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Monitoring results for pesticide residues in feed and feed ingredients

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Introduction

The maximum level of pesticides residues in feed (ingredients) has been regulated according to Directive 2002/32/EC on undesirable substances in animal feed (and subsequent amendments), Directive 90/642/EC (until 09-02-2008) and Regulation 396/2005/EC on maximum residue levels of pesticides in or on food and feed (from 09-02-2008). A regular monitoring program is conducted in The Netherlands as part of enforcement of this legislation and to gain insight in the exposure of animals to pesticides. In this work monitoring data are presented from a seven year period (2002-2009) of analysis of pesticide residue and PCBs in animal feed (ingredients).

Procedure

The analytical procedure is described in Fig 1.

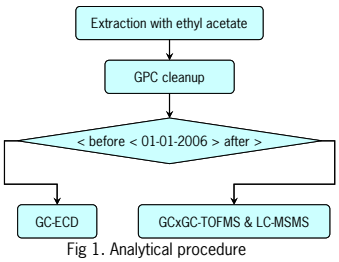

Fig 1. Analytical procedure

Results

The total number of samples of feed (ingredients) is given in Fig 2. The Feed (ingredients) are divided into four subgroups (Fig 3): "Feed materials of animal origin" = group 8, 9, and 10 of Directive 96/25/EC, "Feed materials of plant origin" = groups 1 to 7 of Directive 96/25/EC, "Miscellaneous" = group 11 & 12 of Directive 96/25/EC, and "Composite feeding stuffs".

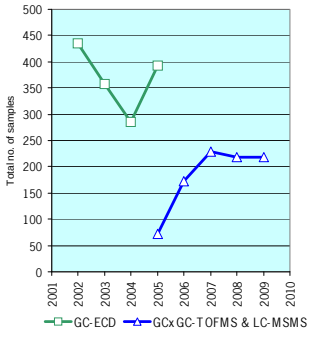

Fig 2. Total no. of samples of feed (ingredients)

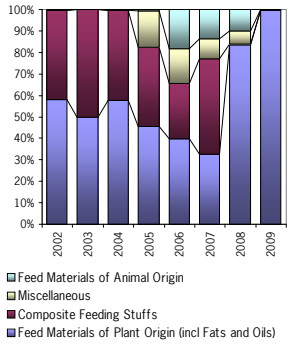

Fig 3. Type of feed materials analyzed

Findings of pesticides are shown in Table 1.
The organophosphates pirimiphos-methyl and malathion are predominantly related to cereal based feed (ingredients). Its use is not allowed in cereals in The Netherlands, however EU-MRLs of 5 or 8 mg/kg exist for a wide range of cereals. Noticeable is the sharp fall in the number of positive samples for pirimiphos-methyl after 2007 (Fig 4).

Results (continued)

Table 1. Positive Samples of Pesticides Detected in Feed (ingredients)

	Reporting Limit (RL) (mg/kg)	Before 1-1-2006 RL-0.1 (mg/kg)	0.1-0.5 (mg/kg)	>0.5 (mg/kg)	After 1-1-2006 RL-0.1 (mg/kg)	0.1-0.5 (mg/kg)	>0.5 (mg/kg)	>MRL[2]
Pirimiphos-methyl	0.05				47	66	26	0
Endosulfan	0.025	23	21	2	3	20	4	1
PCB 101	0.005	8	-	-	1	-	-	
PCB 138	0.005	9	-	-	1	-	-	
PCB 153	0.005	9	-	-	1	-	-	
Malathion	0.05				2	6	-	1
Chlorpyrifos	0.05				1	4	-	4
Chlordane	0.005	4	-	-	1	-	-	
Miscellaneous	0.005/0.05[1]	24	-	-	23	30	8	5

(1) 0.005 mg/kg for CD 2002/32/EC regulated substances, 0.05 mg/kg for other pesticides
(2) MRLs are only available for limited number of pesticide/sample combinations

The organophosphate chlorpyrifos was mainly found in coconut-oil but findings in herb mixture were also encountered.
The organochlorine compound endosulphan is exclusively found in soya products (EU-MRL 0.5 mg/kg in soya bean). Its use is not allowed in The Netherlands. However as soya is not grown in The Netherlands, all positive samples were import products. The rise of positive samples in 2009 may be caused by adjustments in sampling strategy (compare Fig 3 & 4).
The persistent contaminants chlordane, PCB 101, 138, and 153 were mainly found in fish oil/fish oil based products.

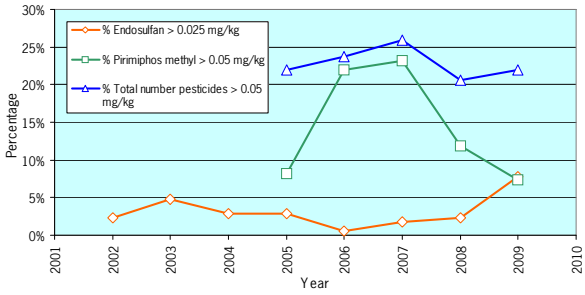

Fig 4. Findings of Pesticides

MRL violations were encountered in vegetable oil (endosulfan), coconut oil (chlorpyrifos), millet (dichlorvos), soya hulls (fenitrothion), soya oil (malathion), soya (bean) extracted (cypermethrin), rice (isoprothiolane), and grass silage (tebuconazole).

Conclusion

- A low incidence of MRL-violations of pesticides in feed (ingredients) was observed in The Netherlands in the period 2002-2009.
- The percentage of animal feed (ingredients) containing pirimiphos-methyl diminished after 2007.
- After 2006 there was a rise in the number of positive samples for endosulfan. However this could be attributed to a change in sampling strategy.
- Extension of scope resulted in detection of a variety of pesticides.
- The lack of MRLs for specific feed commodities (other than for organochlorine pesticides) and the lack of information on composition of composite feeding stuffs, complicates interpretation of residue findings.

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