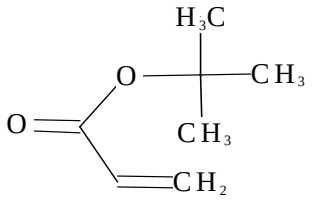
SIDS INITIAL ASSESSMENT PROFILE

CAS No.	1663-39-4
Chemical Name	Tert.-Butyl Acrylate
Structural Formula	

SUMMARY CONCLUSIONS OF THE SIAR

Human Health

Tert. butyl acrylate was tested for relative rates of hydrolysis by a representative mammalian esterase (porcine hepatic esterase) in vitro. No hydrolysis to acrylic acid and the alcohol could be detected.

Animal studies with tert. butyl acrylate show an inhalation LC_{50} (rat) of 7 mg/l/4 h; dermal LD_{50} > 4000 mg/kg bw (rat) and ca. 2000 mg/kg (rabbit); and an oral LD_{50} (rat) of ca. 1047 mg/kg bw. Some of the major clinical signs include rapid and irregular breathing, unsteady/spastic gait, tremors, decreased motility, convulsions (oral), and prone/abdominal or lateral position. Tert. butyl acrylate is slightly irritating to skin and eyes of rabbits. Guinea pig maximization and Freund's complete adjuvant tests showed a sensitizing effect. Based on the structural similarities to other acrylates a tert. butyl acrylate is suggested to be a sensitizer.

In a combined sub-chronic inhalation toxicity study with a reproduction /developmental toxicity screening test, rats were exposed to 20, 60 and 180 ppm (0.106, 0.319 and 0.956 mg/l) 6 hours/day and 5 days/week. The males were treated for approx. 13 weeks (10 weeks premating, 3 weeks mating and post mating). In females treatment lasted from 10 weeks premating, during mating and gestation through day 4 after delivery (approx. 15 weeks). Inhalation of 180 ppm (0.956 mg/l) tert.-butyl acrylate caused slight irritation of the eyes and upper respiratory tract, retarded body weight development, and mild impairment of renal function in the males. The test compound evoked significant systemic toxicity including mortality in pregnant and lactating female rats at this high dose level. Whereas the capability to cohabitate and to generate offspring were not affected in both genders at this concentration, the pre- and postnatal development of offspring was significantly impaired. The impaired postnatal development (lower weight gain and viability) of the offspring from the high dose group is probably secondary to the marked maternal systemic toxicity. The lower weight gain and the pup losses were the consequence of an insufficient maternal care in the dams with liveborn pups.

Local effects, systemic toxicity, impairment of fertility and pre- and postnatal toxicity were not observed at the lower concentrations. The NOAEC and LOAEC from this study is 60 ppm (0.319 mg/l) and 180 ppm (0.956 mg/l), respectively. The NOAEC for reproductive toxicity is 180 ppm (0.956 mg/L).

Tert. butyl acrylate was not mutagenic in the Ames test and not clastogenic *in vivo* in the mouse micronucleus test.

Environment

Tert Butyl acrylate has a melting point - 69°C, a boiling point 121 °C and the vapor pressure 22.66 hPa at 25.7 °C. The water solubility of tert. butyl acrylate is 2 g/L (25 °C) and specific gravity is 0.883g/cm^3 at 20 °C. The measured log P_{ow} is 2.32. Tert butyl acrylate is photodegraded by reaction with hydroxyl radicals in the atmosphere with a half-life of 13.22 hours (calculated). The hydrolysis rate of tert. butyl acrylate is low at pH 7, the half-life is ca. 23.6 years and at pH 8 it is 2.4 years (calculated). Tert. butyl acrylate is not readily biodegradable.

Distribution modeling using Mackay Level I indicates that the main target compartment will be air (97.98 %) with smaller amounts partitioning into water (1.95 %) soil (0.0322 %), and sediment (0.0326 %). Also with Fugacity Model Level III, the air is the main target compartment, the results are: 75.3 % (air), 22.2 % (water), 2.4 % (soil) and 0.094 % (sediment). A BCF of 12.2 was determined, based on a log P_{ow} of 2.32, indicating a low bioaccumulation potential.

In acute aquatic toxicity studies, the key study is from a recalculated measured value, the LC_{50} for fish *(Leuciscus idus)* is 1.6 mg/l. In aquatic invertebrates, the reported 48-h EC_{50} (*Daphnia magna*) is 8.74 mg/l. In algae, (*Desmodesmus subspicatus*) the 72-hr EC_{50} for growth rate and biomass are 14.6 and 7.21 mg/l, respectively. (SAR prediction for tert-butyl acrylate are as follows: 96 hr LC_{50} for fish = 1.9 mg/L; 48 hr EC_{50} for daphnia = 11.2 mg/L; and 96 hr EC_{50} for green algae = 1.1 mg/L)

Exposure

Tert. butyl acrylate is a chemical intermediate, manufactured and processed to polymer within closed systems, therefore exposure to environment is expected to be low. In the U.S., production volume is approximately 226 tonnes according to the 2002 IUR (US EPA Inventory Update Rule). About 1000 –10000 tonnes are produced in Europe. Other production sites are in Asia with an expected production volume between 100 and 1000 tonnes. Workers exposure is adequately controlled (strict industrial hygiene controls, use of personal protective equipment) at production plants in the country of the lead company. Tert. butyl acrylate is mainly used to form homopolymers and copolymers. Since end-use consumer products contain only trace levels of acrylic acid and esters (≤ 10 ppm as a result of polymerization and manufacturing), the consumer exposure to acrylate monomers is estimated to be negligible.

RECOMMENDATION AND RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED

Human Health: This chemical is currently of low priority for further work. The chemical possesses properties indicating a hazard for human health (skin, eye, and upper respiratory tract irritation, sensitization, and developmental effects at high doses in rats). Based on data presented by the country of the lead manufacturer, exposure to humans is anticipated to be low. Countries may desire to investigate any exposure scenarios that were not presented by the Sponsor country.

Environment: The chemical has properties indicating a hazard for environment (aquatic toxicity). However the chemical is of low priority for further work for the environment because of its low exposure potential as it is manufactured and processed to polymers in closed systems.