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MINISTRY OF FOOD AND DRUG SAFETY

National Institute
of Food and Drug Safety Evaluation

Risk Assessment of Fenamiphos

Fenamiphos, an organophosphorus pesticide, is used on various crops including citrus fruits, grapes, peanuts, and pineapple. Its MRL in Korea is set at 0.02–0.5 mg/kg for 29 foodstuffs, e.g., asparagus and soybean (MRLs for Pesticides in Foods, May 31, 2016).

The ADI of fenamiphos at 0.0008 mg/kg bw/day was established by applying the safety factor of 100 (differences between species and individual entities) to the NOAEL of 0.083 mg/kg bw/day drawn from the repeated dose study on dogs carried out for one year. When there is information available on the inhibition of activation of acetylcholinesterase in the brain, the information on the inhibition of activation of acetylcholinesterase in red blood cells is not used; however, the NOAEL is determined based on data in red blood cells when there is no study on the brain. In relation to this, the NOAEL was set at 0.083 mg/kg bw/day, the concentration level where toxicity effects (inhibited activation of acetylcholinesterase in the brain and anemia) were observed.

The intake amount of fenamiphos was estimated based on the results of 3,516 samples of 65 foodstuffs in the Monitoring of Agricultural Products in Korea (2006–2009) by the National Institute of Food and Drug Safety Evaluation. The results showed that the pesticide level was below the LOQ, and thus, fenamiphos was not detected in any of the samples. Concerning data lower than the LOQ, in case more than 60% of data were below the LOQ, estimation was made by applying 0 (non-detection) as the lower exposure limit or LOQ (upper exposure limit), according to the “evaluation of low level contamination of foods” recommended by the WHO. Food consumption was calculated through SAS 9.4 using the tertiary food code data from the KNHANES conducted for five years (2010–2014). For the average weight of all age groups, 60 kg, the weight currently (as of 2016) applied for establishment and revision

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of pesticide residue standards, was used. Risk characterization was made by calculating the HI in consideration of the EDI calculated in the exposure assessment and the ADI, the safe level of human exposure.

In general, when HI is 1 or higher, the adverse effects of toxicity may be expected, and when HI is lower than 1, its adverse effect is not expected. The results of the risk assessment of fenamiphos in all age groups revealed HI between 0 (non-detection data, 0 applied) and 0.016 (non-detection data LOQ applied), as shown in the table below, and that the concentration of fenamiphos was within the safe level of human exposure.

Table 1. ADI and HI of fenamiphos

Age	EDI (mg/person/day)		Average weight (kg)	EDI (mg/kg bw/day)		ADI (mg/kg bw/day)	HI	
	0	LOQ (mg/kg)		0	LOQ (mg/kg)		0	LOQ (mg/kg)
All	0	0.8×10^{-3}	60	0	0.1×10^{-4}	0.0008	0	0.016

Key words: Fenamiphos, Risk Assessment, Organophosphorus insecticide, ADI, Monitoring, Pesticide