

GDCh-Advisory Committee
on Existing Chemicals (BUA)

Propargyl Alcohol

BUA Report 213
(July 1998)



S. Hirzel
Wissenschaftliche Verlagsgesellschaft 2001

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Preface

The Advisory Committee on Existing Chemicals of Environmental Relevance, BUA for short, was established in May 1982 to help the German federal government cope with the large task of dealing with existing chemicals. In an agreement between federal government, scientific community, and the chemical industry, it was associated with the German Chemical Society (GDCh-Gesellschaft Deutscher Chemiker) to ensure objective work, carried out in accordance with scientific principles.

At the end of 1997, the Committee was renamed 'GDCh Advisory Committee on Existing Chemicals' (abbreviation 'BUA' as before) and the statutes were revised to include EU level aspects of occupational safety for the handling of existing chemicals from then on. The collaboration with the Employment Accident Insurance Fund of the Chemical Industry (BG-Chemie), with its knowledge on workplace exposure and the toxicologic properties of chemicals, is a valuable addition to the BUA's know-how.

The cooperation between authorities, industry, and the scientific community, upon which the BUA is based, has proven worthwhile. No other national or international body has dealt with the ecological and health-related effects of so many existing chemicals as the BUA. On the national level, the BUA has produced comprehensive reports on about 300 substances and carried out preliminary evaluation and classification (priority-setting) for approximately 200 more, as of 1997. Publication of the process leading to priority-setting, in addition to the BUA Reports, lends transparency to the Committee's work.

Since the EU presently considers only those substances with a production volume of more than 1000 tonnes/year, the BUA began an additional national project in 1997, which also selects and assesses existing chemicals with a lower production volume in the range of 100 - 1000 tonnes/ year. The chemical industry presents about 50 databases for substances each year, for which the BUA sets the priority. Comprehensive reports are published on chemicals suspected of having a hazardous potential. If the data available for substance assessment are insufficient, the gaps in knowledge are documented and, if necessary, investigations recommended.

Moreover, BUA is increasingly addressing scientific questions and problems such as "endocrine disruptors", selection criteria for "persistent organic pollutants" (POPs), "risk assessment and evaluation models for soils and sediments", "evaluation criteria for the marine sector" and "safety factors within the framework of toxicological risk assessment". The state of scientific knowledge on these subjects is researched, documented, and published as 'BUA Reports'. The aim is to develop assessment approaches for the German federal government, determine gaps in knowledge, identify necessary research, and, last but not least, reduce information deficits in the general population.

Munich, November 1998

Helmut Greim
BUA Chairman

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BUA Report on Propargyl Alcohol

Summary

The sole manufacturer of propargyl alcohol in the Federal Republic of Germany in recent years has been BASF AG, which produces about 500 - 1000 tonnes/year for the global market.

Propargyl alcohol is used as intermediate in the manufacture of crop protection agents, medicines, and dyes. Direct applications include those in the metal processing industry and the use as corrosion inhibitor.

According to the emissions declaration of the sole manufacturer in Germany, about 35 kg/year were emitted into the atmosphere in 1996.

No measured data are available on amounts released into the hydrosphere by the sole German manufacturer. The introduction into sewage plants is estimated to be about 0.75 - 3 tonnes/year.

No wastes occur through production at BASF AG. Data are not available on wastes occurring through processing.

There are no known data on the occurrence of propargyl alcohol in the environment.

Calculation of the theoretical equilibrium distribution of propargyl alcohol according to Mackay Level I gave water as the main target compartment (97.5%). No bio- or geo-accumulation is expected.

It is not possible to calculate the hydrolysis rate of propargyl alcohol. A half-life of 37 hours is calculated according to Atkinson for the photolysis in air through OH radicals, assuming a mean OH radical concentration of $5 \cdot 10^5 / \text{cm}^3$. Data are not available on direct photolysis in the air or water.

Propargyl alcohol cannot be classified as readily biodegradable. Concurring results in 2 agricultural soils found a half-life of about 13 days, with a degradation rate of up to 29.5 mg/kg dw/day. At higher concentrations (28 - 56 mg/kg dw), nitrification was seen to be greatly inhibited.

The known effective concentrations relevant for assessing the ecotoxicity of propargyl alcohol may be summarized as follows: fish: LC_{50} = 1.5 - 4.6 mg/l, crustaceans: EC_{50} = 11 - 32 mg/l, amphibians: LC_{50} = 1.8 - 188 mg/l, protozoa: TT = 3.8 - 17 mg/l, and bacteria: TT = 23 - 150 mg/l. The lowest LC_0 value was determined as 0.5 mg/l in the golden orfe.

For terrestrial organisms, the LC_{50} for the fumigation of beetles and fruit flies was 0.18 - 2.37 mg/l air and <1 - 4 mg/l air, respectively.

Toxicological Aspect:

See Appendix:

Toxicological Assessment No. 116: 'Propargyl Alcohol'

BG Chemie (Employment Accident Insurance Fund of the Chemical Industry), Heidelberg (1998)

Test Recommendations

The end points sensitization, reproduction toxicity and carcinogenicity cannot be adequately evaluated on the basis of available data.

Animal experiments are recommended to clarify the sensitizing properties of propargyl alcohol.

Investigations are lacking on the negative effect on fertility. However, studies with up to 90-day administration to rats gave no indication of impairment to the testes or ovaries, so that further investigation does not appear urgent. While investigations with structurally analogous substances do not indicate a teratogenic effect of propargyl alcohol, it should be examined whether further tests need to be carried out on propargyl alcohol itself, considering its wide distribution.

Although no studies are available on its carcinogenicity, such investigations are not considered necessary, since genotoxicity studies showed no signs of a corresponding potential, and there are no indications of a non-genotoxic carcinogenic potential.