

2016 SCIENTIFIC REPORT



MINISTRY OF FOOD AND DRUG SAFETY

National Institute
of Food and Drug Safety Evaluation

Risk Assessment of Mevinphos

Mevinphos is an organophosphorous pesticide applied to various vegetables and fruits, including lettuce and brassica vegetables in foreign countries. Its domestic MRL is set at 0.05–1 mg/kg for 24 foodstuffs such as melon and potato (MRLs for Pesticides in Foods, May 31, 2016).

The ADI of mevinphos is 0.00025 mg/kg bw/day, and it was established by applying the safety factor 100 (differences between species and individual entities) to the NOAEL obtained from the carcinogenicity test conducted on rats for two years. The NOAEL of 0.025 mg/kg bw/day was determined based on the maximum concentration where toxicity effect (inhibition of activation of acetylcholinesterase in the brain) did not appear. The results of repeated dose study on rats for 91 days reveal the same NOAEL of 0.025 mg/kg bw/day on the inhibition of activation of acetylcholinesterase in the brain.

The intake amount of mevinphos was estimated based on the results of the analysis of 3,516 samples of 65 foodstuffs including rice in the Monitoring of Agricultural Products in Korea (2006–2009) by the National Institute of Food and Drug Safety Evaluation. The result of the monitoring showed that the pesticide level was below the LOQ, and thus, mevinphos 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) being applied for establishment and revision of pesticide residue standards, was used.

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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, adverse effect of toxicity is expected from the exposure, and when HI is lower than 1, adverse effect is not expected. The results of the risk assessment of mevinphos in all age groups revealed HI between 0 (non-detection data 0 applied) and 0.829 (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 mevinphos

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	12.4×10^{-3}	60	0	0.2×10^{-3}	0.00025	0	0.829

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