BROMOETHANE

Data were last evaluated in IARC (1991).

1. Exposure Data

1.1 Chemical and physical data

1.1.1 *Nomenclature*

Chem. Abstr. Services Reg. No.: 74-96-4
Systematic name: Bromoethane
Synonym: Ethyl bromide

1.1.2 *Structural and molecular formulae and relative molecular mass*

C_2H_5Br Relative molecular mass: 108.97

1.1.3 *Physical properties* (for details, see IARC, 1991)

(*a*) *Boiling-point*: 38.4°C
(*b*) *Melting-point*: –118.6°C
(*c*) *Conversion factor*: $mg/m^3 = 4.46 \times ppm$

1.2 Production, use and human exposure

Bromoethane has limited commercial use, including that as an ethylating agent. It has been detected in ocean air as a result of its formation by marine algae (IARC, 1991).

2. Studies of Cancer in Humans

No data were available to the Working Group.

3. Studies of Cancer in Experimental Animals

Bromoethane was tested for carcinogenicity in a two-year study in male and female Fischer 344 rats and $B6C3F_1$ mice by inhalation. In male rats, there was a significant increase in the incidence of phaeochromocytomas, which was not dose-related. A marginal

increase in the incidence of glial tumours of the brain occurred in females. In mice, bromoethane induced neoplasms of the endometrium; a marginal increase in the incidence of lung tumours was observed in males. In a screening study by intraperitoneal injection, bromoethane did not increase the incidence of lung tumours in strain A mice (IARC, 1991).

4. Other Data Relevant to an Evaluation of Carcinogenicity and its Mechanisms

4.1 Absorption, distribution, metabolism and excretion

4.1.1 *Humans*

No data were available to the Working Group.

4.1.2 *Experimental systems*

Unchanged bromoethane accounted for approximately 70% of the dose in the expired air of rats dosed orally by gavage (IARC, 1991).

4.2 Toxic effects

4.2.1 *Humans*

No data were available to the Working Group.

4.2.2 *Experimental systems*

In 14-week studies, male and female Fischer 344/N rats and B6C3F_1 mice were exposed to 100–1600 ppm [446–1780 mg/m^3] bromoethane by inhalation for 6 h per day on five days per week. In rats, tremors, paresis, mineralization and degeneration in the brain, atrophy of the testes, haemosiderosis of the spleen and some depletion of haematopoietic cells in the bone marrow were observed. Involution of the ovary was observed in mice in the 800 and 1600 ppm dose groups (IARC, 1991).

In response to the unusual observation of an increased incidence of uterine tumours in mice (see above), possible changes in blood concentrations of sex hormones were investigated. Female B6C3F_1 mice (11–12 weeks of age) were exposed by inhalation to 400 ppm [1780 mg/m^3] for 6 h per day for 21 days. No consistent changes were found in oestrous cyclicity or in serum concentrations of oestradiol and progesterone. Thus, none of the measured parameters emerged as a mechanistic factor that might contribute to the high incidence of endometrial tumours (Bucher *et al.*, 1995).

4.3 Reproductive and developmental effects

No data were available to the Working Group.

4.4 Genetic and related effects

4.4.1 *Humans*

No data were available to the Working Group.

4.4.2 *Experimental systems*

Bromoethane was mutagenic to bacteria, but not to *Drosophila melanogaster* in a single study. In another single study, bromoethane increased the incidence of sister chromatid exchanges, but not of chromosomal aberrations in cultured mammalian cells (IARC, 1991).

5. Evaluation

No epidemiological data relevant to the carcinogenicity of bromoethane were available.

There is *limited evidence* in experimental animals for the carcinogenicity of bromoethane.

Overall evaluation

Bromoethane is *not classifiable as to its carcinogenicity to humans (Group 3).*

6. References

Bucher, J.R., Morgan, D.L., Adkins, B., Jr, Travlos, G.S., Davis, B.J., Morris, R. & Elwell, M.R. (1995) Early changes in sex hormones are not evident in mice exposed to the uterine carcinogens chloroethane or bromoethane. *Toxicol. appl. Pharmacol*., **130**, 169–173

IARC (1991) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 52, *Chlorinated Drinking-water; Chlorination By-products; Some Other Halogenated Compounds; Cobalt and Cobalt Compounds*, Lyon, pp. 299–314