

# BASIC ACRYLIC MONOMER MANUFACTURERS, INC.

## SUBSTANCE REVIEW: 2-ETHYLHEXYL ACRYLATE

(Last Updated 5/7/12)

[Disclaimer](#)

Substance	Acronym	CAS Number
2-Ethylhexyl acrylate	2EHA	103-11-7

### Physicochemical Properties

Property	Results
Physical state at 20°C and 1013 hPa	Liquid  Color: colorless  Odor: sweet, organic
Melting / freezing point	-90°C
Boiling point	215 °C at 1013 hPa
Relative density	0.88 g/m <sup>3</sup> at 20°C
Vapor pressure	0.24 hPa 25 °C
Surface tension	The surface tension of 2EHA (90% saturation) was measured at 68.2 mN/m @ 20°C.
Water solubility	9.6 mg/L at 25°C
Partition coefficient n-octanol/water (log value)	4.64 at 25°C
Flash point	82-86 °C at 1013 hPa
Flammability	Not flammable The substance has no pyrophoric properties and does not liberate flammable gases on contact with water.
Explosive properties	non explosive
Self-ignition temperature	245-252 °C
Oxidizing properties	no oxidizing properties
Granulometry	not applicable
Stability in organic solvents and identity of relevant degradation products	not applicable
Dissociation constant	not applicable
Viscosity	1.75 mPa.s at 20°C

## **Environmental Fate**

In contact with water, 2EHA will hydrolyze slowly, whereas photodegradation in air will proceed rapidly. In water, sewage treatment plants and soil rapid degradation is expected, since 2-EHA was readily biodegradable in OECD 301 -Screening tests. Based on an estimated log Pow ca. 4, a potential for bioaccumulation is to be expected, but calculated BCF being < 500 and as rapid hydrolysis happens in living organisms, real bioaccumulation is unlikely. Adsorption of 2EHA to solid soil phase is not expected. A fugacity model (Mackay Level I) revealed the atmosphere as the main target compartment for distribution which is also indicated by the substance's physicochemical properties.

## **Ecotoxicity**

When evaluated as a group, the acrylate esters have similar ecotoxicity data. LC50 values in freshwater fish ranged from 1.81 and 5.2 mg/L, EC50 values in freshwater invertebrates (*Daphnia magna*) were between 1.3 and 8.74 mg/L, and EC50 values in freshwater algae were between 1.71 and 14.6 mg/L, respectively. Thus, effect values were all in the same range of concentrations with *Daphnia magna* as the most sensitive freshwater species by a narrow margin. A 21-day chronic life-cycle study with *Daphnia magna* is available with ethyl acrylate with a respective NOEC of 0.19 mg/L, and another with n-butyl acrylate with a NOEC of 0.136 mg/L. In addition, several NOEC values from studies in algal species are available ranging from 0.45 to 3.85 mg/L.

## **Human Health Effects**

### Acute Toxicity

2-Ethylhexyl acrylate is of low toxicity after a single ingestion and virtually nontoxic after a single skin contact. The inhalation of a highly saturated vapor-air-mixture represents an unlikely acute hazard.

- Oral: LD50 = ca. 4435 mg/kg bw (rat)
- Dermal: LD50 ca. 7522 mg/kg bw (rabbit)
- Inhalation: LC50 >1.19 mg/L (saturated vapor)

### Irritation/Sensitization

Skin contact with 2EHA causes irritation. 2EHA may be irritating to the respiratory system. The substance is not irritating to the eyes. 2EHA has moderate sensitizing potential in experimental animals, and sensitization in humans has also been reported.

### Repeated Dose Toxicity

In a subchronic repeated dose study by the inhalation route a NOAEC of 0.075 mg/l (10 ppm) was determined in rats for local effects (degeneration of the olfactory epithelial layer in the cranial part of the nasal cavity). The respective NOAEC for systemic effects was 0.226 mg/l (30 ppm) based on clinical chemistry (elevated activities of transaminase and alkaline phosphatase).

#### Genetic Toxicity

2EHA was negative in bacterial mutation tests. 2EHA seems to have a weak potential of induction of cytogenicity in mammalian cell systems, this effect is limited to doses with strong cytotoxicity. In vivo no genotoxic potential was observed in a cytogenetic test in mice and in an UDS assay in rats. Thus, taking the negative test results of the in vivo studies into consideration, there is no relevant evidence that 2EHA might be an in vivo mutagen.

#### Developmental/Reproductive Toxicity

The results of subchronic animal studies gave no indication of a fertility impairing effect caused by 2EHA. In addition, there are data from the structural analogue methyl acrylate. In a two-generation study in which groups of rats were whole-body exposed to methyl acrylate vapors, no effects on reproductive function (i.e. fertility) were observed. The NOAEC for reproductive function was 75 ppm (= ca. 0.268 mg/L).

No indications of a developmental toxic / teratogenic effect were seen in animal studies with 2EHA and its structural analogue methyl acrylate.

#### Carcinogenicity

Findings from the dermal mouse carcinogenicity study showed that 2EHA induces skin tumors at concentrations which were highly irritative. It was concluded, that tumor growth is associated the highly irritating properties of 2EHA. At a low concentration of 2.5% 2EHA with transient irritation no tumor response of the skin was observed. Other long-term studies on different mouse strains did not confirm tumor induction of the mouse skin. Additionally, there is no concern from tumor data of acrylic acid and 2-ethylhexanol, the hydrolysis products of 2EHA.

Taking into account the negative results from in-vivo genotoxicity testing, it is generally accepted that 2EHA induces skin tumors by a non-genotoxic mechanisms. 2EHA induced skin tumors at high concentrations that were highly irritating, and this damage was presumed to be the mode of action for tumor formation.

#### Toxicokinetics

One study in experimental animals by the oral route has shown that 2EHA is rapidly and extensively absorbed, distributed and eliminated (about 90% during the first 24 hours). There are no specific toxicokinetic studies using dermal administration or inhalation exposure.

#### Disclaimer

This document is not intended to be comprehensive. It is provided solely as background information and should not substitute for an up-to-date Safety Data Sheet or research should specific regulatory or other legal questions arise. It is not intended to be a statement of legal requirements when using or handling acrylates. Although the information is believed to be accurate as of the last update, new information may become available and regulations frequently change, and no warranty, expressed or implied, is made concerning the contents. In addition, many states and localities adopt their own regulations, which are not covered by this summary or on the [BAMM website](#). In all events, the user should consult applicable laws and regulations, as well as their supplier's Safety Data Sheet, for current information and requirements. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.**