

2016 SCIENTIFIC REPORT



MINISTRY OF FOOD AND DRUG SAFETY

National Institute
of Food and Drug Safety Evaluation

Risk Assessment of Methamidophos

Methamidophos is an organophosphorous pesticide not yet registered for usage in Korea. In foreign countries, it is used on cottonseed, potato, tomato, etc., to control insects such as mites, leafhoppers, leaf miners, miridae, threadworms, and white flies. Its MRL is set at 0.05-0.5 mg/kg for 24 foodstuffs including potato and miscellaneous fruits (MRLs for Pesticides in Foods, May 31, 2016).

The ADI is 0.004 mg/kg bw/day, which was established by applying the safety factor 25 to the NOAEL of 0.1 mg/kg bw/day drawn from the chronic toxicity test and carcinogenicity test on rats carried out for two years. The safety factor was set at 25 based on the judgment that the difference between species is insignificant through the in vitro test on the inhibition of activation of cholinesterase in men, dogs, and rats. In this study, the NOAEL was set at 0.1 mg/kg bw/day, the maximum concentration at which the toxicity effect (inhibition of activation of cholinesterase in red blood cells) did not appear.

The intake amount of methamidophos was estimated based on the results of the analysis of 919 samples of 23 foodstuffs including rice in the Monitoring of Agricultural Products in Korea (2006) by the National Institute of Food and Drug Safety Evaluation. The results of the monitoring showed that the pesticide level was below the LOQ, and thus, methamidophos 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

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of 2016) being applied for establishment and revision 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 are expected from the exposure, and when HI is lower than 1, the adverse effect is not expected. The results of the risk assessment of methamidophos in all age groups revealed HI between 0 (non-detection data 0 applied) and 0.003 (non-detection data LOQ applied), as shown in the table below, and that its concentration is within the safe level of human exposure.

Table 1. ADI and HI of methamidophos

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}	0.004	0	0.003

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