28, 0.18	A88083
Australia, 1995 Uraidla (Magnum)	WP[1]	0.18	0.023	800	5	0 2 7 14	0.59, 0.2 0.15, 0.03 0.16, 0.13 0.06, 0.05	A83916
Australia, 1995 Uraidla (Magnum)	WP[1]	0.37	0.046	800	5	0 2 7 14	1.8, 1.6 0.14, 0.02 0.7, 0.11 0.05, 0.05	A83916
Australia, 1995 Werribee South (Greenway)	WP[1]	0.13	0.023	580	7	0 2 7 14	2.0, 1.5 1.3, 1.1 0.41, 0.4 0.33, 0.15	A83550
Australia, 1995 Werribee South (Greenway)	WP[1]	0.13	0.023	580	5	0 2 7 14	0.39, 0.27 0.06, 0.03 0.04, 0.03 0.06, 0.05	A83550
Australia, 1995 Werribee South (Greenway)	WP[1]	0.27	0.046	580	7	7 13 21	5.3, 3.6 2.6, 2.2 0.59, 0.53 0.3, 0.29	A83550

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Australia, 1995 Werribee South (Greenway)	WP[1]	0.27	0.046	580	5	7 13 21	0.86, 0.52 0.09, 0.08 0.16, 0.06 0.09, 0.03	A83550
UK, 1985 Leedstown	WP[1]	0.4	0.04	1000	12	19 19	0.33 trimmed 0.35 untrimmed	A87901 A83637
UK, 1985 Ludington (Diamante)	WP[1]		0.025		4	14 21 28	2.1 0.36 0.15	A87940
UK, 1985 Ludington (Diamante)	WP[1]		0.05		4	14 21 28	7.2 0.91 0.3	A87940
UK, 1985 Ludington (Diamante)	WP[1]		0.025		4[2]	14 21 28	2.1 1.8 0.22	A87940
UK, 1985 Ludington (Diamante)	WP[1]		0.05		4[2]	14 21 28	7.8 0.36 0.76	A87940
UK, 1987 ADAS (Saladin)	WP[1]	0.5	0.05	1000	4	19	0.07	A87985 A83635
UK, 1987 ADAS (Saladin)	WP[1]	0.5	0.05	1000	4	33	0.1	A87985 A83635
UK, 1987 Levingtont (Lobjoits)	WP[1]	1.87	0.25	750	4	9 16 19	0.12 <0.05 <0.05	A87985 A83635
UK, 1987 Levingtont (Monterey)	WP[1]	1.87	0.25	750	4	9 16 19	0.06 0.07 <0.05	A87985 A83635
UK, 1987 Levingtont (Saladin)	WP[1]	1.87	0.25	750	4	9 16 19	0.05 0.17 0.09	A87985 A83635

[1] prochloraz-manganese chloride complex
[2] 28 day interval between treatments

One trial on varieties of head lettuce was conducted in the UK (1987) involving 1-2 applications of 1.87 kg ai/ha to single-replicate 1.4 square meter outdoor plots protected by plastic sheeting. Samples were analysed by Method RESID/82/88. Recovery was 79.2% ±9% (n=15) and apparent residues in untreated samples were <0.05 mg/kg.

Table 62. Residues of prochloraz in head lettuce (protected) from supervised foliar application trials in Levintont, UK, 1987.

(Variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
(Aubade)	WP[1]	1.87	0.25	750	1	8	<0.05	A87985 A83635
Bellona)	WP[1]	1.87	0.25	750	1	8	0.05	A87985 A83635
(Katanga)	WP[1]	1.87	0.25	750	1	8	0.25	A87985 A83635
(Aubade)	WP[1]	1.87	0.25	750	2	15 22	0.25 <0.05	A87985 A83635
(Bellona)	WP[1]	1.87	0.25	750	2	15 22	0.43 0.26	A87985 A83635
(Katanga)	WP[1]	1.87	0.25	750	2	15 22	0.36 0.22	A87985 A83635

[1] prochloraz-manganese chloride complex
[2] 28- day interval between treatments

Beans, dry. In twelve trials in Germany between 1987 and 1989 on field or fodder beans prochloraz was applied as a foliar spray at 0.6 kg ai/ha at flowering and about 14 days later to 100 square metre plots. Samples of foliage (immature plants), immature pods and seeds, and mature seeds were analysed using Methods RESID/88/72 or RESID/82/88. Reported limits of determination were 0.2 mg/kg in the 1987 trials (based on apparent residues of 0.12 mg/kg to 0.18 mg/kg in untreated samples) and 0.05 mg/kg (plants and pods), 0.02 mg/kg (seeds) in the later trials. Average recoveriesranged from 83% to 94%, with maximum apparent residues in the later trials of 0.02 mg/kg to 0.06 mg/kg in untreated pods and seeds, and 0.06 mg/kg to 0.23 mg/kg in untreated immature plants.

Table 63. Residues of prochloraz in dry beans from supervised foliar application trials.

Country, year (variety) crop	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Germany, 1987 Augerstein (Kristall) Fodder beans	WP[1]	0.6	200	2[2]	0 15 35 51	8.1 immature plant 3.8 immature plant <0.2 pods 3.7 immature plant 0.2 seeds 0.33 seeds	A88031 A88032
Germany, 1987 Goch (Alfred) Fodder beans	WP[1]	0.6	200	2[2]	0 7 14 65	10.3 immature plant 0.35 immature plant 0.35 pods 0.2 immature plant 0.26 seeds 1.2 pods <0.2 seeds	A88031 A88032
Germany, 1987 Hohenleith (Troy) Fodder beans	WP[1]	0.6	200	2[2]	0 14 29 61	10.3 immature plant <0.2 immature plant <0.2 pods 1.5 immature plants <0.2 seeds <0.2 seeds	A88031 A88032
Germany, 1987 Kaarst (Alfred) Fodder beans	WP[1]	0.6	200	2[2]	20 40 65	<0.2 immature plant <0.2 pods 1.3 immature plant <0.2 pods <0.2 seeds <0.2 seeds	A88031 A88032
Germany, 1988 Bad Wimpfen (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 9 22 51	8.2 immature plant 1.9 immature plant 0.36 pods 1.2 immature plant 0.28 pods <0.05 seeds 0.09 seeds	A88027
Germany, 1988 Eschau (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 6 20 56	15.5 immature plant 3.5 immature plant 0.42 pods 0.86 immature plant 0.11 pods <0.05 seeds <0.05 seeds	A88027
Germany, 1988 Gottingen (Kristall) Fodder beans	WP[1]	0.6	400	2[2]	0 15 51	7.8 immature plant c0.23 immature plants 4.5 immature plant 0.29 pods 0.07 seeds 0.17 seeds	A88027

Country, year (variety) crop	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Germany, 1988 Neustadt (Kristall) Fodder beans	WP[1]	0.6	400	2[2]	0 20 44	5.9 immature plant c 0.15 immature plant 2.0 immature plant 0.24 pods <0.05 seeds	A88027
Germany, 1989 Eschau (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 7 21 56	13.3 immature plant 1.9 immature plant 0.57 pods 1.9 immature plant c 0.15 immature plant 0.12 pods 0.06 seeds 0.02 seeds	A88046
Germany, 1989 Eschau (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 7 21 56	14.5 immature plant 2.2 immature plant 0.34 pods 2.1 immature plant 0.16 pods 0.03 seeds 0.04 seeds	A88051
Germany, 1989 Goche-Nierswalde (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 10 23 63	18.3 immature plant 3.2 immature plant 1.9 pods 2.6 immature plant 0.27 pods 0.03 seeds 0.04 seeds	A88046
Germany, 1989 Goche-Nierswalde (Alfred) Fodder beans	WP[1]	0.6	400	2[2]	0 10 23 63	6.8 immature plant 3.6 immature plant 1.2 pods 3.1 immature plant 0.1 pods 0.06 seeds 0.03 seeds	A88051

Pods refers to pods including seeds

[1] prochloraz-manganese chloride complex, co-formulated with mancozeb

[2] applied about 14 days apart, over flowering–early pod development

In two trials in Brazil bean seed was treated with prochloraz at rates of 75 g ai/100 kg and 150 g ai/100 kg immediately before planting, and mature bean seeds analysed for total prochloraz using METHOD/88/72, with a mean recovery of 92% ± 5.2% (n=6). Apparent residues in untreated samples were <0.006 mg/kg to 0.008 mg/kg.

Table 64. Residues of prochloraz in dry beans from supervised seed treatment trials in Brazil in 1989.

Location (variety)	Application			PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	No.			
Cosmopolis-SP (Carioquinha)	WS	0.075	1	84	<0.05 seed	A88129 A88130
Cosmopolis-SP (Carioquinha)	WS	0.15	1	84	<0.05 seed	A88109 A88110

Peas, dry. Sixteen trials were conducted between 1986 and 1989 on fodder peas in Germany and the UK (including one field green pea trial in the UK), with prochloraz at 0.5-0.6 kg ai/ha applied as a foliar spray at flowering and in most trials about 14 days later, with samples of foliage (immature plants), immature pods and peas as well as mature (dry) peas taken for analysis by Methods

RESID/88/72 or RESID/82/88. Reported limits of determination were 0.1-0.2 mg/kg in the 1987-88 trials (based on apparent residues in untreated samples) and 0.02-0.05 mg/kg for seeds and pods and 0.1 mg/kg for plants in the 1986 and 1989 trials. Average recoveriesranged from 73% to 90%. In the 1987-88 trials maximum apparent residues in untreated samples ranged from 0.12 mg/kg to 0.93 mg/kg (plants, pods) and 0.02 mg/kg to 0.06 mg/kg, and in the 1989 trials were 0.01-0.04 mg/kg in peas, 0.007-0.007 mg/kg in pods and 0.04-0.08 mg/kg in plants.

Table 65. Residues of prochloraz in dry peas from supervised foliar application trials.

Country, year (variety) crop	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Germany, 1987 Boehl (Stehgold) Fodder peas	WP[2]	0.6	200	2[1]	0 17 24 40	6.7 immature plants 0.84 immature plants <0.2 pods 1.2 immature plants <0.2 pods <0.1 immature peas 0.24 mature peas	A88029 A88030
Germany, 1987 Eschau (Maxi) Fodder peas	WP[2]	0.6	200	2[1]	0 6 13 41	2.6 immature plants 1.4 immature plants 0.3 pods 1.5 immature plants 0.25 pods <0.1 immature peas <0.1 mature peas	A88029 A88030
Germany, 1987 Goch (Birte) Fodder peas	WP[2]	0.6	200	2[1]	0 7 14 43	8.0 immature plants 7.7 immature plants 1.1 pods 3.9 immature plants 0.28 pods 0.36 immature peas 0.35 mature peas	A88029 A88030
Germany, 1987 Hohenleith (Birte) Fodder peas	WP[2]	0.6	200	2[1]	0 7 29 63	3.0 immature plants 1.3 immature plants 0.38 pods 3.1 immature plants c0.24 immature plants 0.26 immature pods <0.1 immature peas 0.13 mature peas	A88029 A88030
Germany, 1988 Eschau (Maxi) Fodder peas	WP[2]	0.6	400	2[1]	0 14 34	2.2 immature plants 2.1 immature plants 0.45 pods <0.1 peas <0.1 mature peas	A88026
Germany, 1988 Goch-Weeze (Astara) Fodder peas	WP[2]	0.6	400	2[1]	0 7 15 56	2.1 immature plants 0.37 immature plants <0.1 pods <0.1 immature plants <0.1 pods <0.1 immature peas <0.1 mature peas	A88026
Germany, 1988 Hohenleith (Birte) Fodder peas	WP[2]	0.6	400	2[1]	0 5 7 39	3.0 immature plants c0.66 immature plants 0.43 pods 2.1 immature plants <0.1 mature peas	A88026

Country, year (variety) crop	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Germany, 1988 Schwinge (Stehgold) Fodder peas	WP[2]	0.6	400	2[1]	0 7 29 37	2.9 immature plants 1.6 immature plants <0.1 pods 2.7 immature plants c0.93 immature plants 0.33 peas <0.1 mature peas	A88026
Germany, 1989 Ebsdorf (Bohatyr) Fodder peas	WP[3]	0.6	400	2[1]	32 59	1.3 immature plants <0.05 pods <0.05 peas <0.05 mature peas	A88049
Germany, 1989 Ebsdorf (Solara) Fodder peas	WP[2]	0.6	400	2[1]	32 59	0.96 immature plants 0.09 pods 0.02 peas <0.02 mature peas	A88050
Germany, 1989 Neustadt (Solara) Fodder peas	WP[3]	0.6	400	2[1]	0 9 19	22 immature plants 7.1 immature plants 1.5 pods <0.05 mature peas	A88049
Germany, 1989 Neustadt (Solara) Fodder peas	WP[2]	0.6	400	2[1]	0 9 19	8.8 immature plants 21 immature plants 0.0.78 pods 0.1 mature peas	A88050
UK, 1986 Christchurch (Bunting) Fodder peas	EC	0.5	560	2[1]	36	<0.05 mature peas	A87958
UK, 1986 Nicholas (Wavertop) Green peas	EC	0.5	560	1	27	<0.05	A87958
UK, 1986 Thornhaugh (Dark Skinned Perfection)	EC	0.5	560	1	21	<0.05 green peas	A87958
UK, 1986 Turves (Bunting)	EC	0.5	560	2[1]	36	0.09 dry peas	A87958

Pods refers to pods including seeds
[1] applied about 14 days apart, over flowering–early pod development
[2] prochloraz-manganese chloride complex
[3] prochloraz-manganese chloride complex, co-formulated with mancozeb

Sugar beet. In three trials in Italy in 1981 and 1986 2-4 foliar applications of between 0.76 and 1.0 kg ai/ha, using knapsack sprayers, were made to plots sized between 25 and 100 sq m. 10-14kg samples of roots and of whole plants (1 trial) were analyed by Method RESID82/88. Recoverieswere 90% ± 18% (n=6 to 13), and maximum apparent residues in untreated samples 0.03mg/kg, 0.71 mg/kg (roots) and 0.14 mg/kg, 0.03 mg/kg in beet tops. The relatively high value (0.71 mg/kg) in the control roots from one site (1986) has been attributed to sample contamination as residues in the control sample from the second site were 0.03 mg/kg.

Table 66. Residues of prochloraz in sugar beet roots and tops from supervised trials on sugar beet (foliar treatments) in Italy.

Year, location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
1986 Emo Capodalista (Monofort)	EC	0.76	600	2	14	2.1 (c0.71) roots	A87981

Year, location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
1986 Emo Capodalista (Monofort)	EC	1.0	600	2	14	2.6 (c0.71) roots	A87981
1986 Emo Capodalista (Monofort)	EC[1]	0.79	600	2	14	2.0 (c0.71) roots	A87981
1986 Zaggia (Vetramono)	EC	0.76	600	3	21	1.5 roots	A87981
1986 Zaggia (Vetramono)	EC[1]	0.79	600	3	21	0.99 roots	A87981
1986 Zaggia (Vetramono)	EC[1]	0.79	600	3	21	0.54 roots	A87981
1981 Mezzano (Novagene)	EC	1.0		2	42	1.2 (c0.13) tops <0.1 roots	A87832
1981 Mezzano (Novagene)	EC	1.0		3	21	1.3 (c0.13) tops <0.1 roots	A87832
1981 Mezzano (Novagene)	EC	1.0		4	5	1.0 (c0.13) tops <0.1 roots	A87832

[1] prochloraz-manganese chloride complex (0.22 kg ai/l)

Rape seed. Residue trials from Canada, Denmark, France, Germany, Sweden and the UK reported to the Meeting involved 1-3 foliar applications of prochloraz at rates of between 0.23 and 0.8 kg ai/ha. Plot sizes mostly ranged from 36-300 sq m with generally 1-4 replicates and when reported treatments were generally by hand-lance or mini-boom plot sprayers.Samples of immature plants and pods, immature and mature seeds (0.5-2.5 kg) were analysed either by method RESID/82/88 or RESID/88/72. Average recoveriesranged from 73% to 108% and maximum apparent residues in untreated samples were 0.05-0.35 mg/kg (plants), 0.02-0.17 mg/kg (seeds), 0.01-0.11 mg/kg (oil) and 0.02-<0.05 mg/kg in press cake. Residues reported in the seed from one trial in Canada [A87971] were significantly higher than expected (0.56-0.87 mg/kg) and appeared to be anomalous.

In a number of the European trials oil was extracted from the seeds with hexane and residues were measured in the oil and remaining dry cake. In the more recent (2000) trials in France, seed samples were pressed to extract crude oil, which was refined by treatment with soda at 15°Baume for 30 min at 80-90°C, with residues measured in the crude and refined oil and the waste presscake.

Table 67. Residues of prochloraz in rape seed from supervised foliar application trials in Canada in 1986.

Location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Fort Sasketchewan (Tobin)	EC	0.6		1	77	0.2	A87971
Fort Sasketchewan (Tobin)	EC	0.6		1	86	<0.05	A87971
Fort Sasketchewan (Tobin)	EC	0.6+ surfactant		1	77	0.1	A87971
Fort Sasketchewan (Tobin)	EC	0.6+ surfactant		1	86	<0.05	A87971
Roland (Tobin)	EC	0.45	450	1	57	0.77, 0.87, 0.56 (c0.17)	A87971

Location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Saskatoon (Westar)	EC	0.4		1	74	<0.05, <0.05	A87971
Saskatoon (Westar)	EC	0.4		1	84	<0.05, <0.05	A87971
Saskatoon (Westar)	EC	0.45		1	65	<0.05, <0.05	A87971
Saskatoon (Westar)	EC	0.45+ surfactant		1	65	<0.05, <0.05	A87971
Souris (Regent)	EC	0.45	450	1	44	0.09	A87971

Table 68. Residues of prochloraz in rape seed from supervised foliar application trials in Europe

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water l/ha	no		seed	oil	other	
Denmark, 1982 Alslev (Gulliver)	EC	0.45			1	76	<0.05	<0.1[1]		A87819
Denmark, 1982 Alslev (Gulliver)	EC	0.45			2	53	0.1	0.14[1]		A87819
Denmark, 1982 Rudkoebing (Karat)	EC	0.45			2	75	<0.05	<0.1[1]		A87819
Denmark, 1982 Rudkoebing (Karat)	EC	0.45			2	53	0.08	0.16[1]		A87819
Denmark, 1982 Sanderumgaard (Brutor)	EC	0.45			1	70	<0.05	<0.1[1]		A87819
Denmark, 1982 Sanderumgaard (Brutor)	EC	0.45			2	53	0.12	0.21[1]		A87819
France 1982 Sens (Jet Neuf)	EC	0.45			1	51	≤0.1, <0.1, <0.1			A87807
France 1982 Sens (Jet Neuf)	EC	0.45			2	38	<0.1, <0.1, 0.1	0.12, 0.13, 0.16[1]		A87807
France 1982 Sens (Jet Neuf)	EC	0.45			2	38	0.1, 0.1, 0.13			A87807
France 1982 Sens (Jet Neuf)	EC	0.45			1	51	0.1, 0.11, 0.1			A87807
France 1982 Veron (Jet Neuf)	EC	0.45			1	42	<0.05, <0.05, 0.05			A87807
France 1982 Veron (Jet Neuf)	EC	0.45			2	27	0.07, 0.05, 0.07	0.22, 0.12, 0.18[1]		A87807
France 1982 Veron (Jet Neuf)	EC	0.45			2	27	0.12, 0.08, 0.06			A87807
France 1982 Veron (Jet Neuf)	EC	0.45			1	42	0.07, <0.05, 0.07			A87807

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water l/ha	no		seed	oil	other	
France, 1982 Pisaux (Jet neuf)	EC	0.45			1	37	<0.05, 0.07, <0.05			A87807
France, 1982 Pisaux (Jet neuf)	EC	0.45			2	25	0.09, 0.07, 0.07	0.12, 0.11, <0.1[1]		A87807
France, 1982 Pisaux (Jet neuf)	EC	0.45			2	25	0.09, 0.09, 0.07			A87807
France, 1982 Pisaux (Jet neuf)	EC	0.45			1	37	<0.05, 0.05, <0.05			A87807
France, 1982 St Just en Chausee (Jet neuf)	EC	0.45			1	46	<0.2, <0.2, <0.2			A87807
France, 1982 St Just en Chausee (Jet neuf)	EC	0.45			2	34	0.29, <0.2, <0.2	0.19, 0.31, 0.3[1]		A87807
France, 1982 St Just en Chausee (Jet neuf)	EC	0.45			2	34	0.31, 0.23, <0.2			A87807
France, 1982 St Just en Chausee (Jet neuf)	EC	0.45			1	46	<0.2, <0.2, <0.2			A87807
France, 2000 Launaguet	EC	0.4		300	2	68	0.08	0.06[2]	<0.05 cake	C026921
France, 2000 Montfavet	EC	0.4		300	2	55	0.07	0.05[2] <0.05	<0.05 cake	C026921
France, 2000 Touffreville	EC	0.4		300	2	56	0.05	0.1[2]	<0.05 cake	C026921
Germany, 1985 Hohenlieth (Jet Neuf)	EC	0.6		400	2	0 60	<u>0.11</u>	0.2[1]	1.1 plant 0.05 cake	A87928
Germany, 1985 Hohenlieth (Jet Neuf)	SC	0.6		400	2	0 60	<u>0.09</u>	0.3[1]	1.2 plant 0.1 cake	A87935
Germany, 1985 Hohenlieth (Jet Neuf)	EC	0.8		400	1	0 79	0.17	0.2[1]	18 plant 0.09 cake	A87928
Germany, 1985 Ottendorf (Jet Neuf)	EC	0.6		400	2	0 58 72	0.12	0.21[1]	31 plant 1.3 plant 0.07 cake	A87928
Germany, 1985 Ottendorf (Jet Neuf)	SC	0.6		400	2	0 58 72	0.1	0.25[1]	19 plant 1.2 plant 0.07 cake	A87935
Germany, 1985 Untermassing (Belinda)	EC	0.6		400	2	0 58	0.15	0.62[1]	12 plant 0.05 cake	A87928
Germany, 1985 Untermassing (Belinda)	SC	0.6		400	2	0 58	<u>0.2</u>	0.75[1]	8.6 plant 0.08 cake	A87935
Germany, 1985 Untermassing (Belinda)	EC	0.8		400	1	0 57 68	0.08 <u>0.09</u>	0.27[1] 0.33[1]	38 plant <0.05 cake <0.05 cake	A87928

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water l/ha	no		seed	oil	other	
Germany, 1986 Diesenbach (Jet Neuf)	EC	0.6	0.15	400	2	0 59	0.07	0.2[1]	11 plant 0.08 cake	A87993
Germany, 1986 Hohenlieth (Jet Neuf)	EC	0.6	0.15	400	2	0 53	0.08	0.13[1]	25 plant 0.07 cake	A87993
Germany, 1986 Varenesch (Mirander)	EC	0.6	0.12	500	2	0 57	<0.05	0.1[1]	18 plant <0.05 cake	A87993
Germany, 1989 Bad Munder (Ceres)	WP	0.6		400	2	0 58 95	0.14	<0.1	18 plant <0.1 pods 0.11 cake	A88086 A88087
Germany, 1989 Goch (Ceres)	WP	0.6		400	2	0 56	≤0.1		11 plant	A88086 A88087
Germany, 1989 Kleve (Lirabon)	WP	0.6		400	2	0 56	≤0.1		18 plant	A88086 A88087
Germany, 1989 Schwarmstedt (Lirabon)	WP	0.6		400	2	0 56	≤0.1		18 plant	A88086 A88087
Germany, 1990 Altenbruch (Ceres)	EC	0.54		400	2	0 42 80	<0.1		7.4 plant <0.2 pod	A88141 A88142
Germany, 1990 Altenbruch (Ceres)	WP	0.6		400	2	0 42 80	<0.05		17 plant 0.11 pod	A88139 A88140
Germany, 1990 Hosbach (Arabella)	EC	0.54		400	2	0 42 69 76	<0.1 green <0.1		5.1 plant <0.2 pod	A88141 A88142
Germany, 1990 Hosbach (Arabella)	WP	0.6		400	2	0 42 69 76	0.1 green <0.05	<0.05	4.5 plant 0.1 pod 0.05 cake	A88139 A88140
Germany, 1990 Thann (Ceres)	WP	0.6		400	2	0 43 52	0.05	0.12	8.9 plant 0.28 plant 0.05 cake	A88139 A88140
Germany, 1990 Thann (Ceres)	EC	0.6		400	2	0 43 52	1.3 green ≤0.1		9.9 plant	A88141 A88142
Germany, 1990 Wensin (Ceres)	EC	0.54		400	2	0 42 85	<0.1	0.1	7.4 plant <0.2 pod <0.05 cake	A88141 A88142
Germany, 1990 Wensin (Ceres)	WP	0.6		400	2	0 42 85	<0.05		5.9 plant <0.1 pod	A88139 A88140
Germany, 1991 Nittenhau (Sylvia)	EC	0.54		400	2	0 35 49 68	<0.1		7.5 plant 0.37 pod 0.3 pod	A88153 A88154
Germany, 1991 Oederquart (Lirajet)	EC	0.54		400	2	0 21 35 72	<0.1		7.1 plant 0.59 plant 0.27 pod	A88153 A88154
Germany, 1991 Schwarmstedt (Lirajet)	EC	0.54		400	2	0 21 36 64	0.32		21 plant 4.1 plant 0.65 pod	A88153 A88154

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water l/ha	no		seed	oil	other	
Germany, 1991 Wensin (Ceres)	EC	0.54		400	2	0 22 36 71	 <0.1		7.9 plant 1.3 plant 0.28 pod	A88153 A88154
Sweden 1982 Ultuna	EC	0.45			1	47	0.17	0.26[1]		A87991
Sweden, 1982 E county	EC	0.45			1	60	0.23	0.35[1]		A87991
Sweden, 1982 R county	EC	0.45			1	72	0.14	0.21[1]		A87991
UK, 1983 Cole Green (Rafal)	EC	0.5 0.5		200+ 300	1+ 1	45	0.27, 0.19			A87855
UK, 1983 Duddenhoe End (Jet Neuf)	EC	0.5 0.5		200+ 300	1+ 1	55	0.17, 0.17			A87855
UK, 1983 Felden (Jet Neuf)	EC	0.5 0.5		200+ 300	1+ 1	41	0.1, 0.1			A87855
UK, 1983 Furneux Pelham (Rafal)	EC	0.5		200	2	36	0.46			A87855
UK, 1983 Furneux Pelham (Rafal)	EC	0.5		200	1	36	0.18			A87855
UK, 1983 Furneux Pelham (Rafal)	EC	0.5		200	2	22	0.74			A87855
UK, 1983 Newton (Jet Neuf)	EC	0.25 0.5		200	1 + 1	44	<0.1			A87855
UK, 1983 Newton (Jet Neuf)	SC EC	0.4 0.45		200	1+ 1	44	≤0.1			A87855
UK, 1983 Newton (Jet Neuf)	SC EC	0.4 0.5		200	1+ 1	44	≤0.1			A87855
UK, 1983 Newton (Jet Neuf)	EC	0.5		200	2	46	≤0.1			A87855
UK, 1983 Tewin (Norli)	EC	0.25 0.5		200	1+ 1	44	0.18			A87855
UK, 1983 Tewin (Norli)	SC EC	0.4 0.45		200	1+ 1	44	≤0.1			A87855
UK, 1983 Tewin (Norli)	SC EC	0.4 0.5		200	1+ 1	44	0.24			A87855
UK, 1983 Tewin (Norli)	EC	0.5		200	2	44	0.22			A87855
UK, 1983 Toft (Jet Neuf)	EC	0.5		200	2	45	0.1			A87855
UK, 1983 Toft (Jet Neuf)	EC	0.5		200	1	45	0.1			A87855

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg			Ref
	Form	kg ai/ha	kg ai/hl	water l/ha	no		seed	oil	other	
UK, 1983 Toft (Jet Neuf)	EC	0.5		200	2	27	0.37			A87855
UK, 1983 Weston Colville (Jet Neuf)	EC	0.5		200	2	43	≤0.1			A87855
UK, 1983 Weston Colville (Jet Neuf)	EC	0.5		200	1	43	0.2			A87855
UK, 1983 Weston Colville (Jet Neuf)	EC	0.5		200	2	29	0.18			A87855
UK, 1984 Baythorne End (Bienvenue)	WP	0.5			3	34	<0.2			A87875
UK, 1984 Boyton End (Jet Neuf)	WP	0.5			2	37	≤0.2			A87875
UK, 1984 Park Farm (Bienvenue)	WP	0.5			2	44	≤0.2			A87875
UK, 1984 Soulbury (Bienvenue)	WP	0.5			3	30	0.21			A87875
UK, 1984 Stoke Hammond (Jet Neuf)	WP	0.5			3	28	0.25			A87875
UK, 1985 Cambridge (Bienvenu)	EC	0.5 0.5		200+ 300	1+ 2	29	0.23, 0.15			A87923
UK, 1997 Barton Bendish (Bristol)	EC	0.22 0.36 0.58		300+ 300+ 400	1+1 +1	0 21 36	 0.46		8.7 pod 1.7 pod	A91781 C003239
UK, 1997 Barton Bendish (Bristol)	EC	0.22 0.36 0.62		300+ 300+ 400	1+1 +1	0 21 36	 0.48		11 pod 2.3 pod	A91780 C003155
UK, 1997 Little Shelford (Arietta)	EC	0.21 0.34 0.56		300+ 300+ 400	1+1 +1	0 21 36	 0.39		16 pod 2.2 pod	A91780 C003155
UK, 1997 Little Shelford (Arietta)	EC	0.24 0.37 0.56		300+ 300+ 400	1+1 +1	0 21 36	 0.36		11 pod 1.4 pod	A91781 C003239
UK, 1997 Sutton Bridge (Apex)	EC	0.23 0.35 0.56		200+ 200+ 400	1+1 +1	0 21 43	 0.14		8.0 pod 0.8 pod	A91781 C003239
UK, 1997 Sutton Bridge (Apex)	EC	0.23 0.37 0.56		200+ 200+ 400	1+1 +1	0 21 43	 0.1		10 pod 1.2 pod	A91780 C003155
UK, 1997 Walton (Arietta)	EC	0.23 0.37 0.54		200+ 200+ 400	1+1 +1	0 22 41	 0.12		6.4 pod 0.94 pod	A91780 C003155
UK, 1997 Walton (Arietta)	EC	0.23 0.37 0.57		200+ 200+ 400	1+1 +1	0 22 41	 0.19		8.2 pod 0.77 pod	A91781 C003239

[1] oil extracted from seed with hexane after grinding
[2] described as crude oil

Sunflower seed. Residue trials in France involving 1-2 foliar applications of prochloraz at rates of between 0.6 and 0.75 kg ai/ha, with seeds, oil (extracted with hexane) and dry cake being analysed for total prochloraz residues using either method RESID/82/88 or RESID/88/72 were reported to the Meeting. Recoverieswere 101% ± 16% (n=33) in the 1988 trials and 96% ± 27% (n=5) in the 1987 trials. Maximum apparent residues in untreated seed were below 0.1 mg/kg in all except three sites [A88020], from which residues of 0.13 mg/kg, 0.014 mg/kg and 0.28 mg/kg were reported. In most trials plot sizes ranged from 40-80 sq m with samples from 2-4 replicate plots bulked for analysis.

Table 69. Residues of prochloraz in sunflower seed from supervised foliar application trials in France.

Year. location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
1987 Montreal (DKS 39)	EC	0.6	500	2	44	0.27 seed	A88124
1987 Montreal (DKS 39)	EC	0.6	500	2	44	0.19 seed	A88124
1987 Montreal (DKS 39)	EC	0.6	500	2	44	0.23 seed	A88124
1987 Raymond (Viki)	EC	0.6	500	1	79	<0.1 seed	A88124
1987 Raymond (Viki)	EC	0.6	500	1	79	<0.1 seed	A88124
1988 Puylaurens (Cargisol)	SC	0.6	500	2	80	<0.1 seed	A88020
1988 Puylaurens (Cargisol)	EC	0.6	500	2	80	<0.1 seed	A88020
1988 Puylaurens (Cargisol)	EC	0.75	500	2	80	<0.1 seed	A88020
1988 St Nicholas (Isomax)	SC	0.6	500	2	79	<0.1 seed	A88020
1988 St Nicholas (Isomax)	EC	0.6	500	2	79	<0.1 seed	A88020
1988 St Nicholas (Isomax)	EC	0.75	500	2	79	0.32 seed 0.57 oil[1] <0.1 cake	A88020
1988 St Sixte (Viki)	SC	0.6	500	2	86	0.28 seed <0.1 oil[1] <0.1 cake	A88020
1988 St Sixte (Viki)	EC	0.6	500	2	86	0.2 seed	A88020
1988 St Sixte (Viki)	EC	0.75	500	2	86	<0.1 seed	A88020
1988 Verfeil (Cargisol)	SC	0.6+ 0.6	333+ 500	1+ 1	71	<0.1 seed (c0.14 seed)	A88020
1988 Verfeil (Cargisol)	EC	0.6+ 0.6	333+ 500	1+ 1	71 71 71	0.14 seed 0.16 oil[1] <0.1 cake	A88020
1988 Verfeil (Cargisol)	EC	0.75+ 0.75	333+ 500	1+ 1	71	<0.1 seed	A88020
1988 Villefranche (Agrisol)	SC	0.6	500	2	54	0.27 seed 0.21 oil[1] 0.15 cake	A88020
1988 Villefranche (Agrisol)	EC	0.6	500	2	54	0.33 seed (c0.28 seed) 0.73 oil[1] 0.15 cake	A88020
1988 Villefranche (Agrisol)	EC	0.75	500	2	54	0.25 seed (c0.13 seed) 0.3 oil[1] 0.14 cake	A88020

[1] extracted from seed with hexane after grinding

In a trial in France sunflower seed was treated with prochloraz at a rate of 0.4 kg ai/100 kg before planting, and mature seeds analysed for total prochloraz by METHOD/82/88 giving a mean recovery of 100% ± 13% (n=3). Apparent residues in untreated samples were 0.03 mg/kg.

Table 70. Residues of prochloraz in sunflower seed from a supervised seed treatment trial in France.

Year, location (variety)	Application			PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	No.			
1988, 36 Levroux (Frankasol)	LS	0.4	1	160	<0.1	A88016

Linseed. In residue trials in the UK seeds were treated with 0.04 kg ai prochloraz/100 kg of seed before planting and 3-4 replicate 1 kg samples of mature daughter seed were bulked for analysis of total prochloraz residues by Method RESID/88/72. Recoverieswere 89% ± 12% (n=4) in the 1988 and 90% ± 11% (n=7) in the 1990 trials. Maximum apparent residues in untreated seed were 0.04 mg/kg (1988) and 0.02 mg/kg (1990).

Table 71. Residues of prochloraz in linseed from supervised seed treatment trials in the UK.

Year, location (variety)	Application			PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	No.			
1990 Icklingham (Atalante)	LS	0.04	1	178	≤0.05 seed	A88109 A88110
1990 Llantwit Major (Atalante)	LS	0.04	1	170	≤0.05 seed	A88109 A88110
1990 Barry (Atalante)	LS	0.04	1	153	≤0.05 seed	A88109 A88110
1988 Stisted (Antares)	LS	0.04	1	173	≤0.05, <0.05 seed (c0.04)	A88088 A88110
1988 Fulbourn (Antares)	LS	0.04	1	149	≤0.05, <0.05 seed	A88088 A88110
1988 Deeping St James (Antares)	LS	0.04	1	153	≤0.05, <0.05 seed	A88088 A88110

Soya beans. In trials in France in 1989 prochloraz was applied as a foliar spray at 0.45 kg ai/ha at the start of flowering and about 4 weeks later, with mature beans (1 kg) analysed by method RESID/88/72, 95.5% recovery (n=2).

Table 72. Residues of prochloraz in soya beans from supervised foliar application trials in France in 1989.

Location (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
Castelmayran (Canton)	EC	0.45	333	2	54	<0.05	A88112
Castelmayran (Canton)	SC[1]	0.45	333	2	54	<0.05	A88112

[1] prochloraz-manganese chloride complex, co-formulated with carbendazim

In trials in Brazil seeds were treated with 0.05-0.1 kg ai prochloraz/100 kg of seed before planting and samples of mature daughter seed analysed for total prochloraz residues by Method

RESID/88/72. Recoveries were 91% ± 8.8% (n=6) and maximum apparent residues in untreated seed <0.007 mg/kg.

Table 73. Residues of prochloraz in soya bean from supervised seed treatment trials in Brazil in 1989.

Location (variety)	Application			PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	No.			
Cosmopolis-SP (IAC 8)	WS	0.05	1	153	<0.05	A88145 A88146
Cosmopolis-SP (IAC 8)	WS	0.1	1	153	<0.05	A88145 A88146

Barley. Residue trials from Austria, Brazil, Canada, Denmark, France, Germany, Greece, The Netherlands, Italy, Portugal, Spain, Sweden and the UK were reported to the Meeting. Treatments ranged from 1-3 applications of 0.24-1.0 kg ai/ha at various growth stages, with green plants, ears, grain and straw being sampled at intervals up to harvest.

In trials carried out in Denmark and Germany barley seeds treated with prochloraz, with and without co-formulated fungicides (carboxin, fluquinconazole) were sown and foliage, straw and grain from the resulting plants sampled for analysis.

Residues of total prochloraz in mature and immature grain are summarised in the following Tables, and the results of analyses of animal feed commodities (foliage and straw) are shown in Tables 88 to 90.

Plot sizes generally ranged from 30-300 sq m, although larger commercial-scale plots were used in some trials, and treatments were mostly applied to single replicate plots using hand-lance or mini-boom sprayers, or tractor-mounted sprayers. Sample sizes ranged from 0.5 to 1.5 kg, with bulked samples being analysed by method RESID/82/88, RESID/88/72 or minor refinements of these.

Average recoveries of free prochloraz ranged from 82 to 102% in grain and 96 to 110% in straw. Maximum residues of free prochloraz apparent in untreated grain samples were <0.01 mg/kg and <0.1 mg/kg in the untreated straw, and average recoveries of total prochloraz ranged from 69-105% (grain), 71-110% (straw), 84-96% (ears) and 77-102% in plants, and in most trials, average maximum residues ranged from <0.01-0.05 mg/kg (grain), <0.01-0.44 mg/kg (straw), 0.01-0.09 mg/kg (ears) and 0.01-0.13 mg/kg in immature plants, except in four trials in which residues were between 0.66 mg/kg and 1.3 mg/kg in untreated straw and in two other trials residues of 0.04 mg/kg to 0.12 mg/kg were reported in untreated grain. These results are included in the following Tables.

Table 74. Residues of prochloraz in barley grain in supervised trials after single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Mollersdorf (Dura)	EC	0.5		400	1	56	<0.01, <0.01	A87745
Austria, 1977 Mollersdorf (Dura)	EC	0.75		400	1	56	<0.01, <0.01	A87745
Austria, 1977 Mollersdorf (Weibulls Herta)	EC	0.5		400	1	63	<0.01, <0.01	A87745

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Mollersdorf (Weibulls Herta)	EC	1.0		400	1	63	<0.01, <0.01	A87745
Austria, 1978 Katzenberg (Dunja)	EC	0.45		400	1	75	<0.012, 0.02, <0.01	A87739
Austria, 1978 Katzenberg (Dunja)	EC	0.9		400	1	75	0.01, 0.01, 0.02	A87739
Austria, 1978 Mattersburg (Rebekka)	EC	0.45		400	1	69	0.02 , 0.02, 0.02	A87739
Brazil, 1987 Ponta Grossa (Antarctica 5)	EC	0.45		300	1	54	<0.02	A88025
Brazil, 1987 Ponta Grossa (Antarctica 5)	EC	0.9		300	1	54	<0.02	A88025
Canada, 1986 Alberta (Klages)	EC	0.45			1	84+ 35[2]	<0.05, <0.05[1]	A87972
Canada, 1986 Manitoba (Argyle)	EC	0.45		226	1	34+ 72[2]	0.47	A87972
Canada, 1986 Manitoba (Argyle)	EC	0.45		225	1	48+ 94[2]	0.24	A87972
Denmark, 1982 Alslov (Gula)	EC	0.23			1	75	<0.02	A87805
Denmark, 1982 Alslov (Gula)	EC	0.23			1	75	0.03	A87805
Denmark, 1982 Alslov (Gula)	EC	0.45			1	75	<0.02	A87805
Denmark, 1982 Alslov (Vega)	EC	0.23			1	73	<0.02	A87805
Denmark, 1982 Alslov (Vega)	EC	0.23			1	85	<0.02	A87805
Denmark, 1982 Alslov (Vega)	EC	0.45			1	80	<0.02	A87805
Denmark, 1982 St Taarnby (Igri)	EC	0.45			1	60	0.05 ear	A87805
Denmark, 1982 Stroeby (Igri)	EC	0.45			1	56	0.1 ear	A87805
Denmark, 1983 Lystrup (Gerbel)	WP	0.45		200	1	72	<0.05	A87860
Denmark, 1983 Roskilde (Triumph)	WP	0.45		200	1	47	≤0.05	A87860
Denmark, 1983 Vasebaek	WP	0.45		200	1	71	<0.05	A87860

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Denmark, 1983 Vigne (Triumph)	WP	0.45		200	1	42	0.06	A87860
Denmark, 1992 Alslevvej (Blenheim)	EC	0.45		200	1	44	0.13	A88169
Denmark, 1992 Alslevvej (Blenheim)	EC	0.9		200	1	44	0.25	A88169
Denmark, 1992 Lundevej (Ariel)	EC	0.45		200	1	53	<0.1	A88169
Denmark, 1992 Skovkildevej (Alexis)	EC	0.45		200	1	57	<0.1	A88169
France, 1978 Vadencourt (Ager)	EC	0.45		500	1	64	0.01, 0.03, 0.03	A87736
France, 1978 Vadencourt (Ager)	EC	0.9		500	1	64	0.02, 0.02, 0.03	A87736
France, 1979 Bouillonville (Carina)	EC	0.45		500	1	54	0.06, 0.09, 0.04	A87737
France, 1979 Marco (Menuet)	EC	0.45		500	1	62	<0.01, <0.01, 0.01	A87737
Germany, 1982 Bayern (Marko)	SC	0.45		400	1	62	<0.05	A87817
Germany, 1982 Gruppenbuhren (Igri)	SC	0.45		400	1	75	<0.05	A87817
Germany, 1982 Schleswig-Holstein (Garbel)	SC	0.45		400	1	76	<0.05	A87817
Germany, 1987 Thann (Arena)	EC	0.45		200	1	42 49	0.08 immature 0.06	A88021 A88022
Netherlands. 1983 Overschild (Bantery)		0.45		480	1	42	0.07, 0.06, 0.05, 0.08	A87844
Sweden, 1982 “K-country”	EC	0.45			1	72	<0.02	A87806
Sweden, 1982 “M-country”	EC	0.45			1	61	<0.02	A87806
Sweden, 1982 Lanne	EC	0.45			1	68	0<0.02	A87806
Sweden, 1982 Ultuna	EC	0.45			1	63	<0.02	A87806
UK, 1976 Calverton (Julia)	EC	0.4			1	54	<0.01	A87750
UK, 1976 Calverton (Julia)	EC	0.5			1	64	<0.01	A87750
UK, 1976 Calverton (Julia)	EC	0.5			1	54	<0.01	A87750

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 1976 Calverton (Julia)	EC	1.0			1	64	<0.01	A87750
UK, 1976 Derbyshire (Maris Mink)	EC	0.5		247	1	19	<0.01	A87750
UK, 1976 Derbyshire (Maris Mink)	EC	0.5		20 (CDA)	1	19	<0.01	A87750
UK, 1976 Derbyshire (Mazurka)	EC	0.4		450	1	74	<0.01	A87750
UK, 1976 Derbyshire (Mazurka)	EC	1.0		450	1	74	<0.01	A87750
UK, 1976 Morton (Maris Mink)	EC	0.4			1	63	<0.01	A87750
UK, 1976 Morton (Maris Mink)	EC	1.0			1	63	<0.01	A87750
UK, 1987 Buntingford (Plaisant)	EC	0.4		200	1	44 44	0.21	A88058 A88059
UK, 1987 Darmsden (Panda)	EC	0.4		200	1	51	0.24	A88058 A88059
UK, 1987 Gt Saling (Concert)	EC	0.4		200	1	51	0.11	A88058 A88059
UK, 1987 Parham (Panda)	EC	0.4		200	1	51	0.16	A88058 A88059

[1] results from treatment with surfactant
[2] sample storage period at ambient temperatures before receipt at laboratory

Table 75. Residues of prochloraz in barley grain in supervised trials after two or more foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Mollersdorf (Dura)	EC	0.5		400	2	70	<0.01, <0.01	A87745
Belgium, 2001 St Amand (Scarlett)	EC	0.46		300	2	33	0.14	C029570
Czechoslovakia, 1987 Libejovice	EC	0.45		400	2	56 56	0.12 ear 0.05	A87991
Denmark, 1982 Alslov (Gula)	EC	0.45			2	75	<0.02	A87805
Denmark, 1982 Alslov (Vega)	EC	0.45			2	73	<0.02	A87805

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Denmark, 1992 Alslevvej (Blenheim)	EC	0.45		200	2	38	0.31	A88169
Denmark, 1992 Lundevej (Ariel)	EC	0.45		200	2	48	0.11	A88169
Denmark, 1992 Skovkildevej (Alexis)	EC	0.45		200	2	52	0.1	A88169
France, 1978 Les Alluete (Souja)	EC	0.45		500	2	62	0.02, 0.03, 0.04	A88167 A88168
France, 1978 Les Alluete (Souja)	EC	0.9		500	2	62	0.04, 0.02, 0.08	A88167 A88168
France, 1979 Chatillon-Le-Roi (Sonja)	EC	0.45		500	2	38	0.05, 0.09, 0.13	A87737
France, 1979 Chatillon-Le-Roi (Sonja)	EC	0.45		500	2	38	0.26, 0.19	A87737
France, 1979 Tavers (Sonja)	EC	0.45		500	2	48	0.24, 0.28, 0.3	A87737
France, 1979 Tavers (Sonja)	EC	0.45		500	2	38	0.28, 0.25, 0.36	A87737
France, 1996 Chaulnes (Plaisant)	SE	0.4		250	2	35 35	2.6 ear 0.51	A91231 N France
France, 1996 Frans (Labea)	SE	0.4		250	2	36	0.88	A89970 S France
France, 2000 La Chapelle (Eurostar)	EW	0.45		250	2	34	0.22	C030983 (South)
France, 2001 Bordeaux (Platine)	EW	0.44		245	2	37	0.23	C029162
France, 2001 Choisies (Scarlett)	EC	0.47		300	2	52	0.08	C029570 N France
France, 2001 Toulouse (Angora)	EW	0.45		250	2	35	0.46	C029162
France, 2002 Champagne-Ardenne (Optic)	EC	0.45		250	2	36	0.35 (c0.06)	C030975 N France
France, 2002 Picardie (Prisma)	EC	0.45		250	2	45	0.26 (c0.05)	C030975 N France
Germany, 1983 Nittenau (Steina)	EC	0.48 0.24		400	1+ 2	0 8 24 37	6.2 ears 2.0 ears 0.31 immature 0.1	A87836
Germany, 1983 Rielasingen (Europa)	EC	0.48 0.24		400	1+ 2	0 14 21 37	2.8 ears 0.79 ears 0.2 immature 0.14	A87836

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1987 Eschau (Igri)	EC	0.45		200	2	29 42 49	1.1 ear <0.05 immature 0.08	A88021 A88022
Germany, 1987 Schwarmstedt (Sonja)	EC	0.3		200	2	15 28 35 42	1.6 ear 0.87 ear 0.82 immature 0.41	A87992
Germany, 1987 Schwarmstedt (Sonja)	EC	0.45		200	2	29 42 49	0.6 ear 0.32 immature 0.16	A88021 A88022
Germany, 1987 Suterode (Gerbel)	WP	0.5		400	2	21 34 41	0.49 ear 0.2 immature 0.12	A88048
Germany, 1987 Thann (Arena)	WP	0.5		200	2	21 35 42	1.7 ear 0.11 0.12	A88048
Germany, 1987 Thann (Arena)		0.36+ 0.3		400	1+ 1	0 14 28 35 42	10 ear 1.6 ear 1.2 ear 0.08 0.16	A87988
Germany, 1988 Husberg (Katinka)	EC	0.45		400	2	58	0.04	A88023
Germany, 1988 Ilsfeld-Auenstein (Igri)	EC	0.45		400	2	58	0.11	A88023
Germany, 1989 Gut Rolfstorf (Katinka)	WP	0.5		400	2	18 39	0.98 ear 0.38 (c0.24)	A88040
Germany, 1989 Gut Rolfstorf (Katinka)	EC	0.5		400	2	21 71	0.86 ear 0.41	C007331 C007332
Germany, 1989 Neinhagen (Trixi)	WP	0.5		400	2	21 35	2.2 ear 0.59	A88040
Germany, 1989 Neinhagen (Trixi)	EC	0.5		400	2	21 35	4.3 ear 0.5	C007331 C007332
Germany, 1989 Nienhagen-Hulfe (Trixi)	EC	0.4		400	2	21 35	2.3 ear 0.65 immature	A88038
Germany, 1989 Otterndorf (Tapir)	EC	0.4		400	2	21 36 50	1.1 ear 0.75 immature 0.08	A88038
Germany, 1989 Otterndorf (Tapir)	WP	0.5		400	2	21 36 50	0.93 ear 0.25 immature 0.11	A88040
Germany, 1989 Otterndorf (Tapir)	EC	0.5		400	2	21 36 50	1.1 ear 0.43 immature 0.1	C007331 C007332
Germany, 1990 Moringen (Franka)	EC	0.5		400	2	42 53	0.62 immature 0.23	A88137
Germany, 1991 Nierswalde (Sonja) prochloraz treated seed	EC	0.45		400	3	21 35 48	0.82 ear 0.71 0.2	A88161

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1991 Walsrode-Fulde (Marinka) prochloraz treated seed	EC	0.45		400	3	21 40	1.9 ear 0.37	A88161
Germany, 1992 Edesheim (Tapir) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49 56	1.2 ear 0.39 0.38 0.32	A88166
Germany, 1992 Edesheim (Tapir) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 47	0.4 0.41	A88166
Germany, 1992 Elvesse (Sonate)	EW	0.45			4	35 42 49	1.4 ear 0.44 0.46	A88167 A88168
Germany, 1992 Elvesse (Sonate) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 40	0.46 0.42	A88166
Germany, 1992 Elvesse (Sonate) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49	1.1 ear 0.37 0.41	A88166
Germany, 1992 Polenz (Erfa) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 43 45	2.9 ear 0.54 0.73	A88166
Germany, 1992 Polenz (Erfa) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	36 38	1.6 1.3	A88166
Germany, 1996 Nordrhein-Westfalen (Baronesse)	SE	0.4		250	2	35	0.45	A91231
Germany, 2001 Aarbergen-Kettenbach (Scarlett)	EC	0.44		300	2	41	0.23	C029570
Germany, 2001 Grabau (Barke)	EC	0.43		300	2	41	0.07	C029570
Germany, 2002 Neidersachsen (Baccara)	EC	0.45		300	2	32	0.68 (c0.09)	C030975
Germany, 2002 Sachsen (Barke)	EC	0.45		300	2	38	0.24 (c0.04)	C030975
Greece, 2001 Kato Milia (Creter)	EW	0.43+ 0.43		286 405	1+ 1	34	0.35	C029162
Italy, 1996 Lombardia (Barrakia)	SE	0.4		250	2	27	0.87	A89970
Portugal, 2002 Alentejo (Ce 9701)	EW	0.45		300	2	35	0.21 (c0.12)	C030983
Spain, 2001 Algodonales (Dobla)	EW	0.45+ 0.46		286 405	1+ 1	32	0.43	C029162
Spain, 2001 Guillena (Almudena)	EW	0.45+ 0.41		301 275	1+ 1	35	0.47	C029162

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Spain, 2002 Andalucia (Sunrise)	EW	0.45		300	2	32	0.41	C030983
Sweden, 1982 Lanne	EC	0.23			2	53	<0.02	A87806
Sweden, 1982 Lanne	EC	0.45			2	53	≤0.02	A87806
Sweden, 1982 Ultuna	EC	0.23			2	55	<0.02	A87806
Sweden, 1982 Ultuna	EC	0.45			2	55	≤0.02	A87806
UK, 1979 Caxton (Maris Otter)	EC	0.4		200	2	63	0.06	A87733
UK, 1979 Newton (Aramir)	EC	0.4		200	2	36	0.03, 0.03, 0.03	A87733
UK, 1979 Woodborough (Maris Otter)	EC	0.4		200	2	58	0.16	A87733
UK, 1986 Comberton (Igri)	EC	0.4			2	37	0.1	A87955 no control samples
UK, 1986 Stapleford (Otter)	EC	0.4			2	37	0.3	A87955 no control samples
UK, 1987 Calford Green (Igri)	EC	0.4		220	2	50	0.16	A88060 A88061
UK, 1987 Cornish Hall End (Halcyon)	EC	0.4		220	2	42	0.53	A88060 A88061
UK, 1987 Lt Walden (Tipper)	EC	0.4			2	43	0.48	A87955 no control samples
UK, 1987 Stow-cum-Quy (Halcyon)	EC	0.4		220	2	40	0.26	A88060 A88061
UK, 1992 Shrawardine (Pipkin)	EC	0.4		200	2	56	<0.1	A88171
UK, 1992 Shrawardine (Pipkin)	EC	0.4		200	2	56	0.15	A88171
UK, 1996 Borders (Maritone)	SE	0.4		250	2	30	1.7	A91231
UK, 1996 Cambridgeshire (Intro)	EC	0.45		300+ 400	1+ 1	0 14	1.8 ear 1.6	A91239
UK, 1996 Cambridgeshire (Pastoral)	EC	0.45		200+ 400	2	0 14	7.4 ear 0.93	A91239
UK, 1996 Little Shelford (Alexis)	EC	0.45		300 400	1+ 1	0 14	1.1 ear 0.97	A91239
UK, 1996 Norfolk (Pipkin)	EC	0.45		200+ 400	2	0 14	7.6 ear 2.5	A91239

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 2001 Denton (Jewel)	EC	0.46		300	2	35	0.65	C029570

Table 76. Residues of prochloraz in barley grain from supervised seed treatment trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Denmark, 1979 "Trial 3"	EC	0.02			1	132	≤0.01	A87732
Denmark, 1979 "Trial 6"	EC	0.02			1	139	≤0.01	A87732
Denmark, 1988 Roskilde (Agneta)	EC	0.02			1	113	≤0.05	A88096
Germany, 1982 Duingen (Aramir)	WP	0.025			1	139	≤0.05	A87867
Germany, 1982 Goch (Aramir)	WP	0.025			1	133	≤0.05	A87867
Germany, 1982 Hahn-Lehmden (Harry)	WP	0.025			1	125	≤0.05	A87867
Germany, 1982 Langforden-Esch (Harry)	WP	0.025			1	140	≤0.05	A87867
Germany, 1982 Nittenau-Bayern (Aramir)	WP	0.025			1	133	≤0.05	A87867
Germany, 1982 Schwinge (Aramir)	WP	0.025			1	129	≤0.05	A87867
Germany, 1982 Stuttgart-Hohenheim (Aramir)	WP	0.025			1	153	≤0.05	A87867
Germany, 1983 Kaarst (Europa)	DS[1]	0.025			1	126	≤0.05	A87867
Germany, 1983 Stuttgart-Mohringen (Aramir)	WP	0.025			1	146	≤0.05	A87867
Germany, 1985 Dusseldorf (Gimpel)	DS[1]	0.02			1	161	≤0.05	A87924
Germany, 1985 Niederkirchen (Gimpel)	DS[1]	0.02			1	128	≤0.05	A87924
Germany, 1985 Niederkirchen (Gimpel)	DS	0.02			1	128	≤0.05	A87924
Germany, 1988 Dusseldorf (Gimpel)	EC	0.02			1	130	≤0.05	A88075
Germany, 1988 Goch	EC	0.02			1	124	≤0.05	A88075

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Germany, 1996 Sachen (Otis)	FS	0.015			1	0 174	110 treated seed <0.05	A83719

[1] co-formulation of prochloraz-manganese complex with carboxin, applied as a dry seed dressing

Oats. Foliar treatment trials involving single applications of 0.45 kg ai/ha were carried out in Denmark and seed treatment trials in Germany at rates of between 0.02-0.025 kg ai prochloraz/100 kg seed in combination with carboxin.

Plot sizes ranged from 25-200 sq m with samples in most trials being taken from single replicate plots, and based on the information reported generally treatments were applied using hand lance or mini-boom plot sprayers. Sample sizes ranged from 0.5 to 1.5 kg and bulked samples were analysed for total prochloraz residues by method RESID/82/88 or RESID/88/72.

The residues in mature and immature grain are summarised in the following Tables, and results of from foliage and straw are given in Tables 91-92.

Average total prochloraz recoveries ranged from 87-103% in grain, 85-96% in straw and 82-102% in plants, and average maximum residues in untreated samples from 0.005 to 0.02 mg/kg in grain, 0.03-0.31 mg/kg in straw and 0.02 to 0.34 mg/kg in immature plants.

Table 77. Residues of prochloraz in oat grain from supervised foliar application trials in Denmark.

Country, year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	water, l/ha	no.			
1982 Borup (Selma)	EC	0.45		1	62	0.03 ear	A87805
1982 Ebbeskov (Selma)	EC	0.45		1	62	<0.02 ear	A87805
1983 Kvaeskeby (Selma)	WP	0.45	200	1	52	<0.05	A87860
1983 (Vallo)	WP	0.45	200	1	46	0.09	A87860

Table 78. Residues of prochloraz in oat grain from supervised seed treatment trials in Germany.

Location, Year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/100kg seed	water, l/ha	No.			
1989 Gravenbroich-Kapellan (F1 Vita)	WP	0.02		1	131	≤0.05	A88106
1985 Niederkirchen (F1 Vita)	DS[1]	0.02		1	146	≤0.01	A87924
1985 Dusseldorf (F1 Vita)	DS	0.02		1	146	≤0.01	A87924
1984 Dusseldorf (Alfred)	WP	0.02		1	158	≤0.05	A87883

Location, Year (variety)	Application				PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/100kg seed	water, l/ha	No.			
1982 Goch-Nierswalde (Flamings Nova)	WP	0.025		1	133	≤0.05	A87867
1982 Duingen (Flamings Nova)	WP	0.025		1	139	≤0.05	A87867
1982 Langforden-Esch (Flamings Silber)	WP	0.025		1	140	≤0.05	A87867
1982 Nittenhau-Thann (Flamings Silber)	WP	0.025		1	134	≤0.05	A87867
1983 Nittenau-Bayern (Flamings Silber)	WP	0.025		1	145	≤0.05	A87867
1983 Kaast (Flamings Silber)	DS[1]	0.025		1	115	≤0.05	A87867

[1] co-formulation of prochloraz-manganese complex with carboxin, applied as dry seed dressing

Rice. Residue trials in Japan, Spain and Taiwan (foliar treatments) and from Australia, Brazil and Japan (seed treatments) were reported. In the trials in Spain single aerial applications of 0.45-0.65 kg ai/ha were made, in Taiwan four applications of 0.13-0.19 kg ai/ha, and in Japan the rates were 0.75 kg ai/ha with or without a pre-planting seed treatment. Application rates in the seed treatment trials ranged from 0.025 kg ai/100 kg seed in Japan to 0.15 kg ai/100 kg seed in Brazil.

Plot sizes ranged from 20-200 sq m, with samples in most trials being taken from 3-4 replicate plots and bulked for analysis. Samples of rice with husk (Spain and Taiwan) and grain (Australia and Brazil) were analysed for total prochloraz residues by method RESID/82/88 or RESID/88/72, and of unpolished brown rice (Japan) were analysed by GC (N-P FID) for the parent compound, after extraction in acetone, filtration and n-hexane partition.

Average recoveries for total prochloraz were 82-92%, with average maximum residues below 0.02 mg/kg in untreated samples, except in the trials in Taiwan and Spain where residues were higher in untreated samples so the LOQ was established at 0.2 mg/kg. In addition residues of 0.34 mg/kg and 0.36 mg/kg were reported in several samples of untreated grain from the aerial trial in Spain which was attributed to contamination from protective plastic sheets covering the control plots when the site was flooded.

Table 79. Residues of prochloraz in brown, unpolished rice from supervised foliar application trials in Japan.

Year Location (variety)	Application					PHI (days)	Total residues, mg/kg Free prochloraz	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
1980 Saitama (Nihonbare)	EC	0.75	0.05	1500	1	7 14 21	0.02 0.03 0.02	A87828
1980 Saitama (Nihonbare)	EC	0.75	0.05	1500	3	7 14 21	0.03 0.04 0.03	A87828
1980 Saitama (Nihonbare)	EC	0.75	0.025[1]+ 0.05	1500	1+3	7 14 21	0.05 0.04 0.03	A87828

Year Location (variety)	Application					PHI (days)	Total residues, mg/kg Free prochloraz	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
1980 J.P.P.Assoc (Koshi-hikari)	EC	0.75	0.05	1500	1	7 14 21	<0.005 0.005 0.005	A87828
1980 J.P.P.Assoc (Koshi-hikari)	EC	0.75	0.05	1500	3	7 14 21	0.008 0.005 0.008	A87828
1980 J.P.P.Assoc (Koshi-hikari)	EC	0.75	0.025[1]+ 0.05	1500	1+3	7 14 21	0.005 0.008 0.005	A87828

[1] seed treatment followed by 3 foliar treatments

Table 80. Residues of prochloraz in rice with husk from supervised foliar application trials in Spain and Taiwan.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Spain, 1990 Seville (4 varieties)	EC	0.45		100 (air)	1	55	<0.2	A88073
Spain, 1990 Seville (4 varieties)	EC	0.45		100 (air)	1	51	<0.2 c0.34	A88073
Spain, 1990 Seville (4 varieties)	EC	0.45		100 (air)	1	23	3.9 c0.36	A88073
Spain, 1990 Seville (4 varieties)	EC	0.45		100 (air)	1	28	5.0	A88073
Spain, 1990 Seville (4 varieties)	EC	0.65		100 (air)	1	55	<0.2	A88073
Spain, 1990 Seville (4 varieties)	EC	0.65		100 (air)	1	51	<0.2 c0.34	A88073
Spain, 1990 Seville (4 varieties)	EC	0.65		100 (air)	1	23	3.1 c0.36	A88073
Spain, 1990 Seville (4 varieties)	EC	0.65		100 (air)	1	28	2.9	A88073
Spain, 1990 Villafranco (Tainato)	WP	0.25		524	1	42	0.93	A88163 A88164
Spain, 1990 Villafranco (Tainato)	WP	0.25		524	1	42	0.41	A88163 A88164
Spain, 1990 Villafranco (Tainato)	EC	0.48		524	1	42	1.7	A88163 A88164
Spain, 1990 Villafranco (Tainato)	EC	0.49		524	1	42	0.61	A88163 A88164
Spain, 1990 Villafranco (Tainato)	WP	0.5		524	1	42	1.5	A88163 A88164
Spain, 1990 Villafranco (Tainato)	WP	0.5		524	1	42	0.65	A88163 A88164

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Taiwan, 1989 Mingchien, Nantou (Tainong)	EC	0.13		1000	4	32	1.6	A88074
Taiwan, 1989 Mingchien, Nantou (Tainong)	EC	0.13		1000	4	32	2.0	A88074
Taiwan, 1989 Mingchien, Nantou (Tainong)	EC	0.19		1000	4	32	3.4	A88074

Rye. In residue trials in Denmark and Germany either foliar treatments or seed treatments with prochloraz were made. The former involved 2-4 sprays of prochloraz (generally co-formulated with other fungicides) at 0.4-0.5 kg ai/ha, and samplings of immature plants and ears, and immature and mature grain and straw, and the latter treatment of the seed at a rate of 0.02 kg ai/100 kg seed, with carboxin included in the formulations.

In most trials, plot sizes ranged from 30-200 sq m and treatments were generally applied to single replicate plots using hand-lance or mini-boom plot sprayers. Analytical sample sizes were 0.5-1.5 kg, with bulked samples being analysed for total prochloraz residues by method RESID/88/72.

Residues of total prochloraz in mature and immature grain are summarised in the following Tables, and the results for foliage and straw are given in Tables 93 and 94.

Total prochloraz average recoveries were 81-105% for all substrates, with average maximum residues in untreated samples of 0.01-0.04 mg/kg in grain, 0.01-0.15 mg/kg in straw and 0.01-0.08 mg/kg in immature plants. However in one trial [A88167] higher residues of up to 0.1 mg/kg were detected in untreated grain and this supported the establishment of an LOQ for grain of 0.1 mg/kg (and 0.5 mg/kg for ears, plants and straw).

Table 81. Residues of prochloraz in rye grain from supervised foliar application trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Denmark, 1982 Haslov	EC	0.45			1	72	0.1 ear	A87805
Denmark, 1982 Rosendal (Petkus II)	EC	0.45			1	77	<0.02 ear	A87805
Germany, 1988 Schwarmstedt (Dominator)	EC	0.45		400	2	49	0.06	A88023
Germany, 1988 Stadl (Danko)	EC	0.45		400	2	71	0.02	A88023
Germany, 1989 Thann (Danco)	EC	0.4		400	2	22 42 49	1.5 ear 0.75 immature ≤0.05	A88038
Germany, 1989 Thann (Danco)	WP	0.5		400	2	22 42 49	1.4 ear 0.43 immature 0.06	A88040
Germany, 1989 Wolbrechts-hausen (Dominator)	EC	0.4		400	2	21 35 42	1.2 ear 0.09 immature 0.06	A88038

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1989 Wolbrechts-hausen (Dominator)	WP	0.5		400	2	21 35 42	1.4 ear 0.19 0.09	A88040
Germany, 1989 Wolbrechts-hausen (Dominator)	EC	0.5		400	2	21 35 42	1.5 ear 0.13 immature ≤0.1	C007331 C007332
Germany, 1990 Grilten (Mrkator)	EC	0.5		400	2	35 43	1.9 immature 0.05	A88137 A88138
Germany, 1991 Helmstadt (Rapid) prochloraz treated seed	EC	0.45		400	3	19 34 53	2.0 ear 0.49 ear <0.05	A88161
Germany, 1992 Ameling-Hausen (Marder) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49 56	1.6 ear <0.1 immature 0.18 immature 0.12	A88166
Germany, 1992 Ameling-hausen (Marder) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	28 35	0.48 0.38	A88166
Germany, 1992 Schwarmstedt-Grindau (Amando)	EW	0.45			4	35 42 49 56	2.0 ear <0.1 immature 0.12 immature 0.17	A88167 A88168

Table 82. Residues of prochloraz in rye grain from supervised seed treatment trials.

Country, year (variety)	Application			PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	No.			
Germany, 1989 Gravenbroich-Kapellan (Sorom)	WP	0.02	1	131	≤0.05	A88106
Germany, 1985 Rotkopf (Sorum)	WP	0.02	1	143	0.02	A87937
Germany, 1985 Neiderkirchen (Sorum)	WP	0.02	1	130	≤0.02	A87937
Germany, 1984 Dusseldorf (Alfred)	WP	0.02	1	158	≤0.05	A87883
Germany, 1984 Dusseldorf (Alfred)	WP	0.02	1	158	≤0.05	A87883

Wheat. In trials in Austria, Brazil, Czechoslovakia, Denmark, France, Germany, The Netherlands, Italy, Portugal, Spain, Sweden, the UK and the USA treatments ranged from 1 to 4 applications of 0.24-1.1 kg ai prochloraz/ha (with or without co-formulated fungicides) at various growth stages. Green plants, ears, grain and straw were sampled at intervals up to harvest.

Seed treatment residue trials were also reported from Denmark, Germany, Greece and the UK. The seeds treated with prochloraz, with and without co-formulated fungicides, were sown and foliage, straw and grain from the resulting plants were sampled.

In most of the trials plot sizes ranged from 30 to 200 sq m and generally single plot treatments were made using hand lance or mini-boom plot sprayers, but in some of the larger trials tractor-mounted plot and commercial sprayers were used. Analytical sample sizes were 0.5-2.0 kg, with bulked samples analysed for total prochloraz residues by method RESID/82/88 or RESID/88/72 sometimes with minor refinements, although some 1977 trials in Germany, The Netherlands and Italy were analysed by method AX 79001 to measure residues of prochloraz only.

Residues of total prochloraz in mature and immature grain are summarised in the following Tables, and results for foliage and straw are given in Tables 95 to 98.

Average recoveries for free prochloraz were 70-83% in the grain and 72-85% in straw, with apparent residues of <0.01 mg/kg free prochloraz in untreated grain and straw. Total prochloraz average recoveries were 69-109% from grain, 68-111% from straw, 86-107% from ears and 67-107% from plants, and average maximum residues were 0.005-0.1 mg/kg in grain, <0.01-0.45 mg/kg in straw, 0.01-0.12 mg/kg in ears and 0.01-0.1 mg/kg in immature plants. However in three trials residues of 0.1 mg/kg to 0.3 mg/kg were reported in untreated grain samples, and in one trial in untreated straw of 0.67 mg/kg.

Table 83. Residues of prochloraz in wheat grain from supervised trials involving single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Kronau bei Langenrohr (Extrem)	EC	0.5		400	1	70	<0.01, <0.01	A87745
Austria, 1977 Kronau bei Langenrohr (Extrem)	EC	1.0		400	1	70	<0.01, <0.01	A87745
Brazil, 1984 Sao Sepe (Maringe)	EC	0.45			1	14+70[1]	0.08, 0.06, 0.06	A87912
Brazil, 1984 Sao Sepe (Maringe)	EC	0.45			1	35+70[1]	0.1, 0.11, 0.12	A87912
Brazil, 1984 Sao Sepe (Maringe)	EC	0.9			1	14+70[1]	0.1, 0.18, 0.07	A87912
Brazil, 1984 Sao Sepe (Maringe)	EC	0.9			1	35+70[1]	<0.03, <0.03, 0.03	A87912
Czechoslovakia, 1987 Kujavy (Selecta)	EC	0.45		400	1	47 47	0.56 ear <0.05	A87991
Czechoslovakia, 1987 Kujavy (Selecta)	EC	0.45		400	1	29 29	0.9 ear <u>≤0.05</u>	A87991
France, 1978 Champs (Top)	EC	0.45		500	1	64	0.01	A87736
France, 1978 Champs (Top)	EC	0.75		500	1	64	0.01	A87736

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1978 Goulens (Capitole)	EC	0.45		500	1	64	0.03	A87736
France, 1978 Goulens (Capitole)	EC	0.75		500	1	64	0.05	A87736
France, 1978 St Eloi des Fourques (Clement)	EC	0.45		500	1	64	0.01	A87736
France, 1978 St Eloi des Fourques (Clement)	EC	0.75		500	1	64	0.01	A87736
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	1	84	<0.05	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	1	81	<0.05	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.6		333	1	84	<0.05	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.6		333	1	81	<0.05	A88170 N France
Germany, 1981 Havixbeck (Janus)	EC	0.48		400	1	30	0.09 ear	A87782
Italy, 1979 Alessandria (Mixture)	EC	0.5		600	1	38	0.07	A87741
Italy, 1979 Alessandria (Mixture)	EC	0.7		600	1	38	0.12	A87741
Netherlands, 1978 Abbenes (Arminda)	EC	0.38		600	1	68	0.02	A87840
Netherlands, 1978 Abbenes (Arminda)	EC	0.75		600	1	68	0.03	A87840
Netherlands, 1980 Abbenes (Okapi)	EC	0.45			1	69	0.02	A87768
Netherlands, 1980 Wieringermeer (Arminda)	EC	0.45			1	69	0.02	A87768
Netherlands, 1980 Wieringermeer (Arminda)	EC	0.68			1	106	<0.02	A87768
Netherlands, 1983 Schrage (Okapi)	EC	0.45		480	1	42	0.09, 0.05, 0.06, 0.07	A87844
Netherlands, 1983 Spriensma (Arminda)	EC	0.45		480	1	42	0.06, 0.11, 0.09, 0.12	A87844
Sweden, 1982 'L-country'	EC	0.45			1	74	<0.02	A87806
Sweden, 1982 'R-country'	EC	0.45			1	73	<0.02	A87806

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 1985 Bottisham (Longbow)	EC	0.4		200	1	39	0.23 (c0.1)	A87921
UK, 1985 Gt Shelford (Rapier)	EC	0.4		200	1	29	0.21	A87921
UK, 1985 Quy (Flanders)	EC	0.4		200	1	36	0.24	A87921
USA, 1985 Cayuse OR (Stephens)	EC	0.28		140	1	128	<0.02	A87947
USA, 1985 Cayuse OR (Stephens)	EC	0.56		140	1	128	<0.02	A87947
USA, 1985 Cayuse OR (Stephens)	EC	1.12		140	1	128	<0.02	A87947
USA, 1985 Lincoln NE (Bennett)	EC	0.28			1	49	<0.02	A87947
USA, 1985 Lincoln NE (Bennett)	EC	0.56			1	49	<0.02	A87947
USA, 1985 Lincoln NE (Bennett)	EC	1.12			1	49	<0.02	A87947
USA, 1985 Mission OR (Stephens)	EC	0.28		140	1	128	<0.02	A87947
USA, 1985 Mission OR (Stephens)	EC	0.56		140	1	128	<0.02	A87947
USA, 1985 Mission OR (Stephens)	EC	1.12		140	1	128	<0.02	A87947
USA, 1985 Pullman WS (Delius)	EC	0.28		24	1	108	<0.02	A87947
USA, 1985 Pullman WS (Delius)	EC	0.56		24	1	108	<0.02	A87947
USA, 1985 Pullman WS (Delius)	EC	1.12		24	1	108	<0.02	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	0.28		470	1	128	<0.02	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	0.56		470	1	128	<0.02	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	1.12		470	1	128	<0.02	A87947

[1] sample storage period at ambient temperatures before receipt at the laboratory

Table 84. Residues of free prochloraz in wheat from supervised trials involving single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg Free prochloraz	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1977 Grossmehring (Jubilar)	EC	0.5		600	1	105	<0.01	A87743
Germany, 1977 Grossmehring (Jubilar)	EC	1.0		600	1	105	<0.01	A87743
Germany, 1977 Northeim (Karmoran)	EC	0.5		600	1	63	0.01	A87743
Germany, 1977 Northeim (Karmoran)	EC	0.75		600	1	63	<0.01	A87743
Germany, 1977 Northeim (Kranich)	EC	0.5		600	1	63	<0.01	A87743
Germany, 1977 Northeim (Kranich)	EC	0.75		600	1	63	<0.01	A87743
Italy, 1977 Frassinelle (Marzotto)	EC	1.0		500	1	56	<0.01, <0.01, <0.01	A87746
Italy, 1977 Stradella (Irnerio)	EC	0.7		400	1	56	<0.01, <0.01, 0.01	A87746
Italy, 1977 Stradella (Irnerio)	EC	0.7		400	1	56	<0.01, <0.01, <0.01	A87746
Italy, 1977 Stradella (Irnerio)	EC	1.0		400	1	56	<0.01, <0.01, 0.01	A87746
Italy, 1977 Stradella (Irnerio)	EC	1.0		400	1	56	<0.01, <0.01, 0.01	A87746
Netherlands, 1977 Abbenes (Lely)	WP	0.38			1	70	<0.01	A87749
Netherlands, 1977 Abbenes (Lely)	EC	0.38			1	70	0.01	A87749
Netherlands, 1977 Abbenes (Lely)	EC	0.5			1	70	0.01	A87749

Table 85. Residues of prochloraz in wheat from supervised trials involving two or more foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Brazil, 1984 Sao Sepe (Maringe)	EC	0.45			2	14+ 70[1]	0.07, 0.08, 0.1	A87912
Brazil, 1984 Sao Sepe (Maringe)	EC	0.45			2	35+ 70[1]	0.07, 0.1, 0.12	A87912

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Brazil, 1984 Sao Sepe (Maringe)	EC	0.9			2	14+ 70[1]	0.07, 0.08, 0.09	A87912
Brazil, 1984 Sao Sepe (Maringe)	EC	0.9			2	35+ 70[1]	0.08, 0.08, 0.06	A87912
Germany, 1981 Havixbeck (Janus)	EC	0.48		400	2	0 8 14 48 60	11 ear 2.5 ear 3.6 ear 0.61 ear 0.05	A87782
Germany, 1981 Lamsted (Selpek)	EC	0.48		400	2	11	3.6 ear	A87782
Germany, 1981 Langforden (Steina)	EC	0.48		400	2	28	0.72 ear	A87782
Germany, 1981 Langforden (Steina)	EC	0.48		400	2	0 8 12 19 21 43	9.2 ear 2.5 ear 0.98 ear 7.1 ear 1.0 ear 0.05	A87782
Germany, 1985 Hohebuch (Max)	EC	0.45		400	2	0 27 42 63	7.5 ear 0.74 ear 0.06 <0.05	A87949
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	2	0 27 39 63	10 ear 0.62 ear 0.08 0.07	A87949
Germany, 1987 Beilstein (Max)	EC	0.4		400	2	0 14 28 36	5.1 ear 0.69 ear 0.46 0.05	A87992
Germany, 1987 Beilstein (Max)	WP	0.5		400	2	0 21 36	0.76 ear 0.34 ear ≤0.05	A87989
Germany, 1996 Nordrhein-Westfalen (Nandu)	SE	0.4		250	2	35	0.17	A91231
Brazil, 1984 Julio de Costilho (Maringe)	EC	0.45			3	39+70[1]	0.08, 0.09, 0.05	A87912
Germany, 1981 Havixbeck (Kolibri)	EC	0.48		400	3	0 14 48 48 60	12 ear 3.6 ear 1.1 ear 0.05 0.04	A87782
Germany, 1981 Lamsted (Selpek)	EC	0.48		400	3	0 7 44 66	18 ear 6.2 ear 0.42 ear 0.06	A87782
Germany, 1981 Langforden (Steina)	EC	0.48		400	3	0 12 19 21 43	17 ear 3.1 ear 7.1 ear 2.0 ear 0.04	A87782

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1985 Hohebuch (Max)	EC	0.45		400	3	0 27 42 63	7.3 ear 0.53 ear <0.05 <0.05	A87939
Germany, 1985 Hohebuch (Max)	EC	0.45		400	3	0 15 30 51	6.1 ear 3.7 ear 0.13 0.06	A87939
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	3	0 31 39 63	11 ear 1.1 ear 0.11 <0.05	A87939
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	3	0 14 22 46	7.3 ear 2.0 ear 0.21 0.07	A87939
Germany, 1986 Lehmden (Ralle)	EC	0.45		200	3	0 15 31 43	8.9 ear 2.0 ear 1.7 <0.05	A87973
Germany, 1983 Leonberg (Selpek)	EC	0.48 0.24		400	2+ 2	0 11 20 28	4.0 ear 1.1 ear 0.57 0.06	A87863
Germany, 1983 Willich (Sciroco)	EC	0.48 0.24		400	2+ 2	0 5 18 33	1.7 ear 2.2 ear 0.47 0.1	A87863
Belgium, 2001 Fleurus (Baltimore)	EC	0.46		300	2	59	<0.05	C029571
Denmark, 1982 Gundsoemagle (Solid)	EC	0.23			2	85	<0.02	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.23+ 0.45			1+ 1	85	<0.02	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.45			2	85	<0.02	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.45			2	85	<0.02	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.23			2	75	<0.02	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.23+ 0.45			1+ 1	75	<0.02	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.45			2	75	0.02	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.45			2	75	<0.02	A87805
Denmark, 1983 Gundsoemagle (Gerbel)	EC WP	0.45+ 0.45		200	1+ 1	64	<0.05	A87860
Denmark, 1983 Roskilde	EC WP	0.45+ 0.45		200	1+ 1	57	<0.05	A87860

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1992 Chevaux (Soissons)	SE	0.4		333	2	56	<0.05	A88180
France, 1992 Chevilly (Soissons)	SE	0.4		333	2	56	<0.05	A88180
France, 1992 Ondes (Soissons)	SE	0.4		333	2	69	<0.05	A88180
France, 1996 Bucy Le Roi (Soissons)	SE	0.4		250	2	52 52	1.7 ear 0.12	A91231 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	2	56	0.05	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	2	53	≤0.05	A88170 N France
France, 1996 Vacquier (Tremi)	EC	0.4		250	2	46	<0.05	A89970 S France
France, 1998 Aquitaine (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	60	<0.05	C002497 S France
France, 1998 Aquitaine (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	44	≤0.05	C002497 S France
France, 1998 Cote-d'Or (Soissons)	EC	0.55		333	2	47	≤0.05	R007789 N France
France, 1998 Isle de France (Oracle)	EC+ SE	0.6+ 0.4		250	1+ 1	60	<0.05	C002499 N France
France, 1998 Isle de France (Oracle)	EC+ SE	0.6+ 0.4		250	1+ 1	67	<0.05	C002499 N France
France, 1998 Isle de France (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	66	<0.05	C002499 N France
France, 1998 Isle de France (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	57	<0.05	C002499 N France
France, 1998 Marignac (Soissons)	EC	0.54		333	2	69	0.07	R007789 S France
France, 1998 Pays de la Loire (Altria)	EC+ SE	0.6+ 0.4		250	1+ 1	59	<0.05	C002499 N France
France, 1998 Pays de la Loire (Altria)	EC+ SE	0.6+ 0.4		250	1+ 1	44	0.06	C002499 N France
France, 1998 Poitou-Charentes (Recital)	EC+ SE	0.6+ 0.4		250	1+ 1	65	<0.05	C002497 S France
France, 1998 Poitou-Charentes (Recital)	EC+ SE	0.6+ 0.4		250	1+ 1	44	0.07	C002497 S France
France, 1998 Poitou-Charentes (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	65	<0.05	C002497 S France

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1998 Poitou-Charentes (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	44	0.09	C002497 S France
France, 2001 Bordeaux (Sideral)	EW	0.45		250	2	37	<0.05	C029166 S France
France, 2001 Choisies (Boston)	EC	0.46		300	2	57	<0.05	C029571 N France
France, 2001 Toulouse (Neodur)	EW	0.48+ 0.45		270+ 250	1+ 1	36	<0.05	C029166 S France
France, 2002 Champagne-Ardenne (Apollo)	EW	0.45		200	2	36	0.07	C031058 N France
France, 2002 Cote d'Azur (Nefer) Durum wheat	EW	0.39		400	2	35	0.13	C031059 S France
France, 2002 Picardie (Shango)	EW	0.45		300	2	40	0.2	C031058 N France
Germany, 1979 Grafing (Caribo)	EC	0.48		400	2	15 42 63	0.15 ear 0.39 ear 0.02	A87734
Germany, 1979 Kleedstaft (Kormoron)	EC	0.48		400	2	0 22 37 55	0.47 ear 0.52 ear 0.21 ear <0.01	A87734
Germany, 1979 Munster (Maris Hunter)	EC	0.48		400	2	0 54 54	0.11 ear 0.04 ear 0.03	A87734
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	2	0 34 54 66	12 ear 0.15 ear <0.05 <0.05	A87949
Germany, 1985 Plitting (Jubilar)	EC	0.45		400	2	0 19 41 66	7.6 ear 0.62 ear 0.38 <0.05	A87949
Germany, 1986 Havixbeck (Okapi)	EC	0.4		200	2	0 25 40 56	8.8 ear 1.1 ear 0.65 ear 0.07	A87966
Germany, 1986 Northeim (Kanzler)	EC	0.4		200	2	0 14 24 47	11 ear 1.6 ear 1.1 ear 0.08	A87966
Germany, 1987 Hann-Munchen (Kanzler)	WP	0.5		400	2	0 22 35 43 58	0.62 ear 0.56 ear 0.26 0.29 0.23	A87989
Germany, 1987 Meerbusch (Kanzler)	EC	0.36+0.3		400	1+ 1	0 14 28 35 42 47	3.2 ear 1.2 ear 0.92 ear 0.09 <0.05 <0.05	A87988

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1987 Otterndorf (Kanzler)	EC	0.36+0.3		400	1+ 1	0 16 37 43 59	1.7 ear 0.68 ear 0.62 (c0.3) 0.37 <0.05	A87988
Germany, 1987 Otterndorf (Kanzler)	EC	0.4		200	2	0 16 28 37 43 59	7.7 ear 0.68 ear 0.78 ear 0.95 1.0 <0.05	A87992
Germany, 1987 Otterndorf (Kanzler)	WP	0.5		400	2	0 22 29 37 43 59	0.31 ear 0.3 ear 0.31 ear 0.41 0.53 <0.05	A87989
Germany, 1989 Eschau (Obelisk)	WP	0.5		400	2	21 35 55	0.33 ear 0.05 immature 0.05	A88040
Germany, 1989 Eschau (Obelisk)	WP	0.5		400	2	21 35 55	0.44 ear 0.07 immature 0.06	A88043
Germany, 1989 Eschau (Obelisk)	EC	0.5		400	2	21 35 55	0.79 ear <0.1 <0.1	C007331 C007332
Germany, 1989 Neinhagen-Hufe (Kanzler)	EC	0.5		400	2	21 35 42	2.2 ear <0.1 immature <u>≤0.1</u>	C007331 C007332
Germany, 1989 Thann (Basalt)	WP	0.5		400	2	21 35 49	0.69 ear 0.08 <u>≤0.05</u>	A88040
Germany, 1989 Thann (Basalt)	WP	0.5		400	2	21 35 49	0.79 ear 0.08 <u>≤0.05</u>	A88043
Germany, 1989 Thann (Basalt)	EC	0.5		400	2	21 35 49	0.98 ear <0.1 <u>≤0.1</u>	C007331 C007332
Germany, 1990 Hosbach (Kanzler)	EC	0.5		400	2	34 42 52	0.21 <0.05 <u>≤0.05</u>	A88137 A88138
Germany, 1990 Wetze (Sperber)	EC	0.5		400	2	32 41	0.15 <u>0.12</u>	A88137 A88138
Germany, 1998 Bayern (Tambor)	EC+ SE	0.6+ 0.4		300	1+ 1	44	<u>≤0.05</u>	C002499
Germany, 1998 Bayern (Tambor)	EC+ SE	0.6+ 0.4		250	1+ 1	59	<0.05	C002499
Germany, 2001 Grabau (Rialto)	EC	0.45		300	2	52	<u>≤0.05</u>	C029571
Germany, 2001 Hunstetten-Gorsroth (Bandit)	EC	0.43		300	2	54	<u>0.09</u>	C029571
Germany, 2002 Niedersachsen (Claire)	EW	0.45		300	2	32	<u>0.31</u> (c0.14)	C031058

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 2002 Nordrhein-Westfalen (Ritmo)	EW	0.45		300	2	38	0.11	C031058
Greece, 2001 Thessalonika (Simento)	EW	0.43+ 0.47		290+ 410	2	35	≤0.05	C029166
Greece, 2002 Thessalonika (Mexicale) Durum wheat	EW	0.45		500	2	35	0.15	C031059
Italy, 1996 Lombardia (Golia)	SE	0.4		250	2	33 41	1.9 ear ≤0.05	A89970
Italy, 2002 Bologna (Neodur) Durum wheat	EW	0.45		500	2	35	0.14	C031059
Netherlands, 1980 Abbenes (Okapi)	EC	0.45			2	69	0.02	A87768
Portugal, 2002 Elvas (Rea 15) Durum wheat	EW	0.45		500	2	35	0.07	C031059
Spain, 1998 Andalucia (ST-4)	EC+ SE	0.6+ 0.4		250	1+ 1	49	<0.05	C002497
Spain, 1998 Andalucia (ST-4)	EC+ SE	0.6+ 0.4		250	1+ 1	45	≤0.05	C002497
Spain, 2001 Cadiz (San Pedro)	EW	0.46		310	2	35	1.2	C029166
Spain, 2001 Sevilla (Simeto)	EW	0.45		300	2	38	0.52	C029166
Sweden, 1982 'L-country'	EC	0.45			2	69	0.02	A87806
Sweden, 1982 'R-country'	EC	0.45			2	58	0.05	A87806
UK, 1986 Gestingthorpe (Longbow)	EC	0.4		200	2	25	0.12	A87955 no control samples
UK, 1986 Saffron Walden (Avalon)	EC	0.4		200	2	40	0.16	A87955 no control samples
UK, 1987 Attleborough (Avalon)	EC	0.4		200	2	92	<0.05	A88058 A88059
UK, 1987 Kenninghall (Avalon)	EC	0.4		200	2	74	0.06	A88058 A88059
UK, 1987 Kenninghall (Norman)	EC	0.4		200	2	27	0.11	A87955 no control samples
UK, 1987 Lemsford (Longbow)	EC	0.4		200	2	36	≤0.05	A88058 A88059
UK, 1992 Clipton (Riband)	EC	0.4		400	2	42	0.1, 0.13	A88171

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 1992 Clipton (Riband)	EC	0.4		400	2	42	0.15, 0.11	A88171
UK, 1992 Kneeton (Riband)	EC	0.4		400	2	41	<0.1	A88171
UK, 1992 Kneeton (Riband)	EC	0.4		400	2	41	<0.1	A88171
UK, 1992 Leintall (Riband)	EC	0.4		400	2	62	0.1	A88171
UK, 1992 Leintall (Riband)	EC	0.4		400	2	62	0.1	A88171
UK, 1996 Borders (Beaver)	SE	0.4		250	2	30	0.08	A91231
UK, 1996 Cambridgeshire (Mercia)	EC	0.45		300+ 400	1+ 1	0 14	0.36 ear 0.2	A91239
UK, 1996 Cambridgeshire (Apollo)	EC	0.45		300+ 400	1+ 1	0 14	0.4 ear 0.43	A91239
UK, 1996 Lincolnshire (Riband)	EC	0.45		200+ 400	2	0 15	4.2 ear 0.26	A91239
UK, 1996 Norfolk (Riband)	EC	0.45		200+ 400	2	0 12	5.9 ear 0.25	A91239
UK, 2001 Denton (Claire)	EC	0.45		300	2	35	0.06	C029571
UK, 2002 Hertfordshire (Riband)	EW	0.45		300	2	33	0.31	C031058
UK, 2002 Suffolk (Claire)	EW	0.45		200	2	35	0.07	C031058
USA, 1985 Rock Springs, PA (Hart)	EC	0.28		280	2	59 59 59 59 59 59	<0.02 <0.02 rough grain <0.02 whole grain <0.02 bran <0.02 germ <0.02 flour	A87947
USA, 1985 Rock Springs, PA (Hart)	EC	0.56		280	2	59 59 59 59 59 59	0.02 <0.02 rough grain <0.02 whole grain 0.03 bran 0.03 germ <0.02 flour	A87947
USA, 1985 Rock Springs, PA (Hart)	EC	1.12		280	2	59 59 59 59 59 59	0.03 <0.02 rough grain <0.02 whole grain 0.04 bran 0.05 germ <0.02 flour	A87947
USA, 1985 Steele MO (Magnum)	EC	0.28		190	2	31 31 31 31 31	0.47 rough grain 0.06 whole grain 0.05 bran 0.04 germ 0.02 flour	A87947

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
USA, 1985 Steele MO (Magnum)	EC	0.56		190	2	31 31 31 31 31	0.74 rough grain 0.09 whole grain 0.11 bran 0.07 germ <0.02 flour	A87947
USA, 1985 Steele MO (Magnum)	EC	1.12		190	2	31 31 31 31 31	1.8 rough grain 0.35 whole grain 0.21 bran 0.16 germ 0.05 flour	A87947
Germany, 1981 Altenbruch (Caribo)	EC	0.48		400	3	0 11 40 40 58	3.3 ear 2.5 ear 0.69 ear 0.12 0.11	A87781
Germany, 1981 Balau (Top Fit)	EC	0.48		400	3	0 7 42 42 64	6.7 ear 2.5 ear 0.47 ear 0.03 0.02	A87781
Germany, 1981 Eschau (Disponent)	EC	0.48		400	3	0 11 46 46 60	7.3 ear 2.4 ear 0.27 ear 0.03 0.09	A87781
Germany, 1981 Hirschlanden (Kormoran)	EC	0.48		400	3	0 14 41 41 57	6.6 ear 2.1 ear 0.4 ear 0.25 0.03	A87781
Germany, 1981 Langforden (Vuka)	EC	0.48		400	3	0 13 31 59	11 ear 5.0 ear 1.0 ear 0.03	A87781
Germany, 1982 Aufhausen (Disponent)	EC	0.48		400	3	58 58	<0.1 <0.1 bread	A87826
Germany, 1982 Behrensen (Okapi)	EC	0.48		400	3	57 57	<0.1 <0.1 bread	A87826
Germany, 1985 Kaarst (Kanzler)	EC	0.45		400	3	0 34 54 66	15 ear 0.27 ear <0.05 <0.05	A87939
Germany, 1985 Kaarst (Kanzler)	EC	0.45		400	3	0 22 42 54	11 ear 2.5 ear 0.09 0.07	A87939
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	3	0 21 46 52	5.6 ear 0.39 ear 0.07 0.08	A87939
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	3	0 7 24 30	6.1 ear 1.7 ear 0.25 0.31	A87939
Germany, 1986 Goch-Nierswalde (Carimulti)	EC	0.45		400	3	0 19 40 48	5.4 ear 1.1 ear 0.07 <0.05	A87973

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1986 Otterndorf (Kanzler)	EC	0.45		400	3	0 22 43 74	4.9 ear 0.52 ear 0.1 0.15	A87973
Germany, 1991 Goch-Nierswalde (Kanzler) prochloraz treated seed	EC	0.45		400	3	21 35 50	1.7 ear 0.09 <0.05	A88161
Germany, 1991 Helmstadt (Urban) prochloraz treated seed	EC	0.45		400	3	21 34 42	1.7 ear 0.08 <0.05	A88161
Germany, 1991 Lauingen (Orestes) prochloraz treated seed	EC	0.45		400	3	21 35 42	0.83 ear 0.11 0.08	A88161
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	35 42 49 66	0.21 0.1 <0.1 <0.1	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	35 42 49 56	0.1 0.12 <0.1 <0.1	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	35 42 49 55	0.15 0.09 <0.1 <0.1	A88166
Germany, 1983 Wulf - Geisen (Caribo)	EC	0.48+0.2 4		400	2+ 2	0 7 28 38	3.5 ear 2.1 ear 0.9 0.04	A87863
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49 58	0.23 0.21 0.13 <0.1	A88166
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	21 35 41	0.67 0.26 0.21	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49	0.19 <0.1 <0.1	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	21 35 38	0.24 <0.1 <0.1	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 47	0.17 <0.1 <0.1	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	21 34	0.31 <0.1	A88166
Germany, 1992 Norten-Hardenberg (Sperber)	EW	0.45			4	35 42 49	<0.1 <0.1 <0.1	A88167 A88168

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1992	EC	0.4+			1+	35	<0.5 ear	A88166
Norten-Hardenberg		0.45+			1+	42	<0.1	
(Sperber)		0.4			1+	49	<0.1	
prochloraz treated seed					1	62	<0.1	
Germany, 1992	EC	0.4+			1+	35	0.17	A88166
Norten-Hardenberg		0.45+			1+	42	<0.1	
(Sperber)		0.4+			1+	49	<0.1	
prochloraz treated seed		0.45			1			
Germany, 1992	EC	0.4+			1+	21	0.29	A88166
Norten-Hardenberg		0.45+			1+	35	<0.1	
(Sperber)		0.4+			1+	40	<0.1	
prochloraz treated seed		0.45			1			
Germany, 1992	EW	0.45			4	35	0.16	A88167
Roellbach						42	0.11	A88168
(Rektor)						49	0.12	

[1] sample storage period at ambient temperatures before receipt at the laboratory

Table 86. Residues of prochloraz in wheat from supervised seed treatment trials

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Denmark, 1988	WP	0.011			1	330	<0.02	A88036
Roskilde								
(Anja)								
Denmark, 1988	WP	0.016			1	330	≤0.02	A88036
Roskilde								
(Anja)								
Denmark, 1988	WP	0.022			1	330	≤0.02	A88036
Roskilde								
(Anja)								
Denmark, 1988	WP	0.043			1	330	<0.02	A88036
Roskilde								
(Anja)								
Germany, 1982	WP	0.025			1	293	≤0.05	A87867
Langforden-Esch								
(Caribo)								
Germany, 1984	WP	0.025			1	161	≤0.05	A87883
Altenbruch								
(Ralle)								
Germany, 1984	WS	0.02			1	158	≤0.05	A87883
Dusseldorf								
(Ralle)								
Germany, 1984	WS	0.025			1	158	≤0.05	A87883
Dusseldorf								
(Ralle)								
Germany, 1984	WS	0.025			1	157	≤0.05	A87883
Eschau								
(Ralle)								
Germany, 1984	WS	0.02			1	156	≤0.05	A87883
Murr								
(Ralle)								
Germany, 1984	WS	0.025			1	156	≤0.05	A87883
Murr								
(Ralle)								
Germany, 1985	DS	0.02			1	130	≤0.01	A87924
Holzhausen								
Germany, 1985	WS	0.02			1	164	≤0.01	A87924
Holzhausen								

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Germany, 1985 Holzhausen (Star)	WS	0.022			1	130	≤0.02	A87937
Germany, 1985 Murr (Star)	WS	0.022			1	127	≤0.02	A87937
Germany, 1985 Niederkirchen (Star)	WS	0.022			1	130	≤0.02	A87937
Germany, 1985 Rotkopf (Star)	WS	0.022			1	143	≤0.02	A87937
Germany, 1988 Dusseldorf (Star)	EC	0.02			1	130	≤0.05	A88075
Germany, 1989 Schwarstedt (Star)	WS	0.02			1	131	≤0.05	A88106
Germany, 1989 Schwarstedt (Star)	EC	0.02			1	131	≤0.05	A88106
Germany, 1996 Hessen (Nandu)	EC	0.01			1	158	<0.05	A91182
Germany, 1996 Hessen (Nandu)	FS	0.015			1	158	≤0.05	A83719
Germany, 1996 Niedersachen (Nandu)	EC	0.01			1	172	<0.05	A91182
Germany, 1996 Niedersachsen (Nandu)	FS	0.015			1	172	≤0.05	A83719
Greece, 1990 Katerini (Apollo)	WS	0.022			1	168	≤0.02	A88127 A88128
Greece, 1990 Katerini (Apollo)	DS	0.022			1	168	≤0.02	A88127 A88128
Greece, 1990 Katerini (Apollo)	WS	0.043			1	168	<0.02	A88127 A88128
Greece, 1990 Katerini (Apollo)	DS	0.043			1	168	<0.02	A88127 A88128
Greece, 1990 Katerini (Mexicana)	WS	0.022			1	168	≤0.02	A88127 A88128
Greece, 1990 Katerini (Mexicana)	WS	0.043			1	168	<0.02	A88127 A88128
UK, 1979 Derbyshire (Maris Huntsman)	DS	0.02			1	314	≤0.01	A87733
UK, 1996 East Anglia (Chablis)	FS	0.015			1	1 179	100 treated seed ≤0.05	A83719
UK, 1996 East Anglia (Chablis)	FS	0.015			1	1 184	110 treated seed ≤0.05	A83719

Pepper, Black. In trials in Malaysia 5-6 foliar applications of 0.025-0.05 kg ai/100 l were made to plants. Green peppercorns with stalks were dried in sunlight to turn black, then further processed to white peppercorns. Triplicate plots were sprayed using a knapsack sprayer. Samples from each plot were bulked for analysis by method RESID/82/88. Recoveries were 80% ±11% (n=15) over a fortification range of 0.2-5.0 mg/kg and apparent residues in untreated samples 0.03-0.37 mg/kg in green, 0.11-1.4 mg/kg in black and 0.11-0.53 mg/kg in white peppercorns.

Table 87. Residues of prochloraz in peppercorns from supervised foliar application trials on pepper, black.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Malaysia, 1988 Beratok, Sarawak (Kucking)	WP[1]		0.025		5	34	2.8 green 2.1 black 1.2 white	A87995
Malaysia, 1988 Beratok, Sarawak (Kucking)	WP[1]		0.038		5	34	5.8 green 5.1 black 1.7 white	A87995
Malaysia, 1988 Beratok, Sarawak (Kucking)	WP[1]		0.05		5	34	4.6 green 5.0 black 1.4 white	A87995
Malaysia, 1988 Sg Moyan (Kucking)	WP[1]		0.05	2000	6	64	1.9 green 2.0 black (c1.4) 0.75 white (c0.53)	A87995
Malaysia, 1988 Muara Tuang (Kucking)	WP[1]		0.05		6	129	0.44 black (c0.11) 0.19 white (c0.11)	A87995

[1] as the manganese chloride complex

Animal feed commodities

In residue trials on grain crops samples of mature grain and straw at harvest and fresh green plants at various stages of maturity were analysed.

Barley. Residue trials were conducted in Austria, Brazil, Canada, Denmark, France, Germany, Greece, The Netherlands, Italy, Portugal, Spain, Sweden and the UK. See also Tables 74 to 76 above.

Table 88. Residues of prochloraz in barley straw from supervised trials involving single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Mollersdorf (Dura)	EC	0.5		400	1	56	<0.01, 0.01	A87745
Austria, 1977 Mollersdorf (Dura)	EC	0.75		400	1	56	0.02, 0.02	A87745
Austria, 1977 Mollersdorf (Weibulls Herta)	EC	0.5		400	1	63	0.02, 0.02	A87745
Austria, 1977 Mollersdorf (Weibulls Herta)	EC	1.0		400	1	63	0.03, 0.03	A87745
Austria, 1978 Katzenberg (Dunja)	EC	0.45		400	1	75	0.44, 0.34, 0.48	A87739

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1978 Katzenberg (Dunja)	EC	0.9		400	1	75	0.5, 0.6, 1.1	A87739
Austria, 1978 Mattersburg (Rebekka)	EC	0.45		400	1	69	0.44, 0.62, 0.68	A87739
Denmark, 1982 Alslov (Gula)	EC	0.23			1	36 75	1.5 green plant 1.3	A87805
Denmark, 1982 Alslov (Gula)	EC	0.23			1	36 75	0.64 green plant 0.6	A87805
Denmark, 1982 Alslov (Gula)	EC	0.45			1	36 75	0.66 green plant 1.1	A87805
Denmark, 1982 Alslov (Vega)	EC	0.23			1	34 73	2.0 green plant 1.4	A87805
Denmark, 1982 Alslov (Vega)	EC	0.23			1	36 85	0.55 green plant 0.75	A87805
Denmark, 1982 Alslov (Vega)	EC	0.45			1	36 80 80	1.1 green plant 0.99	A87805
Denmark, 1982 St Taarnby (Igri)	EC	0.45			1	35 60 60	0.73 green plant 2.1	A87805
Denmark, 1982 Stroeby (Igri)	EC	0.45			1	35 56	1.4 green plant 1.4	A87805
Denmark, 1983 Lystrup (Gerbel)	WP	0.45		200	1	44 72	0.39 green plant 0.89	A87860
Denmark, 1983 Roskilde (Triumph)	WP	0.45		200	1	13 47	5.6 green plant 5.0	A87860
Denmark, 1983 Vasebaek	WP	0.45		200	1	44 71	0.46 green plant 1.2	A87860
Denmark, 1983 Vigne (Triumph)	WP	0.45		200	1	14 42	6.2 green plant 7.0	A87860
Denmark, 1992 Alslevvej (Blenheim)	EC	0.45		200	1	0 26 40 44	14 green plant 6.6 green plant 9.4 mature plant 17	A88169
Denmark, 1992 Alslevvej (Blenheim)	EC	0.9		200	1	0 26 40 44	40 green plant 19 green plant 14 mature plant 31	A88169
Denmark, 1992 Lundevej (Ariel)	EC	0.45		200	1	0 25 39 53	22 green plant 13 green plant 9.1 mature plant 40	A88169
Denmark, 1992 Skovkildevej (Alexis)	EC	0.45		200	1	0 25 39 57	31 green plant 11 green plant 7 mature plant 16	A88169
France, 1978 Vadencourt (Ager)	EC	0.45		500	1	64	3.5, 1.8, 1.7	A87736

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1978 Vadencourt (Ager)	EC	0.9		500	1	64 64	2.9, 3.5, 3.5	A87736
France, 1979 Bouillonville (Carina)	EC	0.45		500	1	54	3.0, 3.1, 3.1 (c0.13)	A87737
France, 1979 Marco (Menuet)	EC	0.45		500	1	62	5.7, 4.2, 3.2 (c0.24)	A87737
Germany, 1982 Bayern (Marko)	SC	0.45		400	1	0 19 38 56 62	4.7 green plant 1.3 green plant 0.46 green plant 0.39 green plant 0.70	A87817
Germany, 1982 Gruppenbuhren (Igri)	SC	0.45		400	1	0 19 40 56 75	6.3 green plant 0.26 green plant 0.17 green plant 0.11 green plant 0.27	A87817
Germany, 1982 Schleswig-Holstein (Garbel)	SC	0.45		400	1	0 19 38 56 76	5.0 green plant 0.46 green plant 0.17 green plant 0.31 green plant 0.47	A87817
Germany, 1987 Thann (Arena)	EC	0.45		200	1	0 28 42 49	8.5 green plant 1.4 ear 3.2 3.0	A88021 A88022
Netherlands. 1983 Overschild (Bantery)		0.45		480	1	42 42	4.0, 6.1, 5.4, 6.8 1.4, 0.7, 0.4, 0.5 chaff	A87844
Sweden, 1982 "K-country"	EC	0.45			1	72	0.77	A87806
Sweden, 1982 "M-country"	EC	0.45			1	61	0.9	A87806
Sweden, 1982 Lanne	EC	0.45			1	68	0.14 (c0.5)	A87806
Sweden, 1982 Ultuna	EC	0.45			1	63	0.84	A87806
UK, 1987 Darmsden (Panda)	EC	0.4		200	1	51	6.1	A88058 A88059
UK, 1987 Gt Saling (Concert)	EC	0.4		200	1	51	3.6	A88058 A88059
UK, 1987 Parham (Panda)	EC	0.4		200	1	51	<0.5	A88058 A88059

[1] results from treatment with surfactant
[2] sample storage period at ambient temperatures before receipt at the laboratory

Table 89. Residues of prochloraz in barley straw from supervised trials involving two or more foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Mollersdorf (Dura)	EC	0.5		400	2	70	<0.01, <0.01	A87745

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Belgium, 2001 St Amand (Scarlett)	EC	0.46		300	2	0 14 21 28 33	21 green plant 5.4 green plant 5.0 green plant 3.7 green plant 4.1	C029570
Czechoslovakia, 1987 Libejovice	EC	0.45		400	2	56 56	0.12 ear 4.1	A87991
Denmark, 1982 Alslov (Gula)	EC	0.45			2	36 75	0.92 green plant 2.2	A87805
Denmark, 1982 Alslov (Vega)	EC	0.45			2	34 73	2.7 green plant 1.8	A87805
Denmark, 1992 Alslevvej (Blenheim)	EC	0.45		200	2	0 20 34 38	33 green plant 16 green plant 19 mature plant 30	A88169
Denmark, 1992 Lundevej (Ariel)	EC	0.45		200	2	0 20 34 48	24 green plant 11 green plant 32 mature plant 21	A88169
Denmark, 1992 Skovkildevej (Alexis)	EC	0.45		200	2	0 20 34 52	26 green plant 12 green plant 15 mature plant 24	A88169
France, 1978 Les Alluete (Souja)	EC	0.45		500	2	62	3.7, 2.2, 3.0	A88167 A88168
France, 1978 Les Alluete (Souja)	EC	0.9		500	2	62	5.9, 6.1, 6.3	A88167 A88168
France, 1979 Chatillon-Le-Roi (Sonja)	EC	0.45		500	2	38	4.6, 4.2, 3.8	A87737
France, 1979 Chatillon-Le-Roi (Sonja)	EC	0.45		500	2	38	6.4, 5.5	A87737
France, 1979 Tavers (Sonja)	EC	0.45		500	2	48	3.8, 3.7, 5.0	A87737
France, 1979 Tavers (Sonja)	EC	0.45		500	2	38	3.9, 4.0, 3.8	A87737
France, 1996 Chaulnes (Plaisant)	SE	0.4		250	2	0 35 35 35	12 green plant 11 stem 12 2.6 ear	A91231 N France
France, 1996 Frans (Labea)	SE	0.4		250	2	0 36	6.9 green plant 8.2	A89970 S France
France, 2000 La Chapelle (Eurostar)	EW	0.45		250	2	0 34	9.8 green plants 8.8	C030983 (South)
France, 2001 Bordeaux (Platine)	EW	0.44		245	2	0 15 21 29 37	19 green plant 4.5 green plant 6.2 green plants 4.8 green plants 4.1	C029162

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 2001 Choisies (Scarlett)	EC	0.47		300	2	0 14 21 28 52	12 green plant 3.1 green plant 2.4 green plant 1.9 green plant 2.4	C029570 N France
France, 2001 Toulouse (Angora)	EW	0.45		250	2	0 14 21 28 35	9.5 green plant 6.8 green plant 9.6 green plants 5.3 green plants 7.1	C029162
France, 2002 Champagne-Ardenne (Optic)	EC	0.45		250	2	0 36	6.9 green plant 13	C030975 N France
France, 2002 Picardie (Prisma)	EC	0.45		250	2	0 45	17 green plant 4.1	C030975 N France
Germany, 1983 Nittenau (Steina)	EC	0.48 0.24		400	1+ 2	0 8 37	6.2 ears 2.0 ears 4.1	A87836
Germany, 1983 Rielasingen (Europa)	EC	0.48 0.24		400	1+ 2	0 14 37	2.8 ears 0.79 ears 9.0	A87836
Germany, 1987 Eschau (Igri)	EC	0.45		200	2	0 29 42 42 49	7.8 green plant 1.1 ear 1.8 immature straw <0.05 immature grain 2.1	A88021 A88022
Germany, 1987 Schwarmstedt (Sonja)	EC	0.3		200	2	0 15 28 35 35 42	16 green plant 1.6 ear 0.87 ear 2.2 immature straw 0.82 immature grain 4.7	A87992
Germany, 1987 Schwarmstedt (Sonja)	EC	0.45		200	2	0 29 42 42 49	9.5 green plant 0.6 ear 1.7 immature straw 0.32 immature grain 3.3	A88021 A88022
Germany, 1987 Suterode (Gerbel)	WP	0.5		400	2	0 21 34 34 41	11 green plant 0.49 ear 0.62 immature straw 0.2 immature grain 0.7	A88048
Germany, 1987 Thann (Arena)	WP	0.5		200	2	0 21 35 42	16 green plant 1.7 ear 2.0 4.5	A88048
Germany, 1987 Thann (Arena)		0.36+ 0.3		400	1+ 1	0 14 28 35 42	10 ear 1.6 ear 1.2 ear 3.7 (c0.4) 4.8 (c0.67)	A87988
Germany, 1988 Husberg (Katinka)	EC	0.45		400	2	0 58	4.8 green plant 2.3	A88023
Germany, 1988 Ilsfeld-Auenstein (Igri)	EC	0.45		400	2	0 58	7.2 green plant 2.3	A88023

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1989 Gut Rolfstorf (Katinka)	WP	0.5		400	2	0 18 39 39	5.8 green plant 0.98 ear 3.7	A88040
Germany, 1989 Gut Rolfstorf (Katinka)	EC	0.5		400	2	0 21 71	11 green plant 0.86 ear 3.7	C007331 C007332
Germany, 1989 Neinhagen (Trixi)	WP	0.5		400	2	0 21 35	13 green plant 2.2 ear 14	A88040
Germany, 1989 Neinhagen (Trixi)	EC	0.5		400	2	0 21 35	13 green plant 4.3 ear 9.8	C007331 C007332
Germany, 1989 Nienhagen-Hulfe (Trixi)	EC	0.4		400	2	0 21 35 35	12 green plant 2.3 ear 16 immature straw 0.65 immature grain	A88038
Germany, 1989 Otterndorf (Tapir)	EC	0.4		400	2	0 21 36 36 50	6.5 green plant 1.1 ear 1.8 immature straw 0.75 immature grain 6.0 (c0.84)	A88038
Germany, 1989 Otterndorf (Tapir)	WP	0.5		400	2	0 21 36 36 50	26 green plant 0.93 ear 1.6 immature straw 0.25 immature grain 6.7	A88040
Germany, 1989 Otterndorf (Tapir)	EC	0.5		400	2	0 21 36 36 50	17 green plant 1.1 ear 2.2 immature straw 0.43 immature grain 3.5	C007331 C007332
Germany, 1990 Moringen (Franka)	EC	0.5		400	2	42 42 53	3.8 immature straw 0.62 immature grain 3.6	A88137
Germany, 1991 Nierswalde (Sonja) prochloraz treated seed	EC	0.45		400	3	0 21 35 48	19 green plant 0.82 ear 6.3 5.8	A88161
Germany, 1991 Walsrode-Fulde (Marinka) prochloraz treated seed	EC	0.45		400	3	0 21 40	11 green plant 1.9 ear 7.9	A88161
Germany, 1992 Edesheim (Tapir) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 49 56	24 green plant 1.2 ear 5.0 11 12	A88166
Germany, 1992 Edesheim (Tapir) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 47	17 green plant 4.6 13	A88166
Germany, 1992 Elvesse (Sonate)	EW	0.45			4	0 35 42 49	42 green plant 1.4 ear 3.8 11	A88167 A88168
Germany, 1992 Elvesse (Sonate) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 40	20 green plant 9.4 8.3	A88166

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1992 Elvesse (Sonate) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	35 42 49	1.1 ear 4.8 11	A88166
Germany, 1992 Polenz (Erfa) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 43 45	15 green plant 2.9 ear 24 17	A88166
Germany, 1992 Polenz (Erfa) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 36 38	<0.5 green plant 21 15	A88166
Germany, 1996 Nordrhein-Westfalen (Baronesse)	SE	0.4		250	2	0 35	7.7 green plant 12	A91231
Germany, 2001 Aarbergen-Kettenbach (Scarlett)	EC	0.44		300	2	0 15 22 29 41	18 green plant 6.2 green plant 7.6 green plant 4.9 green plant 14	C029570
Germany, 2001 Grabau (Barke)	EC	0.43		300	2	0 14 21 28 41	16 green plant 2.3 green plant 2.1 green plant 2.6 green plant 5.7	C029570
Germany, 2002 Neidersachsen (Baccara)	EC	0.45		300	2	0 32	15 green plant 0.68	C030975
Germany, 2002 Sachsen (Barke)	EC	0.45		300	2	0 38	12 green plant 13	C030975
Greece, 2001 Kato Milia (Creter)	EW	0.43+ 0.43		286 405	1+ 1	0 14 21 28 34	11 green plant 7.4 green plant 11 green plant 12 green plant 7.0	C029162
Italy, 1996 Lombardia (Barrakia)	SE	0.4		250	2	0 27	7.2 green plant 12	A89970
Portugal, 2002 Alentejo (Ce 9701)	EW	0.45		300	2	0 35	9.3 green plant 8.4	C030983
Spain, 2001 Algodonales (Dobla)	EW	0.45+ 0.46		286 405	1+ 1	0 14 21 28 32	25 green plant 11 green plant 5.1 green plant 8.7 green plant 8.4	C029162
Spain, 2001 Guillena (Almudena)	EW	0.45+ 0.41		301 275	1+ 1	0 14 21 28 35	36 green plant 22 green plant 18 green plant 12 green plant 20	C029162
Spain, 2002 Andalucia (Sunrise)	EW	0.45		300	2	0 32	12 green plant 13	C030983
Sweden, 1982 Lanne	EC	0.23			2	53	0.5 (c0.5)	A87806
Sweden, 1982 Lanne	EC	0.45			2	53	1.1 (c0.5)	A87806
Sweden, 1982 Ultuna	EC	0.23			2	55	0.86	A87806

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Sweden, 1982 Ultuna	EC	0.45			2	55	1.1	A87806
UK, 1979 Caxton (Maris Otter)	EC	0.4		200	2	63	2.1	A87733
UK, 1979 Newton (Aramir)	EC	0.4		200	2	36	7.6, 6.7, 5.8	A87733
UK, 1979 Woodborough (Maris Otter)	EC	0.4		200	2	58	4.2	A87733
UK, 1986 Comberton (Igri)	EC	0.4			2	37	5.4 (c1.3)	A87955 no control samples
UK, 1986 Stapleford (Otter)	EC	0.4			2	37	9.7 (c0.72)	A87955 no control samples
UK, 1987 Calford Green (Igri)	EC	0.4		220	2	50	1.6	A88060 A88061
UK, 1987 Cornish Hall End (Halcyon)	EC	0.4		220	2	42	9.7	A88060 A88061
UK, 1987 Lt Walden (Tipper)	EC	0.4			2	43	2.3	A87955 no control samples
UK, 1987 Stow-cum-Quy (Halcyon)	EC	0.4		220	2	40	1.4	A88060 A88061
UK, 1992 Shrawardine (Pipkin)	EC	0.4		200	2	56	3.3	A88171
UK, 1992 Shrawardine (Pipkin)	EC	0.4		200	2	56	4.3	A88171
UK, 1996 Borders (Maritone)	SE	0.4		250	2	0 30	8.8 green plant 7.3	A91231
UK, 1996 Cambridgeshire (Intro)	EC	0.45		300+ 400	1+ 1	0 0 14	1.8 ear 11 immature straw 21	A91239
UK, 1996 Cambridgeshire (Pastoral)	EC	0.45		200+ 400	2	0 0 14	7.4 ear 32 immature straw 21	A91239
UK, 1996 Little Shelford (Alexis)	EC	0.45		300 400	1+ 1	0 0 14	1.1 ear 18 20	A91239
UK, 1996 Norfolk (Pipkin)	EC	0.45		200+ 400	2	0 0 14	7.6 ear 26 immature straw 26	A91239
UK, 2001 Denton (Jewel)	EC	0.46		300	2	0 14 21 28 35	18 green plant 8.6 green plant 4.7 green plant 3.2 green plant 6.5	C029570

Table 90. Residues of prochloraz in barley straw from supervised seed treatment trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Denmark, 1979 "Trial 3"	EC	0.02			1	132	≤0.1	A87732
Denmark, 1979 "Trial 6"	EC	0.02			1	139	≤0.1	A87732
Denmark, 1988 Roskilde (Agneta)	EC	0.02			1	83 98 113	<0.1 green plant <0.1 green plant ≤0.2	A88096
Germany, 1982 Duingen (Aramir)	WP	0.025			1	68 139	<0.1 green plant ≤0.1	A87867
Germany, 1982 Goch (Aramir)	WP	0.025			1	62 133	<0.1 green plant ≤0.1	A87867
Germany, 1982 Hahn-Lehmden (Harry)	WP	0.025			1	64 125	0.18 green plant ≤0.1	A87867
Germany, 1982 Langforden-Esch (Harry)	WP	0.025			1	65 140	0.39 green plant ≤0.1	A87867
Germany, 1982 Nittenau-Bayern (Aramir)	WP	0.025			1	68 133	<0.1 green plant ≤0.1	A87867
Germany, 1982 Schwinge (Aramir)	WP	0.025			1	74 129	<0.1 green plant ≤0.1	A87867
Germany, 1982 Stuttgart-Hohenheim (Aramir)	WP	0.025			1	91 153	<0.1 green plant ≤0.1	A87867
Germany, 1983 Kaarst (Europa)	DS[1]	0.025			1	94 126	<0.1 green plant ≤0.1	A87867
Germany, 1983 Stuttgart-Mohringen (Aramir)	WP	0.025			1	94 146	<0.1 green plant ≤0.1	A87867
Germany, 1985 Dusseldorf (Gimpel)	DS[1]	0.02			1	76 161	<0.05 green plant ≤0.05	A87924
Germany, 1985 Niederkirchen (Gimpel)	DS[1]	0.02			1	77 128	0.1 green plant <0.05	A87924
Germany, 1985 Niederkirchen (Gimpel)	DS	0.02			1	77 128	<0.05 green plant ≤0.05	A87924
Germany, 1988 Dusseldorf (Gimpel)	EC	0.02			1	54 130	<0.2 green plants ≤0.1	A88075
Germany, 1988 Goch	EC	0.02			1	46 124 124	<0.2 green plants ≤0.1	A88075
Germany, 1996 Sachen (Otis)	FS	0.015			1	0 85 106 174	110 treated seed <0.05 green plant <0.05 green plant <0.05	A83719

[1] co-formulation of prochloraz-manganese complex with carboxin, applied as a dry seed dressing

Oats. Residue trials from Denmark (foliar treatments) and from Germany (seed treatments) on oats were reported. Also see Tables 77 and 78 above.

Table 91. Residues of prochloraz in oat straw from supervised foliar application trials in Denmark.

Year Location (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
1982 Borup (Selma)	EC	0.45			1	36 62 62	0.76 green plant 1.1 (c0.21) 0.03 ear	A87805
1982 Ebbeskov (Selma)	EC	0.45			1	37 62 62	0.32 green plant 0.86 <0.02 ear	A87805
1983 Kvaeskeby (Selma)	WP	0.45		200	1	13 52	9.5 green plant (c0.31) 9.6	A87860
1983 (Vallo)	WP	0.45		200	1	14 46	4.6 green plant 4.2 (c0.28)	A87860

Table 92. Residues of prochloraz in oat straw from supervised seed treatment trials in Germany.

Year Location (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/100 kg seed	kg ai/hl	water, l/ha	No.			
1989 Gravenbroich-Kapellan (Fl Vita)	WP	0.02			1	68 131	<0.1 green plant ≤0.2	A88106
1985 Niederkirchen (Fl Vita)	DS[1]	0.02			1	76 146	<0.05 green plant ≤0.05	A87924
1985 Dusseldorf (Fl Vita)	DS	0.02			1	76 146 146	<0.05 green plant ≤0.05	A87924
1984 Dusseldorf (Alfred)	WP	0.02			1	86 158	<0.2 green plant ≤0.1	A87883
1982 Goch-Nierswalde (Flamings Nova)	WP	0.025			1	62 133	<0.1 green plant ≤0.1	A87867
1982 Duingen (Flamings Nova)	WP	0.025			1	68 139	<0.1 green plant ≤0.1	A87867
1982 Langforden-Esch (Flamings Silber)	WP	0.025			1	65 140	<0.1 green plant ≤0.1	A87867
1982 Nittenhau-Thann (Flamings Silber)	WP	0.025			1	69 134	<0.1 green plant ≤0.1	A87867
1983 Nittenau-Bayern (Flamings Silber)	WP	0.025			1	94 145	<0.1 green plant ≤0.1	A87867
1983 Kaast (Flamings Silber)	DS[1]	0.025			1	64 115	<0.1 green plant ≤0.1	A87867

[1] co-formulation of prochloraz-manganese complex with carboxin, applied as a dry seed dressing

Rye. Residue trials from Denmark and Germany were made available to the Meeting, involving either foliar treatments or seed treatments with prochloraz. Also see Tables 81 and 82 above.

Table 93. Residues of prochloraz in rye straw from supervised foliar application trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Denmark, 1982 Haslov	EC	0.45			1	35 72 72	0.73 green plant 1.7 0.1 ear	A87805
Denmark, 1982 Rosendal (Petkus II)	EC	0.45			1	35 77 77	1.4 green plant 0.98 <0.02 ear	A87805
Germany, 1988 Schwarmstedt (Dominator)	EC	0.45		400	2	0 49	11 green plant 3.4	A88023
Germany, 1988 Stadl (Danko)	EC	0.45		400	2	0 71	11 green plant 2.3	A88023
Germany, 1989 Thann (Danco)	EC	0.4		400	2	0 22 42 42	8.1 green plant 1.5 ear 5.0 4.7	A88038
Germany, 1989 Thann (Danco)	WP	0.5		400	2	0 22 42 49	6.6 green plant 1.4 ear 3.4 3.1	A88040
Germany, 1989 Wolbrechts-hausen (Dominator)	EC	0.4		400	2	0 21 35 42	8.6 green plant 1.2 ear 1.8 1.7	A88038
Germany, 1989 Wolbrechts-hausen (Dominator)	WP	0.5		400	2	0 21 35 42	8.8 green plant 1.4 ear 1.1 1.5	A88040
Germany, 1989 Wolbrechts-hausen (Dominator)	EC	0.5		400	2	0 21 35 42	10 green plant 1.5 ear 1.6 1.1	C007331 C007332
Germany, 1990 Grilten (Mrkator)	EC	0.5		400	2	35 43	3.3 0.09	A88137 A88138
Germany, 1991 Helmstadt (Rapid) prochloraz treated seed	EC	0.45		400	3	0 19 34 34 53	9.3 green plant 2.0 ear 0.49 ear 2.6 0.63	A88161
Germany, 1992 Ameling-Hausen (Marder) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 49 56	27 green plant 1.6 ear 8.8 21 32	A88166
Germany, 1992 Ameling-hausen (Marder) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 28 35	14 green plant 32 35	A88166

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1992 Schwarmstedt-Grindau (Amando)	EW	0.45			4	0 35 42 49 56	30 green plant 2.0 ear 16 26 11	A88167 A88168

Table 94. Residues of prochloraz in rye straw from supervised seed treatment trials in Germany.

Year Location (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
1989 Gravenbroich-Kapellan (Sorom)	WP	0.02			1	68 131	<0.1 green plant <u>≤0.2</u>	A88106
1985 Rotkopf (Sorum)	WP	0.02			1	52 143	0.1 green plants <u>0.1</u>	A87937
1985 Neiderkirchen (Sorum)	WP	0.02			1	68 130	0.1 green plants <u>≤0.1</u>	A87937
1984 Dusseldorf (Alfred)	WP	0.02			1	75 158	<0.2 green plant <u>≤0.1</u>	A87883
1984 Dusseldorf (Alfred)	WP	0.02			1	75 158	<0.2 green plant <u>≤0.1</u>	A87883

<u>Wheat</u>. Residue trials from Austria, Brazil, Czechoslovakia, Denmark, France, Germany, The Netherlands, Italy, Portugal, Spain, Sweden, the UK and the USA on wheat were reported. Also see Tables 83 to 86 above.

Table 95. Residues of prochloraz in wheat straw from supervised trials involving single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Austria, 1977 Kronau bei Langenrohr (Extrem)	EC	0.5		400	1	70	0.01, 0.01	A87745
Austria, 1977 Kronau bei Langenrohr (Extrem)	EC	1.0		400	1	70	<0.01, <0.01	A87745
Czechoslovakia, 1987 Kujavy (Selecta)	EC	0.45		400	1	47 47	0.56 ear 2.9	A87991
Czechoslovakia, 1987 Kujavy (Selecta)	EC	0.45		400	1	29 29	0.9 ear <u>5.2</u>	A87991
France, 1978 Champs (Top)	EC	0.45		500	1	64	0.41	A87736
France, 1978 Champs (Top)	EC	0.75		500	1	64	0.64	A87736

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1978 Goulens (Capitole)	EC	0.45		500	1	64	3.0	A87736
France, 1978 Goulens (Capitole)	EC	0.75		500	1	64	3.2	A87736
France, 1978 St Eloi des Fourques (Clement)	EC	0.45		500	1	64	0.5	A87736
France, 1978 St Eloi des Fourques (Clement)	EC	0.75		500	1	64	0.74	A87736
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	1	84	1.4	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	1	81	1.9	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.6		333	1	84	1.3	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.6		333	1	81	1.8	A88170 N France
Italy, 1979 Alessandria (Mixture)	EC	0.5		600	1	38	4.7	A87741
Italy, 1979 Alessandria (Mixture)	EC	0.7		600	1	38	5.6	A87741
Netherlands, 1978 Abbenes (Arminda)	EC	0.38		600	1	68	0.71	A87840
Netherlands, 1978 Abbenes (Arminda)	EC	0.75		600	1	68	3.6	A87840
Netherlands, 1980 Abbenes (Okapi)	EC	0.45			1	69	0.36	A87768
Netherlands, 1980 Wieringermeer (Arminda)	EC	0.45			1	69	4.8, 4.9, 6.4, 4.7	A87768
Netherlands, 1980 Wieringermeer (Arminda)	EC	0.68			1	106	0.27	A87768
Netherlands, 1983 Schrage (Okapi)	EC	0.45		480	1	42 42	4.5, 3.2, 4.6, 3.7 4.3, 1.9, 2.3, 2.0 chaff	A87844
Netherlands, 1983 Spriensma (Arminda)	EC	0.45		480	1	42 42	4.8, 4.9, 6.4, 4.7 2.0, 3.5, 2.7, 3.2 chaff	A87844
Sweden, 1982 'L-country'	EC	0.45			1	74	0.53	A87806
Sweden, 1982 'R-country'	EC	0.45			1	73	2.9	A87806
UK, 1985 Bottisham (Longbow)	EC	0.4		200	1	39	6.8	A87921
UK, 1985 Gt Shelford (Rapier)	EC	0.4		200	1	29	1.5 (c0.87)	A87921

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 1985 Quy (Flanders)	EC	0.4		200	1	36	11	A87921
USA, 1985 Cayuse OR (Stephens)	EC	0.28		140	1	128	0.02	A87947
USA, 1985 Cayuse OR (Stephens)	EC	0.56		140	1	128	<0.02	A87947
USA, 1985 Cayuse OR (Stephens)	EC	1.12		140	1	128	0.03	A87947
USA, 1985 Lincoln NE (Bennett)	EC	0.28			1	49	0.62	A87947
USA, 1985 Lincoln NE (Bennett)	EC	0.56			1	49	2.9	A87947
USA, 1985 Lincoln NE (Bennett)	EC	1.12			1	49	0.4	A87947
USA, 1985 Mission OR (Stephens)	EC	0.28		140	1	128	0.02	A87947
USA, 1985 Mission OR (Stephens)	EC	0.56		140	1	128	0.02	A87947
USA, 1985 Mission OR (Stephens)	EC	1.12		140	1	128	0.03	A87947
USA, 1985 Pullman WS (Delius)	EC	0.28		24	1	108	3.0	A87947
USA, 1985 Pullman WS (Delius)	EC	0.56		24	1	108	0.08	A87947
USA, 1985 Pullman WS (Delius)	EC	1.12		24	1	108	0.62	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	0.28		470	1	128	0.02	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	0.56		470	1	128	0.04	A87947
USA, 1985 Walla Walla WS (Stephens)	EC	1.12		470	1	128	0.1	A87947

[1] sample storage period at ambient temperatures before receipt at the laboratory

Table 96. Residues of free prochloraz in wheat straw from supervised trials involving single foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg Free prochloraz	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1977 Grossmehring (Jubilar)	EC	0.5		600	1	105	0.01	A87743
Germany, 1977 Grossmehring (Jubilar)	EC	1.0		600	1	105	<0.01	A87743
Germany, 1977 Northeim (Karmoran)	EC	0.5		600	1	63	0.01	A87743
Germany, 1977 Northeim (Karmoran)	EC	0.75		600	1	63	0.01	A87743
Germany, 1977 Northeim (Kranich)	EC	0.5		600	1	63	0.02	A87743
Germany, 1977 Northeim (Kranich)	EC	0.75		600	1	63	0.02	A87743
Italy, 1977 Stradella (Irnerio)	EC	0.7		400	1	56 56	0.02, 0.02, 0.02	A87746
Italy, 1977 Stradella (Irnerio)	EC	0.7		400	1	56 56	0.09, 0.03, 0.08	A87746
Italy, 1977 Stradella (Irnerio)	EC	1.0		400	1	56 56	0.04, 0.18, 0.03	A87746
Italy, 1977 Stradella (Irnerio)	EC	1.0		400	1	56 56	0.07, 0.1, 0.08	A87746
Netherlands, 1977 Abbenes (Lely)	WP	0.38			1	70 70	<0.01	A87749
Netherlands, 1977 Abbenes (Lely)	EC	0.38			1	70 70	<0.01	A87749
Netherlands, 1977 Abbenes (Lely)	EC	0.5			1	70 70	0.01	A87749

Table 97. Residues of prochloraz in wheat straw from supervised trials involving two or more foliar applications of prochloraz.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1981 Havixbeck (Janus)	EC	0.48		400	2	0 8 14 48 48 60	11 ear 2.5 ear 3.6 ear 0.61 ear 1.8 green plant 3.3	A87782
Germany, 1981 Lamsted (Selpek)	EC	0.48		400	2	11	3.6 ear	A87782

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1981 Langforden (Steina)	EC	0.48		400	2	28	0.72 ear	A87782
Germany, 1981 Langforden (Steina)	EC	0.48		400	2	0 8 12 19 21 43	9.2 ear 2.5 ear 0.98 ear 7.1 ear 1.0 ear 1.7	A87782
Germany, 1985 Hohebuch (Max)	EC	0.45		400	2	0 27 63	7.5 ear 0.74 ear 1.8	A87949
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	2	0 27 63	10 ear 0.62 ear 1.4	A87949
Germany, 1987 Beilstein (Max)	EC	0.4		400	2	0 14 36	5.1 ear 0.69 ear 3.0	A87992
Germany, 1987 Beilstein (Max)	WP	0.5		400	2	0 21 36	0.76 ear 0.34 ear 1.8	A87989
Germany, 1996 Nordrhein-Westfalen (Nandu)	SE	0.4		250	2	0 35	8.3 green plant 20	A91231
Germany, 1981 Havixbeck (Kolibri)	EC	0.48		400	3	0 14 48 48 60	12 ear 3.6 ear 1.1 ear 3.1 green plant 4.2	A87782
Germany, 1981 Lamsted (Selpek)	EC	0.48		400	3	0 7 44 44 66	18 ear 6.2 ear 1.5 green plant 0.42 ear 3.7	A87782
Germany, 1981 Langforden (Steina)	EC	0.48		400	3	0 12 19 21 43	17 ear 3.1 ear 7.1 ear 2.0 ear 3.8	A87782
Germany, 1985 Hohebuch (Max)	EC	0.45		400	3	0 27 63	7.3 ear 0.53 ear 2.4	A87939
Germany, 1985 Hohebuch (Max)	EC	0.45		400	3	0 15 51	6.1 ear 3.7 ear 3.7	A87939
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	3	0 31 63	11 ear 1.1 ear 1.3	A87939
Germany, 1985 Holzhausen (Kadett)	EC	0.45		400	3	0 14 46	7.3 ear 2.0 ear 2.7	A87939
Germany, 1986 Lehmden (Ralle)	EC	0.45		200	3	0 15 43	8.9 ear 2.0 ear 9.6	A87973
Germany, 1983 Leonberg (Selpek)	EC	0.48 0.24		400	2+ 2	0 11 28	4.0 ear 1.1 ear 4.3	A87863
Germany, 1983 Willich (Sciroco)	EC	0.48 0.24		400	2+ 2	0 5 33	1.7 ear 2.2 ear 7.2	A87863

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Belgium, 2001 Fleurus (Baltimore)	EC	0.46		300	2	0 14 21 28 59	7.6 green plant 8.2 green plant 4.0 green plant 4.4 green plant 7.7	C029571
Denmark, 1982 Gundsoemagle (Solid)	EC	0.23			2	36 85	0.28 green plant 1.1	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.23+ 0.45			1+ 1	36 85	0.95 green plant 1.3	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.45			2	36 85	0.6 green plant 1.1	A87805
Denmark, 1982 Gundsoemagle (Solid)	EC	0.45			2	36 85	1.2 green plant 1.2	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.23			2	36 75	0.81 green plant 1.3	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.23+ 0.45			1+ 1	36 75	1.5 green plant 1.6	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.45			2	36 75	1.7 green plant 1.4	A87805
Denmark, 1982 Skensued (Vuka)	EC	0.45			2	36 75	1.2 green plant 1.9	A87805
Denmark, 1983 Gundsoemagle (Gerbel)	EC WP	0.45+ 0.45		200	1+ 1	21 64	1.6 green plant 3.3	A87860
Denmark, 1983 Roskilde	EC WP	0.45+ 0.45		200	1+ 1	22 57	1.1 green plant 2.1	A87860
France, 1992 Chevaux (Soissons)	SE	0.4		333	2	56	9.3	A88180
France, 1992 Chevilly (Soissons)	SE	0.4		333	2	56	7.5	A88180
France, 1992 Ondes (Soissons)	SE	0.4		333	2	69	6.9	A88180
France, 1996 Bucy Le Roi (Soissons)	SE	0.4		250	2	0 52 52 52	10 green plant 8.1 stem 6.9 1.7 ear	A91231 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	2	56	5.2	A88170 N France
France, 1996 Bucy Le Roi (Soissons)	EW	0.45		333	2	53	6.5	A88170 N France
France, 1996 Vacquier (Tremi)	EC	0.4		250	2	0 35 35 46	9.7 green plant 1.5 ears 12 stems 9.6	A89970 S France
France, 1998 Aquitaine (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 60	10 green plant 9.4	C002497 S France

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 1998 Aquitaine (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 44	12 green plant 9.6	C002497 S France
France, 1998 Cote-d'Or (Soissons)	EC	0.55		333	2	47	5.3	R007789 N France
France, 1998 Isle de France (Oracle)	EC+ SE	0.6+ 0.4		250	1+ 1	0 60	8.7 green plant 2.2	C002499 N France
France, 1998 Isle de France (Oracle)	EC+ SE	0.6+ 0.4		250	1+ 1	0 67	8.7 green plant 3.8	C002499 N France
France, 1998 Isle de France (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 66	9.5 green plant 4.4	C002499 N France
France, 1998 Isle de France (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 57	8.2 green plant 3.5	C002499 N France
France, 1998 Marignac (Soissons)	EC	0.54		333	2	69	6.5	R007789 S France
France, 1998 Pays de la Loire (Altria)	EC+ SE	0.6+ 0.4		250	1+ 1	0 59	9.5 green plant 7.3	C002499 N France
France, 1998 Pays de la Loire (Altria)	EC+ SE	0.6+ 0.4		250	1+ 1	0 44	7.6 green plant 13	C002499 N France
France, 1998 Poitou-Charentes (Recital)	EC+ SE	0.6+ 0.4		250	1+ 1	0 65	9.3 green plant 11	C002497 S France
France, 1998 Poitou-Charentes (Recital)	EC+ SE	0.6+ 0.4		250	1+ 1	0 44	7.7 green plant 11	C002497 S France
France, 1998 Poitou-Charentes (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 65	6.6 green plant 5.4	C002497 S France
France, 1998 Poitou-Charentes (Soissons)	EC+ SE	0.6+ 0.4		250	1+ 1	0 44	5.3 green plant 13	C002497 S France
France, 2001 Bordeaux (Sideral)	EW	0.45		250	2	0 14 21 28 37	20 green plant 11 green plant 9.6 green plants 7.9 green plants 22	C029166 S France
France, 2001 Choisies (Boston)	EC	0.46		300	2	0 14 21 28 57	8.4 green plant 11 green plant 5.9 green plant 3.6 green plant 7.5	C029571 N France
France, 2001 Toulouse (Neodur)	EW	0.48+ 0.45		270+ 250	1+ 1	0 15 21 28 36	6.3 green plant 4.0 green plant 5.0 green plants 4.1 green plants 4.3	C029166 S France
France, 2002 Champagne-Ardenne (Apollo)	EW	0.45		200	2	0 36 36	11 green plants 8.0	C031058 N France
France, 2002 Cote d'Azur (Nefer) Durum wheat	EW	0.39		400	2	0 35	8.6 green plant 8.3	C031059 S France

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
France, 2002 Picardie (Shango)	EW	0.45		300	2	0 40	8.9 green plant 19	C031058 N France
Germany, 1979 Grafing (Caribo)	EC	0.48		400	2	0 15 42 63	1.0 green plant 0.15 ear 0.39 ear 0.6	A87734
Germany, 1979 Kleedstaft (Kormoron)	EC	0.48		400	2	0 22 37 55	0.47 ear 0.52 ear 0.21 ear 1.5	A87734
Germany, 1979 Munster (Maris Hunter)	EC	0.48		400	2	0 0 54 54	1.1 green plant 0.11 ear 0.04 ear 2.7	A87734
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	2	0 34 66	12 ear 0.15 ear 2.1	A87949
Germany, 1985 Plitting (Jubilar)	EC	0.45		400	2	0 19 62	7.6 ear 0.62 ear 3.4	A87949
Germany, 1986 Havixbeck (Okapi)	EC	0.4		200	2	0 25 40 56	8.8 ear 1.1 ear 0.65 ear 4.5	A87966
Germany, 1986 Northeim (Kanzler)	EC	0.4		200	2	0 14 24 47	11 ear 1.6 ear 1.1 ear 2.4	A87966
Germany, 1987 Hann-Munchen (Kanzler)	WP	0.5		400	2	0 22 35 43 58	0.62 ear 0.56 ear 0.99 1.5 1.4	A87989
Germany, 1987 Meerbusch (Kanzler)	EC	0.36+0.3		400	1+ 1	0 14 28 35 42 47	3.2 ear 1.2 ear 0.92 ear 3.9 4.8 4.8	A87988
Germany, 1987 Otterndorf (Kanzler)	EC	0.36+0.3		400	1+ 1	0 16 37 43 59	1.7 ear 0.68 ear 1.3 0.98 1.3	A87988
Germany, 1987 Otterndorf (Kanzler)	EC	0.4		200	2	0 16 28 37 43 59	7.7 ear 0.68 ear 0.78 ear 3.1 1.6 4.0	A87992
Germany, 1987 Otterndorf (Kanzler)	WP	0.5		400	2	0 22 29 37 43 59	0.31 ear 0.3 ear 0.31 ear 1.3 0.9 0.99	A87989

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1989 Eschau (Obelisk)	WP	0.5		400	2	0 21 35 35 55	6.3 green plant 0.33 ear 1.7 immature straw 0.05 immature grain 2.4	A88040
Germany, 1989 Eschau (Obelisk)	WP	0.5		400	2	0 21 35 35 55	6.7 green plant 0.44 ear 1.1 immature straw 0.07 immature grain 2.2	A88043
Germany, 1989 Eschau (Obelisk)	EC	0.5		400	2	0 21 35 55	9.9 green plant 0.79 ear 15 1.6	C007331 C007332
Germany, 1989 Neinhagen-Hufe (Kanzler)	EC	0.5		400	2	0 21 35 35 42	2.9 green plant 2.2 ear 9.4 immature straw <0.1 immature grain 6.6	C007331 C007332
Germany, 1989 Thann (Basalt)	WP	0.5		400	2	0 21 35 49	4.7 green plant 0.69 ear 2.0 2.6	A88040
Germany, 1989 Thann (Basalt)	WP	0.5		400	2	0 21 35 49	4.0 green plant 0.79 ear 3.0 2.3	A88043
Germany, 1989 Thann (Basalt)	EC	0.5		400	2	0 21 35 49	8.6 green plant 0.98 ear 3.6 3.7	C007331 C007332
Germany, 1990 Hosbach (Kanzler)	EC	0.5		400	2	34 42 52	1.8 2.4 2.7	A88137 A88138
Germany, 1990 Wetze (Sperber)	EC	0.5		400	2	32 41	2.2 2.5	A88137 A88138
Germany, 1998 Bayern (Tambor)	EC+ SE	0.6+ 0.4		300	1+ 1	0 44	5.1 green plant 2.8	C002499
Germany, 1998 Bayern (Tambor)	EC+ SE	0.6+ 0.4		250	1+ 1	0 59	1.8 green plant 0.99	C002499
Germany, 2001 Grabau (Rialto)	EC	0.45		300	2	0 14 21 28 52	8.9 green plant 2.8 green plant 2.1 green plant 2.7 green plant 5.8	C029571
Germany, 2001 Hunstetten-Gorsroth (Bandit)	EC	0.43		300	2	0 14 21 28 54	17 green plant 9.9 green plant 5.1 green plant 8.1 green plant 16	C029571
Germany, 2002 Niedersachsen (Claire)	EW	0.45		300	2	0 32	9.9 green plants 10	C031058
Germany, 2002 Nordrhein-Westfalen (Ritmo)	EW	0.45		300	2	0 38	21 green plant 22	C031058

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Greece, 2001 Thessalonika (Simento)	EW	0.43+ 0.47		290+ 410	2	0 13 21 27 35	22 green plant 7.9 green plant 7.2 green plants 9.7 green plants 3.5	C029166
Greece, 2002 Thessalonika (Mexicale) Durum wheat	EW	0.45		500	2	0 35	1.9 green plant 8.0	C031059
Italy, 1996 Lombardia (Golia)	SE	0.4		250	2	0 33 33 41	12 green plant 1.9 ear 7.1 stem 10	A89970
Italy, 2002 Bologna (Neodur) Durum wheat	EW	0.45		500	2	0 35	12 green plant 8.2	C031059
Netherlands, 1980 Abbenes (Okapi)	EC	0.45			2	69	1.9	A87768
Portugal, 2002 Elvas (Rea 15) Durum wheat	EW	0.45		500	2	0 35	7.4 green plant 9.6	C031059
Spain, 1998 Andalucia (ST-4)	EC+ SE	0.6+ 0.4		250	1+ 1	0 49	11 green plant 7.5	C002497
Spain, 1998 Andalucia (ST-4)	EC+ SE	0.6+ 0.4		250	1+ 1	0 45	9.4 green plant 10	C002497
Spain, 2001 Cadiz (San Pedro)	EW	0.46		310	2	0 13 21 27 35	15 green plant 20 green plant 19 green plants 12 green plants 13	C029166
Spain, 2001 Sevilla (Simeto)	EW	0.45		300	2	0 14 21 28 38	29 green plant 24 green plant 19 green plants 13 green plants 8.2	C029166
Sweden, 1982 'L-country'	EC	0.45			2	69	1.7	A87806
Sweden, 1982 'R-country'	EC	0.45			2	58	4.1	A87806
UK, 1986 Gestingthorpe (Longbow)	EC	0.4		200	2	25	15	A87955 no control samples
UK, 1986 Saffron Walden (Avalon)	EC	0.4		200	2	40	8.8	A87955 no control samples
UK, 1987 Attleborough (Avalon)	EC	0.4		200	2	92	3.6	A88058 A88059
UK, 1987 Kenninghall (Avalon)	EC	0.4		200	2	74	1.7	A88058 A88059
UK, 1987 Kenninghall (Norman)	EC	0.4		200	2	27	16	A87955 no control samples

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
UK, 1987 Lemsford (Longbow)	EC	0.4		200	2	36	11	A88058 A88059
UK, 1992 Clipton (Riband)	EC	0.4		400	2	42	3.4, 11	A88171
UK, 1992 Clipton (Riband)	EC	0.4		400	2	42	11, 8.6	A88171
UK, 1992 Kneeton (Riband)	EC	0.4		400	2	41	5.1	A88171
UK, 1992 Kneeton (Riband)	EC	0.4		400	2	41	4.3	A88171
UK, 1992 Leintall (Riband)	EC	0.4		400	2	62	7.8	A88171
UK, 1992 Leintall (Riband)	EC	0.4		400	2	62	3.9	A88171
UK, 1996 Borders (Beaver)	SE	0.4		250	2	0 30	5.3 green plant 9.7	A91231
UK, 1996 Cambridgeshire (Mercia)	EC	0.45		300+ 400	1+ 1	0 0 14	0.36 ear 12 13	A91239
UK, 1996 Cambridgeshire (Apollo)	EC	0.45		300+ 400	1+ 1	0 0 14	0.4 ear 13 11	A91239
UK, 1996 Lincolnshire (Riband)	EC	0.45		200+ 400	2	0 0 15	4.2 ear 10 8.5	A91239
UK, 1996 Norfolk (Riband)	EC	0.45		200+ 400	2	0 0 12	5.9 ear 18 12	A91239
UK, 2001 Denton (Claire)	EC	0.45		300	2	0 14 21 28 35	11 green plant 2.8 green plant 3.5 green plant 2.8 green plant 5.6	C029571
UK, 2002 Hertfordshire (Riband)	EW	0.45		300	2	0 33 33	10 green plant 5.2	C031058
UK, 2002 Suffolk (Claire)	EW	0.45		200	2	0 35 35	12 green plant 15	C031058
USA, 1985 Rock Springs, PA (Hart)	EC	0.28		280	2	59	1.1	A87947
USA, 1985 Rock Springs, PA (Hart)	EC	0.56		280	2	59	2.9	A87947
USA, 1985 Rock Springs, PA (Hart)	EC	1.12		280	2	59	2.4	A87947
USA, 1985 Steele MO (Magnum)	EC	0.28		190	2	31	2.0 green plant	A87947

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
USA, 1985 Steele MO (Magnum)	EC	0.56		190	2	31	3.7 green plant	A87947
USA, 1985 Steele MO (Magnum)	EC	1.12		190	2	31	12 green plant	A87947
Germany, 1981 Altenbruch (Caribo)	EC	0.48		400	3	0 11 40 40 58	3.3 ear 2.5 ear 3.3 green plant 0.69 ear 2.7	A87781
Germany, 1981 Balau (Top Fit)	EC	0.48		400	3	0 7 42 42 64	6.7 ear 2.5 ear 0.44 green plant 0.47 ear 1.6	A87781
Germany, 1981 Eschau (Disponent)	EC	0.48		400	3	0 11 46 46 60	7.3 ear 2.4 ear 2.2 green plant 0.27 ear 0.98	A87781
Germany, 1981 Hirschlanden (Kormoran)	EC	0.48		400	3	0 14 41 41 57	6.6 ear 2.1 ear 2.5 green plant 0.4 ear 2.3	A87781
Germany, 1981 Langforden (Vuka)	EC	0.48		400	3	0 13 31 59	11 ear 5.0 ear 1.0 ear 5.9	A87781
Germany, 1985 Kaarst (Kanzler)	EC	0.45		400	3	0 34 66	15 ear 0.27 ear 2.0	A87939
Germany, 1985 Kaarst (Kanzler)	EC	0.45		400	3	0 22 54	11 ear 2.5 ear 3.6	A87939
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	3	0 21 52	5.6 ear 0.39 ear 2.0	A87939
Germany, 1985 Northeim (Kanzler)	EC	0.45		400	3	0 7 30	6.1 ear 1.7 ear 6.4	A87939
Germany, 1986 Goch-Nierswalde (Carimulti)	EC	0.45		400	3	0 19 48	5.4 ear 1.1 ear 8.0	A87973
Germany, 1986 Otterndorf (Kanzler)	EC	0.45		400	3	0 22 74	4.9 ear 0.52 ear 5.3	A87973
Germany, 1991 Goch-Nierswalde (Kanzler) prochloraz treated seed	EC	0.45		400	3	0 21 35 50	8.2 green plant 1.7 ear 4.7 7.5	A88161
Germany, 1991 Helmstadt (Urban) prochloraz treated seed	EC	0.45		400	3	0 21 34 42	9.4 green plant 1.7 ear 6.5 1.3	A88161
Germany, 1991 Lauingen (Orestes) prochloraz treated seed	EC	0.45		400	3	0 21 35 42	5.9 green plant 0.83 ear 6.8 3.7	A88161

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	0 35 42 49 66	24 green plant 3.7 2.9 3.9 5.1	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	0 35 42 49 56	8.0 green plant 2.4 2.8 3.9 5.1	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1	0 35 42 49 55	14 green plant 3.8 5.3 8.5 11	A88166
Germany, 1983 Wulf - Geisen (Caribo)	EC	0.48+0.24		400	2+ 2	0 7 38	3.5 ear 2.1 ear 10	A87863
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 49 58	12 green plant 6.8 3.7 4.9 4.4	A88166
Germany, 1992 Altertheim (Sleipner) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 21 35 41	12 green plant 6.9 3.9 4.7	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 49	11 green plant 4.4 6.2 6.4	A88166
Germany, 1992 Gelliehausen (Apollo) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 21 35 38	12 green plant 8.2 10 8.5	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 47	13 green plant 9.8 12 12	A88166
Germany, 1992 Kaarst (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 21 34	17 green plant 17 18	A88166
Germany, 1992 Norten-Hardenberg (Sperber)	EW	0.45			4	0 35 42 49	13 green plant 5.8 8.1 11	A88167 A88168
Germany, 1992 Norten-Hardenberg (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4			1+ 1+ 1+ 1	0 35 42 49 62	16 green plant <0.5 ear 1.9 2.7 4.7	A88166
Germany, 1992 Norten-Hardenberg (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 35 42 49	13 green plant 4.9 9.4 5.6	A88166
Germany, 1992 Norten-Hardenberg (Sperber) prochloraz treated seed	EC	0.4+ 0.45+ 0.4+ 0.45			1+ 1+ 1+ 1	0 21 35 40	11 green plant 5.3 12 7.2	A88166

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no.			
Germany, 1992 Roellbach (Rektor)	EW	0.45			4	0 35 42 49	10 green plant 6.7 9.6 11	A88167 A88168

[1] sample storage period at ambient temperatures before receipt at the laboratory

Table 98. Residues of prochloraz in wheat straw from supervised seed treatment trials.

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Denmark, 1988 Roskilde (Anja)	WP	0.011			1	330	0.16	A88036
Denmark, 1988 Roskilde (Anja)	WP	0.016			1	330	≤0.1	A88036
Denmark, 1988 Roskilde (Anja)	WP	0.022			1	330	≤0.1	A88036
Denmark, 1988 Roskilde (Anja)	WP	0.043			1	330	<0.1	A88036
Germany, 1982 Langforden-Esch (Caribo)	WP	0.025			1	197 293	<0.1 green plant ≤0.1	A87867
Germany, 1984 Altenbruch (Ralle)	WP	0.025			1	77 161	<0.2 green plant ≤0.1	A87883
Germany, 1984 Dusseldorf (Ralle)	WS	0.02			1	86 158	<0.2 green plant ≤0.1	A87883
Germany, 1984 Dusseldorf (Ralle)	WS	0.025			1	86 158	<0.2 green plant ≤0.1	A87883
Germany, 1984 Eschau (Ralle)	WS	0.025			1	80 157	<0.2 green plant ≤0.1	A87883
Germany, 1984 Murr (Ralle)	WS	0.02			1	71 156	<0.2 green plant ≤0.1	A87883
Germany, 1984 Murr (Ralle)	WS	0.025			1	71 156	<0.2 green plant ≤0.1	A87883
Germany, 1985 Holzhausen	DS	0.02			1	49 130	0.17 green plant ≤0.05	A87924
Germany, 1985 Holzhausen	WS	0.02			1	83 164	0.12 green plant ≤0.05	A87924
Germany, 1985 Holzhausen (Star)	WS	0.022			1	49 130	0.27 green plant ≤0.1	A87937
Germany, 1985 Murr (Star)	WS	0.022			1	62 127	0.1 green plant ≤0.1	A87937
Germany, 1985 Niederkirchen (Star)	WS	0.022			1	68 130	<0.1 green plant ≤0.1	A87937

Country, year (variety)	Application					PHI (days)	Total residues, mg/kg	Ref
	Form	kg ai/ 100kg seed	kg ai/hl	water, l/ha	No.			
Germany, 1985 Rotkopf (Star)	WS	0.022			1	58 143	0.1 green plant ≤0.1	A87937
Germany, 1988 Dusseldorf (Star)	EC	0.02			1	69	0.2 green plant	A88075
Germany, 1989 Schwarstedt (Star)	WS	0.02			1	67 131	<0.1 green plant ≤0.2	A88106
Germany, 1989 Schwarstedt (Star)	EC	0.02			1	67 131	<0.1 green plant ≤0.2	A88106
Germany, 1996 Hessen (Nandu)	EC	0.01			1	84 103 158	<0.1 green plant 0.1 green plant ≤0.1	A91182
Germany, 1996 Hessen (Nandu)	FS	0.015			1	84 103 158	<0.05 green plant <0.05 green plant ≤0.05	A83719
Germany, 1996 Niedersachen (Nandu)	EC	0.01			1	89 109 172	<0.1 green plant <0.1 green plant ≤0.1	A91182
Germany, 1996 Niedersachsen (Nandu)	FS	0.015			1	89 109 172	<0.05 green plant <0.05 green plant 0.1	A83719
UK, 1979 Derbyshire (Maris Huntsman)	DS	0.02			1	314	≤0.1	A87733
UK, 1996 East Anglia (Chablis)	FS	0.015			1	1 95 116 179	100 treated seed <0.05 green plant <0.05 green plant 0.06	A83719
UK, 1996 East Anglia (Chablis)	FS	0.015			1	1 88 108 184	110 treated seed <0.05 green plant <0.05 green plant ≤0.05	A83719

FATE OF RESIDUES IN STORAGE AND PROCESSING

In processing

Processing studies were reported on barley from France, Belgium and Germany, on wheat from France, Belgium and Germany, rape seed from France mushrooms from France and oranges from South Africa.

Barley. In four field trials in Northern Europe (France, Belgium and Germany) two applications of an EC formulation of 0.84-0.93 kg ai/ha were made using a 3 m boom sprayer in 300 l water/ha to 80-125 sq m single replicate plots. Mature grain samples (1-2 kg) were taken for analysis and (9-16 kg) for processing (Zietz and Klimmeck) [Ref: C029570]. The grain in one trial was processed as a balance study: the complete number of by-products was included, while the grain in the other three trials was processed for follow-up studies on pot barley, malt and green beer (Zietz and Klimmeck) [Ref: C034687].

The processing studies involved milling to pot barley, malting barley grain and brewing beer. For pot barley cleaned and conditioned grain was hulled using a Schule-Vertikal-Schalmaschine mill and separate fractions of pot barley and pearling dust (abrasion) collected. For malt, grain was cleaned and graded (>2.5 mm), steeped in water (18-21ºC) for 44-52 hours, then placed into a germination box maintained at 13-16ºC for 96-102 hours. The resulting green malt was kilned in a hot air stream using a four-step temperature programme (55±2ºC to 80±2ºC) and freed from germs by sieving.

For brewing the malt was ground to grist and mashed into decarbonised water at 52ºC. The temperature of the mash was raised to 64ºC, then to 72ºC and finally to 76ºC. During subsequent lautering, the solid particles of spent grain were separated from the liquid wort, and the wort transferred into a kettle and boiled for 20-90 min, during which time the hop extract was added. The hot wort was then drained to separate the flocs (trub) and the cleared wort was cooled in a fermentation vessel and bottom-fermenting yeast added. After fermentation for 7-8 days at about 13ºC the green beer was drained off and stored at 0ºC for 10 days before being filtered and bottled.

Samples of retained grain and processed fractions were analysed for total prochloraz residues by method Report RESID/88/72. The limits of determination were 0.01 mg/kg for beer, 0.1 mg/kg for flocs and 0.05 mg/kg for grain and all other processed fractions, with an average recovery rate of 83% from all substrates (66-98%, n=41, sd 9%).

In the treated retained grain samples taken from the bulk commodity just before processing total prochloraz residues ranged from 0.17 to 0.38 mg/kg. After milling residues of 0.10 to 0.19 mg/kg were found in the pot barley and the highest concentration (4.1 mg/kg) was found in the offal sample. Residues in the malt ranged from 0.10 to 0.16 mg/kg, with 0.01 to 0.03 mg/kg in beer.

Processing factors calculated for each analysed fraction are given in Table 99.

Table 99. Effects of processing on residues in barley grain treated with prochloraz.

Country, year	Processed fraction	Total prochloraz (mg/kg)	Processing factor	Ref
Germany, 2001	Barley grain	0.38		C029570
Aarbergen-Kettenbach	Cleaned grain	0.48	1.3	C034687
	Offal	4.1	11	
	Pearling dust	1.8	4.8	
	Pot barley	0.19	0.5	
	Barley grain	0.36		
	Cleaned grain	0.46	1.3	
	offal of malting	0.8	2.2	
	Malt sprouts	0.26	0.72	
	Malt	0.16	0.44	
	Spent grain	0.36	1.0	
	Flocs	0.63	1.8	
	Wort (flocs)	0.03[1]	0.08	
	Yeast	0.1	0.27	
	Beer (yeast)	0.03[1]	0.08	
	Green beer	0.03	0.08	
Germany, 2001	Barley grain	0.2		C029570
Grabau	Pearling dust	0.95	4.8	C034687
	Pot barley	0.1	0.5	
	Barley grain	0.17		
	Malt	0.1	0.59	
	Green beer	0.02	0.1	

Country, year	Processed fraction	Total prochloraz (mg/kg)	Processing factor	Ref
Belgium, 2001	Barley grain	0.35		C029570
St Amand	Pearling dust	1.5	4.4	C034687
	Pot barley	0.16	0.46	
	Barley grain	0.23		
	Malt	0.15	0.65	
	Green beer	0.03	0.09	
France, 2001	Barley grain	0.35		C029570
Choisies	Pearling dust	0.79	2.3	C034687
	Pot barley	0.1	0.29	
	Barley grain	0.2		
	Malt	0.1	0.5	
	Green beer	0.01	0.1	

[1] Flocs and yeast cells were collected from the wort and green beer respectively, analysed, and the estimated residues in the liquid phases calculated.

Figure 5. Flow-chart showing the milling process for pot barley.

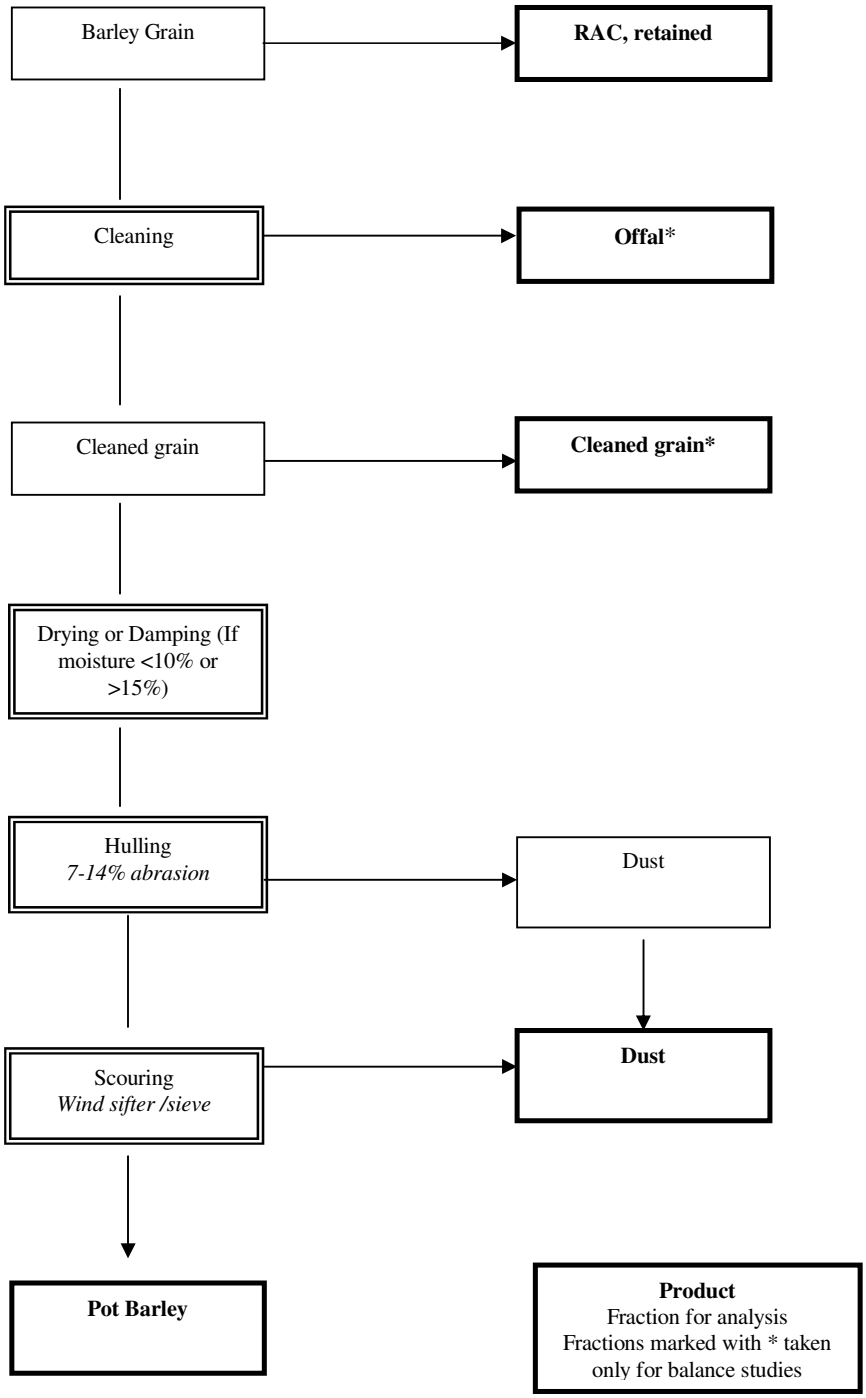


Figure 6. Flow-chart showing the malting process for pot barley.

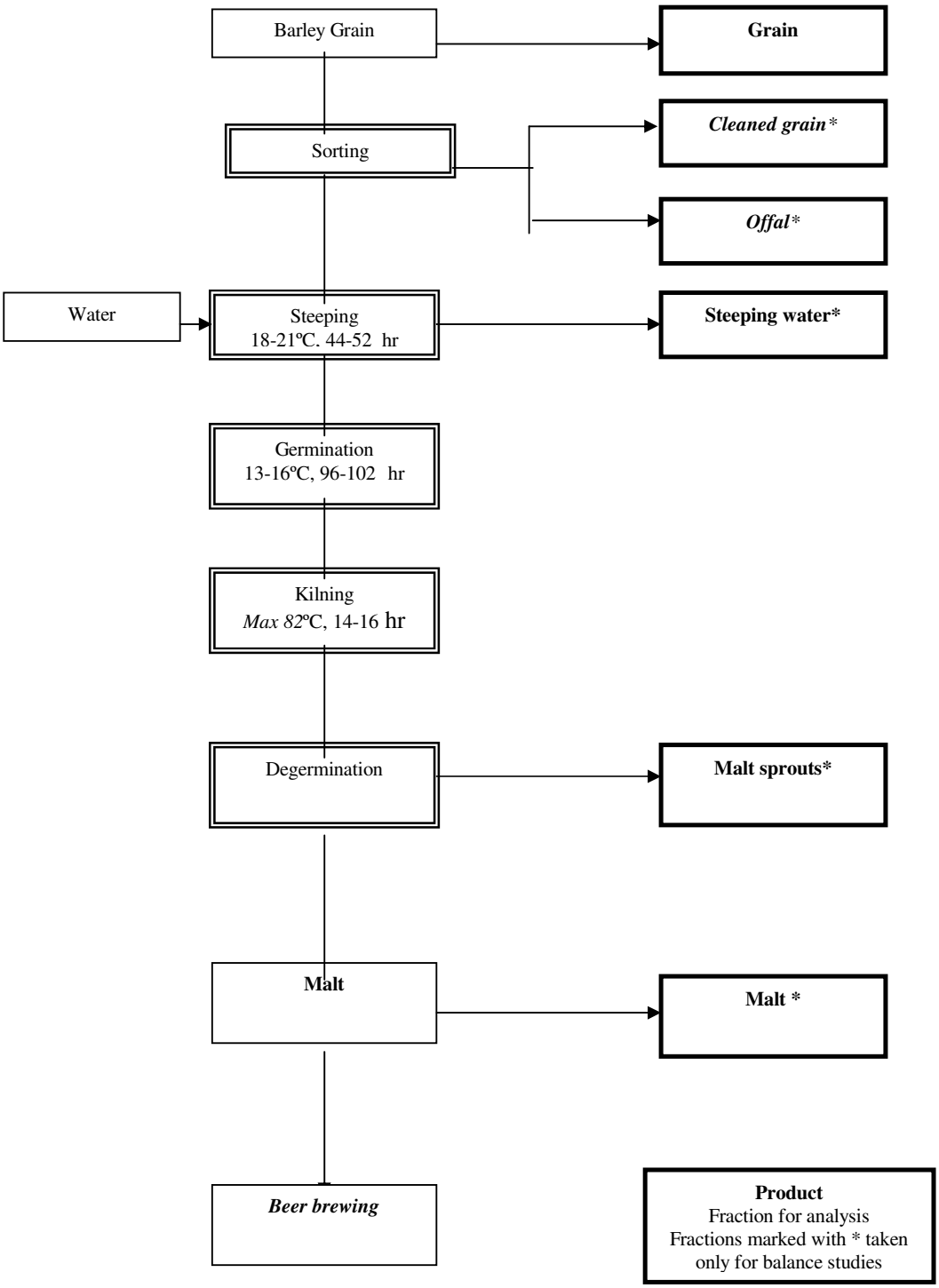
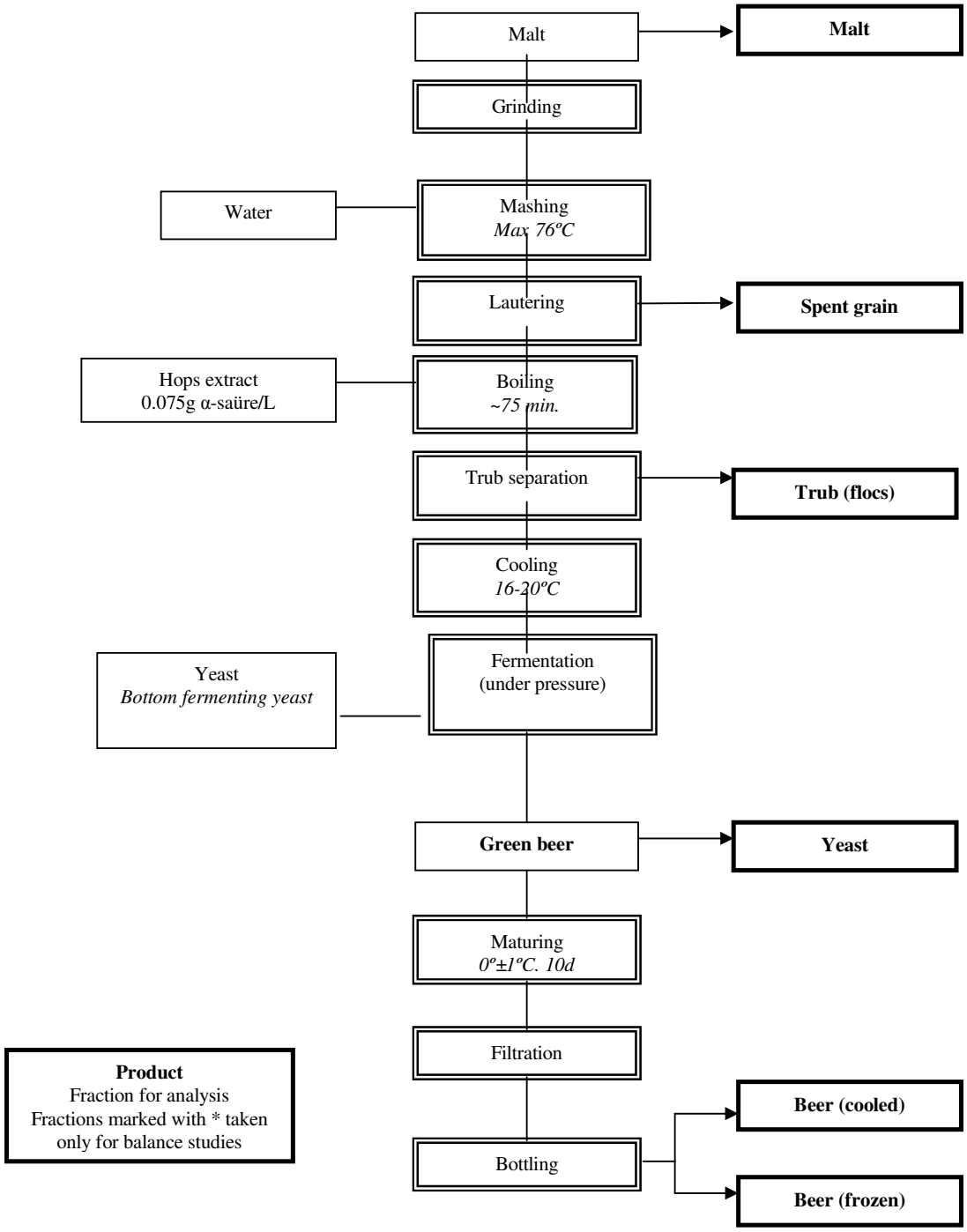


Figure 7. Flow-chart showing the processing for beer.



Wheat. In four field trials in Northern Europe (France, Belgium and Germany) two applications of an EC formulation at 0.84-0.93 kg ai/ha were made by mini-boom sprayer in 300 l water/ha to 100 sq m single replicate plots. Samples of mature grain (1-2 kg) were taken for analysis and 25 kg for processing (Zietz and Klimmeck) [Ref: C029571]. The grain from one trial was processed as a balance study which included the complete number of by-products, while the grain from the other three was used in follow-up studies on flour, bran, and whole-meal flour and bread were analysed (Zietz and Klimmeck) [Ref: C032569].

The processing studies investigated the transfer of residues through milling and baking. For flour, the grain was cleaned, conditioned and the epidermis removed. The grain was then ground and separated into straight flour, coarse bran and fine bran (middlings). The bran fractions were combined and scoured to separate the low-grade meal. An appropriate amount of low-grade meal was blended with straight flour to adjust the mineral content to 0.6% according to industrial standardisation. For whole-meal the cleaned and conditioned grain was also milled and the bran fractions ground into fine particles, with all fractions combined in a blender. Flour was processed to bread by kneading a portion of the whole-meal flour, sour dough, and other typical ingredients. After fermentation and proofing the loaves were baked at 210ºC for one hour. The yield of flour (Type 550) ranged from 70.1 to 83.0% in all four processing studies. The yield of whole-meal flour ranged from 88.3 to 99.0% and that of whole-grain bread was theoretically between 142.6 and 153.1% with reference to the whole-meal flour used for baking.

Samples of the grain and the various processed fractions were analysed for total prochloraz residues using method RESID/88/72, with a limit of determination for all fractions of 0.05 mg/kg and recovery rates of 61-103% (mean 89%, n=28, sd 11%). Residues in the treated grain samples ranged from <0.05 to 0.09 mg/kg. After milling, no residues above the limit of quantification (0.05 mg/kg) were found in any Type 550 flour samples, but residues of 0.11 to 0.39 mg/kg were determined in the treated total bran fractions. The highest residues were in the offal and epidermis samples (2.5 and 1.6 mg/kg respectively) and levels of <0.05 to 0.11 mg/kg were reported in the whole-meal flour used for whole-grain bread in which residues ranged from 0.05 to 0.12 mg/kg.

Processing factors were calculated for each analysed fraction. In whole-grain bread the transfer factor was 1.3, and for total bran 3.4.

The results of the above study, and various other studies for which summaries were reported, are shown in Table 100.

Table.100. Effects of processing on residues in wheat grain treated with prochloraz.

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
Germany, 2001	Wheat grain	0.09		C029571
Hunstetten-Gorsroth	Cleaned grain	0.09	1.0	C032569
	Offal	2.5	28	
	Epidermis	1.6	18	
	Coarse bran	0.33	3.7	
	Fine bran	0.2	2.2	
	Straight flour	<0.05	<0.56	
	Low grade meal	0.14	1.6	
	Bran (total bran)	0.39	4.3	
	Flour (type 550)	<0.05	<0.56	
	Total bran (wholemeal)	0.31	3.4	
	Straight flour (wholemeal)	<0.05	<0.56	
	Wholemeal flour	0.11	1.2	
	Dough	0.11	1.2	
	Whole-grain bread	0.12	1.3	

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
Germany, 2001 Grabau	Wheat grain Bran (total bran) Flour (type 550) Whole-meal flour Whole grain bread	<0.05 0.11 <0.05 <0.05 0.05		C029571 C032569
Belgium, 2001 Moyenne	Wheat grain Bran (total bran) Flour (type 550) Whole-meal flour Whole grain bread	<0.05 0.11 <0.05 <0.05 0.05		C029571 C032569
France, 2001 Choisies	Wheat grain Bran (total bran) Flour (type 550) Whole-meal flour Whole grain bread	<0.05 0.21 <0.05 0.07 0.09		C029571 C032569 N France
USA, 1985 Rock Springs, PA 2×0.56 kg ai/ha, PHI 59 days	Wheat grain Bran Germ Flour	<0.02 0.03 0.03 <0.02		A87947
USA, 1985 Rock Springs, PA 2×0.1.1 kg ai/ha, PHI 59 days	Wheat grain Bran Germ Flour	<0.02 0.04 0.05 <0.02		A87947
USA, 1985 Steele, MO 2×0.28 kg ai/ha, PHI 31 days	Wheat grain Bran Germ Flour	0.06 0.05 0.04 0.02	 0.83 0.66 0.33	A87947
USA, 1985 Steele, MO 2×0.56 kg ai/ha, PHI 31 days	Wheat grain Bran Germ Flour	0.09 0.11 0.07 <0.02	 1.2 0.78 <0.22	A87947
USA, 1985 Steele, MO 2×1.1 kg ai/ha, PHI 31 days	Wheat grain Bran Germ Flour	0.35 0.21 0.16 0.05	 0.6 0.46 0.14	A87947

Figure 8. Flow-Chart showing the summary of the processing of wheat grain.

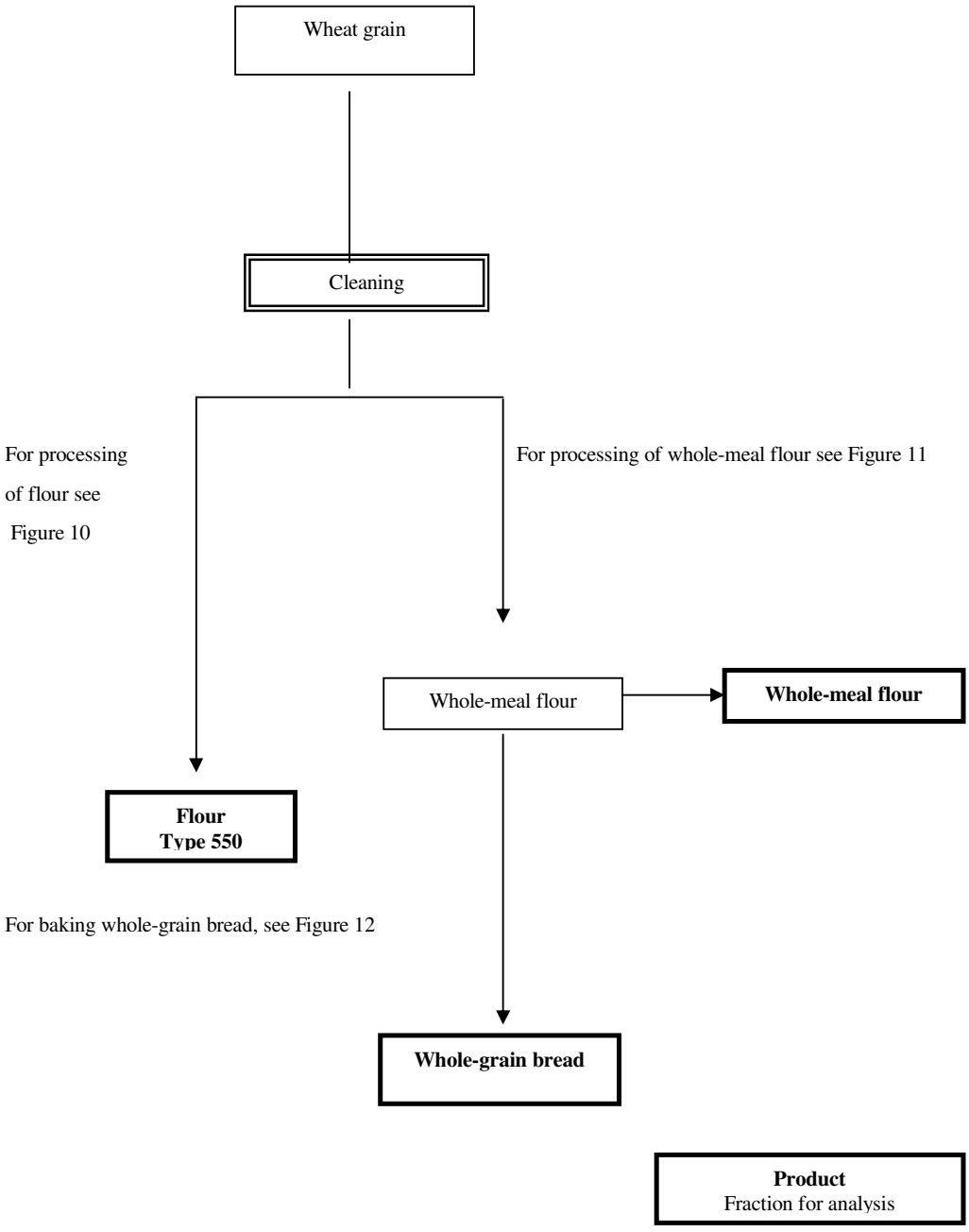


Figure 9. Flow-chart showing the processing for wheat flour (Type 550).

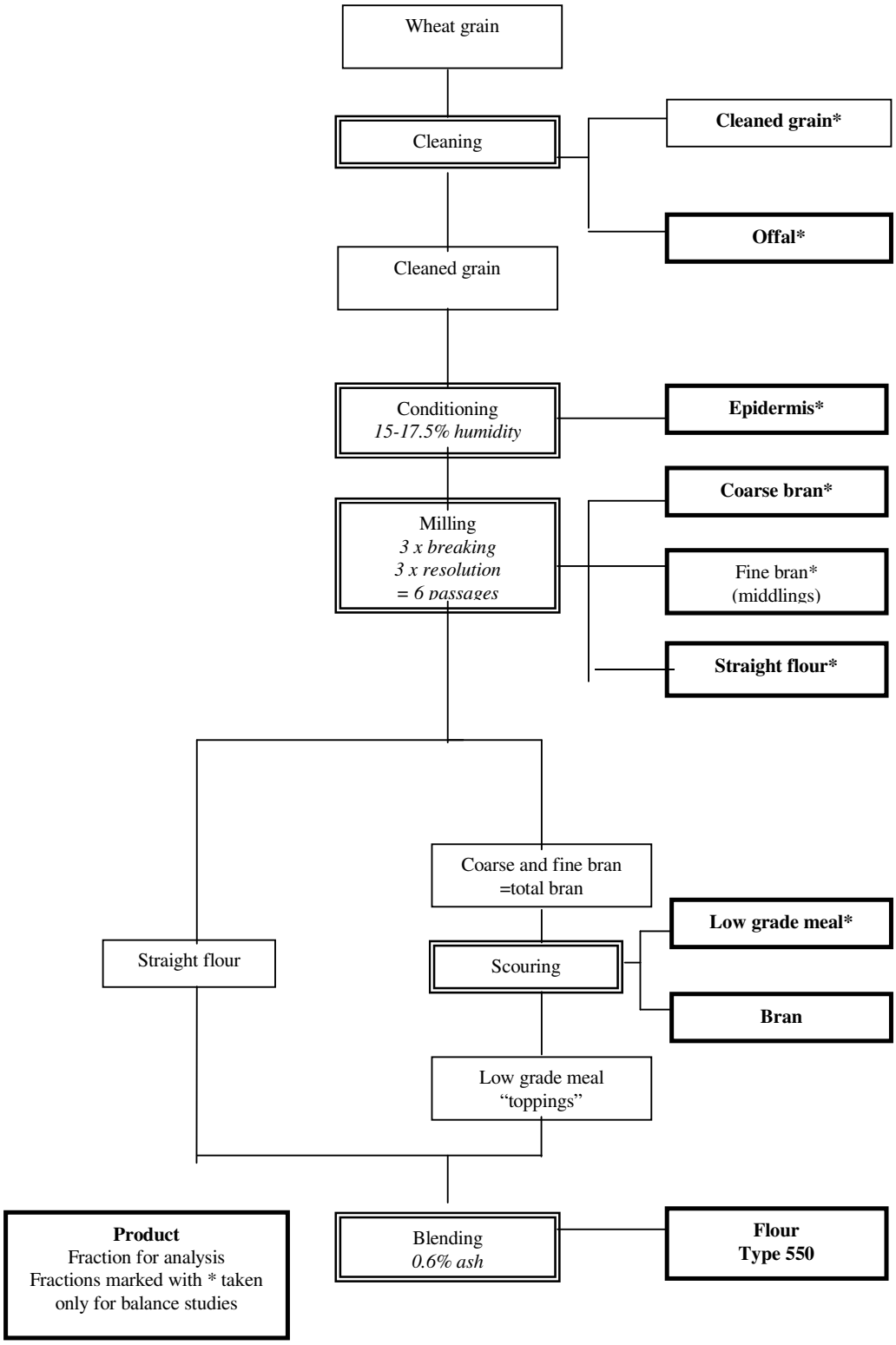


Figure 10. Flow-chart showing the processing for wheat whole-meal flour.

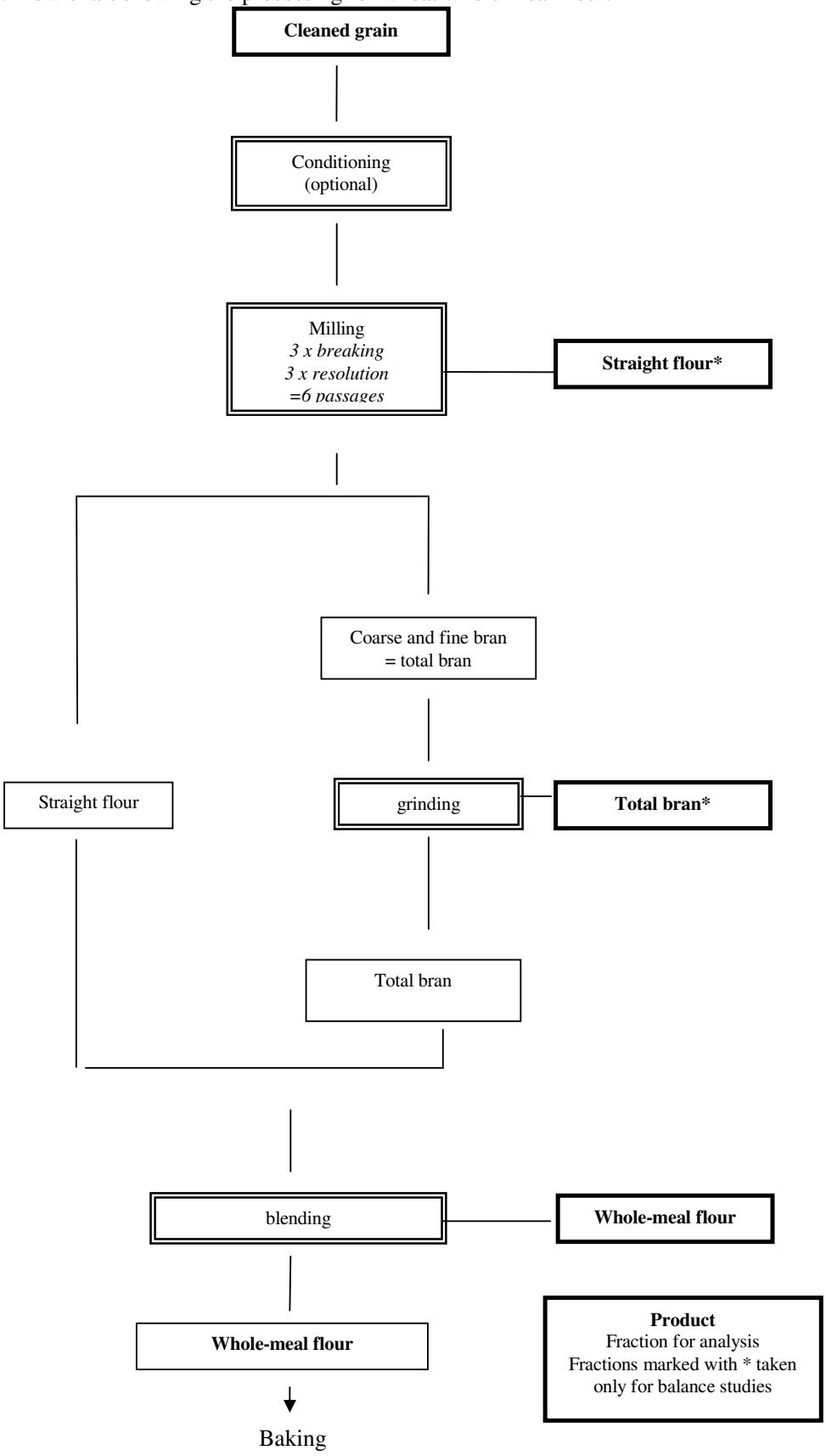
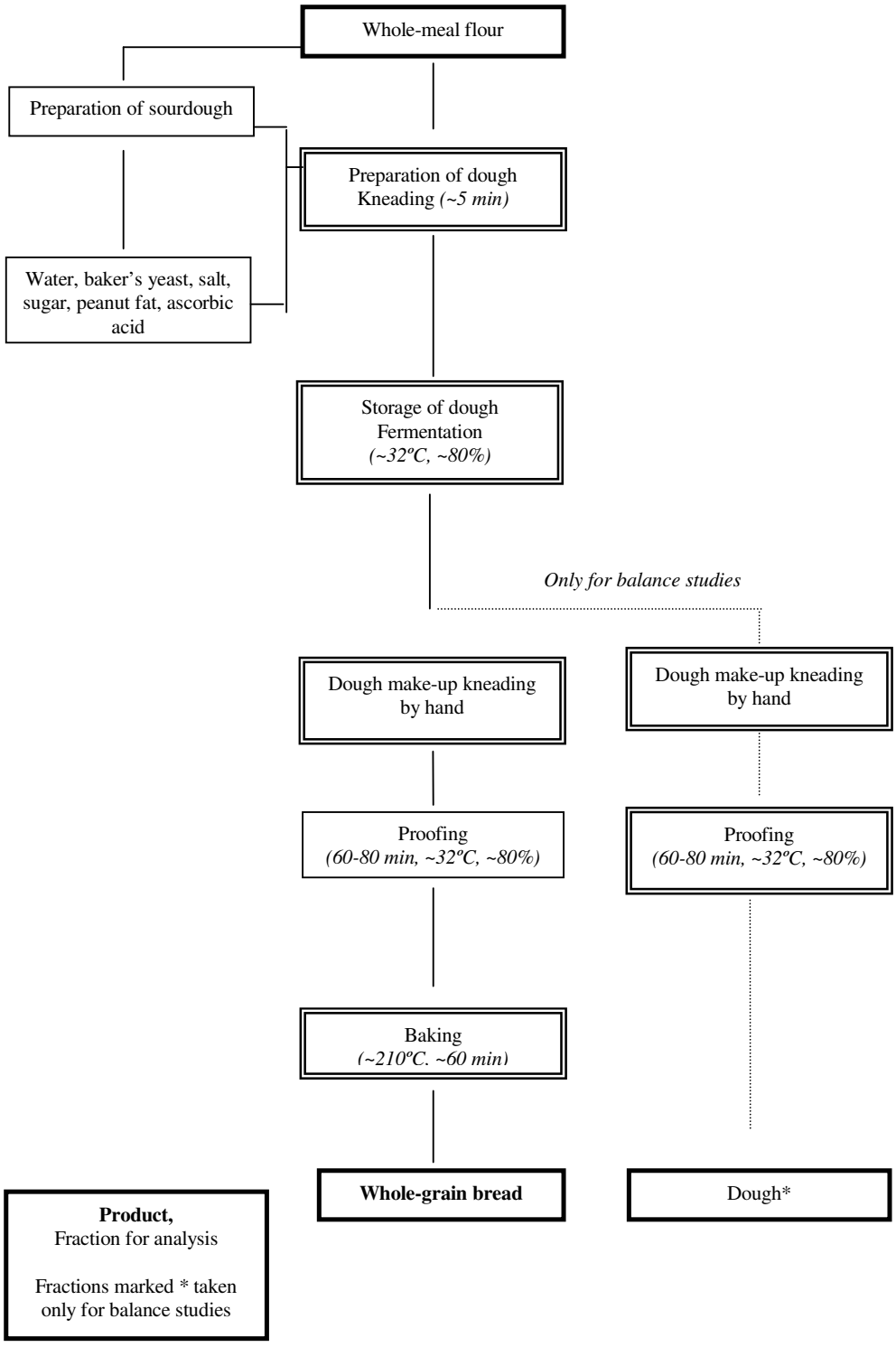


Figure 11. Flow-chart showing the baking of whole-meal flour to whole-grain bread.



Rape seed. In two trials in France (Preu, 2003 [Ref: C037012]) the crops in single replicate 80 sq metre plots were treated twice with EC formulations, each at a rate of 0.4 kg ai/ha prochloraz in 300 l of water using a knapsack sprayer and hand-held mini-boom, 13-16 days apart. 12 kg of mature seed harvested 56-59 days after the second application was taken for processing.

To simulate commercial processing practices, the seeds were conditioned in a hot-air stove at 80ºC to a moisture content of about 8% and pressed in a screw press to pressed oil and press cake. The press cake was pulverised to meal in an ultracentrifugal mill and extracted in a Soxhlet apparatus with n-hexane for about 3 hours at 79ºC. The fractions resulting from the solvent extraction step were miscella (mixture of crude oil and hexane) and solvent extraction cake meal. The micella was distilled in a vacuum rotary evaporator, yielding solvent extracted oil and hexane. An aliquot of the extracted oil was added to an aliquot of the screw–pressed oil to produce crude oil. The solvent extraction cake meal was steam-distilled for about 1 hour to remove the hexane and then oven-dried at 80ºC for 30-60 min, (dry matter content minimum of 86%). The crude oil was pre-cleaned by heating with about 5% w/w water and 1% w/w citric acid for 15-30 min at 80-90ºC and the precipitated compounds were removed by centrifugation. The oil was then treated with 60% w/w sodium hydroxide at 90ºC, and the sodium soaps that formed were removed by centrifugation. The de-acidified oil was then bleached and volatiles removed by steam distillation.

Samples were worked up using the procedures described in method RESID/88/72, but using GC-MSD to determine total prochloraz residues. The reported limit of determination was 0.05 mg/kg for all samples and the method was validated at the limit of determination and at tenfold the limit. Overall recovery rates of 92% (n=8, RSD 17.5%) and 85% (n=10, RDS 15.7%) were reported for the two trials.

For press cake and extracted press cake, transfer factors were 1.4-1.7, showing that a slight concentration of residues takes place in these fractions. Transfer factors for all oil factors were below 1, with the lowest factors in refined oil. Results of this and other studies for which summary information was provided are summarised in Table 101.

Table 101. Effects of processing on residues in seed from rape treated with prochloraz.

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
France, 2001 Etrepagny, Rouen 2×0.4 kg ai/ha, PHI 56-59 days	Rape seed Press cake Screw-pressed oil Crude oil Solvent extracted oil Refined oil Extracted press cake meal	0.12 0.2 0.06 0.07 0.08 <0.05 0.18	 1.7 0.5 0.58 0.67 <0.42 1.5	C037012
France, 2001 Varennes, Toulouse 2×0.4 kg ai/ha, PHI 56-59 days	Rape seed Press cake Screw-pressed oil Crude oil Solvent extracted oil Refined oil Extracted press cake meal	0.08 0.11 0.07 0.05 0.07 <0.05 0.11	 1.4 0.88 0.63 0.88 <0.63 1.4	C037012
Denmark, 1982 Alslev 2×0.45 kg ai/ha, PHI 53 days	Seed Hexane extracted oil	0.1 0.14	 1.4	A87819
Denmark, 1982 Sanderumgaard 2×0.45 kg ai/ha, PHI 53 days	Seed Hexane extracted oil	0.12 0.21	 1.8	A87819
Denmark, 1982 Rudkoebing 2×0.45 kg ai/ha, PHI 53 days	Seed Hexane extracted oil	0.08 0.16	 2	A87819

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
France, 2000	Seed	0.08		C026921
Launaguet	Crude oil	0.06	0.75	
2×0.4 kg ai/ha, PHI 68 days	Press cake	<0.05	<0.63	
	Refined oil	<0.05	<0.63	
France, 2000	Seed	0.07		C026921
Montfavet	Crude oil	0.05	0.71	
2×0.4 kg ai/ha, PHI 55 days	Press cake	<0.05	<0.71	
	Refined oil	<0.05	<0.71	
France, 2000	Seed	0.05		C026921
Touffreville	Crude oil	0.1	2	
2×0.4 kg ai/ha, PHI 56 days	Press cake	<0.05	<1	
France, 1982	Seed	0.23 (mean)		A87807
St Just en Chausee	Hexane extracted oil	0.27 (mean)	1.2	
2×0.45 kg ai/ha, PHI 34 days				
France, 1982	Seed	0.08 (mean)		A87807
Pisaux	Hexane extracted oil	0.11 (mean)	1.4	
2×0.45 kg ai/ha, PHI 25 days				
France 1982	Seed	0.1 (mean)		A87807
Sens	Hexane extracted oil	0.14 mean)	1.4	
2×0.45 kg ai/ha, PHI 38 days				
France 1982	Seed	0.06 (mean)		A87807
Veron	Hexane extracted oil	0.17 (mean)	2.8	
2×0.45 kg ai/ha, PHI 27 days				
Germany, 1990	Seed	0.05		A88139
Thann	Oil	0.12	2.4	A88140
2×0.6 kg ai/ha, PHI 52 days	Cake	0.05	1	
Germany, 1990	Seed	<0.05		A88139
Hosbach	Oil	<0.05		A88140
2×0.6 kg ai/ha, PHI 76 days	Cake	0.05		
Germany, 1990	Seed	<0.1		A88141
Wensin	Oil	0.1		A88142
2×0.54 kg ai/ha, PHI 85 days	Cake	<0.05		
Germany, 1989	Seed	0.14		A88086
Bad Munder	Oil	<0.1	<0.71	A88087
2×0.6 kg ai/ha, PHI 95 days	Cake	0.11	0.79	
Germany, 1986	Seed	0.07		A87993
Diesenbach	Hexane extracted oil	0.2	2.9	
2×0.6 kg ai/ha, PHI 59 days	Cake	0.08	1.1	
Germany, 1986	Seed	0.08		A87993
Hohenlieth	Hexane extracted oil	0.13	1.6	
2×0.6 kg ai/ha, PHI 53 days	Cake	0.07	0.88	
Germany, 1986	Seed	<0.05		A87993
Varenesch	Hexane extracted oil	0.1		
2×0.6 kg ai/ha, PHI 95 days	Cake	<0.05		
Germany, 1985	Seed	0.17		A87928
Hohenlieth	Hexane extracted oil	0.2	1.2	
1×0.8 kg ai/ha, PHI 79 days	Cake	0.09	0.53	
Germany, 1985	Seed	0.11		A87928
Hohenlieth	Hexane extracted oil	0.2	1.8	
2×0.6 kg ai/ha, PHI 60 days	Cake	0.05	0.45	
Germany, 1985	Seed	0.12		A87928
Ottendorf	Hexane extracted oil	0.21	1.8	
2×0.6 kg ai/ha, PHI 72 days	Cake	0.07	0.58	
Germany, 1985	Seed	0.09		A87928
Untermassing	Hexane extracted oil	0.33	3.7	
1×0.8 kg ai/ha, PHI 68 days	Cake	<0.05	0.56	
Germany, 1985	Seed	0.08		A87928
Untermassing	Hexane extracted oil	0.27	3.4	
1×0.8 kg ai/ha, PHI 57 days	Cake	<0.05	0.63	
Germany, 1985	Seed	0.15		A87928
Untermassing	Hexane extracted oil	0.62	4.1	
2×0.6 kg ai/ha, PHI 58 days	Cake	0.05	0.33	

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
Germany, 1985 Hohenlieth 2×0.6 kg ai/ha, PHI 60 days	Seed Hexane extracted oil Cake	0.09 0.3 0.1	 3.3 1.1	A87935
Germany, 1985 Ottendorf 2×0.6 kg ai/ha, PHI 72 days	Seed Hexane extracted oil Cake	0.1 0.25 0.07	 2.5 0.4	A87935
Germany, 1985 Untermassing 2×0.6 kg ai/ha, PHI 58 days	Seed Hexane extracted oil Cake	0.2 0.75 0.08	 3.8 0.4	A87935
Sweden, 1982 E county 1×0.45 kg ai/ha, PHI 60 days	Seed Hexane extracted oil	0.23 0.35	 1.5	A87991
Sweden, 1982 R county 1×0.45 kg ai/ha, PHI 72 days	Seed Hexane extracted oil	0.14 0.21	 1.5	A87991
Sweden 1982 Ultuna 1×0.45 kg ai/ha, PHI 47 days	Seed Hexane extracted oil	0.17 0.26	 1.5	A87991

Figure 12. Flow-chart showing the processing of rape seeds.

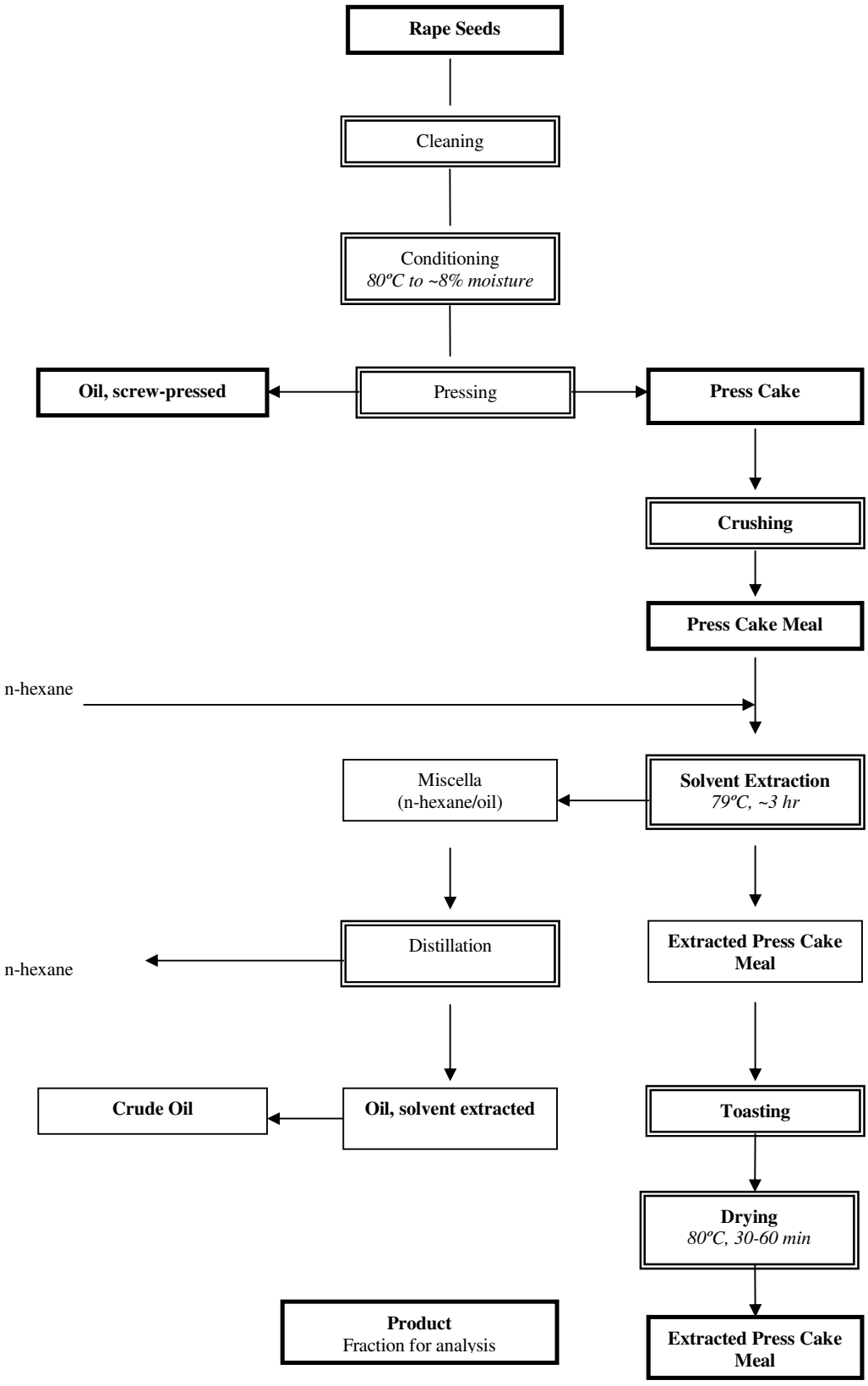
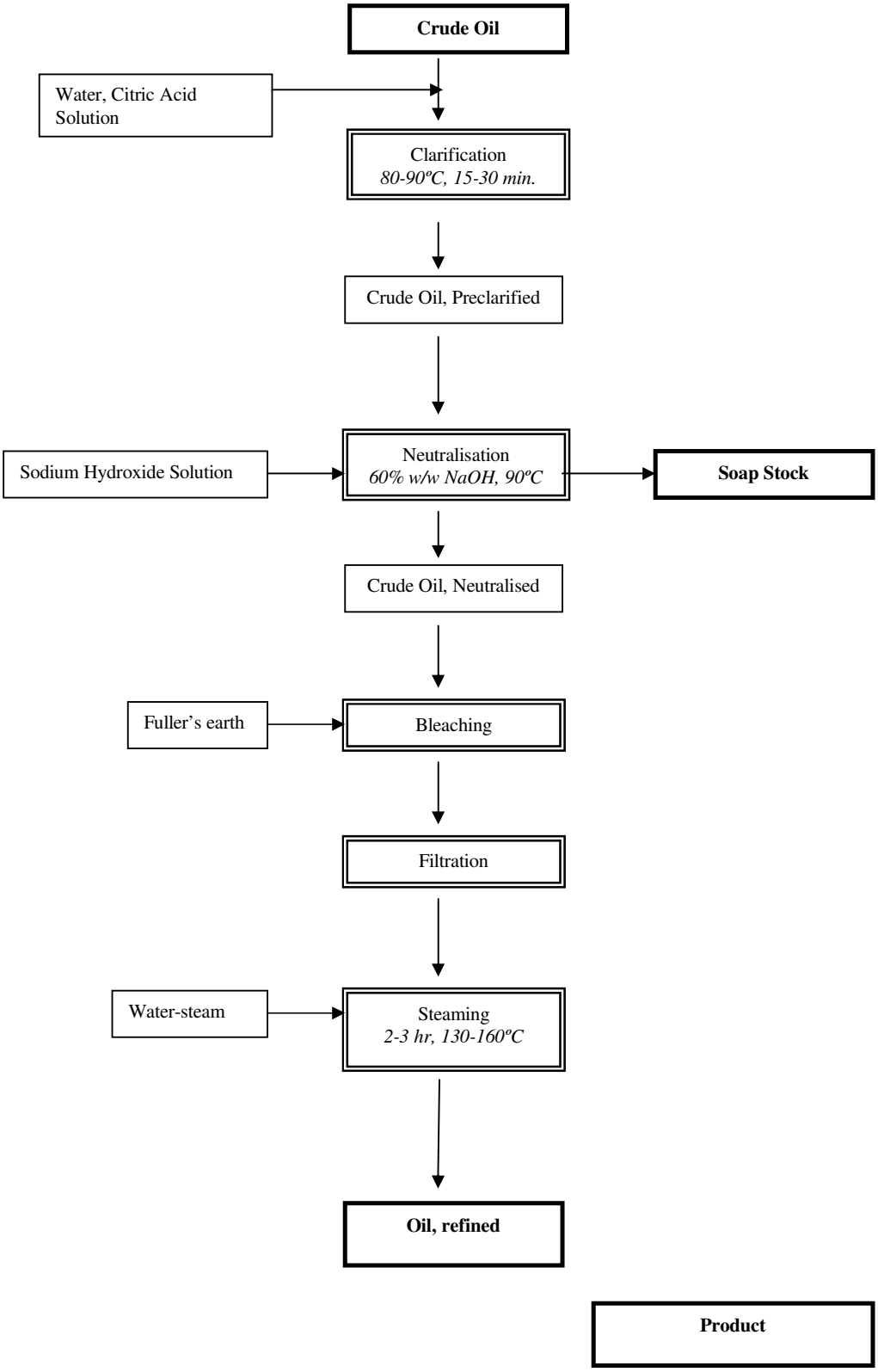


Figure 13. Flow-chart showing the processing of rape crude oil.



Mushrooms. In a study by Churchill and Longland, 1982 [Ref: A87824] total prochloraz residues were measured in fresh, preserved and dehydrated mushrooms following one application of prochloraz, prochloraz/carbendazim or prochloraz manganese complex in France. Mushroom beds were sprayed at rates of 0.3-0.8 g ai/sq m and the mushrooms harvested and either dehydrated or preserved in glass jars. Samples of fresh, dehydrated and preserved mushrooms, as well as the preservation liquor were extracted and analysed for total prochloraz-derived residues using method RESID/82/88. Mean recoveries were 94.3±21.2% (n=4) for fresh and 84.1±10.2% (n=8) for preserved mushrooms, 77.7 ± 18.0 % (n=6) for the liquor and 101.8±12.9% (n=4) for dehydrated mushrooms. Limits of determination were estimated at 0.1 mg/kg for fresh or preserved mushrooms and liquor, and 0.4 mg/kg for dried mushrooms.

Mean transfer factors were 3.7 (3.3-4.2) for dried and 0.41 (<0.31-0.5) for preserved mushrooms, and 0.65 (0.59-0.71) for the liquor.

Table 102. Effects of processing on residues in mushrooms treated with prochloraz in France in 1982.

Location, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
Institute Technique Champignon 1×0.5 g ai/square metre[1]	fresh	0.28		A87824
	dehydrated	0.93	3.3	
	preserved	0.14	0.5	
	liquor	0.2	0.71	
Institute Technique Champignon 1×0.6 g ai/square metre[2]	fresh	0.32		A87824
	dehydrated	1.11	3.5	
	preserved	<0.1	<0.31	
	liquor	0.19	0.59	
Institute Technique Champignon 1×1.0 g ai/square metre[1]	fresh	0.52		A87824
	dehydrated	2.2	4.2	

[1] as manganese chloride complex
[2] co-formulation with carbendazim

Oranges. In a study in South Africa by Manley and Snowdon, 1982 [Ref: A87800], Washington navel oranges were treated with a brush application of prochloraz (EC) at a concentration of 0.1 kg ai/hl (in combination with thiabendazole, 2,4-D and ethephon) and refrigerated for 11 weeks. 12 cases of the fruit were processed commercially in the UK to produce “whole fruit” juices used as intermediates in the manufacture of orange drinks.

Approximately 80 kg of oranges were finely chopped, passed through a 6 mm sieve and diluted with 70 l of water. Samples were taken from the mix at this stage (sample 1) and from the sieve (sample 2). Citric acid (330 g) and metabisulphite preservative (765 g) were added, and the mix pasteurised by heating at 86ºC for 5 min to give “42% Comminuted Orange” (sample 3). In addition, about 60 kg of oranges were finely chopped and passed through a 13 mm sieve. Samples were taken from the thick liquor (sample 4) and from the wet solid on the screen (sample 5). After the addition of 55 l of water, citric acid and benzoate preservative, the mix was passed through a centrifugal filter with a 0.8 mm screen. The wet from this screen was sampled (sample 6). The “thin” liquor was pasteurised at 82ºC for 20 min to give “Special Whole Orange Compound” (sample 7).

Samples were analysed for total prochloraz residues using method RESID/82/88. Reported recoveries were 96.6±18.5% (n=16) from orange peel and pulp, and 96.2±18.1% (n=10) from processed fractions. Residues of 0.28 mg/kg were reported in the control fruit, and similar levels (0.16 to 0.48 mg/kg) were also measured in the various processed samples. It was considered that, because an additional analysis of untreated oranges reported apparent residues below 0.05 mg/kg, the control fruit might have become contaminated during treatment or subsequent handling.

Transfer factors for the “42% Comminuted Orange” and “Special Whole Orange Compound” were calculated as 0.33 and 0.25 respectively, and for the coarse material retained by the screens, (predominantly peel) as between 1.1 and 2.7.

Table 103. Effects of processing on residues in oranges treated with prochloraz.

Country, year	Processed fraction	Total prochloraz mg/kg	Processing factor	Ref
South Africa, 1982 Letaba Estates 1×0.1 kg ai/hl post-harvest brush, PHI approx 77 days	whole oranges 1. diluted mix after screening 2. solids retained by screen 3. 42% comminuted orange 4. chopped fruit after screening 5. solids retained by 1st screen 6. solids retained by 2nd screen 7. special whole orange compound	0.57 (c0.28) 0.2 (c0.33) 0.63 (c0.3) 0.19 (c0.13) 0.3 (c0.29) 1.6 (c0.48) 0.67 (c0.42) 0.14 (c0.16)	 0.35 1.1 0.33 0.53 2.7 1.2 0.25	A87800

Figure 14. Flow-charts showing the processing of whole oranges to "42% Comminuted Orange" and to "Special Orange Compound".

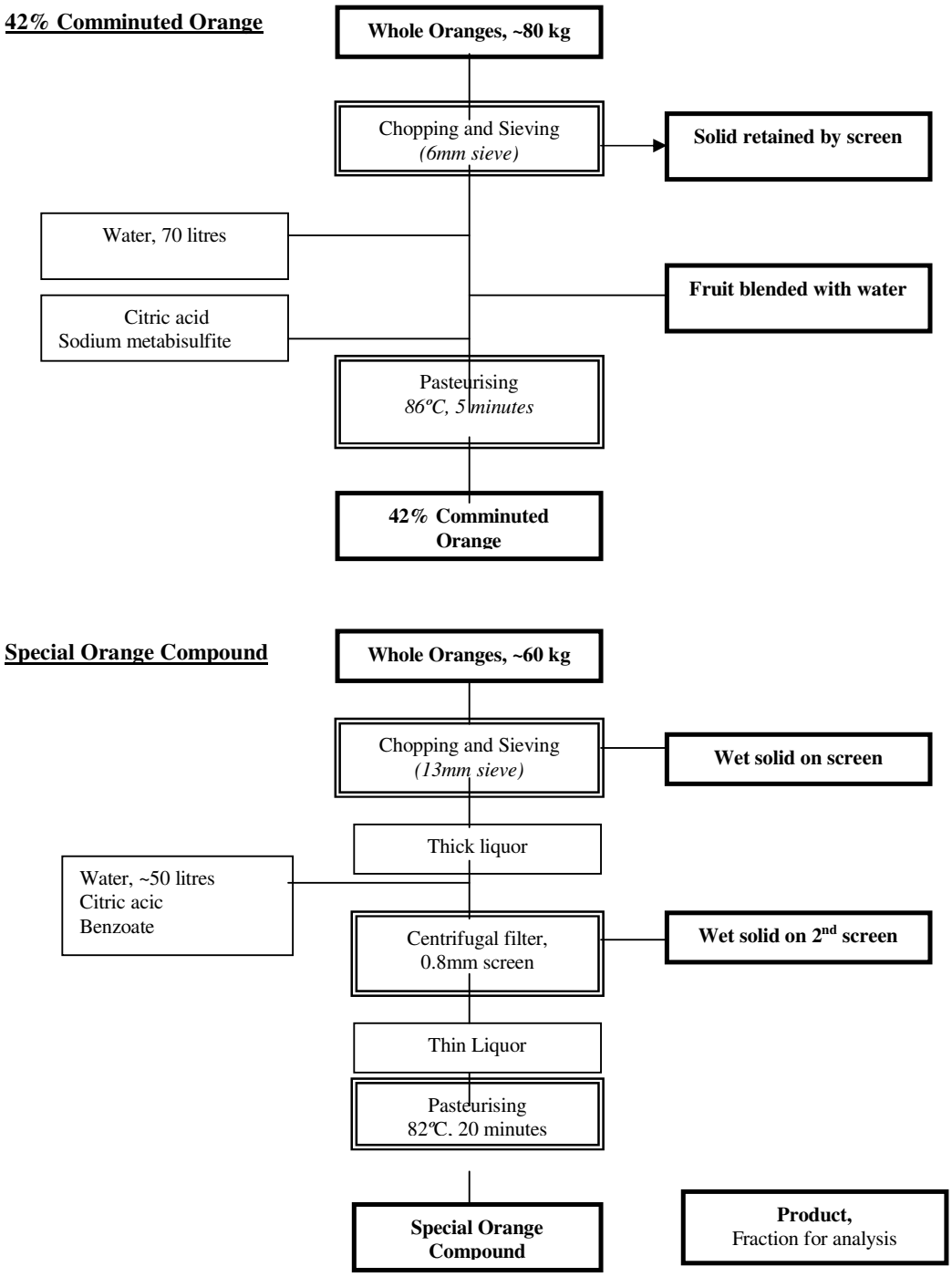


Table 104. Summary of processing factors associated with prochloraz residues in processed foods and feedstuffs.

COMMODITY	Processing factor[1]		
	prochloraz	mean	Reference
BARLEY			
grain			C029570
pearling dust	4.8, 4.8, 4.4, 2.3	4.1	C034687
pot barley	0.5, 0.5, 0.46, 0.29	0.44	
malt	0.65, 0.59, 0.5, 0.44	0.55	
green beer	0.1, 0.1, 0.09, 0.08,	0.09	
WHEAT			
grain			C029571
bran (total)	4.3	4.3	C032569
bran, wholemeal (total)	3.4	3.4	A87947
bran (USA studies)	1.2, 0.83, 0.6	0.88	
germ	0.78, 0.66, 0.46	0.63	
flour (whole meal)	1.2	1.2	
flour (unspecified)	0.33, <0.22, 0.14	0.23	
bread (whole grain)	1.3	1.3	
RAPE SEED			
seed			C037012
press cake (meal)	1.7, 1.4, 1.1, 1.1, 1.0, <1.0, 0.88, 0.79, <0.71, 0.63, <0.63, 0.58, 0.56, 0.53, 0.45, 0.4, 0.4, 0.33	0.79	A87819 C026921 A87807
extracted oil	4.1, 3.8, 3.7, 3.4, 3.3, 2.9, 2.8, 2.5, 2.4, 2.0, 2.0, 1.8, 1.8, 1.8, 1.6, 1.5, 1.5, 1.5, 1.4, 1.4, 1.4, 1.2, 1.2, 0.88, 0.75, 0.71, 0.71, 0.67	2.0	A88139 A88140 A88141
refined oil	<0.71, <0.63, <0.63, <0.42	<0.6	A88142 A88086 A88087 A87993 A87928 A87935 A87991
MUSHROOMS			
fresh			A87824
dehydrated	4.2, 3.5, 3.3	3.7	
preserved	0.5, <0.31	0.4	
preservation liquor	0.71, 0.59	0.65	
ORANGES			
fruit			A87800
42% comminuted orange	0.33	0.33	
whole orange compound	0.25	0.25	
retained solids	2.7, 1.2, 1.1	1.7	
SUNFLOWER SEED			
seed			A88020
oil	2.2, 1.8, 1.2, 1.1, 0.77, <0.36	1.2	
cake	<0.71, 0.56, 0.56, 0.45, <0.36, <0.31	0.49	
PEPPERS			
green peppercorns			A7995
black peppercorns	1.1, 1.1, 0.88, 0.75	0.96	
white peppercorns	0.43, 0.39, 0.3, 0.29	0.35	

[1] Processing factors were not calculated for individual trials when residues in the raw agricultural commodity were at or about the limit of determination.

In storage

In a study on the fate of total prochloraz residues in oranges (Manley and Snowdon, 1982) [Ref: A87800] sodium orthophenolphenate dipped fruit were treated with prochloraz (EC) at rates of 0.1

and 0.2 kg ai/hl and waxed before being shipped under refrigeration to the UK. On arrival 44 days after treatment, samples of the fruit were stored in the dark at either 4°C or at 20°C and 5 oranges from each treatment were removed at intervals for analysis by method RESID/82/88. Reported recoveries were 96.6 ± 18.5% (n=16) from the peel and pulp. Residues of 0.11 mg/kg were calculated in the control fruit (0.33 mg/kg in the peel and 0.07 mg/kg in the pulp). It was concluded that, because an additional analysis of untreated oranges resulted in apparent residues below 0.05 mg/kg, the control fruit might have become contaminated during treatment or subsequent handling. A limit of determination of 0.05 mg/kg was considered appropriate.

Table 105. Effects of storage on residues in oranges treated after harvest with prochloraz and held under refrigeration for 44 days.

Country, year (variety)	Application		Storage (days)	Total residues, mg/kg				Ref
	Form	kg ai/hl		peel	pulp	whole fruit		
						residue	% remaining	
South Africa, 1982	EC	0.1	0	1.7, 1.3	0.05, 0.05	0.51[1], 0.37[1]		A87800
Letaba Estates			ambient					
			7	2.6	0.08	0.7[1]	159	
			14	1.8	<0.05	0.4[1]	91	
			21	1.8	<0.05	0.43[1]	98	
			21			0.45, 0.33	89	
			cool					
			7	2.7	0.05	0.6[1]	136	
			14	2.5	0.05	0.56[1]	127	
			21	1.7	<0.05	0.4[1]	91	
South Africa, 1982	EC	0.2	0	2.4	0.07	0.72[1]		A87800
Letaba Estates			ambient					
			7	3	0.06	0.71[1]	99	
			14	3.6	<0.05	0.72[1]	100	
			21	3.6	0.06	0.91[1]	126	
			21			0.88, 1.1	138	
			cool					
			14	3.5	<0.05	0.77[1]	107	
			21	2.8	<0.05	0.63[1]	88	

[1] whole fruit residues calculated from relative weights and residues in peel and pulp
[2] with thiabendazole
[3] with 2,4-D

Residues in post-harvest treated mandarins, oranges, avocados, bananas and papaya sampled at various intervals during storage at ambient temperatures or under refrigeration have been reported in the previous section of this evaluation, and are summarised below:

Table 106. Effects of storage on residues in mandarins, oranges, avocados and bananas treated post-harvest with prochloraz.

Country, year (variety)	Application		PHI (days)	Total prochloraz residues, mg/kg Whole fruit	% residue remaining	Ref
	storage conditions	kg ai/ hl				
MANDARINS						
Spain, 1994 Alcacer (Clementina fina)	ambient	0.08	0 7 15	5.4 5.3 4.0	 98 74	A89448
Spain, 1994 Alcacer (Fortuna)	ambient	0.08	0 7 15	2.4 3.5 1.9	 146 79	A89448
Spain, 1994 Alcacer (Fortuna)	ambient	0.08	0 7 15	2.7 3.4 1.1	 126 40	A89448
Spain, 1994 Alcacer (Hernandina)	ambient	0.08	0 7 15	1.2 2.0 4.6	 160 380	A89448
Spain, 1994 Alcacer (Hernandina)	ambient	0.08	0 7 15	2.9 2.0 3.9	 69 134	A89448
ORANGES						
Australia, 1981 Kulnura (Late Washington)	ambient	0.025	1 2 4 8 16	0.89[1] 0.44 [1] 0.89[1] 0.71[1] 0.74[1]	 49 100 80 83	A87773
Australia, 1981 Kulnura (Late Washington)	ambient	0.05	1 2 4 8 16	0.77[1] 0.98[1] 0.47[1] 1.0[1] 0.71[1]	 127 61 130 92	A87773
Spain, 1981 Valencia (Valencia Late)	ambient	0.3[2]	14 20 27	1.7[1] 1.7[1] 1.6[1]	 100 94	A87772
Spain, 1980 Valencia (Washington navel)	20-22°C	0.05	1 5 10	0.8[1] 1.0[1] 0.56[1]	 125 70	A87770
Spain, 1980 Valencia (Washington navel)	20-22°C	0.1	1 5 10	0.52[1] 0.91[1] 0.46[1]	 175 88	A87770
UK, 1981 Chesterford	cool store	0.07	1 7 21 35 70	1.6[1] 1.7[1] 1.5[1] 1.7[1] 1.1[1]	 106 94 106 69	A87776
Spain, 1980 Valencia (Washington navel)	3-4°C	0.05	10 20 60	0.61[1] 0.52[1] 0.47[1]	 85 77	A87770
Spain, 1980 Valencia (Washington navel)	3-4°C	0.1	20 60	1.2[1] 0.52[1]	 43	A87770
Morocco, 1983 Casablanca (Maroc Late)	5°C	0.2[2]	5 34	0.61 0.64 c0.32	 105	A87857
Morocco, 1983 Casablanca (Maroc Late)	5°C	0.26[2]	5 34	0.7 0.95 c0.32	 136	A87857
AVOCADOS						
Australia, 1983 Alstonville (Fuerte)	23°C	0.025	0 7	0.81, 1.0 0.4, 0.44	 46	A87830

Country, year (variety)	Application		PHI (days)	Total prochloraz residues, mg/kg Whole fruit	% residue remaining	Ref
	storage conditions	kg ai/ hl				
Australia, 1983 Alstonville (Fuerte)	23°C	0.025	0 7	0.16, 0.37 0.39, 0.24	 119	A87830
Australia, 1983 Alstonville (Fuerte)	23°C	0.05	0 7	0.42, 0.34 0.23, 0.28	 67	A87830
BANANA						
Australia, 1981 Kulnura (Cavendish)	ambient	0.025	9 10 12 16	2.1[1] 1.8[1] 2.3[1] 1.8[1]	 86 109 86	A87777
Australia, 1981 Kulnura (Cavendish)	ambient	0.05	9 10 12 16	1.5[1] 2.2[1] 3.0[1] 2.2[1]	 147 200 147	A87777
Canary Islands, 1984 Santa Cruz (Dwarf Cavendish)	20-22°C	0.025	7 14 21	1.6[1] 1.2[1] 0.61[1]	 75 38	A87890
Canary Islands, 1984 Santa Cruz (Dwarf Cavendish)	20-22°C	0.05	7 14 21	1.8[1] 1.3[1] 0.98[1]	 72 54	A87890
South Africa, 1984 Nelspruit	4°C	0.02	0 36	2.4 1.4	 58	A87893
South Africa, 1984 Nelspruit	4°C	0.03	0 36	3.4 1.8	 53	A87893

[1] calculated whole fruit residues from relative weights and residues in peel and pulp

[2] applied with wax

RESIDUES IN ANIMAL COMMODITIES

Farm animal feeding studies

Studies on dairy cows and calves were reported.

Dairy cows. In a study by Heal and Beck, 2003 [Ref: C038443] four groups of three Friesian/Holstein-Friesian dairy cattle 4.5 to 6.5 years old, weighing 560 to 777 kg were given twice-daily doses of 200, 600 or 2000 mg prochloraz/day in a gelatine capsule, containing ground cattle cake in which the prochloraz had been adsorbed, with a balling gun for 28 consecutive days, equivalent to nominal diet concentrations of 10, 30 and 100 ppm respectively. Average feed consumption was 20 kg dry matter/day. The cows were dosed after morning and evening milkings and milk yields were recorded. During the acclimatisation and dosing periods, morning milk samples were pooled in proportion to yield with the milk sample taken from the previous evening and stored frozen. The day of sampling for the pooled sample was taken as the day of the morning sample. Taking the day of first dosing as day 0, milk samples from day -4 to day 28 inclusive from the control group and the 2000 mg/day group and day 22, 25 and 28 samples from the 600 mg/day group were analysed for prochloraz and three metabolites using a method validated as a part of this study. A larger milk sample was taken on day 24 from each animal and separated into “skim” and “cream” fractions at the University of Reading. These fractions from the control group and the 2000 mg/day group were also analysed for free prochloraz and three metabolites.

Residues of free prochloraz and metabolites BTS 44596, BTS 54906 and BTS 54908 were measured using LC/MS/MS method CLE.1905/079-02V. The limits of quantification were 0.01 mg/kg (prochloraz) and 0.005 mg/kg (metabolites).

Traces of prochloraz, all below the LOQ, were found in many of the post-dosing milk samples from animals in the 2000 mg/day group. Only BTS 44596 was consistently detected above its LOQ (0.005 mg/kg), and only in the 2000 mg/day dose group from Day 4 onwards, with a mean plateau level on days 22 to day 28 of 0.01 ± 0.003 mg/kg, although it was also detected below the LOQ in samples from animals in the 600 mg/day group. This metabolite partitions in favour of the "Cream" fraction when whole milk samples are separated into "Cream" and "Skim" fractions. No other residues of prochloraz or the three metabolites were consistently detected in milk samples, and no other residues above the LOQs were found.

Table 107. Residues of prochloraz and its metabolites in the milk of treated cows.

Day	Residues of prochloraz and metabolites (mg/kg)												
	Free prochloraz			BTS 54906			BTS 54908			BTS 44596			
												100 ppm	
	10 ppm	30 ppm	100 ppm	10 ppm	30 ppm	100 ppm	10 ppm	30 ppm	100 ppm	10 ppm	30 ppm	Single values	Mean
-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1			ND			ND			ND			0.0052, <0.01, <0.01	0.005
4			<0.01[3]			ND			ND			0.0098, 0.006, 0.0197	0.012
7			<0.01[3]			ND			ND			0.0081, 0.0071, 0.0099	0.008
10			<0.01[3]			ND			ND			0.013, 0.0101, 0.0108	0.011
13			<0.01[4]			ND			ND			0.0098, 0.0054, 0.0062	0.007
16			<0.01[4]			ND			ND			0.0091, 0.0062, 0.0074	0.008
19			ND			ND			ND			0.0096, 0.0108, 0.0097	0.01
22		ND	<0.01		ND	ND		ND	ND		<0.01	0.0118, 0.0083, 0.0087	0.01
24			<0.01			ND			ND			0.0134, 0.0091, 0.0088	0.01
25		<0.01[3]	<0.01		ND	ND		ND	ND		<0.01	0.0149, 0.0127, 0.0135	0.014
28		<0.01[3]	<0.01		ND	ND		ND	ND		<0.01	0.0094, 0.0063, 0.0067	0.007
24[1]			<0.01			ND			ND			0.0365, 0.024, 0.0343	0.032
24[2]			ND			ND			ND			0.0056, 0.0053, 0.0058	0.005

[1] analysis of cream

[2] analysis of skim milk

[3] value below limit of quantification reported in one of three animals

[4] value below limit of quantification reported in two of three animals

In a similar study by Peatman and Snowdon 1989 [Ref: 88070], and Cameron, 1990 [Ref: A88071] total prochloraz residues were determined in the tissues of 2 to 9 years old Friesian cattle after twice daily doses of prochloraz in a 28 day feeding trial.

Three animals, with body weights of 399-573 kg, were used as a control group for each of three treatment groups dosed at rates of 200, 600 and 2000 mg prochloraz/animal per day added to concentrated feed rations, with 2 kg of feed provided at each milking (i.e. 4 kg ration per day). 16 kg hay/day was also supplied to each animal. Dose rates were equivalent to nominal diet concentrations of 10, 30 and 100 ppm respectively, with an average feed consumption of 20 kg/day. Two further animals were maintained at the top dose rate (2000 mg/animal/day) and then untreated for 7 or 14 days after the last dose. No treatment-related clinical abnormalities were observed. In general, all concentrate feed offered was consumed.

Samples of subcutaneous and peritoneal fat, skeletal muscle, liver and kidney were frozen and subsequently analysed by method RESID/90/89 for total prochloraz-derived residues from metabolites hydrolysing to 2,4,6-trichlorophenol by direct hydrolysis of the freeze-dried substrate with pyridine-hydrochloride. After clean-up by steam distillation with simultaneous extraction into petroleum ether, residues were determined as 2,4,6-trichlorophenol by gas chromatography with mass selective detection (GC/MSD) with a mean recovery of 89% for BTS44595 and BTS44596. Residues were reported after correction for this recovery and an LOQ of 0.05 mg/kg total prochloraz was established.

Residues in all tissue types showed a good correlation to dose levels. The highest residues occurred in liver, with a mean of 2.8 mg/kg total prochloraz in the lowest dose group (200 mg/animal/day) ranging to 23 mg/kg in the highest dose group (2000 mg/animal/day). The latter showed a significant decline to 4.9 mg/kg after 7 days withdrawal and 2.6 mg/kg after 14 days. Corresponding mean residues in kidneys ranged from 0.52 mg/kg in the lowest dose group to 3.2 mg/kg in the highest dose group where residues after 7 and 14 days withdrawal declined to 0.89 and 0.65 mg/kg respectively.

The lowest residues found in muscle were below the limit of determination in the low dose group. In the highest dose group, a mean residue of 0.37 mg/kg decreased to 0.20 and 0.15 mg/kg after 7 and 14 days withdrawal respectively. Residues in subcutaneous and peritoneal fat were similar, with mean subcutaneous fat residues of 0.09 (low-dose) and 1.2 mg/kg (highest dose) and peritoneal fat values of 0.16 mg/kg (low dose group) and 1.0 mg/kg in the highest dose group. Withdrawal effects were less marked in these substrates, with subcutaneous and peritoneal fat residues of 0.63 and 0.61 mg/kg respectively, remaining after 7 days and 0.58 mg/kg remaining in peritoneal fat after 14 days.

Table 108. Total procloraz-derived residues in the tissues of treated cows.

Dose mg/animal/day (ppm in diet)	Animal no.	Dosing period (days)	Total prochloraz-derived residue level, (mg/kg)				
			Liver	Muscle	Kidney	Sub-fat	Peri-fat
Control	A/1 A/2 A/3	-	- 0.01, ND, 0.01 -	ND - ND	0.01, 0.01 0.009 0.007	0.005 ND, ND -	ND - ND, ND
200 (10 ppm)	B/4 B/5 B/6	1-28 1-29 1-30	2.5 2.7 3.3	<0.05 <0.05 <0.05	0.42 0.59 0.56	0.10 0.12 0.06	0.15 0.24 0.09
600 (30 ppm)	C/7 C/8 C/9	1-28 1-29 1-30	6.3 9.0 3.8, 4.1	0.13 0.14 0.07	1.8 1.2 0.97	0.51 0.39 0.23	0.44 0.40 0.33
2000 (100 ppm)	D/10 D/11 D/12	1-28 1-29 1-30	24 22 23	0.49 0.31 0.32	3.3 2.9 3.4	1.3 1.4 0.92	1.6 0.80 0.69
2000 (100 ppm)	D/13[1] D/14[2]	1-28 1-28	4.9 2.6	0.20 0.15	0.88, 0.90 0.69, 0.61	0.63 NA[3]	0.61 0.58

[1] Animal kept for withdrawal period of 7 days
[2] Animal kept for withdrawal period of 14 days

[3] Sample not available for analysis

Calves. A 28-day feeding study was summarised by Chambers, Houseden and Lomgland, 1985 [Ref: A87909]. Three calves were dosed orally twice daily with prochloraz at a rate of 0.263 mg/kg bw for 28 days. Liver, kidney, heart, muscle and fat were collected 18 hours after the last dose and analysed for prochloraz-related residues by method RESID/85/52. The limit of detection was set at 0.03 mg/kg for all types of tissues and recovery rates of 92% (sd 17%, n=5) in fat and 101% (sd 14%, n=14) in other tissues were reported.

The mean prochloraz-derived residues in the heart, liver, kidney, hind-leg muscle and shoulder muscle tissue were 0.18, 2.2, 0.55, 0.06 and 0.09 mg/kg respectively. The mean prochloraz-derived residue in omental and renal fat was 0.09 mg/kg.

Table 109. Total procloraz-derived residues in the tissues of treated calves.

Dose mg/kg bw/day	Animal no.	Total prochloraz-derived residue level, (mg/kg)						
		Heart	Liver	Kidney	Hind-leg muscle	Shoulder muscle	Omental fat	Renal fat
Control	2298	0.03	0.023	0.017	0.021	0.008	0.014	0.016
2 × 0.263 mg/kg bw/day (28 days)	2293 2294 2299	0.14) 0.13) 0.18 0.26)	2.2) 2.4) 2.2 2.1)	0.68) 0.42) 0.55 0.55)	0.07) 0.03) 0.06 0.07)	0.09) 0.08) 0.09 0.09)	0.08) 0.07) 0.09 0.12)	0.09) 0.07) 0.09 0.12)

NATIONAL RESIDUE LIMITS

The national MRLs are given below.

Table 110. National MRLs for prochloraz..

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
Australia	Avocado	5	
	Banana	5	
	Lettuce, head	2	
	Mango	5	
	Mushrooms	3	
	Papaya	5	
	Pineapple	2	
	Pistachio nut	0.05	T
	Sugar cane	0.05	(*)
Austria	Cereals	0.1	Total prochloraz
	Coffee beans	0.2	
	Potato	0.5	
	Fruit	5	
	Vegetables	0.5	
	Spices	0.2	
	Tea	0.2	
Belgium	Avocado	5	Total prochloraz
	Barley	1	
	Citrus	10	
	Garlic	0.5	
	Herbs	5	
	Hops	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Mango	5	
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other oilseeds	0.1	(*)
	Others	0.05	(*)
	Papaya	5	
	Peas (dry)	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
Denmark	Barley	1	
	Rape seed	0.5	
	Rye	0.2	
	Wheat	0.2	
European Community	Avocado	5	Total prochloraz
	Barley	1	
	Cattle fat	0.2	
	Cattle kidney	0.5	
	Cattle liver	2	
	Citrus	10	
	Eggs	0.1	(*)
	Garlic	0.5	
	Herbs	5	
	Hops (dried)	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Milks	0.02	(*)
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other cereals	0.05	(*)
	Other fruit	0.05	(*)
	Other meat products	0.1	(*)
	Other oilseeds	0.1	(*)
	Other pulses	0.05	(*)
	Other vegetables	0.05	(*)
	Papaya	5	
	Peas	0.3	
	Pineapple	5	
	Potatoes	0.05	(*)
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
France	Avocado	0.3	
	Barley	1	
	Citrus	10	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Eggs	0.1	(*)
	Garlic	0.5	
	Herbs	5	
	Hops (dry)	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Milks and milk products	0.02	(*)
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other meat products	0.1	(*)
	Other oilseeds	0.1	(*)
	Others	0.05	(*)
	Papaya	5	
	Peas	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
Germany	Avocado	5	Total prochloraz
	Barley	1	
	Citrus	10	
	Coffee beans	0.2	
	Garlic	0.5	
	Herbs	5	
	Hops	0.5	
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other food of plant origin	0.05	
	Other oilseeds	0.5	
	Papaya	5	
	Peas	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Spices	0.2	
	Sugar beet	0.5	
	Sunflower seed	0.5	
	Tea	0.5	
	Tea and tea-like substances	0.2	
	Tree nuts	0.5	
	Triticale	0.5	
	Wheat	0.5	
Hungary	Cereals	0.5	
	Rape seed	0.5	
	Sunflower, common	0.5	
Israel	Almonds	1	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Apricot	1	
	Avocado	5	
	Citrus	5	
	Egg plant	5	
	Litchi	1	
	Mango	2	
	Plums	0.05	
	Pomegranate	0.05	
	Strawberry	0.5	
Italy	Avocado	5	
	Barley	1	
	Citrus	10	
	Garlic	0.5	
	Herbs	5	
	Hops	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other oilseeds	0.1	(*)
	Others	0.05	(*)
	Papaya	5	
	Peas (dry)	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Sugar beet (leaves)	2	
	Sugar beet (roots)	0.1	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
Japan	Apricot	0.05	
	Avocado	5	
	Banana	5	
	Cherries	0.05	
	Coffee beans	0.2	
	Lettuce, head and leaf	2	
	Mango	2	
	Mushrooms (cultivated)	2	
	Nectarine	0.05	
	Orange	5	
	Other cereals	0.5	
	Papaya	1	
	Peach	0.05	
	Pineapple	2	
	Plum, Japanese	0.05	
	Plum, Mume	0.05	
	Prunes (fresh)	0.05	
	Rape seed	0.5	
	Strawberry	1	
	Sugarcane	0.05	
Korea (Republic)	Apple	0.5	
	Apricot	0.05	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Avocado	5	
	Banana	5	
	Barley	0.5	
	Cattle by-products	5	
	Cattle fat	0.5	
	Cattle meat	0.1	
	Cherries	0.05	
	Coffee beans	0.2	
	Grape	0.5	
	Mandarin	2	
	Mango	2	
	Milks	0.1	
	Mushrooms	2	
	Oats	0.5	
	Orange	5	
	Papaya	1	
	Peach	0.05	
	Peppers (green, red)	3	
	Plums	0.05	
	Rice	0.05	
	Rye	0.5	
	Strawberry	0.5	
	Watermelon	0.5	
	Wheat	0.5	
Luxembourg	Avocado	5	
	Barley	1	
	Citrus	10	
	Garlic	0.5	
	Herbs	5	
	Hops	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other oilseeds	0.1	(*) as poppy seed, mustard seed, sesame seed, cotton seed, soya bean,
	Others	0.05	(*)
	Papaya	5	
	Peas	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*) as pistachio, pine nuts, Queensland nuts, Brazil nuts, pecans, coconuts, cashew nuts, walnuts, hazelnut, peanuts, almonds
	Triticale	0.5	
	Wheat	0.5	
Malaysia	Banana	5	
	Chilli	2	
	Citrus	5	
	Mango	2	
	Papaya	1	
	Pepper (black, white)	8	
Netherlands	Avocado	5	Total prochloraz
	Barley	1	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Cattle fat	0.2	
	Cattle kidney	0.5	
	Cattle liver	2	
	Citrus	10	
	Eggs	0.1	(*)
	Garlic	0.5	
	Herbs	5	
	Hops (dried)	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Milks	0.02	(*)
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other meat products	0.1	(*)
	Other oilseeds	0.1	(*)
	Peas (pulses)	0.3	
	Pineapple	5	
	Pomegranate	5	
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
New Zealand	Avocado	5	
	Banana	5	
	Cereals	0.3	
	Mushrooms	0.5	
	Mushrooms	0.5	
	Other food	0.1	
	Papaya	2	
Poland	Banana	5	
	Cereals	0.1	
	Citrus	5	
	Mushrooms (cultivated)	0.5	
	Rape seed	0.2	
Portugal	Avocado	5	
	Banana	5	
	Berries and small fruit	0.05	
	Cereals	0.05	as wheat, barley, maize, rye
	Citrus	5	
	Fungi	2	
	Hops	0.05	
	Mango	2	
	Oats	1	
	Oilseeds	0.05	
	Pome fruit	0.05	
	Pomegranate	1	
	Potatoes	0.05	
	Pulses	0.05	
	Stone fruit	0.05	
	Tea	0.05	
	Tree nuts (shelled or unshelled)	0.05	
	Vegetables	0.05	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
South Africa	Avocado	2	
	Banana	2	
	Barley	0.2	
	Citrus	2	
	Ginger	10	
	Mango	5	
	Mushrooms	0.1	
	Potatoes	0.1	
	Wheat	0.2	
Spain	Avocado	5	
	Banana	5	
	Beet, fodder	2	
	Berries and small fruit	0.05	
	Cereals	0.05	
	Citrus	5	
	Garlic	0.5	
	Hops	0.05	
	Kiwifruit	5	
	Legume animal feeds	0.05	
	Litchis	5	
	Mango	5	
	Misc. fodder & forage crops	0.05	
	Misc. secondary food commodities of plant origin	0.05	
	Miscellaneous fruits	0.05	
	Mushrooms (cultivated)	2	
	Mushrooms wild	0.05	
	Oilseeds	0.05	
	Pineapple	5	
	Pome fruit	0.05	
	Pomegranate	5	
	Potatoes	0.05	
	Pulses	0.05	
	Spices	0.05	
	Stone fruit	0.05	
	Straw, fodder & forage & grasses	0.05	
	Sugar beet	0.2	
	Tea	0.05	
	Tree nuts (shelled or unshelled)	0.05	
	Vegetables	0.05	
Sweden	Avocado	5	
	Barley	1	
	Citrus	10	
	Garlic	0.5	
	Herbs	5	
	Hops	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Mushrooms (cultivated)	2	
	Oats	1	
	Other oilseeds	0.1	(*)
	Others	0.05	(*)
	Papaya	5	
	Peas (dry)	0.3	
	Pineapple	5	
	Rape seed	0.5	
	Rice	1	

Country	Commodity	MRL (mg/kg)	Residue definition, remarks
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	
Switzerland	Cereals	0.2	
	Mushrooms	0.5	
	Pome fruit	0.2	
	Rape seed	0.2	
	Stone fruit	0.2	
Taiwan	Drupes	1	includes mango, longan, litchi, loquat
	Melon	0.5	
	Mushrooms	0.5	
	Pomes	1	includes apples, pears, peaches, plums, Japanese apricots, cherries, jujubes, persimmons
	Rice	0.5	
	Root, bulb & tuber vegetables	0.5	includes radish, carrots, ginger, onions, potatoes, bamboo shoots, asparagus, coba, taro
	Small berries	1	includes grapes, strawberries, carambola, wax apple, guava
United Kingdom	Avocado	5	Total prochloraz
	Barley	1	
	Citrus	10	
	Eggs	0.1	(*)
	Garlic	0.5	
United Kingdom	Herbs	5	
	Hops (dried)	0.1	(*)
	Lettuce and similar	5	
	Linseed	0.5	
	Mango	5	
	Meat, fat & preparations of meat	0.1	(*)
	Milks, dairy produce	0.02	(*)
	Mushrooms (cultivated fungi)	2	
	Oats	1	
	Other cereals	0.05	(*)
	Other fruit	0.05	(*)
	Other oilseeds	0.1	(*)
	Other pulses	0.05	(*)
	Other vegetables	0.05	(*)
	Papaya	5	
	Peas	0.3	
	Pineapple	5	
	Potatoes (ware potatoes)	0.05	(*)
	Rape seed	0.5	
	Rice	1	
	Rye	0.5	
	Shallots	5	
	Sunflower seed	0.5	with shell
	Tea	0.1	(*)
	Tree nuts	0.1	(*)
	Triticale	0.5	
	Wheat	0.5	

(*) at or about the limit of determination
T: temporary
Total prochloraz: prochloraz plus metabolites containing 2,4,6-trichlorophenol expressed as prochloraz.

APPRAISAL

Prochloraz is a broad-spectrum imidazole fungicide that is active against a range of diseases in field crops, fruit and vegetables and is also used on mushrooms, as a post-harvest treatment of fruit and as a seed treatment on cereals. It was evaluated initially in 1983 for residues and toxicology; six additional reviews of residues were carried out between 1985 and 1992, and a periodic toxicological review in 2001. The CCPR at its Twenty-ninth Session scheduled prochloraz for periodic review with respect to residues, and it was included on the 2004 JMPR agenda. The Meeting received information on the metabolism and environmental fate of prochloraz, methods of residue analysis, freezer storage stability, national registered use patterns, the results of supervised residue trials, farm animal feeding studies, fate of residues in processing and national MRLs. Information on GAP and national MRLs was submitted by Australia and Japan.

The formulations that are available include emulsifiable concentrates, suspo-emulsions and wettable powders. A number of formulations with other fungicides are also available, mainly for use on cereal crops. Wettable powder formulations of a 4:1 complex of prochloraz and manganese chloride are available for use on crops susceptible to phytotoxicity.

In this evaluation, the term 'total prochloraz' refers to the parent compound and metabolites containing the common 2,4,6-trichlorphenol moiety, expressed as prochloraz equivalents (using a correction factor of 1.9). The term 'free prochloraz' refers to the parent compound only.

The following abbreviations are used for the metabolites:

BTS 44595	*N*-propyl-*N´*-2-(2,4,6-trichlorophenoxy)ethylurea
BTS 44596	*N´*-formyl-*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy)ethyl]urea
BTS 44770	*N*-2-(2,4,6-trichlorophenoxy)ethylurea
BTS 9608	2,4,6-trichlorophenoxyacetic acid
BTS 45186	2,4,6-trichlorophenol
BTS 54906	2-(2,4,6-trichloro-3-hydroxyphenoxy)ethanol
BTS 54908	*N*-2-(2,4,6-trichloro-3-hydroxyphenoxy)ethyl-*N*-propylurea

Metabolism

Animals

The Meeting received information on the metabolism of prochloraz in rats, lactating goats lactating cows and laying hens.

Prochloraz was extensively metabolized in rats, no unchanged parent compound being detected in urine; it was, however, detected in faeces and was the most abundant component on day 1. Faeces contained significant quantities of the plant metabolites BTS 44595 and BTS 44596, formed by opening of the imidazole ring. The most abundant metabolite in urine was BTS 9608, comprising around 35% of the excreted radioactivity. A more recent study in rats (2003) generally confirmed the results of the earlier studies, although a more complex pattern of metabolism was reported, additional metabolites being detected in urine and faeces. The metabolism of prochloraz in the rat proceeds via cleavage of the imidazole ring, oxidation of the side-chain, phenyl-ring hydroxylation and substitution of chlorine by a hydroxyl group. Other processes were revealed in the latest study in rats, including *N*-dealkylation, *N*-deacetylation and sulfate conjugation of hydroxy groups.

Straw from field plots treated 11 weeks before harvest with [^{14}C]prochloraz and containing the equivalent of 19 mg/kg was fed to a lactating goat daily for 4 days. Milk and blood samples were taken twice daily, and the animal was killed on the fifth day. The highest residue levels were found in liver (0.05 mg/kg), kidney fat and rumen wall (0.04 mg/kg), expressed as equivalents. All other

tissues contained ≤ 0.03 mg/kg, milk contained ≤ 0.006 mg/l; the maximum level in plasma was 0.08 mg/l.

A lactating cow was given gelatin capsules containing [^{14}C]prochloraz at a rate providing 1.5 mg/kg bw per day twice a day for 3 days, equivalent to 37.5 mg/kg of diet. The radioactivity in plasma reached a plateau at 72 h, and the levels in milk rose to a plateau of 0.14 mg/l after 24 h. Most of the radioactivity was found in the liver (10 mg/kg) and kidney (1.7 mg/kg), with lower levels in other tissues. Parent prochloraz was not found in the gut contents, plasma, milk or tissues. Analysis of the gut contents indicated that prochloraz was rapidly degraded to the imidazole ring-opened metabolites BTS 44596, BTS 44595 and BTS 44770, and these metabolites were also detected in tissues and in early plasma samples. The phenolic metabolites BTS 54906 and BTS 54908 were prevalent in milk, in addition to BTS 4496 (23% TRR).

In laying hens given [^{14}C]prochloraz in gelatin capsules daily at a rate of 1.5 mg/day for 14 days, equivalent to 10 mg/kg of diet, 85% of the TRR had been excreted within 24 h, and the levels of radioactivity in eggs, mostly in the yolk, reached a plateau of 1.7 mg/kg by day 8. The highest residue levels were found in the liver (0.9 mg/kg) and gastrointestinal tract (0.8 mg/kg), and levels ≤ 0.19 mg/kg were found in skin, ≤ 0.09 mg/kg in fat, 0.05 mg/kg in breast muscle and 0.07 mg/kg in thigh muscle. Parent prochloraz was not found in excreta, eggs or tissues; BTS 9608 and BTS 44596 were the main metabolites in liver, muscle, fat and eggs.

Generally, prochloraz is rapidly absorbed, metabolized and excreted, and it is not detected in milk, eggs or tissues. BTS 44596, the formyl urea metabolite, is the residue component found predominantly in egg yolk, and BTS 54906 and BTS 44596 are the main components in milk. Except in liver and to a lesser extent in kidney, the residue levels in tissues are generally low and consist mainly of BTS 44596, BTS 44595 and BTS 44770.

Plants

The Meeting received the results of studies of the metabolism of prochloraz in wheat and oil-seed rape after foliar application, in mushrooms after treatment of the casing and in wheat after seed treatment.

In two studies in which young wheat plants received foliar treatment with radiolabelled prochloraz at 0.25–0.39 kg ai/ha, the residue levels of parent compound were 0.6–1% TRR after 19–20 days. The main metabolites detected were BTS 44596 (32–38%), free and conjugated BTS 44595 (31%) and BTS 45186 (8%). In one of the studies, mature grain harvested 14 weeks after treatment contained < 0.05 mg/kg, representing < 0.2% of the TRR present in straw; the residues in grain were mostly bound in fibre, while the residues in straw consisted mainly of BTS 44596 (26% TRR) and BTS 44595 (8% TRR), with less than 0.1% parent compound.

In two studies on mature wheat harvested 13 weeks after foliar treatment with radiolabelled prochloraz at 1 kg ai/ha, the residues in grain represented 3–8% TRR as free BTS 45186 and 40–54% TRR as stable polar conjugates containing the 2,4,6-trichlorophenoxy moiety. Of the residues in straw, about 5% TRR was free BTS 45186 and 38–58% was conjugates containing the 2,4,6-trichlorophenoxy moiety.

In wheat plants grown from seed treated with radiolabelled prochloraz (0.4 g ai/kg of seed), 5.6% TRR was measured in aerial plant portions during the first 6 weeks of growth; no further translocation was seen. At maturity, 58% of the applied radiolabel was found in soil and 15% in the root system; no radioactivity was observed in grain.

The metabolism of prochloraz in oil-seed rape was studied after foliar treatment of young plants. Leaves sampled 19 days after treatment contained < 3% of the TRR, and the main metabolites were BTS 44596 (20%), BTS 44595 (29%) and polar origin material (30%). A similar distribution was reported in mature plants; about 3% of the TRR was detected in plant parts that had not been treated directly, and the residues in mature seeds accounted for about 0.1% TRR.

In mushrooms treated with the prochloraz–manganese chloride complex at 3 g ai/m^2 and analysed 8 and 30 days later, unchanged parent compound accounted for 75% and 83% of the extracted radioactivity respectively, and BTS 9608 accountedfor a further 9–10%.

In summary, prochloraz is metabolized to BTS 44596 via cleavage of the imidazole ring, followed by 'deformylation' to generate BTS 44595. Low levels of conjugates of both these metabolites are formed, which are resistant to the initial extraction solvents, being released only under more exhaustive conditions (e.g. microwave acetonitrile:water extraction). The fact that polar materials could be converted to BTS 45186 by pyridinium hydrochloride hydrolysis indicates that the trichlorophenoxy moiety is present in this material. The metabolic fate of prochloraz in oil-seed rape is similar to that in wheat. In mushrooms, prochloraz–manganese complex underwent dissociation to free prochloraz and subsequent metabolism to BTS 9608 and conjugates containing the BTS 45186 moiety.

Rotational crops

The Meeting received information on the behaviour and fate of prochloraz in soil and in rotational crops.

Under normal agricultural conditions, prochloraz is moderately persistent in soil, with a DT_{50} of < 40 days. The products of biotic and photolytic degradation, BTS 44596 and BTS 44595, have been detected occasionally in soil samples collected in the field but at levels close to the LOQ .

When prochloraz is applied to bare soil, it is metabolized in rotational crops to BTS 44596, BTS 44595, BTS 45186 and BTS 9608. The levels of total residues declined sharply between 30- and 120-day crops and declined further with soil ageing. The metabolites in rotational crops were essentially the same as those reported in the studies of plant metabolism, except that the levels of BTS 9608 were lower. The concentrations of metabolites were low in all crops (< 0.01 mg/kg), exceeding 0.05 mg/kg only in wheat forage and straw.

Methods of analysis

The Meeting received information on methods for analysis for free prochloraz and for total prochloraz (prochloraz plus metabolites containing the common 2,4,6-trichlorophenoxy moiety), in plant material, animal tissues and soils. Analytical methods for specific metabolites in plant and animal tissues were also provided.

The 'common moiety' method, involving hydrolysis of prochloraz and its metabolites to 2,4,6-trichlorophenol, was used in most of the supervised residue trials and for enforcement purposes. In this method (RESID/88/72) and in an earlier, related method (RESID/82/88), samples are Soxhlet-extracted with acetone, concentrated and hydrolysed with pyridine hydrochloride to break down all components to 2,4,6-trichlorophenol. This hydrolysate is then extracted into petroleum ether by steam distillation, with further clean-up by extraction into the aqueous layer with alkali and re-extraction into toluene after acidification. Total 2,4,6-trichlorophenol residues are determined by gas chromatography (with electron capture detection for plant material and soil and MS detection or mass spectrometry for milk and animal tissues), and the results are expressed as prochloraz equivalents, with a correction factor of 1.9.

Methods for measuring free prochloraz in plant materials are based on acetone extraction, acidification with hydrochloric acid, evaporation and extraction under acid conditions with petroleum ether. The aqueous extract is neutralized, further extracted with petroleum ether and evaporated, and the residue is dissolved in ethyl acetate before analysis by gas chromatography with electron capture detection.

An HPLC method for measuring prochloraz and the major metabolites BTS 44596 and BTS 44595 and the hydroxyamide metabolite BTS 54908 has also been reported for milk (liquid

chromatography with tandem mass spectrometry), with an LOQ of 0.01 mg/kg for prochloraz and 0.005 mg/kg for each metabolite.

The LOQs of 'common moiety' methods for prochloraz equivalent in most substrates are 0.01–0.05 mg/kg, although a higher LOQ of 0.1 mg/kg may be required for some materials (immature cereal plants and straw, sub-tropical citrus fruit peel) in which there are high background levels of residues. Recovery efficiencies of about 90% are common, usually ranging from 75% to 110%.

Stability of residues in stored analytical samples

The Meeting received information on the stability of prochloraz in various commodities under freezer storage (–18 to –20°C). Less than 30% of the residues had degraded during storage in wheat stored for 24 months, in barley at 23 months, in sugar-beet roots and tops at 14 months, in maize plants at 24 months, in rape-seed at 36 months, in muscle at 12 months, in milk at 12 months and in eggs at 12 months.

Definition of the residue

Studies of metabolism in lactating goats and cows and in hens indicate that the parent compound is not found in tissues, milk or eggs; however, a number of metabolites containing the 2,4,6-trichlorophenoxy moiety occur, BTS 44596, BTS 44595, BTS 44770, BTS 54906, BTS 54908 and BTS 9608 being found in one or more of the above substrates.

In plants, the metabolic pathway is consistent, involving cleavage of the imidazole ring to form the aldehyde BTS 44596, oxidation of the side-chain to form the urea (BTS 44595) and the carboxylic acid (BTS 9608, generally only in conjugated form), with eventual formation of the phenol BTS 45186 and its polar conjugates.

The Meeting therefore considered that the residues of toxicological concern would be those of unchanged parent compound, the non-polar metabolites BTS 44595 and BTS 44596 and low levels of free BTS 45186, which are readily extracted from plant material with acetone. The Meeting noted that these compounds are also found in rats and are therefore covered by the toxicological assessment.

The Meeting confirmed the current prochloraz residue definition, 'Sum of prochloraz and its metabolites containing the 2,4,6-trichlorphenol moiety, expressed as prochloraz', for compliance with MRLs and for estimation of dietary intake from both animal and plant commodities.

Taking into account the log P_{ow} of prochloraz of 3.5 and the results of the animal feeding studies, the Meeting decided that residues of prochloraz should be classified as fat-soluble.

Results of supervised trials on crops

The results of supervised trials were available for use of prochloraz on citrus fruit (lemon, mandarin, orange), avocado, banana, mango, papaya, pineapple, onion, melon, mushroom, tomato, lettuce, bean, pea, sugar-beet, rape-seed, sunflower seed, linseed, soya bean, barley, oat, rice, rye, wheat and pepper, black.

The results of trials or relevant GAP were not submitted for coffee beans or stone fruits, for which maximum residue levels are currently recommended. The Meeting agreed to withdraw the previously recommended maximum residue levels for these commodities.

The Meeting noted that a post-treatment interval has not been defined for most approved uses on citrus and sub-tropical fruit (inedible peel), and that in the relevant studies on orange, mandarin, avocado and banana, the residue levels, although variable, were often high in fruit sampled after day 0. As the residues in post-harvest-treated fruit did not appear to degrade appreciably during storage,

the Meeting agreed to use the results of analyses up to 21 days after treatment to reflect the residue levels expected in fruit immediately after treatment.

Citrus fruit

The results of trials of post-harvest dipping and spraying on lemon, mandarin and orange were available from Argentina, Australia, Greece, Italy, Morocco, Spain and the United Kingdom, and the results of post-harvest brushing trials on oranges were available from South Africa.

Lemon

GAP in Argentina for citrus includes a post-harvest spray application of 0.2–0.29 kg ai/hl (no post-treatment interval specified). In trials in Spain reflecting this GAP, the residue levels in lemons sampled 12–16 days after treatment were 3.8 and 4.5 mg/kg. The corresponding residue levels in lemon pulp were 0.16 mg/kg and 0.23 mg/kg

Orange

GAP for citrus in Argentina includes a post-harvest spray application of 0.2–0.29 kg ai/hl (no post-treatment interval specified). While no trials in Argentina matched this GAP, one trial in Spain that did showed a residue level of 1.7 mg/kg in oranges (0.07, 0.1, 0.13, 0.14 and 0.17 mg/kg in pulp) sampled 14 days after treatment.

In South Africa, GAP is for a post-harvest brush treatment with 0.15 kg ai/hl (no post-treatment interval specified). In one trial in Argentina reflecting this GAP (± 25–30%), the residue level was 5.3 mg/kg in oranges (0.02 mg/kg in pulp).

In Greece, GAP is for use of prochloraz as a post-harvest dip or spray at up to 0.09 kg ai/hl. Trials in Australia, Morocco and Spain were evaluated against the GAP of Greece. The residue levels in oranges were: 1.3, 1.4, 1.5, 1.7, 2.0, 3.7, 5.9 and 6.8 mg/kg, and those in pulp (edible portion) were: 0.02, 0.06 (two), < 0.1 (two), 0.26, 0.33, 0.56 and 0.92 mg/kg.

The residue levels in oranges, in ranked order, were: 1.3, 1.4, 1.5, 1.7 (two), 2.0, 3.7, 5.3, 5.9 and 6.8 mg/kg, and those in pulp were: 0.02 (two), 0.06 (two), 0.07, < 0.1 (two), 0.1, 0.13, 0.14, 0.17, 0.26, 0.33, 0.56 and 0.92 mg/kg.

Mandarin

Two post-harvest trials in Spain matching GAP in Argentina (up to 0.29 kg ai/hl) showed residue levels of 2.1 and 3.5 mg/kg, with corresponding levels of 0.1 and 0.35 mg/kg in pulp.

In Greece, GAP is for use of prochloraz as a dip or spray at up to 0.09 kg ai/hl, while in Spain GAP is for use at up to 0.08 kg ai/hl. The trials in Australia (no GAP), Morocco (no GAP) and Spain were evaluated against the GAP of Greece. The residue levels in mandarins were 2.0, 2.1 (three), 2.3, 3.2, 3.4, 3.5, 3.9, 4.3, 4.6, 5.4 and 5.9 mg/kg, and the corresponding levels in pulp (edible portion) were: 0.07 (two), 0.09 (three), 0.1, 0.12, 0.26 and 0.31 mg/kg.

The residue levels in mandarins, in ranked order, were: 2.0, 2.1 (four), 2.3, 3.2, 3.4, 3.5 (two), 3.9, 4.3, 4.6, 5.4 and 5.9 mg/kg, and the corresponding levels in pulp (edible portion) were: 0.07 (two), 0.09 (three), 0.1 (two), 0.12, 0.26, 0.31 and 0.35 mg/kg.

The Meeting agreed to combine the data for lemon, orange and mandarin, to give a data set for citrus from 27 trials of: 1.3, 1.4, 1.5, 1.7 (two), 2.0 (two), 2.1 (four), 2.3, 3.2, <u>3.4</u>, 3.5 (two), 3.7, 3.8, 3.9, 4.3, 4.5, 4.6, 5.3, 5.4, 5.9 (two) and 6.8 mg/kg, and residue levels in pulp of: 0.02 (two), 0.06 (two), 0.07 (three), 0.09 (three), < 0.1 (two), <u>0.1</u> (three), 0.12, 0.13, 0.14, 0.16, 0.17, 0.23, 0.26 (two), 0.31, 0.33, 0.35, 0.56 and 0.92 mg/kg.

The Meeting estimated a maximum residue level of 10 mg/kg for prochloraz in citrus, replacing the previous recommendation of 5 mg/kg for oranges, sweet and sour. The Meeting also

estimated an STMR of 0.1 mg/kg and a highest residue level of 0.92 mg/kg for prochloraz in the edible portion.

Assorted tropical and sub-tropical fruits minus inedible peel

Avocado

The results of trials on post-harvest dipping and spraying on avocado were made available to the Meeting from Australia, Colombia (no GAP) and South Africa.

GAP in South Africa is for post-harvest spray at 0.05 kg ai/hl (no post-treatment interval specified). The residue levels in trials in Australia and South Africa matching this GAP were: 0.42, 1, 1, 1.3, 2.3 and 3.5 mg/kg in whole fruit with stone and < 0.1 and 0.11 mg/kg in pulp.

The residue levels in post-harvest trials in Australia and South Africa matching Australian GAP (0.025 kg ai/hl, no post-treatment interval specified) were: 0.39, 0.83, 0.87, 0.92, 1, 1.2 (two) and 2.4 mg/kg in whole fruit with stone and < 0.1 (four) and 0.12 mg/kg in the edible portion.

The residue levels in 14 trials in avocados, in ranked order, were: 0.39, 0.42, 0.83, 0.87, 0.92, 1 (three), 1.2 (two), 1.3, 2.3, 2.4 and 3.5 mg/kg in whole fruit with stone and $\underline{< 0.1}$ (five), 0.11 and 0.12 mg/kg in the edible portion.

The Meeting noted that, while data for pre-harvest foliar application were available, no matching GAP was provided.

Banana

The results of trials of post-harvest dipping on banana were available from Australia, South Africa and the West Indies, and trials of spray or drench application were reported from the Canary Islands and the Philippines.

GAP in the Philippines is for a spray application at 0.09 kg ai/hl, but no trials matched this GAP. In China, GAP is for use of prochloraz as a dip at up to 0.05 kg ai/hl (no post-treatment interval specified). The residue levels in trials of dipping in Australia, the Canary Islands, South Africa and the West Indies matching this GAP were: 1.8, 2.5, 2.6, 2.7, 3.0, 3.3, 3.5 and 5.1 mg/kg in whole fruit and: 0.04, < 0.1, 0.1, 0.11, 0.12 and 0.17 (two) mg/kg in pulp.

In Australia, GAP (0.025 kg ai/hl) is for use of prochloraz as a dip. The residue levels in dipping trials in Australia, the Canary Islands, the Philippines, South Africa and the West Indies matching this GAP were: < 0.1, 0.69, 1.1, 1.3, 1.6, 1.7 (two), 2.3, 2.4, 2.9, 3.0 and 3.4 mg/kg in whole fruit and: 0.03, 0.06, 0.07, 0.08, < 0.1, 0.1 (two), 0.12 (two), 0.13 and 0.21 (two) mg/kg in pulp.

The residue levels in banana, in ranked order, were: < 0.1, 0.69, 1.1, 1.3, 1.6, 1.7, 1.8, 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 3.0 (two), 3.4, 3.5 and 5.1 mg/kg in whole fruit, and the residue levels in pulp were: 0.03, 0.04, 0.06, 0.07, 0.08, < 0.1 (two), $\underline{0.1}$ (three), 0.11, 0.12 (three), 0.13, 0.17 (two) and 0.21 (two) mg/kg.

The Meeting noted that, while data for pre-harvest foliar applications were available, no matching GAP was provided.

Mango

The Meeting was provided with the results of trials on pre-harvest foliar spray in Israel (no GAP), Malaysia (GAP: 0.056 kg ai/hl, 15-day PHI), South Africa (no GAP) and Taiwan (no GAP), and of trials on post-harvest dipping in Australia (post-harvest spray at 0.025 kg ai/hl, no post-treatment interval specified), Colombia (0.025 kg ai/hl, no post-treatment interval specified), Israel (no GAP) and South Africa (maximum of 0.08 kg ai/hl, no post-treatment interval specified).

None of the pre-harvest trials from Malaysia matched Malaysian GAP.

None of the post-harvest treatment trials matched GAP in China (0.1 kg ai/hl) or South Africa (maximum of 0.08 kg ai/hl), but four trials in Australia, Colombia, Israel and South Africa matched GAP in Brazil (0.05 kg ai/hl) and Peru (0.045 kg ai/hl). In these trials, the residue levels in total fruit were: 1, 1.2, 1.3 and 1.4 mg/kg, while those in the edible portion were: 0.18 and 0.44 mg/kg.

In three trials in Australia and South Africa that matched GAP in Australia and Colombia (0.025 kg ai/hl), the residue levels were 0.48, 0.68 and 1.8 mg/kg in whole fruit without stone and 0.1 and 0.47 mg/kg in pulp.

The residue levels in the post-harvest trials on mango, in ranked order, were: 0.48, 0.68, 1, 1.2, 1.3 and 1.4 (two) mg/kg, and those in pulp were: 0.1, 0.18, 0.44 and 0.47 mg/kg.

Papaya

The results of post-harvest dipping trials were provided from Australia (GAP: 0.025 kg ai/hl, no post-treatment interval specified), Brazil (GAP: 0.034 kg ai/hl, 3-day post-treatment interval) and South Africa (no GAP).

In three post-harvest dipping trials in Australia and South Africa that matched the GAP of Australia (0.025 kg ai/hl), the residue levels were: 0.41, 0.61 and 1.4 mg/kg in whole fruit (including pips) and < 0.1 and 0.7 mg/kg in the edible portion.

Pineapple

The results of post-harvest dipping trials were made available from Australia (GAP: 0.025 kg ai/hl, no post-treatment interval specified) and Kenya (no GAP). In the one trial matching Australian GAP, the residue level was 1.1 mg/kg in whole fruit and 0.18 mg/kg in the edible portion.

The Meeting considered that the available data on residue levels in avocado, banana, mango, papaya and pineapple were sufficient to mutually support a group maximum residue level for assorted tropical and sub-tropical fruits minus inedible peel. The residue levels, in ranked order, were: < 0.1, 0.39, 0.41, 0.42, 0.48, 0.61, 0.68, 0.69, 0.83, 0.87, 0.92, 1 (four), 1.1 (two), 1.2 (three), 1.3 (three), 1.4 (three), 1.6, 1.7, 1.8, 2.3 (two), 2.4 (two), 2.5, 2.6, 2.7, 2.9, 3.0 (two), 3.4, 3.5 (two) and 5.1 mg/kg in whole fruit in 43 trials, and: 0.03, 0.04, 0.06, 0.07, 0.08, < 0.1 (eight), 0.1 (four), 0.11 (two), 0.12 (four), 0.13, 0.17 (two), 0.18 (two), 0.21 (two), 0.44, 0.47 and 0.7 mg/kg in the edible portion in 33 trials.

The Meeting estimated a maximum residue level of 7 mg/kg for prochloraz in assorted tropical and sub-tropical fruits minus inedible peel, replacing the previous recommendations of 5 mg/kg for avocado and banana, 2 mg/kg for mango and 1 mg/kg for papaya. The Meeting also estimated an STMR of 0.1 mg/kg and a highest residue level of 0.7 mg/kg for prochloraz in the edible portion.

Onion

The results of field trials on onions were made available to the Meeting from The Netherlands (no GAP) and from Thailand (no GAP). The results of post-harvest dipping trials were provided from Australia (no GAP).

Melon

The results of field trials on melons involving foliar drenching and flood irrigation were made available to the Meeting from Spain. None of the trials matched Spanish GAP (up to four applications at 0.9 kg ai/ha, 15-day PHI). The results of post-harvest dipping trials were provided from Australia and Colombia, but no matching GAP was available.

Mushroom

The Meeting noted two distinct patterns of use of prochloraz on mushrooms: one established in the United Kingdom, involving two to three casing sprays of 0.3–0.6 g ai/m^2, with a PHI of 2 days, and the other common in a number of other European countries, Australia and New Zealand, involving one or more treatments at 1.5 g ai/m^2 and a PHI of 10–14 days.

In seven trials in The Netherlands, Switzerland and the United Kingdom matching GAP in Denmark, Italy, The Netherlands, New Zealand and Poland (one or two treatments at 1.5 g ai/m^2, 10-day PHI), the residue levels were: 0.21, 0.25, 0.48, 0.71 and 0.74 mg/kg.

The maximum GAP of two sprays of 0.6 g ai/m^2 (2-day PHI) in the United Kingdom is supported by the results of trials in Germany and the United Kingdom, with residue levels of: 0.81, 3.6, 6.2 and 37 mg/kg.

The Meeting noted that these two residue populationsare different and, on the basis of the data supporting the United Kingdom GAP, estimated a maximum residue level of 40 mg/kg for prochloraz in mushrooms, an STMR of 4.9 mg/kg and a highest residue level of 37 mg/kg. The recommended maximum residue level of 40 mg/kg for mushrooms replaces the previous recommendation of 2.0 mg/kg.

Tomato

The results of field trials of both foliar application and soil drenching on tomatoes were made available to the Meeting from Israel (no GAP) and the USA (no GAP).

Lettuce

The results of field trials on lettuce, head, were made available to the Meeting from Australia (GAP: 0.18 kg ai/ha, 0.023 kg ai/hl, 7-day PHI) and from the United Kingdom (no GAP). Trials on protected lettuce crops were also provided by the United Kingdom (no GAP). Four trials in Australia matching Australian GAP showed residue levels of: 0.06, 0.16, 0.41 and 0.59 mg/kg.

The Meeting agreed that the available data were insufficient to estimate a maximum residue level for lettuce

Beans, dry

The results of field trials on beans were made available to the Meeting from Germany, and two trials of seed treatment were provided from Brazil. No matching GAP was available for either use pattern.

Peas, dry

The results of field trials on peas were made available to the Meeting from Germany and the United Kingdom; however, no matching GAP was available.

Sugar-beet

The results of field trials on sugar-beet were made available to the Meeting from Italy (GAP: one or two applications at 0.48–0.8 kg ai/ha, 20-day PHI). Three of the trials matched Italian GAP

(± 30%); however, because the control samples apparently contained high residue levels, the Meeting agreed that the available data were insufficient to estimate a maximum residue level for sugar-beet.

Oilseeds

Rape-seed

The results of field trials from Canada (no GAP), Denmark (GAP: 0.45–0.7 kg ai/ha, 28-day PHI), France (GAP: 0.45–0.6 kg ai/ha), Germany (GAP: 0.6 kg ai/ha, 56-day PHI), Sweden (no GAP) and the United Kingdom (GAP: 0.2–0.5 kg ai/ha, 42-day PHI, maximum of 1 kg ai/ha per season) were made available to the Meeting.

In trials in Denmark, France and Germany that matched German GAP (0.6 kg ai/ha, 56-day PHI), the residue levels in mature seed were: 0.05, 0.07, 0.08, 0.09 (two), < 0.1 (four), 0.11, 0.12 and 0.15 mg/kg.

In field trials from the United Kingdom matching the corresponding GAP (up to 0.5 kg ai/ha, 42-day PHI), the residue levels in mature rape-seed were < 0.1 (five), 0.1 (three), 0.12, 0.14, 0.17, 0.18, 0.19, < 0.2 (two), 0.22, 0.24, 0.36, 0.39, 0.46 and 0.48 mg/kg.

The residue levels in rape-seed, in ranked order, were: 0.05, 0.07, 0.08, 0.09 (two), < 0.1 (nine), 0.1 (three), 0.11, 0.12 (two), 0.14, 0.15, 0.17, 0.18, 0.19, < 0.2 (two), 0.22, 0.24, 0.36, 0.39, 0.46 and 0.48 mg/kg in 33 trials.

The Meeting estimated a maximum residue level of 0.7 mg/kg for prochloraz in rape-seed, replacing the previous recommendation of 0.5 mg/kg. The Meeting also established an STMR of 0.1 mg/kg and a highest residue level of 0.48 mg/kg.

Sunflower seed

The results of field trials in France (GAP: one or two applications at 0.32–0.6 kg ai/ha, no PHI specified) were made available to the Meeting. In view of the similarity between GAP in France and that in Croatia (GAP: up to two applications at 0.6 kg ai/ha, 63-day PHI), the Meeting evaluated the trials in France against GAP in Croatia.

In the 11 trials, the residue levels were: ≤ 0.1 (eight), 0.14, 0.27 and 0.32 mg/kg,

One trial on seed treatment was reported from France, but no matching GAP was available

The Meeting estimated a maximum residue level of 0.5 mg/kg, an STMR of 0.1 mg/kg and a highest residue level of 0.32 mg/kg for sunflower seed.

Linseed

The results of six trials of seed treatment were reported from the United Kingdom (GAP: 0.4 g ai/kg seed) in which seed treated with prochloraz according to GAP was grown to maturity and the daughter seeds analysed for residues 149–178 days after planting. In all the trials, the residue levels of total prochloraz were below the LOQ of 0.05 mg/kg. As a residue level of 0.04 mg/kg was reported in the control samples in one trial, the Meeting decided to evaluate the remaining five trials, with residue levels < 0.05 mg/kg.

The Meeting estimated a maximum residue level of 0.05* mg/kg, an STMR of 0.05 mg/kg and a highest residue level of 0.05 mg/kg for linseed.

Soya beans

The results of two field trials by foliar application on soya beans were made available to the Meeting from France, but no GAP was available.

Cereal grains

Barley

The results of field trials on barley were made available to the Meeting from Austria (GAP: one application at 0.45 kg ai/ha, 35-day PHI), Brazil (GAP: 0.45 kg ai/ha, 32-day PHI), Canada (no GAP), Denmark (maximum GAP: one application at 0.45 kg ai/ha, PHI up to Zadoks 39), France (maximum GAP: 0.6 kg ai/ha, PHI up to stem elongation), Germany (maximum GAP: one application at 0.48 kg ai/ha, 35-day PHI), Greece (maximum GAP: 0.19 kg ai/ha, 56-day PHI), The Netherlands (GAP: 0.45 kg ai/ha, 42-day PHI), Italy (maximum: GAP: 0.8 kg ai/ha, 40-day PHI), Portugal (GAP: 0.45 kg ai/ha, 35-day PHI), Spain (maximum GAP: one application at 0.72 kg ai/ha, 60-day PHI), Sweden (one application at 0.45 kg ai/ha, PHI not specified) and the United Kingdom (maximum GAP: 0.45 kg ai/ha, 42-day PHI).

In five trials in Denmark, The Netherlands and the United Kingdom, involving a single application of prochloraz, which matched German GAP (0.48 kg ai/ha, 35-day PHI), the residue levels in grain were: < 0.05, 0.06, 0.08, 0.13 and 0.21 mg/kg.

The residue levels in 34 trials in Belgium, Denmark, France, Germany, Sweden and the United Kingdom with two applications and matching GAP in the United Kingdom (0.45 kg ai/ha, 42-day PHI) were: < 0.02 (two), 0.03, 0.07, 0.08 (three), 0.1 (three), 0.11 (two), 0.12 (two), 0.14, 0.16 (three), 0.23 (two), 0.24, 0.26 (two), 0.3, 0.31, 0.35, 0.38, 0.45, 0.48, 0.5, 0.53, 0.59, 0.65 and 0.68 mg/kg.

In 15 trials in France, Greece, Italy, Portugal and Spain involving two applications of prochloraz according to GAP in Portugal (0.45 kg ai/ha, 35-day PHI), the residue levels were: 0.13, 0.21, 0.22, 0.23, 0.26, 0.3, 0.35, 0.36, 0.41, 0.43, 0.46, 0.47, 0.51, 0.87 and 0.88 mg/kg.

The residue levels in 54 trials in barley, in ranked order, were: < 0.02 (two), 0.03, < 0.05, 0.06, 0.07, 0.08 (four), 0.1 (three), 0.11 (two), 0.12 (two), 0.13 (two), 0.14, 0.16 (three), 0.21 (two), 0.22, <u>0.23</u> (three), 0.24, 0.26 (three), 0.3 (two), 0.31, 0.35 (two), 0.36, 0.38, 0.41, 0.43, 0.45, 0.46, 0.47, 0.48, 0.5, 0.51, 0.53, 0.59, 0.65, 0.68, 0.87 and 0.88 mg/kg.

The Meeting also received data from field trials in Denmark (GAP: 20 g ai/100 kg seed) and Germany (no GAP) on barley grown from seed treated with prochloraz. In the 17 trials matching GAP in Denmark, the residue levels of total prochloraz were < 0.01 (two) and < 0.05 (15) mg/kg..

Oats

Prochloraz is registered for use on cereals in Austria, Belgium, Croatia, Denmark and Germany, with a common GAP of one or two foliar applications at 0.45 kg ai/ha, and a 35-day PHI. None of the four trials provided from Denmark matched this GAP.

The Meeting was also provided with the results of trials of seed treatment in Germany (GAP: 20 g ai/kg seed), in which the residue levels in oats grown from seed treated with prochloraz were: < 0.05 (eight) and < 0.1 (two) mg/kg.

Rice

Field trials of foliar application on rice were made reported to the Meeting from Japan (no GAP), Spain (GAP: 0.45 kg ai/ha, 15-day PHI) and Taiwan China (no GAP). None of the trials in Spain matched Spanish GAP.

Rye

Field trials of foliar application on rye were reported to the Meeting from Denmark (maximum GAP: one application at 0.45 kg ai/ha, 28-day PHI) and Germany (maximum GAP: one to two applications at 0.48 kg ai/ha, 35-day PHI). In three trials in Germany that matched German GAP, the residue levels were: 0.06, 0.09 and < 0.1 mg/kg. The Meeting noted that GAP for rye in the United Kingdom is similar to that in Germany but with a PHI of 42 days. It therefore considered that

the trials in Germany supported the United Kingdom GAP. The residue levels in trials matching GAP in the United Kingdom were: < 0.05, 0.05, 0.06 (three), 0.09 and < 0.1 mg/kg.

The Meeting also received the results of field trials of seed treatment in Germany (GAP: 20 g ai/100 kg seed) with regard to residues in rye grown from seed treated with prochloraz. In five trials matching German GAP, the residue levels of total prochloraz were < 0.02 (two) and < 0.05 (three) mg/kg.

Wheat

The results of field trials on wheat were made available to the Meeting from Austria (GAP: one application at 0.45 kg ai/ha, 35-day PHI), Brazil (GAP: 0.45 kg ai/ha, 40-day PHI), the former Czechoslovakia (no GAP), Denmark (maximum GAP: one application at 0.45 kg ai/ha, 28-day PHI), France (maximum GAP: 0.6 kg ai/ha, PHI up to stem elongation), Germany (maximum GAP: one application at 0.48 kg ai/ha, 35-day PHI) Italy (GAP: 0.45 kg ai/ha, 42-day PHI), The Netherlands (GAP: 0.45 kg ai/ha, 42-day PHI), Portugal (no GAP), Spain (maximum GAP: one application at 0.72 kg ai/ha, 60-day PHI), Sweden (one application at 0.45 kg ai/ha, PHI not specified), the United Kingdom (maximum GAP: 0.45 kg ai/ha, 42-day PHI) and the USA (no GAP).

None of the trials in Spain trials matched Spanish GAP. One trial in Italy matching Italian GAP (maximum GAP: 0.8 kg ai/ha, 40-day PHI) showed a residue level of 0.12 mg/kg. In six trials in the former Czechoslovakia, The Netherlands and the United Kingdom involving a single application of prochloraz, which matched German GAP (maximum GAP: one application at 0.48 kg ai/ha, 35-day PHI), the residue levels in grain were: < 0.05, 0.09, 0.12, 0.21, 0.23 and 0.24 mg/kg.

The residue levels in trials in southern France, Greece, Italy, Portugal and Spain involving two applications of prochloraz according to GAP in Portugal (0.45 kg ai/ha, 35-day PHI) were: < 0.05 (six), 0.07 (two), 0.09, 0.13, 0.14, 0.15, 0.52 and 1.2 mg/kg. The residue levels in trials involving two applications of prochloraz to wheat in northern France, Germany and the United Kingdom and matching GAP in Belgium and the United Kingdom (maximum GAP: 0.45 kg ai/ha, 42-day PHI) were: 0.03, < 0.05 [10], 0.05 (two), 0.06 (two), 0.07 (two), 0.08, 0.09, < 0.1 (four), 0.11, 0.12 (two), 0.13, 0.15, 0.16, 0.17, 0.2 and 0.31 (two) mg/kg.

The residue levels in 54 trials in wheat, in ranked order, were: 0.03, < 0.05 (17), 0.05 (two), 0.06 (two), 0.07 (four), 0.08, 0.09 (three), < 0.1 (four), 0.11, 0.12 (four), 0.13 (two), 0.14, 0.15 (two), 0.16, 0.17, 0.2, 0.21, 0.23, 0.24, 0.31 (two), 0.52 and 1.2 mg/kg.

The Meeting also received the results of field trials on residues in wheat grown from seed treated with prochloraz in Denmark (no GAP), Germany (GAP: 20 g ai/100 kg seed), Greece (no GAP) and the United Kingdom (GAP: 14 g ai/100 kg seed). In the 26 trials matching GAP in Germany, the residue levels of total prochloraz were: < 0.01 (three), < 0.02 (nine) and < 0.05 (14) mg/kg..

The Meeting considered that the available data on barley, rye and wheat treated by foliar application were sufficient to mutually support a group maximum residue level for cereal grains. The residue levels, in ranked order, in 118 trials were: < 0.02 (two), 0.03 (two), < 0.05 (19), 0.05 (three), 0.06 (seven), 0.07 (five), 0.08 (five), 0.09 (five), < 0.1 (six), 0.1 (three), 0.11 (three), 0.12 (six), 0.13 (four), 0.14 (two), 0.15 (two), 0.16 (four), 0.17, 0.2, 0.21 (three), 0.22, 0.23 (four), 0.24 (two), 0.26 (three), 0.3 (two), 0.31 (three), 0.35 (two), 0.36, 0.38, 0.41, 0.43, 0.45, 0.46, 0.47, 0.48, 0.5, 0.51, 0.52, 0.53, 0.59, 0.65, 0.68, 0.87, 0.88 and 1.2 mg/kg.

The Meeting estimated a maximum residue level of 2 mg/kg for prochloraz in cereal grains, replacing the previous recommendations of 0.5 mg/kg for barley, oats, rye and wheat. The Meeting also estimated an STMR of 0.11 mg/kg and a highest residue level of 1.2 mg/kg.

The Meeting agreed that the proposed maximum residue level, the STMR and the highest residue level for cereal grains based on foliar application would also accommodate seed treatment use of prochloraz.

Pepper, black

The results of trials on foliar application on black pepper were made available to the Meeting from Malaysia (GAP: 0.05 kg ai/hl, 30-day PHI). In trials matching this GAP, the residue levels were 5.0 and 5.1 mg/kg.

The Meeting estimated a maximum residue level of 10 mg/kg, an STMR of 5.1 mg/kg and a highest residue level of 5.1 mg/kg for prochloraz in pepper, black.

Animal feed commodities

Barley straw and fodder, dry

In four trials on barley in Denmark and The Netherlands involving a single application of prochloraz and which matched the GAP of Germany, the residue levels in barley straw were: 5.0, 6.8, 7.0 and 17 mg/kg.

The residue levels in straw in 34 trials in Belgium, Denmark, France, Germany, Sweden and the United Kingdom with two applications and matching GAP in the United Kingdom were: 0.68, 0.7, 1.1 (two), 1.4, 1.6, 2.1, 2.3, 2.4, 3.3, 3.5, 3.6, 3.7, 4.1 (two), 4.5, 4.8, 5.4, 5.7, 6.0, 6.5, 6.7, 7.6, 9.7 (two), 9.8, 12, 13 (two), 14 (two), 21, 24 and 30 mg/kg.

In 15 trials in France, Greece, Portugal and Spain, involving two applications of prochloraz according to GAP in Portugal, the residue levels in straw were: 4.0, 4.1, 4.6, 5.0, 6.4, 7.0, 7.1, 8.2, 8.4 (two), 8.8, 12 (two), 13 and 20 mg/kg.

The residue levels in barley straw in the 53 trials, in ranked order, were: 0.68, 0.7, 1.1 (two), 1.4, 1.6, 2.1, 2.3, 2.4, 3.3, 3.5, 3.6, 3.7, 4.0, 4.1 (three), 4.5, 4.6, 4.8, 5.0 (two), 5.4, 5.7, 6.0, 6.4, 6.5, 6.7, 6.8, 7.0 (two), 7.1, 7.6, 8.2, 8.4 (two), 8.8, 9.7 (two), 9.8, 12 (three), 13 (three), 14 (two), 17, 20, 21, 24 and 30 mg/kg.

In field trials in Denmark (GAP: 20 g ai/100 kg seed) and Germany (no GAP) on residues in barley grown from seed treated with prochloraz, the residue levels of total prochloraz in straw in 17 trials matching Danish GAP were: < 0.05 (three), < 0.1 (13) and < 0.2 mg/kg.

Oat straw and fodder, dry

In 10 field trials of seed treatment in Germany that matched German GAP (20 g ai/kg seed), the residue levels of total prochloraz in oat straw grown from seed treated with prochloraz were: < 0.05 (two), < 0.1 (seven) and < 0.2 mg/kg.

Rye straw and fodder, dry

In three trials in Germany matching German GAP, the residue levels in straw were: 1.1, 1.5 and 1.7 mg/kg. The residue levels in additional trials in Germany matching GAP in the United Kingdom were: 0.09, 3.1, 3.4 and 4.7 mg/kg. The residue levels in rye straw, in ranked order, were: 0.09, 1.1, 1.5, 1.7, 3.1, 3.4 and 4.7 mg/kg.

In five trials in Germany matching German GAP on residues in straw from rye grown from seed treated with prochloraz, the residue levels of total prochloraz were: < 0.1 (four) and < 0.2 mg/kg.

Wheat straw and fodder, dry

In six trials on wheat conducted in the former Czechoslovakia, The Netherlands and the United Kingdom involving a single application of prochloraz and matching German GAP, the residue levels in straw were: 1.5, 4.6, 5.2, 6.4, 6.8 and 11 mg/kg.

The residue levels in straw in 14 trials on wheat in southern France, Greece, Italy, Portugal and Spain involving two applications of prochloraz according to GAP in Portugal (0.45 kg ai/ha, 35-day PHI), the residue levels were: 3.5, 4.3, 8.0, 8.2 (two), 8.3, 9.6 (two), 10 (two), 11, 13 (two) and 22 mg/kg.

The residue levels in 32 trials involving two applications of prochloraz to wheat in northern France, Germany and the United Kingdom matching GAP in Belgium and the United Kingdom were: 1.7, 1.8, 2.3, 2.4, 2.5, 2.6, 2.7 (two), 2.8, 3.0, 3.7, 4.3, 5.1, 5.2, 5.3, 5.6, 5.8, 6.5, 6.6, 6.9, 8.0, 8.8, 10, 11 (three), 13, 15, 16, 19, 20 and 22 mg/kg.

The residue levels in wheat straw in all 52 trials, in ranked order, were: 1.5, 1.7, 1.8, 2.3, 2.4, 2.5, 2.6, 2.7 (two), 2.8, 3.0, 3.5, 3.7, 4.3 (two), 4.6, 5.1, 5.2 (two), 5.3, 5.6, 5.8, 6.4, 6.5, 6.6, 6.8, 6.9, 8.0 (two), 8.2 (two), 8.3, 8.8, 9.6 (two), 10 (three), 11 (five), 13 (three), 15, 16, 19, 20 and 22 (two) mg/kg.

In 24 trials of seed treatment matching German GAP, the residue levels of total prochloraz in wheat straw were: < 0.05 (four), < 0.06, < 0.1 (17) and < 0.2 (two) mg/kg.

The Meeting considered that the available data on barley, rye and wheat straw and fodder treated by foliar application were sufficient to mutually support a group maximum residue level for straw and fodder, dry, of cereal grains. The residue levels in the 112 trials, in ranked order, were: 0.09, 0.68, 0.7, 1.1 (three), 1.4, 1.5 (two), 1.7 (two), 1.6, 1.8, 2.1, 2.3 (two), 2.4 (two), 2.5, 2.6, 2.7 (two), 2.8, 3.0, 3.1, 3.3, 3.4, 3.5 (two), 3.6, 3.7 (two), 4.0, 4.1 (three), 4.3 (two), 4.5, 4.6 (two), 4.7, 4.8, 5.0 (two), 5.1, 5.2 (two), 5.3, 5.4, 5.6, 5.7, 5.8, 6.0, 6.4 (two), 6.5 (two), 6.6, 6.7, 6.8 (two), 6.9, 7.0 (two), 7.1, 7.6, 8.0 (two), 8.2 (three), 8.3, 8.4 (two), 8.8 (two), 9.6 (two), 9.7 (two), 9.8, 10 (three), 11 (five), 12 (three), 13 (five), 14 (two), 15, 16, 17, 19, 20 (two), 21, 22 (two), 24 and 30 mg/kg.

Allowing for a dry matter content of 90% (*FAO Manual*), the Meeting estimated a maximum residue level of 40 mg/kg for prochloraz in straw and fodder, dry, of cereal grains, replacing the previous recommendations of 15 mg/kg for barley straw and fodder, dry; oats straw and fodder, dry; rye straw and fodder, dry, and wheat straw and fodder, dry. The Meeting also estimated an STMR of 7.2 mg/kg and a highest residue level of 33 mg/kg.

The Meeting agreed that the available data indicated that the proposed maximum residue level, STMR and highest residue level for straw and fodder, dry, after foliar application would also accommodate seed treatment use of prochloraz.

Fate of residues during storage

The Meeting received the results of a study on the fate of prochloraz residues in oranges. Fruit dipped in prochloraz at 0.1–0.2 kg ai/hl and shipped under refrigeration for 44 days were stored at 4°C or 20°C for a further 7, 14 or 21 days. No significant degradation of residue was observed during the post-shipping 21-day storage period, as > 87% of the residue remained in the stored fruit. The median retention value was 99% for ambient-stored fruit and 117% for cool-stored fruit.

Fate of residues during processing

The effect of processing on levels of residues of prochloraz was studied in barley, rape-seed and wheat, and the residue levels in oil and press cake were reported in several field trials on sunflower seed; residue levels in green black pepper and in processed white pepper were reported in one trial on pepper. A study on residues in dehydrated and preserved mushrooms was also provided to the Meeting. The processing factors of relevance to estimation of maximum residue levels, the dietary burden of farm animals and dietary risk assessment, shown below, were derived from these studies.

Raw agricultural commodity	Processed product	No. of samples	Mean processing factor
Barley	Beer	4	0.09
Wheat	Bran (total)	1	4.3
	Flour (unspecified)	3	0.23
	Bread (whole grain)	1	1.3

Raw agricultural commodity	Processed product	No. of samples	Mean processing factor
Rape-seed	Seed cake (meal)	18	0.79
	Refined oil	4	< 0.6
Sunflower seed	Seed cake (meal)	6	0.49
Pepper	Black peppercorns	4	0.96
	White peppercorns	4	0.35
Mushrooms	Dehydrated	3	3.7
	Preserved	2	0.4
	Preservation liquor	2	0.65

Wheat was processed into milled by-products (bran), flour and whole-grain bread, with processing factors of 4.3, 0.23 and 1.3 respectively. On the basis of the STMR value of 0.11 mg/kg for cereal grains, the STMR-Ps were 0.025 mg/kg for wheat flour and 0.14 mg/kg for wholemeal bread.

Wheat milled by-products (bran) is listed as animal feed in the *FAO Manual* (Appendix IX). Allowing for the standard 88% dry matter, the Meeting estimated an STMR-P of 0.54 mg/kg for wheat bran (dry weight).

On the basis of the highest residue level of 1.2 mg/kg, the processing factor of 4.3 and the standard dry matter content of 88%, the Meeting recommended a maximum residue level of 7 mg/kg for wheat bran, unprocessed (dry weight basis).

Barley was processed into beer, with a processing factor of 0.09. On the basis of the STMR value of 0.11 mg/kg for cereal grains, the STMR-P for beer was 0.01 mg/kg.

The residue levels in seed cake in trials on rape in Denmark and Germany, matching the GAP of the United Kingdom and Germany respectively, and used in estimating the maximum residue levels, were: < 0.05, 0.05 (three), 0.07, 0.08 (two) and 0.1 mg/kg. The Meeting established an STMR-P of 0.06 mg/kg for rape-seed meal.

In four processing studies, the residue levels in refined oil from rape-seed containing 0.07–0.12 mg/kg were below the LOQ (< 0.05 mg/kg). Using a processing factor of < 0.6 and an STMR of 0.1 mg/kg for rape-seed, the Meeting established an STMR-P of 0.06 mg/kg for rape-seed oil, edible.

The residue levels in seed cake in three trials on *sunflower seed* in France that were used in estimating the maximum residue level were ≤ 0.1 (two) and 0.15 mg/kg. Taking into account the STMR for sunflower seed (0.1 mg/kg) and the processing factor of 0.49, the Meeting established an STMR-P of 0.05 mg/kg for sunflower seed meal.

The Meeting agreed to use the STMR of 0.1 mg/kg for sunflower seed and the processing factor of < 0.6 derived for refined rape-seed oil to estimate an STMR-P of 0.06 mg/kg for sunflower seed oil (refined).

In a field study in Malaysia on green (fresh) peppercorns, the residues were not concentrated during the sun-drying process used to produce black peppercorns (mean processing factor, 0.96), and the residue levels decreased during husking to produce white peppercorns (mean processing factor, 0.35).

Residues in animal commodities

Dietary burden of farm animals

The Meeting estimated the dietary burden of total prochloraz in cows and poultry on the basis of the diets listed in Appendix IX of the *FAO Manua*. Calculations from MRLs and highest residue levels provide the levels in feed suitable for estimating MRLs for animal commodities, while calculations from STMR values for feed are suitable for estimating STMR values for animal commodities. The percentage of dry matter is taken as 100% when MRLs and STMR values are already expressed as dry weight.

Estimated maximum dietary burden of farm animals

Commodity	Group	Residue (mg/kg)	Basis	Dry matter (%)	Residue/Dry matter (mg/kg)	Dietary content (%)			Residue contribution (mg/kg)		
						Beef cattle	Dairy cattle	Poultry	Beef cattle	Dairy cattle	Poultry
Rape meal	–	0.06	STMR-P	88	0.07						
Sunflower meal	–	0.05	STMR-P	92	0.05						
Barley straw	AS	33	HR	100	33	**10**	**60**		3.3	19.8	
Wheat straw	AS	33	HR	100	33						
Rye straw	AS	33	HR	100	33						
Oat straw	AS	33	HR	100	33						
Wheat milled by-products	CF	0.54	STMR-P	100	0.54	**10**		**20**	0.05		0.11
Barley grain	GC	1.2	HR	88	1.36						
Corn grain	GC	1.2	HR	88	1.36	**80**	**40**	**80**	1.09	0.55	1.09
Rye grain	GC	1.2	HR	88	1.36						
Wheat grain	GC	1.2	HR	89	1.35						
Oat grain	GC	1.2	HR	89	1.35						
Total						100	100	100	**4.4**	**20**	**1.2**

Estimated median dietary burden of farm animals

Commodity	Group	Residue (mg/kg)	Basis	Dry matter (%)	Residue/Dry matter (mg/kg)	Dietary content (%)			Residue contribution (mg/kg)		
						Beef cattle	Dairy cattle	Poultry	Beef cattle	Dairy cattle	Poultry
Rape meal	–	0.06	STMR-P	88	0.07						
Sunflower meal	–	0.05	STMR-P	92	0.05						
Barley straw	AS	7.2	STMR	100	7.2	**10**	**60**		0.72	4.32	
Wheat straw	AS	7.2	STMR	100	7.2						
Rye straw	AS	7.2	STMR	100	7.2						
Oat straw	AS	7.2	STMR	100	7.2						
Wheat milled by-products	CF	0.54	STMR-P	100	0.54	**10**		**20**	0.05		0.11
Barley grain	GC	0.11	STMR	88	0.13						
Corn grain		0.11	STMR	88	0.13	**80**	**40**	**80**	0.1	0.05	0.1
Rye grain	GC	0.11	STMR	88	0.13						
Wheat grain	GC	0.11	STMR	89	0.12						

Commodity	Group	Residue (mg/kg)	Basis	Dry matter (%)	Residue/Dry matter (mg/kg)	Dietary content (%)			Residue contribution (mg/kg)		
						Beef cattle	Dairy cattle	Poultry	Beef cattle	Dairy cattle	Poultry
Oat grain	GC	0.11	STMR	89	0.12						
Total						100	100	100	**0.87**	**4.4**	**0.21**

The total dietary burdens of prochloraz for estimating MRLs for animal commodities (residue levels in animal feeds expressed as dry weight) are 4.4 ppm for beef cattle, 20 ppm for dairy cattle and 1.2 ppm for poultry. The associated median dietary burdens for estimating STMR are 0.87 ppm for beef cattle, 4.4 ppm for dairy cattle and 0.21 ppm for poultry.

Feeding studies

The Meeting received information from two studies on the residue levels in tissues and milk from dairy cows dosed with prochloraz for 28 days at an equivalent of 10, 30 and 100 ppm in the diet and from a feeding study in which calves were fed a diet containing prochloraz twice daily, resulting in a rate of 0.263 mg/kg bw (dietary concentration could not be estimated).

In one of the studies in dairy cows, tissues were analysed for total prochloraz residues by gas chromatography with mass spectrometry detection after conversion of the metabolites to 2,4,6-trichlorphenol. The mean recovery efficiency was 89%, and the LOQ was 0.05 mg/kg. At the end of the 28-day treatment period, the mean residue levels in muscle ranged from < 0.05 mg/kg to 0.37 mg/kg in cows at the highest dose. In subcutaneous fat, the mean residue levels ranged from 0.09 mg/kg at the lowest dose to 1.2 mg/kg at the highest dose, and those in peritoneal fat ranged from 0.16 mg/kg to 1 mg/kg for the three groups. The mean residue levels in kidney were 0.52 mg/kg at the lowest dose to 3.2 mg/kg at the highest, and those in liver were 2.8 mg/kg at the lowest dose, 6.4 mg/kg at 30 ppm and 23 mg/kg at 100 ppm.

The results of the study in which calves were dosed at 0.26 mg/kg bw for 28 days were similar to those for cows receiving the lowest dose, with mean residue levels of 2.2 mg/kg in liver, 0.55 mg/kg in kidney, 0.09 mg/kg in fat and 0.06–0.09 mg/kg in muscle.

Residues of free prochloraz and three metabolites were measured in milk from cows dosed twice daily after milking with prochloraz for 28 days at an equivalent of 10, 30 and 100 ppm in the diet. Traces of prochloraz were detected in the group at 100 ppm from day 4 and in the group at 30 ppm after day 28, but all the residue levels were below the reported LOQ of 0.01 mg/kg. No residues of the metabolites BTS 54906 and BTS 54908 were detected in milk from cows at any dose. Trace levels (< 0.01 mg/kg) of BTS 44596 were reported in milk from cows at 30 ppm from day 22, and the average levels in milk from cows at 100 ppm reached a plateau of 0.01 ± 0.003 mg/kg from day 4. Milk sampled and separated on day 24contained average levels of BTS 44596 of 0.005 mg/kg in skim milk and 0.032 mg/kg in cream, suggesting preferential partitioning (six times) into milk fat.

Maximum residue levels

As the total dietary burdens of *beef and dairy cattle* are 4.4 and 20 ppm respectively, the maximum residue levels to be expected in tissues can be obtained by interpolating the results of feeding at a level of 10 or 30 ppm. The maximum residue levels reported were 3.3 mg/kg and 9 mg/kg in liver, 0.24 mg/kg and 0.51 mg/kg in fat, 0.05 mg/kg and 0.14 mg/kg in muscle and 0.59 mg/kg and 1.8 mg/kg in kidney.

The median dietary burdens were 0.87 ppm for beef cattle and 4.4 ppm for dairy cattle. STMR values can be extrapolated from the mean residue levels in tissues of animals at 10 ppm, i.e. 2.8 mg/kg in liver, 0.13 mg/kg in fat, < 0.05 mg/kg in muscle and 0.52 mg/kg in kidney. The mean residue level in milk at both feeding levels was < 0.01 mg/kg,

Dietary burden (mg/kg)[a]		Prochloraz residue level (mg/kg)[c]								
Feeding level [ppm][b]		Milk (mean)	Fat		Muscle		Liver		Kidney	
			High	Mean	High	Mean	High	Mean	High	Mean
MRL beef cattle	(20) [10:30]		*(0.38)* 0.24:0.51		*(0.1)* 0.05:0.14		*(6.2)* 3.3:9		*(1.2)* 0.59:1.8	
MRL dairy cattle	(20) [10:30]	*(< 0.01)* < 0.01:< 0.01								
STMR beef cattle	(4.4) [5]			*(0.057)* 0.13		*(< 0.022)* < 0.05		*(1.23)* 2.8		*(0.229)* 0.52
STMR dairy cattle	(4.4) [5]	*(< 0.0044)* < 0.01								

[a] In parentheses, estimated dietary burden

[b] In square brackets, actual feeding levels in transfer studies

[c] Values in parentheses in italics are derived from the dietary burden, feeding levels and residue levels found in the transfer studies. 'High' is the highest residue level in an individual tissue in the relevant feeding group. 'Mean' is the mean residue level in tissue (or milk) in the relevant feeding group.

On the basis of the above considerations, the Meeting estimated highest residue levels of 0.1 mg/kg in meat (muscle), 0.38 mg/kg in meat (fat), 6.2 mg/kg in edible offal (mammalian) and 0 mg/kg in milks.

The Meeting estimated maximum residue levels of 0.5 mg/kg (fat) in meat (from mammals other than marine mammals); 10 mg/kg in edible offal, mammalian and 0.05 (*) mg/kg in milks. These recommendations replace the previous recommendations of 0.5 mg/kg for cattle fat, 0.1 (*) mg/kg for cattle meat, 5.0 mg/kg for cattle, edible offal of, and 0.1 (*) mg/kg for milks. The Meeting estimated STMRs of 0.02 mg/kg for meat (muscle), 0.06 mg/kg for meat (fat), 1.2 mg/kg for edible offal (mammalian) and 0 mg/kg for milks.

For poultry, the information provided by the study of metabolism in hens at feeding rates of 5 and 10 ppm in hens was considered by the Meeting to be sufficient for use in estimating maximum residue levels in eggs and poultry tissues. In tissues from birds at 5 ppm, the maximum residue levels were 0.41 mg/kg in liver, 0.029 mg/kg in fat and 0.02 mg/kg in muscle. The average residue level in eggs after a plateau had been reached at day 8 was 0.28 mg/kg. The average residue levels in hens at 5 ppm were 0.34 mg/kg in liver, 0.028 mg/kg in fat, 0.019 mg/kg in muscle and 0.28 mg/kg in eggs (after day 8).

The total dietary burden of poultry is 1.2 mg/kg, and the median dietary burden is 0.21 mg/kg. The Meeting agreed that extrapolation from the results for hens at the 5 ppm feeding level in the metabolism study was appropriate for estimating maximum residue levels, STMRs and highest residue levels

Dietary burden (mg/kg)[a]		Prochloraz residue levels (mg/kg)[c]						
Feeding level [ppm][b]		Eggs (mean)	Fat		Muscle		Liver	
			High	Mean	High	Mean	High	Mean
MRL poultry	(1.2) [5]	*(0.0672)* 0.28	*(0.007)* 0.029		*(0.0048)* 0.02		*(0.0984)* 0.41	
STMR poultry	(0.21) [5]	*(0.0118)* 0.28		*(0.0012)* 0.028		*(0.0008)* 0.019		*(0.0143)* 0.34

a In parentheses, estimated dietary burden

b In square brackets, actual feeding levels in transfer studies

c Values in parentheses in italics are derived from the dietary burden, feeding levels and residue levels found in the transfer studies. 'High' is the highest residue level in an individual tissue in the relevant feeding group. 'Mean' is the mean residue level in tissue in the relevant feeding group.

On the basis of this extrapolation, the Meeting estimated highest residue levels of 0.005 mg/kg for poultry meat, 0.007 mg/kg for poultry fats, 0.1 mg/kg for poultry, edible offal of, and 0.07 mg/kg for eggs.

The Meeting estimated maximum residue levels of 0.05 (*) mg/kg for poultry meat, 0.2 mg/kg for poultry, edible offal of, and 0.1 mg/kg for eggs; it also estimated STMRs of 0.001 mg/kg in poultry meat (muscle), 0.001 mg/kg in poultry meat (fat), 0.015 mg/kg in poultry, edible offal of, and 0.012 mg/kg in eggs.

RECOMMENDATIONS

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

Definition of the residue (for compliance with MRL and for estimation of dietary intake): Sum of prochloraz and its metabolites containing the 2,4,6-trichlorphenol moiety, expressed as prochloraz. This definition applies to both plant and animal commodities.

The residue is fat soluble

CCN	Commodity Name	MRL (mg/kg) New	MRL (mg/kg) Previous	STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
FI 0326	Avocado	W [1]	5 Po		
FI 0030	Assorted tropical and subtropical fruits–inedible peel	7 (Po)		0.1	0.7
FI 0327	Banana	W [1]	5 Po		
GC 0640	Barley	W [1]	0.5		
AS 0640	Barley straw and fodder, dry	W [1]	15		
	Beer			0.01	
MF 0812	Cattle fat	W [1]	0.5		
MM 0812	Cattle meat	W [1]	0.1 (*)		
MO 0812	Cattle, Edible offal of	W [1]	5		
GC 0080	Cereal grains	2		0.11	1.2
FC 0001	Citrus fruits	10 Po		0.1	0.92
SB 0716	Coffee beans	W	0.2		
MO 0105	Edible offal (Mammalian)	10		1.2	6.2
PE 0112	Eggs	0.1		0.012	0.07
SO 0693	Linseed	0.05 (*)		0.05	0.05
FI 0345	Mango	W [1]	2 Po		
MM 0095	Meat (from mammals other than marine mammals)	0.5 (fat)		0.02 (muscle) 0.06 (fat)	0.1 (muscle) 0.38 (fat)
ML 0106	Milks	0.05 (*)	0.1 (*)	0	0
VO 0450	Mushrooms	40	2	4.9	37
GC 0647	Oats	W [1]	0.5		
AS 0647	Oats straw and fodder, dry	W [1]	15		
FC 0004	Oranges, Sweet and Sour	W [1]	5 Po		
FI 350	Papaya	W [1]	1 Po		
HS 0790	Pepper; Black; White	10		5.1	5.1
PM 0110	Poultry meat	0.05 (*)		0.001 (muscle) 0.001 (fat)	0.005 (muscle) 0.007 (fat)
PO 0111	Poultry, Edible offal of	0.2		0.015	0.1
SO 0495	Rape seed	0.7	0.5	0.1	0.48

CCN	Commodity Name	MRL (mg/kg) New	MRL (mg/kg) Previous	STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
	Rape seed meal			0.06	
OR 0495	Rape seed oil, edible			0.06	
GC 0650	Rye	W [1]	0.5		
AS 0650	Rye straw and fodder, dry	W [1]	15		
FS 0012	Stone fruits	W	0.05		
AS 0081	Straw and fodder (dry) of cereal grains	40			
SO 0702	Sunflower seed	0.5		0.1	0.32
	Sunflower seed meal			0.05	
OR 0702	Sunflower seed oil (edible)	1		0.06	
GC 0654	Wheat	W [1]	0.5		
CM 0654	Wheat bran, unprocessed	7		0.54	
AS 0654	Wheat straw and fodder, dry	W [1]	15		
CF 1211	Wheat flour			0.025	
	Wholemeal bread			0.14	

(*) = the MRL is estimated at or about the LOQ

W = Withdrawn

1 = Replaced by recommendatiomns for wider group of commodities

DIETARY RISK ASSESSMENT

Long-term intake

The evaluation of prochloraz resulted in recommendations for MRLs and STMRs for raw and processed commodities. Data were available on the consumption of 35 food commodities, and these were used in calculating dietary intake. The results are shown in Annex 3.

The IEDIs in the five GEMS/Food regional diets, on the basis of the estimated STMRs, represented 7–10% of the ADI of 0–0.01 mg/kg bw (Annex 3). The Meeting concluded that the long-term intake of residues of prochloraz from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The IESTI of prochloraz was calculated for the food commodities (and their processing fractions) for which maximum and highest residue levels had been estimated and for which data on consumption were available. The results are shown in Annex 4.

The IESTI varied from 0 to 130% of the ARfD (0.1 mg/kg bw) for the general population and from 0 to 150% of the ARfD for children ≤6 years. The short-term intake of mushrooms, for which the calculation was made, represented 150% of the ARfD for children ≤ 6 years and 130% of the ARfD for the general population. The information provided to the Meeting precluded a conclusion that the short-term dietary intake of mushrooms would result in residue levels below the ArfD.

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