

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Camphene file (CAS # 79-92-5)
FROM: Gary Butterfield
SUBJECT: Screening level for camphene
DATE: June 24, 2009

Camphene is also known as 2,2-dimethyl-3-methylenebicyclo(2.2.1)heptane. The molecular formula is C₁₀H₁₆ with a molecular weight of 136.2 g/mol. It is a solid at normal ambient temperatures, with a melting point of 45C, and boiling point of 156C. The vapor pressure is 2.4 mmHg at 20C.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - June 2009), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches for this evaluation were conducted on June 16, 2009. Minimal toxicity information could be located. This chemical was identified as being one of the high production volume chemicals. There is a copy on the Internet of the HPV robust summary (EPA 2006), which identifies several unpublished toxicity studies.

Also in the robust summary document is few details of a published acute oral toxicity study reported by Opdyke (1975), where the LD50 is reported to be greater than 5000 mg/kg. There is also reported a company sponsored oral acute study where 2/10 Wistar rats dosed with 5000 mg/kg died during the observation period, the LD50 is reported to be greater than 5000 mg/kg.

In an unpublished, four-week gavage study reported by Hoechst (1991), groups of 5 male and 5 female Wistar rats were gavaged daily for 28 days with 0, 62.5, 250 or 1000

mg/kg. The dosed male rats developed alpha-2-microglobulin nephrotoxicity, which has no relevance to human effects. Liver weights being increased at 1000 mg/kg was observed in both sexes along with increased hepatocyte vacuolization. The NOAEL in females is 250 mg/kg, males did not show a NOAEL because of the nephrotoxicity.

In general, it is more desirable to use longer-term studies to set the screening level. In this case, the screening level can be determined from the oral 28-day repeat dose female rat NOAEL (rather than the LD50) and the equation from R232(1)(e) for a 7-day oral study, as follows. Note that there is no information available on absorption efficiency by either the oral or inhalation exposure route. For this R232(1)(e) calculation both efficiencies were assumed to be equal.

$$\text{ITSL} = \frac{250 \text{ mg/kg}}{35 \times 100} \times \frac{1 \text{ kg}}{0.9 \text{ m}^3} = 80 \text{ ug/m}^3 \text{ annual average}$$

References:

EPA. 2006. Revised robust summaries for bicyclic terpene hydrocarbons (one of which is camphene). Submitted to EPA HPV Challenge Program by the Terpene Consortium.

Hoechst. 1991. (Ber.-Nr. 91.0475)

Opdyke. 1975. Monographs on Fragrance Raw Materials. Food and Cosmetics Toxicology 13:735-8.

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