

Fenthion

MAK Value Documentation, addendum – Translation of the German version from 2024

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Abstract

Fenthion [55-38-9] is used as an insecticide and acaricide but is no longer approved in the European Union. The previous MAK value documentation and addendum do not reflect the current data situation of the substance. The MAK Commission decided that a new evaluation is not of high priority. The MAK value and the other classifications are therefore suspended and the substance is listed in the Section IIc of the List of MAK and BAT Values for substances no longer evaluated.

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MAK value	see Section II c of the List of MAK and BAT Values
Peak limitation	–
Absorption through the skin	–
Sensitization	–
Carcinogenicity	–
Prenatal toxicity	–
Germ cell mutagenicity	–
BLW (2023)	reduction of the acetylcholinesterase activity in erythrocytes to 70% of the reference value^{a)}
Synonyms	<i>O,O</i> -dimethyl <i>O</i> -(3-methyl-4-methylthiophenyl) thiophosphate
Chemical name (IUPAC)	dimethoxy-(3-methyl-4-methylsulfanyphenoxy)-sulfanylidene- λ^5 -phosphane
CAS number	55-38-9
Molar mass	278.32 g/mol
Melting point	7.5 °C (NCBI 2023)
Vapour pressure at 20 °C	4×10^{-5} hPa (NCBI 2023)
log K_{OW}	4.09 (NCBI 2023)
Solubility	7.5 mg/l water (NCBI 2023)
1 ml/m³ (ppm) $\hat{=}$ 11.549 mg/m³	1 mg/m³ $\hat{=}$ 0.087 ml/m³ (ppm)

^{a)} The BLW (biological guidance value) is derived as the ceiling value because of acute toxic effects.

This addendum was prepared because the previous evaluations no longer reflect the data currently available for the MAK value and for the designations and classifications of the substance. Fenthion is an insecticide and acaricide from the class of organophosphates. The substance is a cholinesterase inhibitor that is activated by metabolism in the liver. The biological guidance value (BLW) for acetylcholinesterase inhibitors (reduction of the acetylcholinesterase activity in erythrocytes to 70% of the reference value; Lewalter 1995; Weistenhöfer et al. 2024) therefore applies to fenthion. The BLW is derived as the ceiling value because of acute toxic effects. However, it was not investigated whether this is the most sensitive end point.

In 1981, a MAK value of 0.2 mg/m³ I (inhalable fraction) was set and fenthion was designated with an “H” (for substances which can be absorbed through the skin in toxicologically relevant amounts). In 2002, the substance was assigned to Peak Limitation Category II with an excursion factor of 2 (Greim 2002, available in German only; Henschler 1981, available in German only).

Fenthion is used as an insecticide to control biting and sucking insects. In veterinary medicine, the active substance is used in the form of prescription medication against fleas (BfArM 2020). However, no medication against fleas containing fenthion is currently approved for use in the Federal Republic of Germany (AMVV 2022; BfArM 2022; BMG 2022). Fenthion was approved as an active substance in plant protection products in the Federal Republic of Germany between 1971 and 1998; in the former German Democratic Republic it was approved until 1967 (BVL 2010). No plant protection products containing this active substance are approved in the European Union (AERU 2022; European Commission

2022 b; European Parliament and European Council 2009). Fenthion is listed in Annex I Parts 1 and 2 of the PIC Regulation (EC) No 689/2008 (European Commission 2022 a). Exports therefore require an export notification and the express consent of the importing country.

The previous evaluations (MAK value documentation and addendum) do not reflect the currently available data. However, a re-evaluation of the substance is not a priority. Therefore, the MAK value, the peak limitation and the “H” designation have been withdrawn and fenthion has been allocated to Section II c of the List of MAK and BAT Values (DFG 2022). This section lists substances for which the previous MAK values, designations and classifications have been withdrawn and which are no longer being reviewed at present.

Notes

Competing interests

The established rules and measures of the Commission to avoid conflicts of interest (https://www.dfg.de/mak/conflicts_interest) ensure that the content and conclusions of the publication are strictly science-based.

The views expressed in these publications are those of the individual authors acting in their personal capacity as experts and do not represent the positions of their respective institutions or employers.

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