

GDCh-Advisory Committee
on Existing Chemicals (BUA)

2-tert-Butylphenol

BUA Report 231

(February 2001)



S. Hirzel

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on Existing Chemicals (BUA, Status February 2001)

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on Existing Chemicals

GDCh-Beratergremium
für Altstoffe (BUA)



S. Hirzel

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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 of substances in soils", "evaluation criteria for the marine sector" and "safety factors within the framework of toxicological risk assessment". The aim of BUA is to develop assessment concepts, determine data gaps, point out the need for further research and, last but not least, also to reduce information deficits in the general population.

Weihenstephan, February 2001

Helmut Greim
BUA Chairman

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BUA Report on 2-tert-Butylphenol

Summary

Ecological Aspect

2-tert-Butylphenol is manufactured in Germany exclusively by CONDEA Chemie GmbH. In 1999, 2-tert-butylphenol was produced in quantities ranging from 100 to 1000 t. About the same quantities were exported as were imported. The amount processed in Germany was < 1000 t.

There are two other known producers in Europe: Schenectady (Switzerland) and Inspec Spain SA (currently LaPorte, Spain). Further data are unavailable on this.

In Germany, 2-tert-butylphenol is handled only as an intermediate. It is reacted to perfume intermediates and herbicides. Plastic additives are no longer produced using 2-tert-butylphenol. The use of 2-tert-butylphenol as an antioxidant in aviation gasoline and the processing of it to surfactants is not known.

Significant emissions of 2-tert-butylphenol into the environment are not expected during the production in Germany because of the production technique and the efficient preparation of the reaction mixture.

At one important processor, the reaction occurs in a closed system. Emissions into the environment do not take place. Data on the emissions at the few other German processors are unavailable.

2-tert-Butylphenol was detected in tar resulting from the gasification of pine wood, as well as in floor dust, in papaya puree, as a component of barley hay and decomposing barley hay, as well as in a sample of a new drinking water storage container made of plastic. 2-tert-Butylphenol has not been clearly identified in Rhine water samples.

In the DOC-DIE AWAY test, 2-tert-butylphenol was proven to be readily biodegradable. A hydrolysis is not expected under environmentally relevant conditions. A half-life of 9 hours was calculated for the photochemical-oxidative degradation in the troposphere.

The BCF calculated on the basis of the log K_{OW} infers an accumulation potential in aquatic organisms. Based on the calculated soil sorption coefficient, a low mobility of 2-tert-butylphenol in soils is expected. Combined with the ready degradation, there is no risk potential for groundwater.

2-tert-Butylphenol is classified as being moderately volatile from aqueous solution. Corresponding to the equilibrium distribution calculated according to Mackay, Level I, water is the target compartment (69 %).

The following test results are available on the ecotoxicity to aquatic organisms:

Organism	Test Period	End Point	Result
Microorganisms			
- <i>Tetrahymena pyriformis</i>	n. s.	growth	EC ₅₀ = 8.67 mg/l
- <i>Bacillus subtilis</i>	n. s.	germination rate	I ₅₀ = 5.2 mg/l
	n. s.	germination	I ₅₀ = 6 mg/l
- <i>Staphylococcus aureus</i>	18 h	growth	MIC = 60 mg/l
- <i>Pseudomonas putida</i>	18 h	bacterial toxicity	EC ₁₀ = 85 mg/l ^{*)}
Algae			
- <i>Scenedesmus subspicatus</i>	72 h	biomass	E _b C ₅₀ = 3.10 mg/l
	72 h	growth	E _r C ₅₀ = 6.5 mg/l
- <i>Chlorella vulgaris</i>	6 h	growth	EC ₅₀ = 21 mg/l
			EC ₅₀ = 27 mg/l
Invertebrates			
- <i>Crangon septemspinosa</i>	96 h	toxicity	EC ₅₀ = 2.4 mg/l
- <i>Daphnia magna</i>	48 h	immobilization	EC ₀ = 1.3 mg/l
			EC ₅₀ = 3.4 mg/l
			EC ₁₀₀ = 10 mg/l
Vertebrates			
- <i>Leuciscus idus</i>	48 h	toxicity	LC ₅₀ = 3.7 mg/l ^{*)}

*) data from the EU safety data set of CONDEA Chemie GmbH; no further details available;

n. s. = not specified

Toxicological Aspect

2-tert-Butylphenol is harmful to health. Studies are unavailable on repeated administration. 2-tert-Butylphenol is strongly irritating to caustic to the skin and eyes. The substance is non-sensitizing in animal tests. 2-tert-Butylphenol is non-mutagenic in bacteria but is clastogenic *in vitro* in mammalian cells. *In vivo* at toxic dosages, it does not induce any micronuclei in the bone marrow of mice. Studies are unavailable on carcinogenicity or reproduction toxicity.