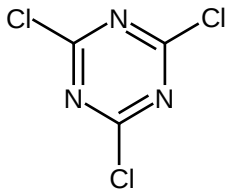
SIDS INITIAL ASSESSMENT PROFILE

CAS No.	108-77-0
Chemical Name	Cyanuric chloride
Structural Formula	

RECOMMENDATIONS

The chemical is currently of low priority for further work.

SUMMARY CONCLUSIONS OF THE SIAR

Human Health

Acute toxicity of cyanuric chloride showed an oral LD50 of ~320 mg/kg bw and a dermal LD50 of >2000 mg/kg bw. The high acute inhalation toxicity of cyanuric chloride (LC50 170 mg/m^3) is likely to be secondary to its highly irritating/caustic properties. The compound is highly irritating to the skin, the eyes and the respiratory tract (RD50 5.9 mg/m^3). In humans exposure to cyanuric chloride causes irritation and caustic effects to the skin, eyes and respiratory tract. Cyanuric chloride is sensitizing. Asthma and contact dermatitis are also reported in humans.

In oral repeated dose studies cyanuric chloride induced body weight loss and stomach erosion and ulceration. In a 21-day dermal study decreased body weight was reported at 150 and 500 mg/kg bw. Severe dermal irritation was seen at all dose levels tested. Since it can not be excluded that the effects on body weight were secondary to stress by the treatment, no systemic NOAEL was derived. The LOAEL for local effects is 50 mg/kg bw. From a 90-day inhalation study a NOAEC of 0.25 mg/m^3 (the highest concentration tested) for systemic toxicity was derived. The NOAEC for local effects in the respiratory tract of rats displaying intercurrent respiratory infection was found to be 0.05 mg/m^3. The effects included inflammation in the nose and lungs.

For developmental toxicity an oral teratogenicity study is available. The NOAEL for maternal toxicity is 25 mg/kg bw, based on a decreased body weight gain. For developmental effects a NOAEL of 25 mg/kg bw was derived, based on increased post-implantation loss and a decreased number of fetuses at 50 mg/kg bw. In the 90-day inhalation toxicity study no effects on the gonads were found and therefore no studies of any effects of cyanuric chloride on fertility are required under SIDS.

Cyanuric chloride is found to be not mutagenic in the Ames test and the mouse micronucleus test.

Environment

Released cyanuric chloride will end up in surface water for ~99% (EQC-model). In water cyanuric chloride hydrolyses quickly to cyanuric acid via the intermediates 2,4-dichloro-6-hydroxy-s-triazine and 2-chloro-4,6-dihydroxy-s-triazine (DT_{50} < 5 hours). The DT_{50} for the disappearance of cyanuric chloride in aqueous medium is < 5 minutes.

Cyanuric chloride has a low vapour pressure and logKow of 1.7. Due to its low solubility (440 mg/L) and its hydrolysis properties, the actual concentration of cyanuric chloride in water is very low. For the biodegradation process of cyanuric chloride the hydrolysis products are much more relevant than cyanuric chloride itself. Studies on these hydrolysis products showed very limited biodegradability of these compounds under standard test conditions.

The toxicity of cyanuric chloride to aquatic organisms can not be determined in view of the hydrolytic properties of the substance. For the hydrolysis product 2-chloro-4,6-dihydroxy-s-triazine the LC50 in fish and the EC50 in daphnia were >2000 mg/L. For cyanuric acid the fish LC50 was >1000 mg/L and the daphnia EC50 was >1800 mg/L. No effects of cyanuric acid on algae were found in saturated medium. Algal toxicity was investigated for isocyanuric acid (72-h LC50 620 mg/L, NOEC 62.5 mg/L). No bioaccumulation in carps was found in a test with cyanuric acid.

Exposure

Yearly more than 100,000 tonnes of cyanuric chloride are produced. The compound is used exclusively as an intermediate in the production of pesticides (herbicides), optical brighteners, dyes and plastic additives.

Due to the fact that cyanuric chloride is almost exclusively used in closed systems, worker exposure is expected to be low or negligible. During production cyanuric chloride may be released to the environment via the waste water. The annual release into the atmosphere was 268 kg/year (1990/1991), Consumer exposure is considered not relevant in view of the use as an intermediate.

NATURE OF FURTHER WORK RECOMMENDED

No further work recommended.