

# 2016 SCIENTIFIC REPORT



MINISTRY OF FOOD AND DRUG SAFETY

National Institute  
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## Risk Assessment of Azinphos-methyl

Azinphos-methyl, an organophosphorus pesticide, is used to control various insects, including codling moths, plum curculios, fruit flies, aphids, tortricids, mites, mealybugs, moths, and boil weevils. Its usage is registered for crops such as pome fruits, stone fruits, nuts, fruiting vegetables, cucurbit vegetables, leafy vegetables, brassica vegetables, fodder crops, bulb vegetables, root crops, berries, and citrus fruits. Its MRL in Korea is set at 0.1–3 mg/kg for 63 foodstuffs, such as rice and potato (MRLs for Pesticides in Foods, May 31, 2016).

The ADI of azinphos-methyl at 0.03 mg/kg bw/day was established by applying the safety factor of 10 (differences between individual entities) to the NOAEL drawn from a 30-day clinical test on male volunteers. There were no significant differences among the NOAELs for inhibited activation of acetylcholinesterase in red blood cells, azinphos-methyl's most representative toxicity endpoint, obtained from studies on several rodents and men; thus, the test result on men was used as a representative value. The maximum concentration of 0.29 mg/kg bw/day, where the toxicity effect (inhibited activation of acetylcholinesterase in red blood cells) did not appear, was established as the NOAEL.

The intake amount of azinphos-methyl was estimated based on the results 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 demonstrated that the pesticide level was below the LOQ, and thus, azinphos-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

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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 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 exposure, and when HI is lower than 1, an adverse effect is not expected. The results of the risk assessment of azinphos-methyl in all age groups revealed HI between 0 (non-detection data, value of 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 azinphos-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	$3.4 \times 10^{-3}$	60	0	$0.1 \times 10^{-3}$	0.03	0	0.002

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