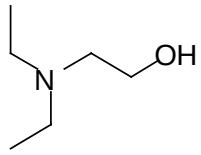
SIDS INITIAL ASSESSMENT PROFILE

CAS No.	100-37-8
Chemical Name	2-Diethylaminoethanol
Structural Formula	

SUMMARY CONCLUSIONS OF THE SIAR

Human Health

2-Diethylaminoethanol was rapidly absorbed via the oral route. It is presumably absorbed by dermal and inhalation routes of administration. In the rat it was widely distributed to many tissues. It was primarily excreted unchanged via the urine in rats. Excretion via the feces was also observed in rats, but to a lesser extent. Urinary excretion was also reported in humans. The major metabolites in rats were reported to be diethylaminoacetic acid and diethyl-(2-hydroxyethyl)-amino-oxide.

The LD_{50} for the rat after oral administration was 1320 mg/kg bw. The main clinical signs described were apathy and dyspnea. After inhalation of vapors of 2-diethylaminoethanol an LC_{50} of ca. 4600 mg/m^3/4 hour was estimated in rats using Haber's rule. Severe signs of irritation were observed, e.g. mucous membrane irritation and dyspnea. A dermal LD_{50} in guinea pigs was reported to be ca. 885 mg/kg bw.

2-Diethylaminoethanol was corrosive to the skin of rabbits; since the pH was measured to be 11.5 (100 g/l) at 20°C, the corrosive effects are not surprising. The potential for severe damage to the eyes can be expected based on the animal studies available and on the pH. 2-Diethylaminoethanol was not sensitizing to the skin in studies with guinea pigs.

Repeated exposure of rats to 2-diethylaminoethanol vapors (up to 365 mg/m^3) for 14 weeks caused local toxicity (irritation) at the site of contact, namely, the upper respiratory tract and the eyes; however, systemic toxicity was not observed (NOAEC, systemic toxicity, 365 mg/m^3 or 76 ppm). After inhalation exposure, the main symptom described was respiratory irritation which led to noises called rales and irritation of the eyes. The LOAEC for local toxicity (irritation) to the respiratory tract was 120 mg/m^3 (25 ppm) and the NOAEC for local toxicity was 53 mg/m^3 (10 ppm) based on histopathological effects in the nasal cavity. However, since an effect (rales) was seen at the lowest concentration a NOEC was not reached.

2-Diethylaminoethanol gave no evidence of *in vitro* mutagenic activity nor *in vivo* clastogenic potential.

Repeated exposure of rats to 2-diethylaminoethanol vapors (365 mg/m^3) for 14 weeks did not cause any adverse effects on the reproductive organs when administered by inhalation. In pregnant rats even the highest concentration tested of 486 mg/m^3, which already produced maternally toxic effects, did not lead to adverse developmental effects.

In a limited study, 2-diethylaminoethanol was not carcinogenic to rats when given by feed (tested up to ca. 50-400 mg/kg/d).

An odor threshold of 0.011 ppm (approx. 0.053 mg/mg^3) has been reported. In a laboratory worker short-time

exposure to approx. 100 ppm (480 mg/m^3) 2-diethylaminoethanol caused nausea and vomiting. Subjects exposed to 2-diethylaminoethanol vapor by humidified air in office buildings complained about eye, nose and throat irritation, dizziness, nausea and vomiting. Also several cases of asthma were observed. However, these symptoms were more consistent with reactive airway dysfunction syndrome than with an allergic respiratory reaction. In one case detectable amounts of 2-diethylaminoethanol were 0.05 and 0.04 mg/m^3.

Environment

2-diethylaminoethanol is a colourless – light yellowish organic liquid. The hygroscopic substance is miscible with water in all proportions, has a vapor pressure of about 1.8 hPa at 20 °C. The density is 0.885 g/cm³. Melting point and boiling point are – 68 °C and 162-163 °C (at 1013 hPa) respectively.

The distribution of the substance between the compartments of air, biota, sediment, soil and water was calculated according to Mackay Level I. The non-charged molecule distributes mainly to the water (99.1 %).

A soil adsorption coefficient (K_{OC}) of 5.98 was estimated for 2-diethylaminoethanol (DEAE). This Koc value suggests that this compound would be mobile in soil and adsorption to suspended solids would not be important. From the pKa-value of 9.87 it can be assumed that under environmental conditions the substance is available as acation. Therefore, binding of the substance to the matrix of soils with high capacities for cation exchange (e.g. clay) cannot be excluded. However, no data was available for ionic-ionic interactions in soil. The calculated Henry's law constant ($3.16*10^{-4}$ Pa m³ mol^{-1} at 25 °C) and complete water solubility of 2-diethylaminoethanol suggest that volatilization from water would not be an important fate process. The substance has no considerable potential for bioaccumulation (log Kow = 0.21, measured). The compound is readily biodegradable (OECD 301 A, 95% after 22 days 10d-window fulfilled). The EC_{20} (30 min) for activated sludge was determined to be >1000 mg/l. The photodegradation rate in the atmosphere is fast under environmental conditions (50% after 3.9 hours).

The following aquatic effect concentrations are available:

Leuciscus idus LC_{50} (96 h) = 147 mg/l (nominal concentration). The toxic effect may be (partly) due to the high pH of the non-neutralized test solutions, since the pH adjusted 1000 mg/l dose group tolerated the substance for 96 h without mortality.
Pimephales promelas LC_{50} (96 h) = 1780 mg/l (measured concentration, adjustment of pH)
Daphnia magna: EC_{50} (48 h) = 83.6 mg/l (nominal concentration) (toxicity due to pH effects cannot be excluded)
Daphnia magna EC_{50} (48 h) = 165 mg/l (nominal concentration, adjustment of pH)
Scenedesmus subspicatus: E_rC_{50} = 44 mg/l, with a NOEC of 5 mg/l (corresponding values for biomass are 30 and 5 mg/l respectively; nominal concentration).

Using the aquatic toxic effect on the most sensitive species, *Scenedesmus subspicatus*, of 44 mg/l for the endpoint growth rate (30 mg/l endpoint biomass) a $PNEC_{aqua}$ of 44 µg/l is derived by applying an assessment factor of 1000. This factor is justified, because only short-term toxicity values were available.

The following terrestrial effect concentration was reported:

Chrysanthemum morifolium cultivar "Indianapolis white" EC_{50} (22 d) = 0.12 mg/l (in the nutrient solution; endpoint: chlorosis; nominal concentration). However, no PNECsoil can be derived from this result as no soil concentration is given.

Exposure

The production volume of this chemical at BASF, Germany, was more than 1000 tons in 2000. No information about the worldwide production volume is available.

The organic compound is used for the synthesis of pharmaceuticals and as a catalyst in the synthesis of polymers in the chemical industry. It is also used as a pH stabilizer. According to Swiss, Danish and Swedish Products Registers

and the Hazardous Substances Data Bank, 2-diethylaminoethanol is contained in a large number of products. Some of them may be available to consumers.

Releases into the environment are likely to occur during the production and processing of 2-diethylaminoethanol as an intermediate, as well as from the use of the substance itself and use of products containing the substance.

Assuming worst case conditions, less than 9.5 kg of 2-diethylaminoethanol per day were released into the Rhine from an industrial site. During production and internal processing, less than 25 kg/a were emitted into the air from the same production site. From the reported use in consumer products, it can be concluded that most of the 2-diethylaminoethanol is released into wastewater, but part of it may also be released into the atmosphere.

RECOMMENDATION

The chemical is currently of low priority for further work.

RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED

Human Health: The chemical is currently of low priority for further work. Due to the corrosive potential, exposure to humans at the workplace and from consumer products has been regulated in the sponsor country. However, if this is not the case in other countries, further exposure assessment and, if necessary, risk assessment are recommended.

Environment: In addition to its use as chemical intermediate, European product registers indicate a wide dispersive use of 2-diethylaminoethanol. No information is available about the total production volume and about total environmental releases. However, the low aquatic toxicity, the low bioaccumulation potential and the ready biodegradability lead to the recommendation, that the chemical is currently of low priority for further work