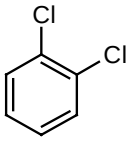
SIDS INITIAL ASSESSMENT PROFILE

CAS No.	95-50-1
Chemical Name	1,2-Dichlorobenzene
Structural Formula	

RECOMMENDATIONS

Health: The chemical is not a candidate for further work.
Environment: The chemical is a candidate for further work.

SUMMARY CONCLUSIONS OF THE SIAR

Human Health

1,2-Dichlorobenzene has been shown to cause eye and respiratory irritation in humans at exposure levels above 100 ppm. Skin irritation has been observed following dermal application in humans and animals.

1,2-Dichlorobenzene is absorbed via the oral route. Absorption via the dermal or inhalation routes is poorly characterized. Inhalation is expected to be the major route for human exposure. The available toxicological data indicate that metabolic profiles and effects from 1,2-dichlorobenzene exposure are similar in rats, mice and humans. Animal studies with rats and mice have shown 1,2-dichlorobenzene to induce acute hepatotoxic effects. The LD_{50} for a single oral exposure to 1,2-dichlorobenzene for the rat ranges from 1516 to 2138 mg/kg bw. The LC_{100} for the rat is ≤ 977 ppm (5.9 mg/L) for a 10 hour exposure. During a 4 hour exposure, 1 of 20 rats died at 941 ppm (5.6 mg/L). In humans, the acute effects of 1,2-dichlorobenzene by ingestion or inhalation are reported to be headache, nausea, vomiting, vertigo, malaise and unconsciousness.

Several oral studies of rats and mice ranging from 10 days to 2 years duration indicate that the adverse effects include increases in liver and kidney weights and hepatotoxicity. From these repeat dose studies, the NOAEL for non-neoplastic effects was 60 mg/kg bw, while the LOAEL was 120 mg/kg bw due to increased renal tubular regeneration in male mice.

In several microbial organisms and mammalian systems, 1,2-dichlorobenzene tested negative *in vitro*. However, it did induce sister chromatid exchanges in Chinese Hamster ovary cells and increased mutation frequency in mouse lymphoma cells, both in the presence of metabolic activation. 1,2-dichlorobenzene was negative in several *in vivo* mammalian tests, except one of two micronuclei assays in mouse bone marrow was positive. In a two-year oral study in rats and mice, 1,2-dichlorobenzene was considered not to be carcinogenic (maximum dose of 120 mg/kg bw). In an inhalation 2-generation reproduction study in rats, no fertility effects were observed and reduced pup weight during lactation occurred at doses toxic to adults. The NOAEL and LOAEL (kidney and liver effects) for adult rats were 50 (0.3 mg/L) and 150 ppm (0.6 mg/L) respectively. In developmental studies in rats and rabbits, developmental effects were only seen in rats at maternally toxic doses (400 ppm, 2.4 mg/L). No human epidemiological studies have been conducted.

Environment

1,2-Dichlorobenzene has a water solubility of 155.8 mg/L; vapour pressure of 0.196 kPa; and Log Kow of 3.4. It is expected to partition mainly to the atmospheric compartment where its primary removal mechanism will be through reaction with hydroxyl radicals (half life <50 days). Where released to either soil or water compartments, a major removal mechanism being volatilisation up into the surrounding atmosphere. However, adsorption to sediment may also be a major fate process. Biodegradation studies (generally following non-standard procedures) show 1,2-dichlorobenzene to be biodegradable under aerobic conditions where bacterial populations have been acclimatised to the chemical. However, where bacterial populations are not acclimatised, the chemical can not be regarded as ready biodegradable. The chemical is not degraded under anaerobic conditions. 1,2-Dichlorobenzene has a high potential for bioconcentration in the fatty tissue of aquatic species with BCFs based on lipid content up to 8710 for fish, and 28840 for a crab species. However, depuration from exposed organisms is expected to be rapid once exposure ceases.

1,2-Dichlorobenzene has been tested on a wide range of aquatic organisms under acute exposure, although chronic data are scarce. Results for fish ranged from 96 h LC50=1.58 mg/L for rainbow trout to 57 mg/L for fathead minnow. Both acute and chronic toxicity to aquatic invertebrates were obtained with two results showing high acute toxicity, namely EC50's of 0.78 mg/L and 0.66 mg/L to *Daphnia* and *Ceriodaphnia* respectively. Results from exposure to algae showed EC50 values in the 1-100 mg/L range for 1,2-dichlorobenzene. Toxicity to micro-organisms can be considered slight.

Although the major compartment expected to be exposed to 1,2-dichlorobenzene is the atmosphere, there are no ecotoxicity results available for organisms exposed through the gas phase. The chlorine substituents on the chemical suggest a potential for effects on stratospheric ozone. However, the chemical is unlikely to persist long enough to escape the troposphere, although it may persist long enough to undergo long range atmospheric transport.

While there are a large number of acute data covering all trophic levels, chronic data are scarce. Therefore, an assessment factor of 100 has been chosen. The result used for determining the PNEC was the lowest chronic value obtained, i.e. 21 d NOEC = 0.63 mg/L for *Daphnia magna*. The $PNEC_{aquatic}$ was therefore determined to be 6.3 µg/L.

Exposure

1,2-Dichlorobenzene is manufactured in Europe, the USA, Canada, Mexico and China. Production figures were reported to be approximately 16,500 tonnes for Western Europe in 1983 and approximately 23,680 tonnes produced by the USA in 1984. More recent data indicates that in 1999 production in the Western World was 54,000 tonnes, with the predominant uses being chemical synthesis and use as a solvent.

The main industrial use of 1,2-dichlorobenzene in Australia is as a solvent with approximately 86% used in the agricultural sector for wool branding products. The chemical is also used as an automotive and marine degreaser/decarboniser and in industrial paint strippers, industrial deodorants and a small amount in a single pharmaceutical preparation.

Occupational exposure to 1,2-dichlorobenzene can occur during manufacture and end use, with inhalation the major route of exposure. Potential for consumer exposure from the use of products and human exposure via the environment is expected to be low.

NATURE OF FURTHER WORK RECOMMENDED

Environment: 1,2-Dichlorobenzene is toxic and bioconcentrates. Additionally, it may be considered persistent due to its lack of biodegradation where microbial communities are not acclimatised. Member countries may wish to undertake a more in-depth exposure analysis and if then indicated, a risk assessment may be considered.