ALDRIN, DIELDRIN (001) AND ENDRIN (033)

EXPLANATION

The 22nd (1990) Session of the CCPR agreed to maintain CXLs for aldrin and dieldrin (001) and endrin (033) until sufficient monitoring data were available for the proposal of ERLs to replace MRLs. Monitoring data were supplied by two countries to the 1990 JMPR. The 1990 JMPR recommended that current MRLs be converted to temporary ERLs pending required further information to be supplied for evaluation in 1992.

The 23rd (1991) Session of the CCPR agreed with the recommendation of the 1990 JMPR to convert existing CXLs to TERLs (ALINORM 91/24A, para 71). The 1990 JMPR had recommended conversion of current MRLs (listed on p19 of the 1990 Residue Evaluations) to temporary ERLs, but had made no recommendations on the existing ERLs for carrots, cereal grains (except rice), eggs, lettuce, meat and milks. Part 2 of the Guide (July 1991 edition) lists temporary ERLs for these commodities also. This is perhaps an unintended interpretation of a general statement; there was no specific reason to convert existing ERLs to temporary status..

Monitoring data from Australia, The Netherlands, Thailand and the USA and information on Australian, Netherlands and United States authorised uses were made available to the Meeting.

USE PATTERN

Since 1987 the use of aldrin and dieldrin in Australia has been severely restricted to applications aimed at limiting the damage caused to buildings and furniture by subterranean termites. In addition the use of dieldrin is still permitted as a soil treatment against one pest in sugar cane in one small locality of Australia. Uses will cease entirely soon because the last imports have taken place and no stocks remain for purchase. All usage of endrin ceased some years ago.

There are no authorised uses (i.e. registered uses) of aldrin, dieldrin and endrin in the United States. All previously registered uses of these compounds have been cancelled by the Environmental Protection Agency.

There have been no registered uses in The Netherlands for many years.

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

Monitoring data for dieldrin are summarized in Tables 1, 2 and 3. Only those commodities are included in the tables where the number of samples is 20 or more, or if a residue has been detected. The the USA has reported only those commodities where there have been positive findings.

The USA also reported that in 1990 dieldrin was detected in 8 of 4442 samples of domestically produced meat and poultry products (0.02-0.12 mg/kg, in the fat) and in 1991 in 20 of 12000 samples (0.02-0.29 mg/kg, in the fat). No aldrin or endrin residues were detected in any of the meat and poultry samples collected in 1990 and 1991. Neither aldrin nor endrin residues were detected in samples taken in the US FDA total diet study of 1990. Aldrin was detected in a sample of imported dried mushrooms. Endrin was detected in domestically produced squash (1 of 111 samples), imported squash (1 of 545 samples) and melons (1 of 204 samples).

Thailand reported that endrin was not detected in the 1990 monitoring programme (samples, numbers in parentheses): egg (5), meat (14), milk (54),

poultry meat (243), rice (17), and maize (2). In 1991 endrin was detected in 26 of 100 chicken meat samples at a level of 0.01 mg/kg.

Aldrin and endrin were not detected in any of the Australian samples listed in Tables 1, 2 or 3. Endrin was not detected (<0.04 mg/kg) in any of the samples from the Netherlands reported in Table 3.

Table 1. Monitoring data for dieldrin in fruit and. cereals. Data from Thailand are for aldrin + dieldrin for 1988-1990. Australian data are for August 1990 to December 1991.

Commodity	Country/type/ year 1/	Number of samples	
		Total	Number with residues detected (and levels, mg/kg)
Apples	Australia/ES/1991	155	6 (0.02-0.09)
Citrus	Australia/DS/1991	27	0 (LOD 0.02) 2/
Fruits	Thailand/1988-1990	175	0 (LOD 0.02)
Grapes	Australia/DS/1991	50	0 (LOD 0.02)
Melons	USA/DS/1990	96	2 (0.02-0.04)
	USA/IS/1990	118	1 (0.01)
	USA/DS/1991	130	3 (0.02-0.03)
Pears	Australia/ES/1991	89	0 (LOD 0.02)
Tangerines	Thailand/1988-1990	39	11 (0.01-0.03)
Barley	Australia/ES/1991	329	0 (LOD 0.02)
Bran	Australia/ES/1991	24	0 (LOD 0.02)
Flour	Australia/ES/1991	167	0 (LOD 0.02)
Oats	Australia/ES/1991	307	0 (LOD 0.02)
Sorghum	Australia/ES/1991	62	0 (LOD 0.02)
Wheat	Australia/ES/1991	502	0 (LOD 0.02)
	USA/DS/1991	176	1 (0.03)

1/ DS: domestic surveillance IS: import surveillance
ES: export surveillance 2/ LOD: limit of detection

Table 2. Monitoring data for dieldrin in vegetables. Australian data are for August 1990 to December 1991.

Commodity	Country/type/year 1/	Number of samples			
		Total	Number with residues detected (and levels, mg/kg		
Beans	USA/IS/1990	178	1	(0.05)	
	USA/DS/1991	20	1	(0.01)	
Cabbages	Australia/DS/1991	26	0	(LOD 0.02)	2/
Carrots	Australia/DS/1991	29	1	(0.02-0.09)	
	USA/DS/1990	110	3	(0.01-0.05)	
	USA/IS/1990	89	1	(0.01)	
	USA/DS/1991	140	5	(0.01-0.03)	
	USA/IS/1991	65	1	(0.07)	
Cauliflowers	Australia/DS/1991	24	0	(LOD 0.02)	
Cucumbers	USA/DS/1990	119	5	(0.02-0.09)	
	USA/IS/1990	177	2	(0.01)	
	USA/DS/1991	100	10	(0.02-0.06)	
	USA/IS/1991	131	2	(0.02)	
Kale	USA/DS/1991	78	2	(0.03)	
Lupins	Australia/ES/1991	67	0	(LOD 0.02)	
onions	USA/IS/1990	80	1	(0.01)	
Peas (field peas, chick-peas)	Australia/ES/1991	77	0	(LOD 0.02)	
Potatoes	Australia/DS/1991	30	0	(LOD 0.02)	
	USA/DS/1990	373	8	(0.01-0.04)	
	USA/DS/1991	272	3	(0.01-0.04)	
	USA/IS/1991	66	1	(0.01)	
Pumpkins	Australia/DS/1991	22	2	(0.02-0.09)	
	USA/DS/1990	8	1	(0.03)	
	USA/DS/1991	23	5	(0.02-0.08)	
Radish	USA/DS/1991	2	1	(0.05)	
Soya beans	USA/DS/1990	59	6	(0.01)	
	USA/DS/1991	70	5	(0.002-0.007)	
Spinach	USA/DS/1990	128	1	(0.01)	
Squash	USA/DS/1990	111	4	(0.02-0.04)	
	USA/IS/1990	545	4	(0.01-0.1)	
	USA/DS/1991	81	9	(0.02-0.07)	
Tomatoes	Australia/DS/1991	25	0	(LOD 0.02)	

1/ DS: domestic surveillance IS: import surveillance ES: export surveillance
2/ LOD: limit of detection

Table 3. Monitoring data for dieldrin in animal commodities. Australian data are for August 1990 to December 1991.

Commodity	Country/type/year 1/	Number of samples	
		Total	Number with residues detected (and levels, mg/kg)
Beef	Australia/ES/1991	12435	104 (0.02-0.04), 45 (0.05-0.2), 7 (>0.2) f 3/
	Netherlands/ 1990-91	312	2 (0.02-0.1), 1 (05-1) f
Buffalo	Australia/ES/1991	123	1 (002-0.04) f
Deer	Australia/ES/1991	21	0 (LOD 0.02) f 2/
Eggs	Australia/ES/1991	348	1 (0.01), 4 (0.02-0.1)
Eggpowder	Netherlands/ 1990-91	24	0 (LOD 0.02)
Goats	Australia/ES/1991	267	3 (0.02-0.04) f
	Netherlands/ 1990-91	24	0 (LOD 0.02) f
Honey	Australia/ES/1991	26	0 (LOD 0.02)
Horses	Australia/ES/1991	603	2 (0.02-0.04), 8 (0.05-0.2) f
	Netherlands/ 1990-91	25	0 (LOD 0.02) f
Kangaroo	Australia/ES/1991	132	0 (LOD 0.02) f
Milk	USA/DS/1990	443	17 (0.01-0.07) f
	USAIDS/1991	437	22 (0.01-0.08) f
Milk products	Australia/ES/1991	879	42 (0.02-0.04), 2 (0.05-0.15) f
	Netherlands/ 1990-91	157	37 (0.01-0.02), 3 (0.02-0.03) f
Pigs	Australia/ES/1991	5248	33 (0.02-0.04), 18 (0.05-0.2), 3 (>0.2) f
	Netherlands/ 1990-91	216	0 (LOD 0.02) f
Poultry	Australia/ES/1991	588	11 (0.02-0.04), 4 (0.05-0.2) f
	Netherlands/ 1990-91	96	0 (LOD 0.02)
Rabbits	Australia/ES/1991	395	1 (0.02-0.04) f
Sheep	Australia/ES/1991	7418	17 (0.02-0.04), 10 (0.05-0.2) f
	Netherlands/ 1990-91	49	1 (0.02-0.05)

1/ DS: domestic surveillance ES: export surveillance
2/ LOD: limit of detection
3/ f.. residue data expressed as mg pesticide/kg fat

Table 4. Summary of dieldrin monitoring data classified according to commodity group, aggregating data reported to the 1990 JMPR and the 1992 JMPR. Limits of determination were generally in the vicinity of 0.01-0.02 mg/kg.

COMMODITY GROUP		No. of samples analysed	No. of dieldrin detections
	FRUITS		
FC 0001	Citrus fruits	181	11
FP 0009	Pome fruits	770	6
FS 0012	Stone fruits	16	0
FB 0018	Berries and other small fruits	340	0
FI 0030	Assorted tropical and sub-tropical fruits - inedible peel	125	0
	VEGETABLES		
VA 0035	Bulb vegetables	168	1
VB 0040	Brassica vegetables	133	0
VC 0045	Fruiting vegetables, Cucurbits	1961	61
VO 0050	Fruiting vegetables, other than Cucurbits	41	0
VI, 0053	Leafy vegetables	348	3
VP 0060	Legume vegetables	198	2
VD 0070	Pulses	273	11
VR 0075	Root and tuber vegetables	1314	24
	CEREALS		
GC 0080	Cereal grains	3441	3
	ANIMAL COMMODITIES		
MM 0095	Meat	60341	434
ML 0106	Milks	1142	46
PM 0110	Poultry meat	684	is
PE 0112	Eggs	1302	34
Egg powder		24	0
Meat and poultry		16442	28
Milk products		1036	84
Honey		26	0

APPRAISAL

The 22nd (1990) Session of the CCPR had requested monitoring data for aldrin, dieldrin and endrin so that ERLs could be estimated to replace MRLs. Monitoring data were supplied to the 1990 JMPR and MRLs were converted to temporary ERLs pending the proposed 1992 review.

The 1990 JMPR had recommended conversion of existing MRLs (listed on p.19 of the 1990 Residue Evaluations) to temporary ERLs, but had made no recommendations on the existing ERLs (for carrots, cereal grains (except rice), eggs, lettuce, meat and milks). Part 2 of the *Codex Guide to Residue* Limits (July 1991 edition) lists temporary ERLs for these commodities, but they should not have been converted to temporary limits.

The Extraneous Residue Limit (ERL) for JMPR purposes refers to a pesticide residue arising from environmental sources (including former agricultural uses) other than the use of a pesticide directly or indirectly on the commodity. It is the maximum concentration of a pesticide residue that is recommended by the Codex Alimentarius Commission to be legally permitted or recognized as acceptable in or on a food, agricultural commodity or animal feed (JMPR Report 1990).

Information from Australia, The Netherlands, Thailand and the USA was made available to the Meeting. The new data were evaluated in conjunction with the data supplied in 1990.

Where dieldrin and aldrin have been used and use has been discontinued, traces of dieldrin are likely to be present in the soil for a number of years. Dieldrin in the soil can lead to contamination of plant or animal commodities produced in its vicinity.

Monitoring data demonstrate that for a large range of crop and animal commodities most samples (97-99% plus) do not contain detectable residues of dieldrin, with analytical methods operating usually down to 0.01-0.02 mg/kg. However, this small incidence of detections could cause trade disruptions unless officially recognized as acceptable by the assignment of ERLs.

MRLs are estimated for individual commodities when there are registered uses for those crops or animals, and extrapolation to a commodity group is possible only when there is GAP (registered uses) on the major crops or animals within the group. ERLs have no such relationship to registered uses, and the possibility of contamination of one commodity in a group is equal to the possibility for other members of the group if produced in similar circumstances. The Meeting agreed that, in general, monitoring data would be interpreted on a commodity group basis for the purpose of estimating ERLs.

Dieldrin has been detected in fruits, vegetables, cereals and animal commodities. Extraneous residues can be particularly troublesome in animal commodities because of the sampling philosophy. For animal commodities every individual unit in a consignment should comply with the MRL or ERL. If any one unit contains a residue exceeding the MRL, the whole consignment is considered to be in violation. For crop commodities the residue level in the final composite sample from the consignment should comply with the MRL or ERL. Under this philosophy a number of samples are taken from the consignment and composited to represent the average. The composite is then analysed. If the composite contains a residue exceeding the MRL, the consignment is in violation.

Endrin is less persistent in the environment than dieldrin, it was probably less widely used, and its uses were phased out earlier than those of dieldrin or aldrin. Consequently endrin is detected in monitoring programmes less often than dieldrin.

The Meeting recommended ERLs for aldrin, dieldrin and endrin on commodity groups where residues have been detected in recent monitoring programmes. The estimated levels for the ERLs should include residues which inadvertently occur by contamination; direct use of these compounds on an animal or crop would be likely to lead to residues higher than the proposed ERLs.

Where no residues have been detected in commodity groups no ERL has been recommended. The monitoring data suggest that in these commodity groups the residues do not exceed 0.01 mg/kg.

It is expected that for environmental contaminants the incidence of detections would increase if analytical methods with lower limits of determination (LODs) were employed. The Meeting noted the comments made at the 24th Session of the CCPR (ALINORM 93/24, para 29) about realistic limits of determination, and agreed that using methods with unjustifiably low LODs was more costly and not the best use of resources. The Meeting recommended that for the general monitoring of aldrin, dieldrin and endrin residues a suitable LOD would be 0.01 mg/kg.

As production of these compounds ceases, and environmental residues dissipate, extraneous residues in food commodities are also likely to decrease. The Meeting recommended that available monitoring data be evaluated in 1998 with a view to further revision of aldrin, dieldrin and endrin ERLs.

RECOMMENDATIONS

On the basis of monitoring data the Meeting concluded that the residue levels listed on the following pages, for (1) aldrin and dieldrin and (2) endrin, are suitable for establishing extraneous. residue limits. The previously established ERLs for adrin/dieldrin in eggs, meat and milks should be maintained.

1. Aldrin and dieldrin. Residue definition: sum of HHDN and HEOD (fat-soluble residue).

Commodity			ERL (mg/kg)	Previous		
Code no.		Name		ERL (mg/kg)		Commodity
Fruit						
FC	0001	Citrus fruits	0.05	0.05	T	A02 0001 Fruits
FP	0009	Pome fruits	0.05	0.05	T	A02 0001 Fruits
Vegetables						
VS	0621	Asparagus	W	0.1	T	
VB	0400	Broccoli	W	0.1	T	
VB	0402	Brussels sprouts	W	0.1	T	
VA	0035	Bulb vegetables	0.05	0.1	T	VA 0385 Onion, Bulb
VB	0041	Cabbages, Head	W	0.1	T	
VB	0404	Cauliflower	W	0.1	T	
VO	0440	Egg plant	W	0.1	T	
VC	0045	Fruiting vegetables, Cucurbits	0.1	0.1	T	VC 0424 Cucumber
VL	0053	Leafy vegetables	0.05	0.1		VL 0482 Lettuce, Head
				0.1	T	VL 0494 Radish leaves
VP	0060	Legume vegetables	0.05			
VO	0051	Peppers	W	0.1	T	
VO	0445	Peppers, Sweet	W	0.1	T	
VD	0070	Pulses	0.05			
VR	0075	Root and tuber vegetables	0.1	0.1		VR 0577 Carrot
				0.1	T	VR 0583 Horseradish
				0.1	T	VR 0588 Parsnip
				0.1	T	VR 0589 Potato
				0.1	T	VR 0494 Radish
Cereal grains						
GC	0080		0.02	0.02	T	GC 0081 Cereal grains (except rice)
				0.02	T	GC 0649 Rice
Animal commodities						
PM	0112	Poultry meat	0.2 (fat)			

W: withdrawal

2. Endrin. Residue definition: sum of endrin and delta-keto-endrin(fat-soluble).

Code no.	Commodity Name	ERL (mg/kg)	Previous ERL (mg/kg)
Fruit			
FP 0226	Apple	W	0.02(*) T
Vegetables			
VC 0045	Fruiting vegetables, Cucurbits	0.05	
VO 0447	Sweet corn (corn-on-the-cob)	W	0.02(*) T
Cereal grains			
GC 0640	Barley	W	0.02(*) T
GC 0651	Sorghum	W	0.02(*) T
GC 0654	Wheat	W	0.02(*) T
CM 0649	Rice, husked	W	0.02(*) T
CM 1205	Rice, polished	W	0.02(*) T
Oil seeds			
SO 0691	Cotton seed	W	0.1 T
OC 0691	Cotton seed oil, crude	W	0.1 T
OR 0691	Cotton seed oil, edible	W	0.1 T
Animal commodities			
PE 0112	Eggs	W	0.2 T
MM 0095	Meat	W	0.1 (fat)
ML 0106	Milks	W	0.0008 F
PM 0110	Poultry meat	0.1 (fat)	1 (fat) T

W: withdrawal