[2] Shell
[3] Haulm

Fodder beet. Five supervised trials were carried out in Germany with 0.21 kg ai/ha of racemic haloxyfop-etotyl with PHIs of 0-133 days (Table 37).

Table 37. Residues of haloxyfop in fodder beet in Germany. All single EC applications of racemic haloxyfop.

Year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
1982	SR-EE	0.21	0.052	42	43 days after planting	<0.02[1]	GHE-P-1198 (N11)
				71		<0.02[1]	
				105		<0.02[2]	
				105		<0.01[3]	
				133	normal crop	<0.02[2]	
				133	normal crop	<0.01[3]	
1982	SR-EE	0.21	0.042	13	48 days after planting	0.34[1]	GHE-P-1198 (N11)
				22		0.13[1]	
				58		<0.02[1]	
				70		<0.02[2]	
				70		<0.01[3]	
				106		<0.02[2]	
				106		<0.01[3]	
				114	normal crop	<0.02[2]	
				114	normal crop	0.01[3]	
1982	SR-EE	0.21	0.042	0	60 days after planting	4.75[1]	GHE-P-1198 (N11)
				11		0.92[1]	
				30		0.10[1]	
				78		0.03[2]	
				78		0.04[3]	
				114		<0.02[2]	
				114		0.03[3]	
				122	normal crop	<0.02[2]	
				122	normal crop	0.02[3]	
1983	SR-EE	0.21	0.052	15	52 days after planting	0.37[1]	GHE-P-1198 (N11)
				50		<0.02[2]	
				50		<0.01[3]	
				85		<0.02[2]	
				85		0.01[3]	
				123	normal crop	0.04[2]	
				123	normal crop	<0.01[3]	
1983	SR-EE	0.21	0.042	2	69 days after planting	1.67[1]	GHE-P-1198 (N11)
				23		0.19[2]	
				23		0.17[3]	

haloxyfop

Year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
				58		0.16[2]	
				58		0.08[3]	
				88		<u>0.05</u>[2]	
				88		<u>0.03</u>[3]	
				99	normal crop	0.04[2]	
				99	normal crop	0.04[3]	

[1] Whole plant
[2] Tops
[3] Roots

Sugar beet leaves or tops. The results from 32 European supervised trials were submitted, 27 with racemic haloxyfop and 5 with haloxyfop-R-methyl (Table 38).

Table 38. Residues of haloxyfop in sugar beet leaves or tops.

Country, year	Application				PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	No	kg ai/ha	kg ai/hl				
	SR-EE	1	0.21	N.S.[1]	134	6 leaves	0.02	GHE-P-1263
Denmark 1983		2	0.1	N.S.	118	8-10 leaves	0.08	(N14)
	SR-EE	1	0.21	0.052	7	N.S.	1.96	GHE-P-1198
					21		<0.01	(N11)
1982					87		0.08	
					117		0.05	
					130	normal crop	0.02	
	SR-EE	1	0.21	0.042	4	N.S.	2.4	GHE-P-1198
Germany					15		0.48	(N11)
1982					34		0.11	
					82		0.03	
					118		0.02	
					126	normal crop	<0.01	
	SR-EE	1	0.21	0.052	26	4-5 leaves	0.12	GHE-P-1198
Germany					59		0.02	(N11)
1982					89		<0.01	
					119		<0.01	
					150	normal crop	<0.01	
	SR-EE	1	0.1	0.021	0	N.S.	0.05	GHE-P-1198
Germany					22		0.04	(N11)
1983					37		0.09	
					71		0.04	
					106		0.02	
					115	normal crop	0.03	
		1	0.21	0.042	0		3.46	
					22		0.14	
					37		0.1	
					71		0.04	
					106		0.04	
					115	normal crop	0.03	
	SR-EE	1	0.1	0.021	0	N.S.	3.57	GHE-P-1198
Germany					21		0.08	(N11)
1983					36		0.05	
					70		0.02	
					101		0.02	
					114	normal crop	0.01	

Country, year	Application				PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	No	kg ai/ha	kg ai/hl				
		1	0.21	0.042	0		5.77	
					21		0.16	
					36		0.08	
					70		0.02	
					101		<0.02	
					114	normal crop	<0.02	
	SR-EE	1	0.21	0.052	1	6-8 leaves	4.54	GHE-P-2036
Germany					13		0.76	(N11)
1988					76		0.3	
					104		0.2	
					118	normal crop	0.16	
	SR-EE	1	0.21	0.052	0		4.41	GHE-P-2036
Germany					24	crop cover	0.18	(N11)
1988					76	complete	0.28	
					108		0.18	
					128	normal crop	0.16	
	SR-EE	1	0.21	0.052	1	6 leaves	3.94	GHE-P-2036
Germany					15		0.21	(N11)
1988					98		<0.02	
					125	normal crop	<0.02	
The Netherlands 1982	SR-EE	1	0.21	N.S.	137	8-10 leaves	0.08	GHE-P-1223 (N12)
	SR-EE	1	0.21	0.1	119	6-8 leaves	0.01	GHE-P-1265
Sweden 1982					126	6-10 leaves	0.04	(N15)
	SR-EE	2	0.1	0.052	104	8-10 leaves	0.03	GHE-P-1265
Sweden 1982					112		0.1	(N15)
	SR-EE	2	0.21	0.1	133	6-10 leaves	0.05	GHE-P-1265
Sweden 1982								(N15)
	SR-EE	1	0.1	0.052	160	2-8 leaves	<0.03	GHE-P-993
UK 1982		1	0.21	0.1	160		<0.03	(N1)
	SR-EE	1	0.21	0.1	168	2-8 leaves	<0.03	GHE-P-993
UK 1982		1	0.42	0.21	168		0.07	(N1)
	SR-EE	1	0.21	0.1	181	2-8 leaves	<0.03	GHE-P-993
UK 1982		1	0.42	0.21	181		<0.03	(N1)
	SR-EE	1	0.21	0.1	143	2-8 leaves	0.28	GHE-P-993
UK		1	0.21	0.1	181		0.04	(N1)
1982		1	0.42	0.21	143		0.16	
		1	0.42	0.21	181		<0.03	
	SR-EE	1	0.21	N.S.	153	8 leaves	<0.01	GHE-P-1195
UK					153		<0.02	(N2)
1982		1	0.42	N.S.	153		0.01	
					153		<0.02	
	SR-EE	1	0.21	0.1	180	6-8 leaves	0.02	GHE-P-1230
UK		1	0.42	0.21	180		<0.02	(N3)

Country, year	Application				PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	No	kg ai/ha	kg ai/hl				
1982		1	0.83	0.42	180		0.08	
		1	0.21	0.1	143	10-12 leaves	0.33	
		1	0.42	0.21	143		0.27	
		1	0.83	0.42	143		0.34	
	SR-EE	1	0.21	0.1	168	4-6 leaves	0.03	GHE-P-1230
UK		1	0.42	0.21	168		0.04	(N3)
1982		1	0.83	0.42	168		0.05	
		1	0.21	0.1	153	11 leaves	0.12	
		1	0.42	0.21	153		0.12	
		1	0.83	0.42	153		0.24	
	SR-EE	1	0.21	0.1	181		<0.02	GHE-P-1230
UK		1	0.42	0.21	181	4-6 leaves	<0.02	(N3)
1982		1	0.83	0.42	181		0.03	
		1	0.21	0.1	166		0.04	
		1	0.42	0.21	166	12 leaves	0.09	
		1	0.83	0.42	166		0.26	
	SR-EE	1	0.21	0.1	135	6-8 leaves	0.06	GHE-P-1262
UK		1	0.42	0.21	135		0.12	(N4)
1983		1	0.21	0.1	135		0.09	
		1	0.42	0.21	135		0.19	
	SR-EE	1	0.21	0.1	117	10-12 leaves	0.05	GHE-P-1262
UK 1983		1	0.42	0.21	117		0.06	(N4)
	SR-EE	1	0.21	0.1	38	mature	0.41	GHE-P-1310
UK					68	rows meeting	0.45	(N6)
1984					94	30 cm height	0.13	
					124	8-10 leaves	0.04	
					147	4 leaves	<0.02	
					174	cotyledon	<0.02	
		1	0.42	0.21	38		0.71	
					68		1.05	
					94		0.18	
					124		0.07	
					147		<0.02	
					174		<0.02	
	SR-EE	1	0.63	0.31	38		1.08	
					68		1.32	
					94		0.24	
					124		0.08	
					147		<0.02	
					174		<0.02	
	SR-EE	1	0.21	0.1	28	mature	0.3	GHE-P-1314
UK					60	mature	0.21	(N7)
1984					97	40-50 cm height	0.22	
					126	10-12 cm height	0.11	
					153	4-6 leaves	<0.02	

Country, year	Application				PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	No	kg ai/ha	kg ai/hl				
		1	0.42	0.21	28		0.61	
					60		0.42	
					97		0.38	
					126		0.15	
					153		<0.02	
		1	0.63	0.31	28		0.98	
					60		0.22	
					97		0.44	
					126		0.29	
					153		0.03	
	SR-EE	1	0.21	0.1	43	mature	0.68	GHE-P-1314
UK					78	18-26 leaves	0.27	(N7)
1984					106	11 leaves	0.1	
					146	11 leaves	0.04	
					163	6 leaves	<0.02	
		1	0.42	0.21	43		0.82	
					78		0.53	
					106		0.15	
					146		0.05	
					163		0.03	
		1	0.62	0.31	43		1.48	
					78		0.81	
					106		0.22	
					146		0.11	
					163		0.03	
	SR-EE	1	0.21	0.1	63	mature	0.23	GHE-P-1314
UK					98	28-30 leaves	0.29	(N7)
1984					125	25-30 leaves	0.23	
					166	9 leaves	0.04	
					182	4 leaves	<0.02	
		1	0.42	0.21	63		0.53	
					98		0.37	
					125		0.41	
					166		0.07	
					182		<0.02	
		1	0.62	0.31	63		0.81	
					98		0.82	
					125		0.43	
					166		0.08	
					182		<0.02	
	R-Me	1	0.1	0.026	1	6-8 leaves	2.46	GHE-P-2036
Germany					13		0.38	(N11)
1988					76		0.14	
					104		0.1	
					118	normal crop	0.09	

Country, year	Application				PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	No	kg ai/ha	kg ai/hl				
Germany 1988	R-Me	1	0.1	0.026	0 24 76 108 128	crop cover complete normal crop	2.02 0.42 0.1 0.09 0.08	GHE-P-2036 (N11)
Germany 1988	R-Me	1	0.1	0.026	1 15 98 125	6 leaves normal crop	2.16 0.17 <0.02 <0.02	GHE-P-2036 (N11)
Italy 1992	R-Me	1	0.1	0.026	67	8-9 leaves	0.09	GHE-P-3078 (N13)
Italy 1992	R-Me	1	0.1	0.026	65	8-9 leaves	0.09	GHE-P-3078 (N13)

[1] not specified

Peanut shells and vines. The results of two supervised trials are shown in Table 39.

Table 39. Residues of haloxyfop in peanut shells and vines from single EC applications of racemic haloxyfop-etotyl in Australia.

Year Country	Application		PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	kg ai/ha	kg ai/hl				
1983	0.05	0.075	115	N.S.[1]	<0.01	PAU-3312-189
	0.1	0.15	115		0.02	(N122)
	0.4	0.6	76		0.04	
1986	0.16	0.14	82	first peanuts present	0.12	PAU-3313-252
			103	15-18 cm height, flowers present	0.04	(N124)
			117	8-9th trifoliate	0.03	
	0.31	0.29	82		0.82	
			103		0.15	
			117		0.04	

[1] Not specified

Rape fodder. Results were submitted from 17 trials in Germany, Sweden and the UK with racemic haloxyfop-etotyl, and 2 in Germany with haloxyfop-R-methyl (Table 40).

Table 40. Residues of haloxyfop in rape fodder. All single applications of EC formulation.

Country, year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
Germany, 1989	SR-EE	0.21	0.052	1 42	6 leaves	8.26[2] 1.82[2]	GHE-P-2144 (N2)

Country, year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
				189		0.02[2]	
				241		0.04[2]	
				272	normal crop	<0.05	
	SR-EE	0.21	0.052	1	6 leaves	<0.02[2]	GHE-P-2144
Germany				34		0.15[2]	(N2)
1989				184		<0.02[2]	
				229		<0.02[2]	
				259	normal crop	<0.05	
	SR-EE	0.16	0.04	54	7 mo after	0.08[2]	GHE-P-1194R
Germany				68	planting	0.08[2]	(N32)
1982				88		0.11[2]	
	SR-EE	0.16	N.S.[1]	0	7 mo after	4.4[2]	GHE-P-1194R
Germany				14	planting	1.06[2]	(N32)
1982				29		0.29[2]	
				46		0.12[2]	
		0.21	N.S.	0		7.17[2]	
				14		1.47[2]	
				29		0.28[2]	
				46		0.16[2]	
	SR-EE	0.16	N.S.	160	57 days after	0.02[2]	GHE-P-1194R
Germany				187	planting	<0.01[2]	(N32)
1983				222		<0.01[2]	
		0.21	N.S.	0	7 mo after	13.3[2]	
				27	planting	0.88[2]	
				62		0.05[2]	
	SR-EE	0.16	0.031	0	46 days after	4.74[2]	GHE-P-1194R
Germany				50	planting	0.42[2]	(N32)
1982				193		0.11[2]	
				219		0.02[2]	
				249		0.02[2]	
				303	normal crop	<0.05	
	SR-EE	0.1	0.021	0	8 mo after	5.46[2]	GHE-P-1194R
Germany				23	planting	0.31[2]	(N32)
1983				53		0.17[2]	
				107	normal crop	0.1	
		0.21	0.042	0		8.55[2]	
				23		0.82[2]	
				53		0.2[2]	
				107	normal crop	0.09	
	SR-EE	0.1	0.021	0	7 mo after	0.14[2]	GHE-P-1194R
Germany				34	planting	0.13[2]	(N32)
1982				64		0.06[2]	

Country, year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
		0.21	0.042	116 0 34 64 116	normal crop	0.04 6.35[2] 6.16[2] 0.12[2] <u>0.12</u>	
Germany 1983	SR-EE	0.16	0.031	0 50 193 219 249 301	36 days after planting normal crop	0.13[2] 0.24[2] 0.09[2] 0.02[2] 0.03[2] <<u>0.05</u>	GHE-P-1194R (N32)
Germany 1983	SR-EE	0.16	N.S.	0 57 174 209	33 days after planting	6.42[2] 0.27[2] 0.1[2] 0.02[2]	GHE-P-1311 (N33)
Germany 1983	SR-EE	0.16	N.S.	27 62 206 243	4 leaves	0.68[2] 0.43[2] 0.09[2] 0.03[2]	GHE-P-1311 (N33)
Sweden 1982	SR-EE	0.21	0.052	85	18-20 cm height	0.22	GHE-P-1220 (N34)
UK 1983	SR-EE	0.21 0.42 0.21 0.42 0.21 0.42	0.1 0.21 0.1 0.21 0.1 0.21	292 292 292 292 292 292	4-6 leaves	<<u>0.05</u> <0.05 <<u>0.05</u> <0.05 <<u>0.05</u> <0.05	GHE-P-1221 (N22)
UK 1983	SR-EE	0.21 0.42 0.21 0.42 0.21 0.42	0.1 0.21 0.1 0.21 0.1 0.21	279 279 279 279 279 279	4-6 leaves	<u>0.05</u> <0.05 <<u>0.05</u> <0.05 <<u>0.05</u> <0.05	GHE-P-1221 (N22)
UK 1983	SR-EE	0.21 0.42	0.1 0.21	269 269	4-5 leaves	<<u>0.05</u> <0.05	GHE-P-1267 (N23)
UK 1983	SR-EE	0.21 0.42	0.1 0.21	292 292	5 leaves	<<u>0.05</u> <0.05	GHE-P-1267 (N23)
UK 1983	SR-EE	0.21 0.42 0.21 0.42 0.21	0.1 0.21 0.1 0.21 0.1	265 265 158 158 265	3-4 leaves 7 leaves	<<u>0.05</u> <0.05 <u>0.08</u> 0.12 <<u>0.05</u>	GHE-P-1264 (N24)

Country, year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
		0.42	0.21	265		<0.05	
		0.21	0.1	158		0.07	
		0.42	0.21	158		0.07	
	R-Me	0.1	0.026	1	6 leaves	5.28[2]	GHE-P-2144
Germany				42		1.25[2]	(N2)
1989				189		0.04[2]	
				241		0.03[2]	
				272	normal crop	<0.05	
	R-Me	0.1	0.026	1	6 leaves	1.52[2]	GHE-P-2144
Germany				34		0.79[2]	(N2)
1989				184		<0.02[2]	
				229		<0.02[2]	
				259	normal crop	<0.05	

[1] Not specified
[2] Whole plant

Pasture. Supervised trials carried out in Australia, four with 0.1-0.21 kg ai/ha of racemic haloxyfop-etotyl with PHIs of 0-42 days and two with 0.052-0.1 kg ai/ha of haloxyfop-R-methyl with PHIs of 0-57 days (Table 41).

Table 41. Residues of haloxyfop in pasture in Australia. All single applications of EC formulation.

Year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
	SR-EE	0.1	0.1	0	N.S.[1]	3.74	GHF-P926
				4		2.3	(N105)
1989				7		2.04	
				14		1.02	
				28		1.39	
				42		1.21	
	SR-EE	0.21	0.21	0		8.08	
				4		4.41	
				7		4.61	
				14		2.9	
				28		2.72	
				42		1.55	
	SR-EE	0.1	0.1	0	N.S.	4.61	GHF-P926
				5		1.98	(N105)
1989				7		3.35	
				14		2.5	
				28		2.22	
				57		0.53	

Year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
		0.21	0.21	0		7.15	
				5		5.69	
				7		5.6	
				14		2.84	
				28		2.74	
				57		0.586	
	R-Me	0.052	0.052	0	N.S.	1.45	GHF-P1002
				4		0.87	(N105A)
1989				7		0.99	
				14		0.6	
				28		0.64	
				42		0.43	
		0.1	0.1	0		3.73	
				4		1.58	
				7		3.07	
				14		1.23	
				28		1.42	
				42		0.96	
	R-Me	0.052	0.052	0	N.S.	2.55	GHF-P1002
				5		1.29	(N105A)
1989				7		1.47	
				14		1.18	
				28		0.78	
				57		0.39	
		0.1	0.1	0		4.32	
				5		1.66	
				7		2.18	
				14		1.78	
				28		1.27	
				57		0.3	
	SR-EE	0.1	0.1	0	N.S.	2.86	GHF-P814
				4		1.1	(N105B)
1988				8		1.71	
				18		1.71	
				21		1.22	
				29		0.45	
	SR-EE	0.21	0.21	0		7.1	
				4		3.37	
				8		3.65	
				18		3.44	
				21		3.6	
				29		0.795	
	SR-EE	0.1	0.12	0	N.S.	10.5	GHF-P814
				4		1.81	(N105B)
1988				7		0.49	

Year	Application			PHI, days	Growth stage at last treatment	Residues, mg/kg	Reference
	Compound	kg ai/ha	kg ai/hl				
1988	SR-EE EC	0.21	0.23	14		0.54	
				21		0.45	
				28		0.46	
				0		21	
				4		0.49	
				7		2.46	
				14		1.53	
				21		1.9	
				28		0.68	

[1] Not specified

Animal feeding studies

Beef calves. Calves were fed haloxyfop each day by bolus for a period of 28 days at levels equivalent to 0, 0.25, 0.5, 1, 5 and 10 ppm in the diet on a dry matter basis (Kutschinski and Bjerke, 1984a). Three animals at each feeding level were slaughtered with no withdrawal period and three at the highest feeding level were slaughtered seven and fourteen days after withdrawal of the compound. Samples of muscle, liver, kidney and fat were collected for residue analysis. All samples were analysed for residues of haloxyfop and its conjugates by a GLC method with a lower limit of quantification of 0.01 mg/kg. The results are shown in Table 42.

Table 42. Residues in tissues of calvevs (3 at each feeding level) resulting from ingestion of haloxyfop.

Tissue	Residue, mg/kg, at indicated intake, ppm						
	0.25	0.5	1	5	10	10(7-w)[1]	10(14-w)[1]
Muscle	<0.01	<0.01	<0.01	0.01	0.02-0.06	<0.01	<0.01
Liver	<0.01	0.01-0.04	0.03-0.06	0.14-0.15	0.40-0.72	0.02-0.03	<0.01-0.03
Kidney	0.02-0.03	0.03-0.12	0.12-0.17	0.35-0.51	0.83-1.90	0.03-0.06	0.03-0.05
Fat	<0.01	<0.01-0.01	<0.01-0.01	0.06-0.09	0.24-0.53	0.07-0.21	0.06-0.22

[1] (7-w) and (14-w) are after 7 and 14 days withdrawal respectively

Lactating cows. Four groups of cows were fed rations containing haloxyfop at levels of 0, 0.25, 0.75 and 2.5 ppm for 28 days and then with untreated feed for 14 days (Gardener, 1984a). Samples of milk were taken daily, and samples of cream on four days during treatment and two days during withdrawal. The samples were analysed for haloxyfop by a GLC method with validated LODs of 0.01 mg/kg in milk and 0.02 mg/kg in cream. The results are shown in Tables 43 (milk) and 44 (cream).

Table 43. Residues in milk from cows fed haloxyfop.

Days	Residue, mg/kg, at indicated intake, ppm (means of triplicates)			
	0	0.25	0.75	2.5

Days	Residue, mg/kg, at indicated intake, ppm (means of triplicates)			
	0	0.25	0.75	2.5
3	<0.01	<0.01	0.01	0.01
10	<0.01	<0.01	0.02	0.02
20	<0.01	0.01	0.01	0.04
28	<0.01	<0.01	0.01	0.03
1 of withdrawal	<0.01	<0.01	0.01	0.03
7 of withdrawal	0.01	<0.01	<0.01	<0.01
14 of withdrawal	<0.01	<0.01	<0.01	<0.01

Table 44. Residues in cream from cows fed haloxyfop.

Days	Residue, mg/kg, at indicated intake, ppm (means of triplicates)			
	0.00	0.25	0.75	2.5
3	<0.02	0.05	0.17	0.32
10	<0.02	0.05	0.16	0.35
17	<0.02	0.05	0.14	0.38
28	<0.02	0.02	0.05	0.17
1 of withdrawal	<0.02	0.04	0.13	0.43
7 of withdrawal	<0.02	<0.02	<0.02	<0.02

Laying hens. Laying hens were fed haloxyfop each day for 28 days at 0, 0.25, 0.75 and 2.5 ppm on a dry matter basis (Kutschinski and Bjerke, 1984b). Hens at each level were killed with no withdrawal period and one group at the highest level was killed seven days and one fourteen days after withdrawal of the compound. Samples of muscle (with attached skin), liver and fat were collected for residue analysis. Eggs from each group were collected daily throughout the experiment. Samples were analysed for residues of haloxyfop and its conjugates by a GLC method with a validated lower limit of quantification of 0.01 mg/kg. The results are shown in Table 45.

Table 45. Residues in chicken tissues and eggs resulting from ingestion of haloxyfop.

Tissue	Residue, mg/kg, at indicated intake, ppm				
	0.25	0.75	2.5	2.5[1]	2.5[2]
Muscle/Skin	<0.01	<0.01-0.02	0.02-0.12	<0.01-0.02	<0.01-0.03
Liver	0.01-0.09	0.06-0.20	0.19-0.68	<0.01-0.02	<0.01-0.01
Fat	<0.01-0.03	0.02-0.12	0.12-0.60	0.04-0.75	0.06-0.34
Eggs	<0.01	0.02	0.04	0.01	<0.01

[1] After 7 days withdrawal
[2] After 14 days withdrawal

FATE OF RESIDUES IN STORAGE AND PROCESSING

In processing

Sugar beet. Samples of control and treated beet taken 66 days after treatment were processed in the UK in 1983 in 25-kg batches in a pilot plant simulating commercial practice. The results are shown in Table 46.

Table 46. Residues of haloxyfop in processed fractions of sugar beet harvested 66 days after a single treatment with haloxyfop-etotyl EC in the UK, 1983.

Application		Sample	Residues, mg/kg	Reference
kg ai/ha	kg ai/hl			
0.21	0.1	Cossettes	0.07	GHE-P-1125 (N8)
		Pressed pulp	0.03	
		Raw juice	0.03	
		Sugar	<0.01	
		Green syrup	0.22	
		Molassed pulp	0.6	
0.42	0.21	Cossettes	0.11	
		Pressed pulp	0.04	
		Raw juice	0.09	
		Sugar	<0.01	
		Green syrup	0.32	
		Molassed pulp	0.8	

Soya beans. Approximately 9 kg of soya beans were processed in a laboratory-scale solvent extractor. A portion of the oil was refined by the official laboratory methods of the American Oil Chemists' Society. The results are shown in Table 47.

Table 47. Residues of haloxyfop in processed fractions of soya beans treated once with racemic haloxyfop-methyl EC in the USA.

Year	Application		PHI, days	Sample	Residues, mg/kg	Reference
	kg ai/ha	kg ai/hl				
1989	0.51	N.S.[1]	97	Whole beans	0.54	ID:89026 (N84)
				Hulls	0.38	
				Meal	0.71	
				Crude oil	0.22	
				Refined oil	0.18	
				Soapstock	0.24	
1989	0.51	N.S.	88	Whole beans	0.24	ID:89026 (N84)
				Hulls	0.15	
				Meal	0.3	
				Crude oil	0.19	
				Refined oil	0.18	

Year	Application		PHI, days	Sample	Residues, mg/kg	Reference
	kg ai/ha	kg ai/hl				
				Soapstock	0.27	
1983	0.28	N.S.	69	Beans	0.68	(N73)
				Hulls	0.56	
				Meal	0.81	
				Crude oil	0.85	
				Refined oil	0.83	
				Soapstock	0.72	
1983	0.28	N.S.	91	Beans	0.08	(N73)
				Hulls	0.05	
				Meal	0.06	
				Crude oil	0.03	
				Refined oil	0.03	
				Soapstock	0.03	

[1] Not specified

Rice. Residues in the bran of treated rice were <0.02 mg/kg. Details are given in Table 29.

Cotton seed. Cotton seed samples were extracted with solvent in the laboratory. The results are shown in Table 48.

Table 48. Residues of haloxyfop in processed fractions of cotton seed treated once with haloxyfop-etotyl EC. Australia 1986.

kg ai/ha	PHI, days	Sample	Residues, mg/kg	Reference
0.16	123	Seed	0.06	(N111)
		Crude oil	0.06	
0.31		Seed	0.08	
		Crude oil	0.1	
0.16	113	Seed	0.08	(N111)
		Crude oil	0.07	
	142	Seed	<0.05	
		Crude oil	<0.05	
	157	Seed	<0.05	
		Crude oil	<0.05	
0.31	113	Seed	0.1	
		Crude oil	0.16	
	142	Seed	<0.05	
		Crude oil	<0.05	
	157	Seed	<0.05	
		Crude oil	<0.05	

Sunflower seed. Samples of sunflower seed (600-1000 g) were processed in a laboratory-scale simulation of commercial practice. The process consisted in extraction with n-hexane, degumming with phosphoric acid, alkali refining, bleaching and deodorisation. The results are shown in Table 49.

Table 49. Residues of haloxyfop in processed fractions of sunflower seed treated once with haloxyfop-etotyl EC and harvested after 99 days. France, 1983.

Application		Sample	Residues, mg/kg	Reference
kg ai/ha	kg ai/hl			
0.1	0.021	Seed	<0.05	GHE-P-1315R
		Crude oil	<0.05	(N46)
		Refined oil	0.06	
		Meal	<0.1	
0.21	0.042	Seed	<0.05	
		Crude oil	0.06	
		Refined oil	0.1	
		Meal	<0.1	
0.52	0.1	Seed	0.16	
		Crude oil	0.29	
		Refined oil	0.35	
		Meal	0.18	

Rape seed. Rape seed from trials carried out in France (Table 32, refs GHE-P-1050R and 1313R) were processed, the 1982 sample by laboratory pressing and solvent extraction only but the 1983 samples (1

kg) by the same laboratoy-scale process, simulating commercial practice, as sunflower seed. The results are shown in Table 50.

Table 50. Residues of haloxyfop in processed fractions of rape seed in France. One EC application of haloxyfop-etotyl.

Year	Application		PHI, days	Sample	Residues, mg/kg	Reference
	kg ai/ha	kg ai/hl				
1982	0.21	0.069	164	Seed	0.14	GHE-P-1050R (N30)
				Cake	0.13	
				Pressed oil	0.28	
				Soxhlet oil	0.39	
	0.42	0.14		Seed	0.32	
				Cake	0.23	
				Pressed oil	0.42	
				Soxhlet oil	0.75	
1983	0.1	0.026	227	Seed	<0.05	GHE-P-1313R (N31)
				Crude oil	0.06	
				Refined oil	0.08	
				Meal	0.04	
	0.21	0.052		Seed	<0.05	
				Crude oil	0.06	
				Refined oil	0.05	
				Meal	0.05	
1983	0.1	0.026	122	Seed	0.28	GHE-P-1313R (N31)
				Crude oil	0.4	
				Refined oil	0.3	
				Meal	0.25	
	0.21	0.052		Seed	0.37	
				Crude oil	0.73	
				Refined and dodorized oil	0.81	
				Meal	0.34	

NATIONAL MAXIMUM RESIDUE LIMITS

The following national MRLs were reported to the Meeting.

Country	Crop	MRL, mg/kg
Argentina	Citrus fruit	0.02
	Grapes/vines	0.02
	Onions	0.05
	Peanuts	0.02
	Pome and stone fruit	0.02
	Potatoes	0.05
	Rice	0.01
	Soya bean	0.5
	Sunflower seed	0.5
Australia	Alfalfa forage	3
	Apple	0.05
	Avocado	0.05
	Banana	0.05
	Blueberry	0.05
	Cattle edible offal	0.5
	Cattle fat	0.1
	Cattle meat	0.02
	Cattle milk	0.02
	Citrus	0.05
	Cotton seed	0.1
	Custard apple	0.05
	Feijoa	0.05
	Grapes/vines	0.05
	Guava	0.05
	Kiwi Fruit	0.05
	Litchi	0.05
	Logan	0.05
	Mango	0.05
	Nashi	0.05
	Nut trees	0.05
	Passion fruit	0.05
	Pasture	3
	Pawpaw	0.05
	Peanuts	0.05
	Pears	0.05
	Persimmon	0.05
	Poultry edible offal	0.5
	Poultry eggs	0.05
	Poultry fat	0.5
	Poultry meat	0.2
	Primary feed	3
	Rambutan	0.05

haloxyfop

Country	Crop	MRL, mg/kg
	Rape seed	0.1
	Stone fruit	0.05
	Sunflower seed	0.02
	Vetch	0.05
Belgium	Rape seed	0.02
	Sugar beet	0.02
Brazil	Soya bean	0.05
	Soya bean	0.05 [1]
Croatia	Rape seed	0.2
	Soya bean	0.2
	Sugar beet	0.2
	Sunflower seed	0.2
Ecuador	Cotton seed	3
	Soya bean	20
France	Fodder beet	0.1
	Grapes/vines	0.01
	Peas, fodder	0.1
	Rape seed (autumn)	0.1
	Sugar beet	0.1
	Sunflower seed	0.1
Germany	Fodder beet, roots	0.2
	Rape seed	0.2
	Rape seed oil	1
	Sugar beet, roots	0.2
Hungary	Apple	0.05 [1]
	Apple	0.1
	Grapes/vines	0.05 [1]
	Grapes/vines	0.1
	Onions	0.05
	Potatoes	0.05
	Rape seed	0.1
	Soya bean	0.1
	Sugar beet roots	0.2
	Sunflower seed	0.1
	Tomatoes	0.1
Italy	Potatoes	0.1
	Rape seed	0.2
	Rape seed, forage	0.1
	Soya bean	0.1
	Soya bean oil	0.2
	Sugar beet	0.1
	Sunflower forage	0.1
	Sunflower seed	0.2
Spain	Cotton seed	0.1
	Cotton seed	0.05[1]

Country	Crop	MRL, mg/kg
	Garlic	0.05
	Grapes/vines	0.01
	Lentils	0.05
	Onions	0.05
	Potatoes	0.05
	Pulses	0.05
	Rape seed	0.05
	Sugar beet, roots	0.05
	Sugar beet, tops	0.1
	Sugar beet, tops	0.05[1]
	Sunflower seed	0.05
	Vegetation	0.02
Switzerland	Grapes/vines	0.02
	Onions	0.1
	Potatoes	0.1
	Rape seed	0.1
	Rape seed oil	0.2
	Sugar beet	0.2
	Top fruit	0.02

[1] MRL for haloxyfop-R-methyl

APPRAISAL

Haloxyfop is a substituted phenoxypropionic acid derivative which has been developed as a selective herbicide for the control of grass weeds in broad-leaf crops. In the first formulations produced, the active substance was either racemic haloxyfop-etotyl or the racemic methyl ester. When applied to plants, the ester is rapidly hydrolysed to the acid which has herbicidal activity. As it has been demonstrated that the (*R*)- isomer of haloxyfop is the herbicidally active compound, with essentially no activity associated with the (*S*)- isomer, a resolved methyl ester has been developed which is approximately 98% (*R*)- isomer.

Haloxyfop was evaluated for the first time by the present Meeting.

Supervised trials were carried out on a wide range of crops with methyl, ethoxyethyl and butyl esters of haloxyfop or haloxyfop-R (the resolved (*R*)-isomer), but the results can be evaluated on the basis of the acid because the esters are rapidly hydrolysed in plants, animals and soils, and the (*S*)-isomer is rapidly converted to the (*R*)-isomer in animals and soils.

Metabolic studies on several species of animals and plants show that the major residues are haloxyfop and its conjugation products; the conjugates are easily hydrolysed to yield haloxyfop under mild alkaline conditions. The residue analytical method used in all the trials included the hydrolysis process.

The fate of haloxyfop was studied in four soils under aerobic conditions. The soils were treated at a rate equivalent to 104 g/ha haloxyfop. The methyl ester of haloxyfop-R was degraded rapidly in all soils. One day after application only 1.3-5.0% of the applied radioactivity (AR) was present as the ester. Haloxyfop (acid) was degraded to 4-[(3-chloro-5-trifluoromethyl)-2-

pyridinyloxy]phenol (referred to as the phenol), which further decomposed to 3-chloro-5-trifluoromethylpyridin-2-ol (referred to as the pyridinol). The phenol and pyridinol reached maximum concentrations of 7-12.6% and 35.5-52.4% of the AR between 3 and 14 days and about 90 days after treatment, respectively. Three unidentified metabolites were detected. One accounted for 2.0-9.3% of the AR at 182 days after treatment; the other two were below 1%. The evolved CO_2 amounted to 6.5-24% of the AR by day 182. The level of unextractable residues increased continuously and ranged between 23.3 and 34.7% of the AR on day 182. The half-lives of haloxyfop ranged from 9 to 20 days. Under anaerobic conditions the methyl ester was rapidly degraded to haloxyfop which remained stable during the following 300 days.

The behaviour of the residues was studied in lysimeters under field conditions. Sugar beet was sown in the soils, which were treated at rates of 112 and 212 g/ha haloxyfop equivalents. The leachate contained 0.29-0.71% of the AR. No methyl ester, haloxyfop or pyridinol could be detected in the leachate. The radioactivity in the leachate consisted of an unknown compound at 0.03-0.15 ì g haloxyfop equivalent/l. Most of the soil residues remained in the top 30 cm. No haloxyfop could be detected (<0.00009 mg/kg), while the pyridinol was present at concentrations of 0.00027-0.0019 mg/kg.

The total radioactivity in the edible parts of the plants at harvest amounted to 0.01-1.0% of the AR, equivalent to 0.004-0.013 mg/kg haloxyfop.

In water/sediment systems under aerobic conditions haloxyfop-etotyl was steadily converted to the pyridinol which reached its maximum concentration within 2-4 weeks.

The residue analytical procedure consists in extraction and hydrolysis of the ester or conjugate of haloxyfop with alkaline methanol, acid organic-phase partitioning, alkaline extraction, a second acid organic partitioning, and conversion to the methyl or butyl ester. Further clean-up of the sample is achieved on a Florisil column before quantification by gas chromatography with electron-capture detection.

The Meeting agreed to define the residue as the sum of haloxyfop esters, haloxyfop and its conjugates, expressed as haloxyfop.

The residue data from supervised trials were evaluated as follows.

Fruits

Orchard crops. Haloxyfop is used in orchards to control grass weeds. Since the application is directed at the weeds growing at the base of the trees, residues in fruits will only be caused by drift contamination or translocation after the uptake of soil residues by the roots. The Meeting therefore concluded that orchard crops should be evaluated as a single group.

Citrus fruits. Supervised trials were carried out on oranges in Brazil and Italy and lemons and grapefruit in New Zealand, with application rates of 0.21-1.9 kg ai/ha of racemic haloxyfop or 0.16-0.42 kg ai/ha of haloxyfop-R with PHIs of 28-206 days.

Information on GAP was not available from these countries, but was submitted from Argentina, Bolivia, Paraguay and Peru for citrus (racemic haloxyfop: post weed emergence at 2-4 leaves stage with an application rate of 0.06-0.3 kg ai/ha) and from Australia, Czech Republic, Poland and Slovakia for orchards (racemic haloxyfop up to early weed tillering at 0.21-0.83 kg ai/ha; haloxyfop-R up to early weed tillering or closing canopy at 0.052-0.21 kg ai/ha).

The residues were <0.02, <0.03 and <0.1 mg/kg.

Pome fruits. Two Italian and one New Zealand residue trials on apples were carried out with application rates of 0.1-0.42 kg ai/ha at PHIs of 29-132 days with racemic haloxyfop. Information on GAP was submitted from Australia for orchards (up to early weed tillering at 0.21-0.83 kg ai/ha) and from Argentina, Bolivia, Paraguay and South Africa for pome fruit (after weed emergence at 2-4 leaves stage at 0.06-0.31 kg ai/ha).

The residues were <0.02 mg/kg and <0.01 mg/kg from the trials in Italy and New Zealand respectively.

Grapes. Six supervised trials were carried out in Australia and France with racemic haloxyfop according to GAP (Australia: orchard, up to early weed tillering at 0.21-0.83 kg ai/ha; France: up to early weed tillering at 0.16-0.62 kg ai/ha).

The residues were <0.01-0.03 mg/kg.

Three supervised trials were carried out in Italy with haloxyfop-R at 0.21 kg ai/ha. There was no information on GAP. The residues were <0.05 mg/kg.

Bananas. Two supervised trials were carried out in Australia, one with racemic haloxyfop and one with haloxyfop-R under approved use conditions (orchard, up to early weed tillering with application rates of 0.21-0.83 kg ai/ha of racemic haloxyfop and 0.1-0.21 kg ai/ha of haloxyfop-R). The residues were <0.05 mg/kg in both cases.

The meeting estimated a maximum residue level of 0.05* mg/kg for citrus fruits, pome fruits, grapes and banana.

Vegetables

Garlic, onion, cabbage, Brussels sprouts, cauliflower, melon, tomato, fennel, lettuce, spinach, carrot, globe artichoke and asparagus. There were too few trials or insufficient information on GAP to estimate maximum residue levels.

Beans and peas. Data on beans and peas (legume vegetables and their fodders) were received by the Meeting but the exact Codex commodities to which the data applied were not clear. The Meeting agreed not to estimate maximum residue levels until the commodity descriptions were clarified (the report of the 1991 JMPR, Section 2.7, explains the need for descriptions of commodities according to the *Codex Classification of Foods and Animal Feeds*).

Pulses (dry). Haloxyfop is registered for several varieties of pulses. The Meeting concluded that the supervised trials on pulses could be evaluated together because of the similarities in the use patterns and residue behaviour.

Broad bean (dry). Two supervised trials were carried out in Australia with racemic haloxyfop. The trial conditions (PHI 103-171 days with application rates of 0.078-0.21 kg ai/ha) were slightly different from GAP in Australia (PHI 147 days with application rates of 0.052-0.1 kg ai/ha) for Faba beans, but the data could be evaluated because the residues were negligible.

One supervised trial was carried out in France with racemic haloxyfop. Information on French GAP was not submitted to the Meeting, but the trial conditions (PHI 46 days with application rate of 0.21 kg ai/ha) were comparable to Spanish GAP (legumes, after weed emergence at 2-4 leaves with application at 0.1-0.21 kg ai/ha). Residue data from Greece could not be related to any available GAP because the application was made at a late growth stage. The residues were <0.05 mg/kg and 0.03

mg/kg in the Australian and French trials respectively.

Chick-pea (dry). Three supervised trials in Australia reflected GAP (PHI 98 days with application rates of 0.052-0.1 kg ai/ha). The residues were 0.03-0.04 mg/kg after 78-99 days.

Common bean (dry). Two supervised trials were carried out in Australia in 1986 and 1989 with racemic haloxyfop. The maximum residue was 0.03 mg/kg from GAP application timed according to the growth stage.

Two supervised trials were carried out with racemic haloxyfop in Brazil and one in the UK, but no information on relevant GAP was available.

One supervised trial was carried out in Germany with haloxyfop-R and one in the UK in 1989-1991 but information on GAP was not submitted.

In general residues seem to depend on the growth stage of the crop rather than on the PHI. The residues were 0.03 mg/kg and <0.05 mg/kg for applications at an early growth stage and 0.2-0.41 mg/kg for applications at early budding or the end of flowering. However, in practice application at early budding or the end of flowering is not GAP.

Field pea (dry). Four supervised trials were carried out with racemic haloxyfop in Australia and two of them were according to GAP (PHI 91 days with application at 0.052-0.16 kg ai/ha). Six supervised trials were carried out in France at application rates of 0.1-0.21 kg ai/ha of racemic haloxyfop but information on GAP was not submitted. However the trial conditions were comparable to Spanish GAP (legumes, after weed emergence at 2-4 leaves stage with application rates of 0.1-0.21 kg ai/ha).

The residues were <0.01 mg/kg and <0.02-0.14 mg/kg in the Australian and French trials respectively.

Two supervised trials in Australia with haloxyfop-R were according to GAP (PHI 91 days, application rate 0.04-0.078 kg ai/ha). Six supervised trials were carried out in France and four in Germany with application rates of 0.052-0.1 kg ai/ha of haloxyfop-R. No information on GAP was available from these countries, but the trial conditions were comparable to GAP in East European countries (peas, up to closing of canopy or PHI of 60 days with application rates of 0.052-0.156 kg ai/ha). The residues were <0.01 mg/kg, <0.02-0.10 mg/kg and <0.02-0.03 mg/kg in the Australian, French and German trials respectively.

Lupin (dry). Ten supervised trials were conducted in Australia with racemic haloxyfop. The residues from three trials with application rates of 0.12-0.16 kg ai/ha and PHIs of 99-115 days, conditions close to Australian GAP (0.052-0.1 kg ai/ha with a PHI of 119 days), were <0.05, 0.03, and 0.04 mg/kg.

Only one supervised trial was conducted with haloxyfop-R in Australia in accordance with Australian GAP (PHI 119 days with application at 0.04-0.052 kg ai/ha). The residue at 92 days from an application rate of 0.052 kg ai/ha was 0.05 mg/kg.

Pigeon pea (dry). Data from two supervised trials were submitted to the Meeting, but without information on GAP.

Soya bean (dry). Four supervised trials in Australia with racemic haloxyfop were according to GAP (PHI 119 days with application rate of 0.1-0.16 kg ai/ha). Eleven supervised trials were carried out in Brazil with racemic haloxyfop and five of them accorded with GAP (PHI 98 days with application rate of 0.096-0.12 kg ai/ha). The residues from 18 US supervised trials were <0.05-0.22 mg/kg for pre-bloom and <0.05-3.08 mg/kg for in-bloom applications, but information on US GAP was not

submitted.

The residues from the trials in Australia and Brazil which were in accordance with GAP were <0.03 mg/kg and <0.05-0.07 mg/kg.

Four and six supervised trials were carried out with haloxyfop-R in France and Italy respectively. The residues in the ten trials from applications according to French GAP were <0.02-0.09 mg/kg.

On the basis of the combined residue data, the meeting estimated a maximum residue level of 0.2 mg/kg for dry pulses.

Potato. Twenty-one supervised trials were carried out in Belgium, Germany, The Netherlands, Norway, Sweden and the UK with racemic haloxyfop. Information on GAP was not submitted for these countries but the trial conditions could be compared with Irish GAP (up to 60 cm height of crop with an application rate of 0.21 kg ai/ha).

Twelve supervised trials were carried out in Germany with haloxyfop-R. The application rate (0.1 kg ai/ha) was lower than the approved rates in East European countries (0.13-0.21 kg ai/ha). The residues were <0.01-0.1 mg/kg.

The Meeting estimated a maximum residue level of 0.1 mg/kg.

Sugar beet (roots). The Meeting concluded that supervised trials on sugar beet and fodder beet could be evaluated together because the use pattern of haloxyfop on these crops is the same and the residue behaviour is expected to be similar.

Twelve of 14 supervised trials carried out in France with racemic haloxyfop were according to GAP (up to early weed tillering with application at 0.1-0.21 kg ai/ha).

Eight supervised trials were carried out in Germany with racemic haloxyfop according to GAP (PHI 90 days with application rate of 0.16-0.21 kg ai/ha).

Fourteen supervised trials were carried out in the UK at application rates of 0.1-0.83 kg ai/ha with racemic haloxyfop. Information on GAP was not submitted, but the treatments were comparable to French GAP (up to early weed tillering with application rates of 0.1-0.21 kg ai/ha).

The residues were <0.02-0.1 mg/kg (application at 0.21 kg ai/ha at 2-8 leaves stage), <0.005-0.16 mg/kg (application at 0.21 kg ai/ha at PHI of 76-108 days) and <0.01-0.23 mg/kg (application rate of 0.21 kg ai/ha at 2-10 leaves stage) from the French, German and UK trials respectively.

Eight supervised trials were carried out in France, Germany and Italy with haloxyfop-R. No information on GAP in Germany or Italy was available, but the trial conditions were comparable to French GAP (up to early weed tillering with the application rates of 0.052-0.1 kg ai/ha).

The residues were <0.02-0.06 mg/kg from application at 0.1 kg ai/ha at the 2-9 leaves stage.

The Meeting estimated a maximum residue level of 0.3 mg/kg.

Cereal grains

Rice. Nine supervised trials were carried out in Brazil, Colombia, Mexico and Costa Rica under conditions comparable to GAP in Argentina, Ecuador and Uruguay with application rates of 0.09-0.11

kg ai/ha at early post-planting (after weed emergence and at 2-4 leaves stage). The residues were <0.01 mg/kg in both husked rice and polished rice following applications at rates of 0.03-0.24 kg ai/ha with PHIs of 98-140 days.

The Meeting noted that the residues of haloxyfop in husked rice and polished rice were below 0.01 mg/kg, but concluded that a maximum residue level of 0.02* mg/kg was a more appropriate estimate for both commodities.

Oilseed

Cotton seed. Four supervised trials were carried out in Australia with racemic haloxyfop according to GAP (PHI 119 days, application rate 0.1-0.16 kg ai/ha) and four trials in Brazil with racemic haloxyfop approximated GAP in Paraguay (after weed emergence at 2-4 leaves stage with and application rate of 0.072-0.18 kg ai/ha).

A single supervised trial was carried out in Spain with haloxyfop-R, but only GAP for racemic haloxyfop was submitted to the Meeting.

The residues from the trials with racemic haloxyfop were <0.05-0.2 mg/kg.

The Meeting estimated a maximum residue level of 0.2 mg/kg for cotton seed.

Peanuts. Six supervised trials were carried out in Argentina and Australia with racemic haloxyfop according to GAP. The residues were <0.03, <0.05 and 0.03 mg/kg.

The Meeting estimated a maximum residue level of 0.05 mg/kg for peanut.

Rape seed. Two supervised trials were carried out in Australia with racemic haloxyfop. The residues were <0.03-0.07 mg/kg at an application rate (0.16 kg ai/ha) slightly higher than Australian GAP (application rate 0.052-0.1 kg ai/ha, PHI 119 days).

Eight and five supervised trials were carried out with racemic haloxyfop in France in autumn and spring (February or March) respectively according to French GAP. The residues were <0.05-0.09 mg/kg from the autumn and <0.05-0.66 mg/kg from the spring application, at the approved application rate of 0.21 kg ai/ha.

Spanish GAP allows a higher application rate of 0.42 kg ai/ha at after weed emergence at the 2-4 leaves stage. The residues from trials carried out in France which corresponded to Spanish GAP were <0.05-1.68 mg/kg.

Seven and five supervised trials were carried out in Germany with racemic haloxyfop in autumn and spring (March and April) respectively according to German GAP (application rate 0.21 kg ai/ha). The residues were <0.05-0.13 mg/kg and 0.1-0.77 mg/kg at approved or slightly lower application rates (0.16-0.21 kg ai/ha) from the autumn and spring applications respectively.

Twenty and five supervised trials were carried out in the UK in the autumn and spring respectively, but information on GAP was not submitted. The residues were <0.05 mg/kg for autumn and 0.06-0.64 mg/kg for spring (up to March) at the rate of 0.21 kg ai/ha approved in France and Germany.

Five supervised trials in Norway and Sweden showed residues higher than those in other countries, but no information on GAP was available.

Five supervised trials were carried out in France and Germany with haloxyfop-R in the autumn. The residues were <0.05-0.07 mg/kg at the application rate approved in France.

The Meeting estimated a maximum residue level of 2 mg/kg for rape seed.

Sunflower seed. Nine supervised trials were carried out in Argentina, Australia and France according to GAP. The residues were <0.03-0.16 mg/kg and 0.07 mg/kg for racemic haloxyfop and haloxyfop-R respectively. The Meeting estimated a maximum residue level of 0.2 mg/kg.

Animal feed

Alfalfa. Four supervised trials were carried out in Australia in 1984, 1988 and 1989. Two of them were almost in conformity with GAP (PHI 21 days, application rate 0.052-0.16 kg ai/ha) with a slightly higher application rate.

The residues were 2.45-3.7 mg/kg for racemic haloxyfop and 1.8-2.2 mg/kg for haloxyfop-R. The Meeting estimated a maximum residue level of 5 mg/kg.

Fodder beet, Sugar beet leaves or tops. The Meeting evaluated the data for sugar beet and fodder beet together since both crops and use patterns are similar.

The residues in normally treated and harvested sugar beet leaves or tops were <0.01-0.3 mg/kg (21 trials) and <0.02-0.14 mg/kg (four trials) for racemic haloxyfop and haloxyfop-R respectively.

Five supervised trials were carried out on fodder beet in Germany at 1982 and 1983 according to GAP (PHI 90 days, application rate 0.21 kg ai/ha). The residues were <0.02-0.05 mg/kg in tops and <0.01-0.03 mg/kg in roots at PHIs of 78-106 days.

The Meeting estimated a maximum residue level of 0.3 mg/kg for sugar beet leaves or tops, fodder beet tops and fodder beet roots.

Peanut fodder. The residue in the fodder from a normally treated and harvested crop was 0.03 mg/kg (one result).

The Meeting concluded that a single result was not sufficient to estimate a maximum residue level.

Rape fodder. Residues in rape fodder treated according to GAP and harvested at maturity were <0.05-0.12 mg/kg.

Pasture. Four supervised trials with racemic haloxyfop and two with haloxyfop-R were carried out in Australia in 1988 and 1989 according to GAP.

The residues were 0.49-3.35 mg/kg from racemic haloxyfop and 0.99-1.47 mg/kg from haloxyfop-R.

Processing studies

Sugar beet. No residues of haloxyfop (<0.01 mg/kg) were found in sugar derived from sugar beet containing 0.07-0.11 mg/kg.

Soya beans. Concentration factors were 0.37-1.25 for crude oil and 0.22-1.2 for refined oil. The

Meeting estimated maximum residue levels for both crude and refined soya bean oil of 0.2 mg/kg, the same level as soya bean (dry).

Rice. The residues in rice bran processed from normally treated and harvested rice were <0.02 mg/kg.

The Meeting estimated a maximum residue level of 0.02* mg/kg for rice bran, unprocessed.

Cotton seed. When cotton seed containing residues in the range 0.06-0.1 mg/kg was processed to oil the concentration factors varied from 0.88 to 1.6.

The Meeting estimated a maximum residue level of 0.5 mg/kg for crude cotton seed oil.

Sunflower seed. Three processing studies were carried out, but two of them were with seed containing residues below the LOD. The concentration factors found in the third study were 1.8 and 2.2 for crude and refined oil respectively. The processing data were insufficient to estimate a maximum residue level for sunflower seed oil.

Rape seed. Six processing studies were carried out, two with seeds containing residues below the limit of determination. The mean concentration factors from the other four studies were 1.7 for crude and 2.1 for refined oil. The Meeting estimated a maximum residue level of 5 mg/kg for both crude and refined oil.

Animal feeding studies

Cattle. Fodder beet, alfalfa, pasture, sugar beet tops, pulses, rape fodder and processed fractions of oil seed can be used as feed for beef and dairy cattle. The maximum residues found in these items from treatments according to GAP were 2.45-3.71 mg/kg in alfalfa and 0.49-3.35 mg/kg in pasture. The estimated intake of haloxyfop from these sources was comparable to that in 28-day dietary intake studies conducted with beef calves and lactating cows at 5 ppm and 2.5 ppm feeding levels respectively.

In these studies the residues were 0.01 mg/kg in beef muscle, 0.14-0.15 mg/kg in beef liver, 0.35-0.51 in beef kidney, 0.06-0.09 in beef fat, 0.03-0.04 mg/kg in milk and 0.38-0.43 mg/kg in cream.

The Meeting estimated maximum residue levels of 0.01 mg/kg for cattle meat, 0.5 mg/kg for edible offal of cattle, 0.1 mg/kg for cattle fat, and 0.05 mg/kg for cattle milk.

Poultry. Pulses and oil seeds can be used as poultry feed. The maximum proportion pulses and oil seed meal in the diet was assumed to be 30% and 20% respectively. Rape seed meal is not thought to be a poultry feed item. On the basis of these assumptions and the levels residue levels estimated for poultry feed items the Meeting concluded that the intake of haloxyfop by poultry would not exceed 0.1 ppm in the diet. The lowest feeding level (0.25 ppm) in the poultry feeding study was used to estimate the maximum levels in poultry. The residues found were <0.01 mg/kg in muscle, 0.01-0.09 mg/kg in liver, <0.01-0.03 mg/kg in fat and <0.01 mg/kg in eggs.

The Meeting estimated maximum residue levels of 0.01* mg/kg for chicken meat, 0.1 mg/kg for edible offal of chicken and 0.01* mg/kg for chicken eggs.

The Meeting was unable to complete the evaluation of the ruminant and poultry metabolism studies provided in the time available. The studies will therefore be evaluated by the 1996 JMPR. The residue data have been reviewed on the assumption that metabolism in ruminants and poultry is essentially the same as indicated in the metabolism studies provided for rats, mice, dogs, monkeys and

humans.

Information is needed on the uptake by crops of haloxyfop and its soil degradation products or metabolites from soil.

Because of the lack of critical supporting data on the uptake of the soil degradation products by crops the Meeting concluded that the estimated maximum residue levels could not be recommended as MRLs. The estimated maximum residue levels are recorded below.

RECOMMENDATIONS

The Meeting provisionally estimated the maximum residue levels shown below, but these are not recommended for use as MRLs.

Definition of the residue: haloxyfop esters, haloxyfop and its conjugates expressed as haloxyfop.

Commodity		Provisional maximum residue level, mg/kg	PHI, days
CCN	Name		
AL 1021	Alfalfa forage (green)	5.0	21
FI 0327	Banana	0.05*	-
FC 0001	Citrus fruits	0.05*	-
SO 0691	Cotton seed	0.2	-
OC 0691	Cotton seed oil, crude	0.5	-
AM 1051	Fodder beet	0.3	90
AV 1051	Fodder beet leaves or top	0.3	90
FB 0269	Grapes	0.05*	-
SO 0697	Peanut	0.05	-
FP 0009	Pome fruits	0.05*	-
VD 0070	Pulses (dry)	0.2	-
VR 0589	Potato	0.1	-
SO 0495	Rape seed	2	-
OC 0495	Rape seed oil, crude	5	-
OR 0495	Rape seed oil, edible	5	-
CM 1206	Rice bran, unprocessed	0.02*	-
CM 0649	Rice, husked	0.02*	-
CM 1205	Rice, polished	0.02*	-
OC 0541	Soybean oil, crude	0.2	-
OR 0541	Soybean oil, refined	0.2	-
VR 0596	Sugar beet	0.3	-
AV 0596	Sugar beet leaves or tops	0.3	-
SO 0702	Sunflower seed	0.2	-
MM 0812	Cattle meat	0.01	-
MO 0812	Cattle, Edible offal of	0.5	-
MF 0812	Cattle fat	0.1	-
ML 0812	Cattle milk	0.05	-
FM 0812	Cattle milk fat	0.5	-
PM 0840	Chicken meat	0.01*	-
PO 0840	Chicken, Edible offal of	0.1	-
PE 0840	Chicken eggs	0.01*	-

FURTHER WORK OR INFORMATION

Desirable

1. Sugar beet processing data with specific regard to the concentration of haloxyfop residues in processing to molasses.

2. Sunflower seed processing data with specific regard to the concentration of haloxyfop residues in the oil.

3. Data on residues in peanut fodder resulting from supervised trials.

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1. Alphabetically
2. Under supervised trial no.

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