

# 2016 SCIENTIFIC REPORT



MINISTRY OF FOOD AND DRUG SAFETY

National Institute  
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## Risk Assessment of Terbufos

Terbufos is a systemic organophosphorous pesticide and nematicide applied in general to plants, flowers, corn, sugar beet, sorghum, etc. It is used to control various harmful insects including wireworms, cutworms, rice weevils, and nematodes. In Korea, it was first registered in the form of emulsion in 1984, and its MRL is set at 0.01–0.1 mg/kg for 14 foodstuffs including potato and chili pepper (MRLs for Pesticides in Foods, May 31, 2016).

The ADI of terbufos at 0.0006 mg/kg bw/day was established by applying the safety factor 100 (differences between species and individual entities) to the NOAEL of 0.06 mg/kg bw/day obtained from the repeated dose study on dogs conducted for one year in relation to the inhibition of activation of cholinesterase in the brain, a key toxicity endpoint of the pesticide.

The intake amount of terbufos 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 result of the monitoring showed that the pesticide level was below the LOQ, and thus, terbufos 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. Risk characterization was made by calculating the HI in consideration of the EDI calculated

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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, the adverse effect is not expected. The results of the risk assessment of terbufos in all age groups revealed HI between 0 (non-detection data 0 applied) and 0.035 (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 terbufos

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	$1.3 \times 10^{-3}$	60	0	$0.2 \times 10^{-4}$	0.0006	0	0.035

**Key words:** Terbufos, Risk Assessment, Organophosphorus insecticide, ADI, Monitoring, Pesticide