Social Europe

Recommendation from the Scientific Committee on Occupational Exposure Limits for methyl iodide

SCOEL/SUM/80
March 1999

European Commission

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8-hour TWA	:	-
STEL (15 mings)	:	-
Additional classification	:	-

Substance

Methyl iodide **CH_3I**

Synonyms : Iodomethane
EINECS N° :
EEC N° : 200-819-5 Classification: T; R40-21-23-25-37/38
CAS N° : 74-88-4
MWt : 141.94

Conversion factor (20°C, 101kPa) : 1ppm = 5.9 mg/m^3

1. Occurrence/use

Methyl iodide is a colourless (or brown, due to contamination by iodine as an oxidative breakdown product) liquid with an ether-like or pungent odour. It has a freezing point of -66°C, a boiling point of 42°C and a vapour pressure of 400 mm Hg at 25°C. It is soluble in water and miscible in ethanol and diethyl ether.

It is used as a methylating agent in pharmaceutical and chemical synthesis. Very little exposure data are available.

2. Health Significance

In animals, methyl iodide appears to be well absorbed by inhalation and orally; its molecular size and physicochemical nature suggests that it would also be absorbed through the skin to a significant extent. Following absorption, methyl iodide and/or its metabolites are widely distributed within the body. Metabolism is via conjugation with glutathione, with release of iodide and the formation of S-methyl glutathione, which is then further metabolised to the mercapturic acid and other derivatives. Excretion is rapid, metabolites appearing in the urine and faeces, via the bile; very little is excreted unchanged. Very little toxicokinetic information is available from human studies.

Methyl iodide is moderately toxic in animals on single exposure by inhalation and orally. A 1-hour LC_{50} in mice of 862 ppm (approximate 5 g/m^3) and acute oral LD_{50} values in rats of 76 and 150-220 mg/kg have been reported (Buckell, 1950; Johnson, 1966). No acute dermal toxicity information is available in animals. No useful information is available on acute toxicity in humans.

No reliable information is available on the irritant or sensitising potential of methyl iodide in animals; concentrations of methyl iodide producing general signs of toxicity on inhalation have also produced eye irritation in rodents. In humans, there is some evidence that liquid methyl iodide can produce significant skin irritation, but again, no sensitisation data are available (Buckell, 1950).

Very limited data are available on the effects of repeated exposure. An abstract report states that in rats, no adverse effects were seen with repeated inhalation exposure to 10 ppm (59 mg/m^3) for 14 weeks (Blank *et al*., 1984). At concentrations of 30 ppm (177 mg/m^3) and above, eye and nasal irritation and reduced body weight gain were reported. In humans, health effects claimed to have arisen following repeated inhalation exposure to methyl iodide include headache, nausea and various neurological and psychological abnormalities (Schimmelpfennig and Matschke, 1991; Appel *et al*., 1975). However, the reports are of poor quality and contain no exposure information.

Methyl iodide is a direct-acting mutagen *in vitro* (e.g. McCann *et al*., 1975; Clive *et al*., 1979; Moore *et al*., 1985; Amacher and Zelljadt, 1984). Its genotoxic potential *in vivo* has not been properly investigated, although it has been shown to interact with DNA in several tissues examined after rats were exposed to methyl iodide by inhalation (Gansewendt *et al*., 1991).

No carcinogenicity studies are available involving the inhalation, oral or dermal routes of exposure. Two animal carcinogenicity studies employing subcutaneous or intraperitoneal injection are of insufficient quality to allow meaningful conclusions to be drawn in relation

to potential human carcinogenicity (Druckey, 1970; Poirer *et al*., 1975). No human carcinogenicity data are available.

There are no studies available investigating the reproductive toxicity of methyl iodide.

Recommendation

There are only limited toxicological data available on methyl iodide, but its chemical properties and the results of *in vitro* mutagenicity assays suggest that it would produce genetic damage *in vivo*, which could be indicative of carcinogenic potential. However, the limited studies available are not appropriate for evaluation of the carcinogenic potential. Because of these concerns and the limited database, it is not possible to identify a reliable, safe level of exposure. Also, because of the lack of data, it is not possible to provide meaningful estimates of the risk of genetic damage and/or cancer at specified levels of exposure.

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