MALATHION (049)

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EXPLANATION

Malathion was evaluated in the periodic review program by the JMPR in 1999 and re-evaluated in 2004. At its 37th Session, the CCPR decided to advance the MRLs for apple, citrus and grapes for adoption at step 5. The CCPR also decided to return all other MRLs associated with animal feeds, including cotton seed, maize and wheat, to Step 6 pending review by JMPR of animal feeding studies. These studies were listed as desirable in the 1999 JMPR report, but no data was submitted to the Meeting. In the 2004 JMPR, residues from trials conducted on alfalfa according to GAP confirmed the previous recommendations for this crop.

METABOLISM AND ENVIRONMENTAL FATE

At this Meeting, animal dietary burden was calculated for cattle and poultry based on the recommendations on animal feed made by the previous Meetings. In addition, animal metabolism studies submitted to the 1999 JMPR were evaluated in light of the calculated dietary burden. No additional GAP information was provided to this Meeting.

Table 1. Estimated maximum dietary burden of farm animals.

Commodity	Residue	Basis	Group	% DM*	Residues, dw	*Diet content (%)*			Residue contribution mg/kg		
						Beef cattle	*Dairy cows*	*Poultry*	Beef cattle	Dairy cows	Poultry
Alfalfa forage	98	hr	AL	22	445	***70***	***60***	-	**312**		
Alfalfa fodder	175	hr	AL	89	196	*70*	*60*	-			
Clover	95	hr	AL	19	500	*30*	*60*				
Clover hay	120	hr	AL	89	135	*30*	*60*				
Grass forage	190	hr	AF	25	760	*30*	*60*	-		**456**	
Hay or fodder (dry) of grasses	260	hr	AS	88	295	*60*	*60*	-			
Maize grain	0.02	HR	GC	88	0.023	*80*	*40*	*80*			
Maize fodder	24	hr	AS	83	29	*25*	*15*	-			
Maize forage	2.4	hr	AF	40	6.0	*40*	*50*	-			
Sorghum	2.2	HR	GC	86	2.6	*40*	***10***	*80*		0.26	2.0
Wheat	0.28	HR	GC	89	0.31	*50*	*40*	*80*			
Wheat forage	2.4	hr	AF	22	11	*25*	*60*	-			
Wheat straw and fodder, dry	34	hr	AS	88	38	*10*	*10*	-			
Cotton seed meal	0.34	median-p	-	89	0.38	*15*	*15*	***20***			0.08
Cotton seed hulls	10.8	hr-p	AM	90	12	*20*	*15*	-			
Citrus dried pulp	0.2	median-p	AB	91	0.22	*20*	*20*	-			
Turnip tops	3.4	HR	AV	30	11	***30***	***30***	-	3.4	3.4	
Turnip roots	0.13	HR	VR	15	0.87	*75*	*20*	-			
Total						**100**	**100**	**100**	**315**	**460**	**2.1**

DM= dry matter; dw= dry weight; hr= highest residue for animal feed; m= median residues for animal feed; p=processing commodity, *information from the trials or from the *FAO Manual*

Animal Metabolism

Two metabolism studies were evaluated by the 1999 JMPR. In one study conducted with goats dosed at 115 ppm diet for 5 days, malathion was found to be used as a carbon source, with the radioactivity being incorporated in fatty acids, glycerol, tricarboxylic cycle acid intermediates and protein. No malathion or any products arising from primary metabolism of malathion were observed at levels above 0.05 mg/kg in any sample analysed.

In one study conducted in hens, dosed at 25 ppm diet for 4 days, malathion was also found to be used as a carbon source. No malathion or any products of immediate metabolism were observed at levels exceeding 0.02 mg/kg in any of the samples, except the white from one egg on day 1, where significant activity as malathion carboxylic acid was detected.

Residues in animal products

The *FAO Manual* (2002) states that feeding studies in animals are required where significant residues (> 0.1 mg/kg) occur in crops or commodities fed to animals and metabolism studies indicate that significant residues (> 0.01 mg/kg) may occur in edible tissues. Residues in commodities fed to animals estimated by the JMPR are significant and the calculated dietary burden for ruminants (460 ppm) is much higher than the dose used in the metabolism study in goats. The Meeting concluded that the metabolism study could not be used to estimate the level of malathion residues in commodities from ruminant animals, and confirms that feeding studies with malathion on ruminant animals are desirable.

The Meeting noticed that the highest contribution to the dietary burden of malathion came from crops grown specifically for feed. Residues of malathion in other feed and food commodities, including cereal grains and citrus dried fruit, are low (< 1 mg/kg) and are not expected to make any significant contribution to the animal dietary burden. Although currently there is no recommendation for apple pomace, the recommended HR for apple is 0.28 mg/kg, and the Meeting agreed that the expected residues in apple pomace should also not contribute significantly to the animal dietary burden.

The metabolism study conducted in hens at approximately 10 times the calculated dietary burden indicates that no residues of malathion are expected to be found in tissues and eggs. The Meeting concluded that a feeding study in hens is not necessary. However, no recommendations could be made in poultry commodities as no analytical method in animal products was submitted to this or previous meetings.