

# 2016 SCIENTIFIC REPORT



MINISTRY OF FOOD AND DRUG SAFETY

National Institute  
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## Risk Assessment of Pirimiphos-methyl

Pirimiphos-methyl is an organophosphorous pesticide used to control insects including cigarette beetles, red flour beetles, granary weevils, maize weevils, lice, and horn flies. It is applied to crops such as corn and sorghum. In Korea, it was first registered in the form of cypermethrin/pirimiphos-methyl emulsion in 1987, and its MRL is set at 0.05–5 mg/kg for 35 foodstuffs including potato and peas (MRLs for Pesticides in Foods, May 31, 2016).

The ADI of pirimiphos-methyl at 0.03 mg/kg bw/day was established by applying the safety factor 10 (differences between individual entities) to the NOAEL of 0.25 mg/kg bw/day obtained in relation to the inhibition of activation of cholinesterase in red blood cells in 28-day and 56-day clinical studies conducted on human subjects. The NOAEL on the inhibition of activation of cholinesterase in the brain, its most representative toxicity endpoint, obtained from studies on mice, rats, and dogs was 0.5 mg/kg bw/day.

The intake amount of pirimiphos-methyl was estimated based on the results of the analysis of 2,082 samples of 52 foodstuffs including rice in the Monitoring of Agricultural Products in Korea (2011–2015) 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, pirimiphos-methyl 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

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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 from the exposure, and when HI is lower than 1, adverse effect is not expected. The results of the risk assessment of pirimiphos-methyl in all age groups revealed HI between 0 (non-detection data 0 applied) and 0.002 (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 pirimiphos-methyl

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	$3.2 \times 10^{-3}$	60	0	$0.1 \times 10^{-3}$	0.03	0	0.002

**Key words:** Pirimiphos-methyl, Risk Assessment, Organophosphorus insecticide, ADI, Monitoring, Pesticide