FOREWORD INTRODUCTION

CAMPHENE

CAS N°: 79-92-5

Substance

End Point	:	**IDENTIFIERS, PHYSICAL AND CHEMICAL PROPERTIES**
Chemical Name	:	**Bicyclo[[2.2.1]]heptane, 2,2-dimethyl-3-methylene-**
Common Name	:	**Camphene**
CAS Number	:	**79-92-5**
RTECS Number	:	**EX1055000**

Synonyms

Camphene
2,2-Dimethyl-3-methylenebicyclo(2.2.1)heptane
2,2-Dimethyl-3-methylennorboran
3,3-Dimethyl-2-methylene-norcamphane

Properties & Definitions

Molecular Formula	:	**C10 H16**
Molecular Weight	:	**136.23**
Melting Point	:	**45-46C**
Boiling Point	:	**156-160C**
State	:	**Solid**
Density	:	**0.87g/cm2**
Vapour Pressure	:	**0.330kPa(2.4mmHg) at 20C**
Octanol/Water Partition Coefficient	:	**log Pow = 4.1222 calculated**
Water Solubility	:	**4.2mg/l**
Impurities	:	**Tricyclen < 30%, cyclophenon < 2%, fenchen < 1%**
General Comments	:	Camphene is not considered as hazardous to general public.

Overall Evaluation

SIDS INITIAL ASSESSMENT

This chemical is presently of low priority for further work.

SHORT SUMMARY OF THE REASONS WHICH SUPPORT THE RECOMMENDATIONS

The effect concentrations for human toxicity give no ground for evident concern.

On the basis of the provided acute aquatic toxicity data (nominal concentrations), the ratio between these effect concentrations and predicted environmental concentrations are sufficiently high.

To confirm the present assessment, an acute toxicity test on a fresh water fish species is presently being performed in a flow through system.

Further data on possible uses in other countries should be gathered.

Production-Trade

Chemical Name : **Camphene**
CAS Number : **79-92-5**
Geographic Area : **DEU**

Production

Quantity	*Year*
2000 T - P	**1991**
200 T - EX	**1991**

General Comments : No information on imported volumes. No information on production in other countries.

References

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Processes

Chemical Name : **Camphene**

CAS Number : **79-92-5**

Process

Process comments : In Germany camphene is industrially produced by isomerisation of.alpha.-pinene, using a heterogenous catalyst under normal pressure at temperatures above 100C in closed systems. Isolation of camphene is done by fractional distillation under reduced pressure. A high boiling fraction left at the end contains 3% of camphene.

References

Primary Reference : **#HOECH***
Hoechst A.G.

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 7, (1993)

Uses

Chemical Name : **Camphene**
CAS Number : **79-92-5**
Geographic Area : **DEU**

Use

Quantity		*Year*	*Comments*
1700 T	**P**	**1991**	This amount of camphene is used as an intermediate in chemical industry : 1. For production of isobornylacetate 80-90% 2. For production of fragrance materials 3. For acrylates 4. An unspecified amount is used for production of terpene-phenol-resins and other camphene derivatives.
10 T		**1991**	5. Maximum 10T/year is used directly as fragrance material (mostly fragrance stones for toilets). 6. A high boiling fraction from isolation of camphene (by fractional distilation) containing about 3% of camphene in used as solvent for varnish in automobile industry. This use amounts to a total of 12T/year of camphene. 7. As food additive: camphene was given "GRAS" status by F.E.M.A. in (1965); F.D.A. approved camphene for food use (21 C.F.R. 121.1164). The Council of Europe(1974) included camphene in the list of artificial flavoring that can be added to foodstuffs without a hazard to public health (the approved level: 0.5ppm).

References

Primary References : **#HOECH***
Hoechst A.G.
FCTXAV
Opdyke, D. L. J. Food and Cosmetics Toxicology, 13, 735-738, (1975)

Secondary References : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point	:	**Pathway into the Environment and Environmental Fate.**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Geographic Area	:	**DEU**

Pathway and Transport

Pathway	:	**INDST**
Pathway description	:	Discharge into air and water during production processes. By spraying (paint) in the automobile industry.

Quantity Transported

Medium	*to Medium*	*Quantity*	*Time*	*Year*	*to Year*
	to AIR	**12 T**	**1 y**	**1991**	

The higher boiling fraction of distillated camphene containing 3% camphene is used as solvent in the automobile industry (in paint applied by spraying).

to AIR

Unspecified amount discharged into atmosphere during production processes.

to AQ

Unspecified amount of camphene discharged into hydrosphere via waste water during production processes, purification or fractional distillation.

References

Primary Reference : **#HOECH***
Hoechst A.G.

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 7-8, (1993)

Study

End Point	:	**HUMAN INTAKE AND EXPOSURE**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**

Evaluations

Evaluation text	:	According to the exposure pattern, the substance is not expected to produce a hazard for the general population.

References

Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point	:	**BIODEGRADATION**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Study type	:	**LAB**

Test Subject

Organism	*Medium*	*Specification*
BACT	**AQ**	**SEW**

Species/strain/system : Municipal sewage

Test Substance

Purity Grade : **TG 77%**

Test Method and Conditions

Test method description	:	Test method: DIN 38409, part 52 requirement corresponding to Guideline EEC 79/831 part C. pH neutralized with 0.1ml NaOH
Temperature	:	**22C**
pH	:	**7.2**

Exposure

Exposure comments : Inoculum 30mg/l

Test Results

Quantity		*Time*	*Comments on result*
9 %	DOC	**28 d**	DOC = Dissolved Organic Carbon

General Comments : It is assumed that the removal from waste water during treatment is caused by stripping effect.

References

Primary Reference : **#HOECH***
Hoechst A.G., 88-514

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point	:	**BIODEGRADATION**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Study type	:	**LAB**

Test Subject

Organism	*Medium*	*Specification*
BACT	**AQ**	**SEW**

Species/strain/system : Municipal sewage (adapted)

Test Substance

Purity Grade : **TG**

Test Method and Conditions

Test method description : Zahn-Wellens test, measured with a saturated solution at 20C

Temperature : **20C**

(An)aerobic : **AEROB**

Exposure

Exposure comments : Inoculum-unspecified amount

Test Results

Quantity		*Time*	*Comments on result*
100 %	COD	**5 d**	Measured in a saturated solution at 20C (probably stripping effect).
10 mg/l	TOC	**5 d**	TOC = Total Organic Carbon

General Comments : According to available data camphene is not readily biodegradable.

References

Primary Reference : **#HOECH***
Hoechst A.G., 05.10.HH

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 9, (1993)

Study

End Point	:	**PHOTODEGRADATION**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Medium	:	**AIR**

Test Substance

Purity Grade	:	**TG**

Test Method and Conditions

Test method description	:	Stability in air calculated according to R. Atkinson method (1988)
(An)aerobic	:	**AEROB**

Test Results

Quantity	*Time*	*Comments on result*
T/2	**6.5 h**	Photodegradation half-life. Reported as 0.27 day.

References

Primary Reference :

ECTCDK

Atkinson, R. Environmental Toxicology and Chemistry, 7, 435-442, (1988)

Secondary Reference :

!SIDSP*

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10-11, (1993)

Study

End Point	:	**HYDROLYSIS**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Medium	:	**AQ**

Test Method and Conditions

(An)aerobic	:	**AEROB**

Test Results

General Comments	:	Hydrolysis is not likely in water (calculated Log Pow = 4.122).

References

Primary Reference :

#HOECH*

Hoechst A.G., 88-514

Secondary Reference :

!SIDSP*

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point	:	**EVAPORATION**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**

Test Results

General Comments	:	Due to the physical and chemical properties of camphene, rapid volatilisation from water to the atmosphere takes place (calculated Henry's constant = 10701Pa.m3/mol). Therefore practically all emitted camphene will enter the atmosphere where it is readily degradable by OH-radicals.

References

Primary Reference	:	**#HOECH*** Hoechst A.G.
Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 7-8, (1993)

Study

End Point	:	**OXIDATION**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**

Test Results

General Comments	:	In air camphene is readily degraded through indirect photochemical degradation by reaction with OH-radicals.

References

Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 13, (1993)

Study

End Point : **ABSORPTION**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
HUMAN			**SKN**				

Exposure

Exposure comments : Evaluation of the absorption of camphene from bath oil.

Test Results

Quantity Absorbed	*Time*	*Comments on result*
81 ml/cm2	**/h**	Percutaneous absorption of camphene from the bath calculated as a constant of 81ul/cm2/h.

General Comments : A combination of 2 experiments. In the first using a single subject, 90% of an IV injection of 0.6ug/kg camphene was exhaled in 30 minutes. In the second experiment, a subject immersed in a bath containing pine-needle oil exhaled camphene. The results of dermal absorption were calculated with respect to the values obtained from the elimination of camphene through the lungs after IV administration.

References

Primary Reference : **MMWOAU**
Rommelt, H. et al. Munenchener Medizinische Wochenshrift (Medical Weekly Letters), 116, 537-540, (1974)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 33, (1993)

Study

End Point : **EXCRETION**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
HUMAN			**IVN**				

Exposure

Exposure Type : **ACUTE**
Dose / Concentration : **0.6 ug/kg BW**
Exposure comments : To evaluate the elimination of injected camphene through respiration.

Test Results

Organ	*Quantity*	*Time*	*Comments on result*
RESPI	90 %	30 mi	After 30minutes 90% of injected camphene was detected in the respiratory air.

References

Primary Reference : **MMWOAU**
Rommelt, H. et al. Munenchener Medizinische Wochenshrift (Medical Weekly Letters), 116, 537-540, (1974)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 32-33, (1993)

Study

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Dose / Concentration : **5000 mg/kg BW**

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
RAT			**ORL**			**LD50**	LD50 stated to be higher than 5000mg/kg/body weight.

References

Primary Reference : **FCTXAV**
Opdyke, D. L. J. Food and Cosmetics Toxicology, 735-738, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 22, (1993)

Study

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Dose / Concentration : **>2500 mg/kg BW**

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
RBT			**SKN**			**LD50**	Dermal LD50 in rabbits stated to be higher than 2500mg/kg/body weight.

References

Primary Reference : **FCTXAV**
Opdyke, D. L. J. Food and Cosmetics Toxicology, 735-738, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 23-24, (1993)

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
MOUSE			**ORL**	**ADULT**			

Test Method and Conditions

Test method description : Acute oral toxicity. GLP:yes

Exposure

Dose / Concentration : **5000 mg/kg BW**

Test Results

Lethal dose reported to be higher than 5000mg/kg

References

Primary Reference : **HOECH***
HOECHST A.G.(91.0246). Hoechst A.G.

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 23

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RAT			**ORL**	**ADULT**	**M**		

Species/strain/system : Wistar rats

Exposure

Exposure Period : **14 DAY**
Dose / Concentration : **0.5-1 % DIET**
Exposure comments : 14-day feeding study with daily administration of 0.5% and 1% concentration of camphene in food.

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	NEF				

0.5% was the concentration at which no toxic effects were observed after 14 days of exposure.

BW	**RETAR**
LIVER	**SIZE**

Camphene at 1% concentration in the diet slightly reduced body weight gain. No effect on the food intake. Relative liver weights slightly increased.

References

Primary Reference : **ABCHA6**
Imaizumi et al. Agricultural and Biological Chemistry, 49, 2795-96, (1965)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 26, (1993)

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RAT			**ORL**	**ADULT**	**M** **F**		

Species/strain/system : Wistar rats

Test Method and Conditions

Test method description : Test conditions in agreement with GLP. Test method: according to OECD Guideline 407. Repeated dose oral toxicity-rodent test.

Exposure

Exposure Period : **28 day**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	NEF			**F**	

250mg/kg/body weight was the dose at which no toxic effects were observed in female rats.

KIDNY	**STRUC**			**M**	

In all dose groups of male rats deposits of the test substance in the epithelium of the proximal renal tubules associated with necrosis of single cells have been observed. These effects seem to be specific for male rats and contingent upon .alpha.-2 microglobinemia.

General Comments : The renal toxic effects found in all dose levels groups in male rats are interpreted as uniquely specific for male rats, and as having no relevance for other animal species and humans.

References

Primary Reference : **#HOECH***
Hoechst A.G., (91.0475)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 27, (1993)

Study

End Point : **MUTAGENICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
BACT			**VTR**				

Species/strain/system : Salmonella typhimurium, strains: TA100, TA98, UTH8414, UTH8413

Test Method and Conditions

Test method description : According to Maron and Ames (1983) Mutat. Res. 113, 173-215.

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	NEF				

No mutagenic effect either with or without metabolic activation.

References

Primary Reference : **TOLED5**
Conner, T. H. et al. Toxicology Letters, 25, 33-40, (1985)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 27-28, (1993)

Study

End Point : **MUTAGENICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
MOUSE			**ORL**	**ADULT**			

Species/strain/system : NMRI mouse

Test Substance

Purity Grade : **TG 78%**

Test Method and Conditions

Test method description : Micronucleus test - according to OECD Guideline 474

Exposure

Exposure comments : In vivo exposure

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	NEF				

The results of this test are marked as negative for mutagenic effects.

References

Primary Reference : **#HOECH***
Hoechst A.G., (91.0246)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 28-29, (1993)

Study

End Point : **SENSITIZATION**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
HUMAN			**SKN**	**ADULT**		**25**	

Test Method and Conditions

Test method description : Maximization test according to Kligman (1966)

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
SKIN	**NEF**				

No skin sensitization.

References

Primary Reference : **FCTXAV**
Opdyke, D. L. J. Food and Cosmetics Toxicology, 13, 735-738, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 25, (1993)

Study

[redacted]

End Point : **IRRITATION**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RBT			**SKN**	**ADULT**			

Species/strain/system : Albino rabbits

Test Method and Conditions

Test method description : OECD Guideline 404 GLP: yes

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
SKIN	**NEF**				

No irritation of the skin.

General Comments : Must not be labelled according to EEC-Guideline 83/467/EWG.

References

Primary Reference : **#HOECH***
Hoechst A.G., (88.1776)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 20, (1993)

Study

[redacted]

End Point : **IRRITATION**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RBT			**OCU**	**ADULT**			

Species/strain/system : Albino rabbits

Test Method and Conditions

Test method description : OECD Guideline 405

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
EYE	**IRRIT**				

Eye irritation was found on testing.

General Comments : Must be labelled according to EEC Guideline : 83/467/EWG.

References

Primary Reference : **#HOECH***
Hoechst A.G., (88.1853)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 24-25, (1993)

Study

End Point : **TERATOGENICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RAT			**ORL**		**F**		

Species/strain/system : Sprague-Dawley; pregnant rats

Test Substance

Purity Grade : **TG 78%**

Test Method and Conditions

Test method description : Examination of the influence of camphene on the pregnant rat and the fetus, by oral administration, according to OECD Guideline 414.

Exposure

Exposure Period : **10 DAY**
Dose / Concentration : **250-1000 mg/kg BW**
Exposure comments : From day 6th to 15th of gestation camphene was administered by oral gavage.

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed*	*Affected in Controls*
	NEF					

No toxic effect observed in treated dams nor in the fetuses at the dose of 250mg/kg/body weight for 10 days.

	CHNG					

In the 1000mg/kg/body weight/day dosage group some mild and transient effects: salivation and reduced motor activity were observed in 6 of the treated dams, 5-20 minutes after first exposure and in two of the treated dams after the second exposure and lasted from 20 minutes up to 6 hours.

In the high dose treated dams there was a transient decline of the food consumption: 6%, 22% and 10% respectively on days 7, 8 and 9th of pregnancy. No other clinical signs observed in the high dose group. No substance-related pathological changes were detected at autopsy.

FETUS	**DEATH**				**11.5%**	**5.2%**

Camphene at 1000mg/kg/BW/day by gavage, in administration from the 6th to 15th day of gestation, caused slight but not significant (p = < 0.01) increase of the resorption rate, and consequently of the implantation loss. No further influence on the prenatal development was detected.

References

Primary Reference : **#HOECH***
Hoechst A.G., 7263/92, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 29-32, (1993)

Study

[redacted]

End Point	:	**AQUATIC ACUTE TOXICITY**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Species/strain/system	:	Water flea (Daphnia magna)
Exposure Period	:	**24-48 h**
Dose / Concentration	:	**22-46 mg/l**

Test Substance

Vehicle - Solvent	:	Triethyleneglycol, ethanol, acetone or dimethylformamid

Test Method and Conditions

Test method description	:	Procedures based on protocols in method for acute toxicity tests with fish, macroinvertebrates and amphibians. (U.S. EPA. 1975). GLP: (all data within 95% of confidence limits).

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
CRUS	**AQ**	**FRESH**				**LC50**	LC50 for 24h = 46mg/l, for 48h = 22mg/l.

References

Primary Reference	:	**BECTA6** Leblanc, G. A. Bulletin of Environmental Contamination and Toxicology, 24(5), 684-691, (1980)
Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 16-17, (1993)

Study

[redacted]

End Point	:	**AQUATIC ACUTE TOXICITY**
Chemical Name	:	**Camphene**
CAS Number	:	**79-92-5**
Species/strain/system	:	Zebrafish (Brachydanio rerio)
Exposure Period	:	**48 h**
Dose / Concentration	:	**150-180 mg/l**

Test Substance

Vehicle - Solvent	:	Ethanol (cosolvent)

Test Method and Conditions

Test method description	:	OECD Guideline 203 Acute Fish Toxicity Test. GLP: Yes Static test.

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
FISH	**AQ**	**FRESH**				**LC50** **LC100**	Lethal concentration (LC50) for fish = 150mg/l for 48h. LC100 = 180mg/l for 48h.

References

Primary Reference : **#HOECH***
Hoechst A.G., 88.0254

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 15-16, (1993)

Study

End Point : **AQUATIC ACUTE TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Species/strain/system : Sheepshead minnow (Cyprinodon variegatus)
Exposure Period : **24-96 h**
Dose / Concentration : **1.8-2.0 mg/l**

Test Substance

Purity Grade : **80%**
Vehicle - Solvent : Acetone or triethyleneglycol (cosolvent)

Test Method and Conditions

Test method description : Static; methods for acute toxicity tests with fish, macroinvertevrates and amphibians (U.S. EPA, 1975). GLP: Yes specified for this test. Test was realized using natural seawater.

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
FISH	**AQ**	**ESTUA**				**LC50**	LC50 for 24h = 1.8mg/l, LC50 for 48h = 2.0mg/l, LC50 for 72h = 2.0mg/l, LC50 for 96h = 1.9mg/l

General Comments : It is not indicated in literature whether the test has been performed in an open or closed system. But considering that these are nominal values, it becomes clear that due to the high volatility of the compound, the 96h value is to be interpreted as much too high, compared to the 24h value. Considering the results of the analytical monitoring in the algae test, even the 24h value is questionable.

References

Primary Reference : **BECTA6**
Heitmuller, P. T., et al. Bulletin of Environmental Contamination and Toxicology, 596-604, (1981)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 14-15, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Evaluations

Evaluation text : According to the assessment concept of the German Federal Environmental Agency, the value of the safety factor F is to be determined in a range of 400 to 1000, as - data from acute toxicity tests are available, - camphene in inherently removable from water. To narrow down the range, data density has to be considered . As the validity of most of the acute toxicity tests have to be questioned, the highest value of 1000 has to be chosen. Considering the OECD assessment concept, the same value of 1000 has to be chosen for a safety factor, as valid toxicity data for at least algae, crustaceans and fish are not available. In order to calculate the maximum tolerable concentration(MTC), the lowest aquatic effect concentration of 1.8mg/l, obtained in an acute test, and the safety factor of 1000 is used: MTC = 1.8ug/l As MTC > PEC, camphene apparently represents low hazard for the aquatic compartment. Conclusions: Based on the values for human toxicity, there is no need for further studies nor for suggestions for other measures in this field. The hazard assessment for the aquatic compartment showed that the calculated "worst case" PECs can be of the same order of magnitude than the MTC. Moreover, the assessment could be made on acute toxicity data only, whose validity could not be thoroughly established. The here described exposure scenarios are valid for Germany. There are no data available on possible uses in other countries. Recommendations: In order to confirm the present assessment, an acute toxicity test on a fresh-water fish species, in a flow through system is presently being performed. Furthermore, a more refined exposure assessment could be made if more data on different uses of camphene from other countries could be gathered.

References

Secondary Reference : **!SIDSP***
OECD/SIDS ASSESSMENT REPORT. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**

Evaluations

Evaluation text : There is no direct exposure of the terrestrial compartment to be expected. Due to the high volatility of camphene and the high disappearence rate of camphene in the atmosphere, an indirect exposure of the terrestrial compartment is unlikely. Testing of terrestrial organisms was therefore no required.

References

Secondary Reference : **!SIDSP***
OECD/SIDS ASSESSMENT REPORT. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
ALGAE	**AQ**	**FRESH**					

Species/strain/system : Green algae (Scenedesmus subspicatus)

Test Substance

Purity Grade : **TG 88%**
Vehicle - Solvent : Tween 80 (cosolvent)

Test Method and Conditions

Test method description : OECD Guideline 201. Ultrasound was used to obtain a homogenous dispersion of the stock solution. Static test. GLP: yes

Exposure

Exposure Period : **72 h**
Dose / Concentration : **320-1000 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
---	---	---	---	---	---

EC0

Effective concentration (EC) for growth rate at 72h equal or higher than 320, and less than 580mg/l (nominal conc.)

EC10

EC for growth rate at 72h = 580 - 1000mg/l (nominal conc.)

EC50

EC for growth rate at 72h equal or higher than 1000mg/l: (nominal conc.)

EC0

EC for increase biomass at 72h equal or higher than 320 and less than 580mg/l: (nominal conc.)

EC10

EC for increase biomass at 72h = 320 - 580mg/l: (nominal conc.)

EC50

EC for increase biomass at 72h equal or higher than 1000mg/l: (nominal conc.)

General Comments : No concentration/reaction relationship could be shown. Due to low log Pow and high vapor pressure, the real concentration of camphene was analyzed to less than 10% of the nominal concentration. Detection limit of camphene was 2.2mg/l (by analytical monitoring).

References

Primary Reference : **#HOECH***
Hoechst A.G., 91-HH, 1203

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
ALGAE	**AQ**	**FRESH**					

Species/strain/system : Green algae (Scenedesmus subspicatus)

Test Substance

Purity Grade : **TG 88%**
Vehicle - Solvent : DMSO (cosolvent)

Test Method and Conditions

Test method description : Static test. Ultrasound was used to obtain a homogenous dispersion of the stock solution. OECD Guideline 201. GLP: yes

Exposure

Exposure Period : **72 h**
Dose / Concentration : **580-1000 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
---	---	---	---	---	---

EC0
Effective concentration (EC) for growth rate at 72h equal or higher than 1000mg/l (nominal concentration)

EC0
EC for increase biomass at 72h equal or less than 580mg/l (nominal conc.)

EC10
EC for increase biomass at 72h equal 580 or less than 1000mg/l (nominal conc.)

EC50
EC for increase biomass at 72h equal or less than 1000mg/l (nominal conc.)

These results are not valid as they are nominal concentrations

EC10

EC for toxic effect at 72h equal or less than 580 or higher than 1000 mg/l expressed as DBC10 or E(Mu)C10 in the OECD/SIDS initial assessment report (1993) in accordance with Guideline 201.

General Comments : Analytical monitoring showed that the effective conc. were less than 10% of the nominal conc. at the beginning of the tests. Camphene could not be detected at the end of tests. (Detection limit 2.2mg/l). No concentration reaction relationship could be shown.

References

Primary Reference : **#HOECH***
Hoechst A.G., 91, 1203 HH

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 18-19, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
BACT	**AQ**	**SLUDG**					

Species/strain/system : Activated sludge

Test Method and Conditions

Test method description : EEC Guidelines 88/302 part C. Inhibition of respiration, OECD Guidelines 209. Camphene was added directly to diluent water.

Exposure

Dose / Concentration : **490.5-1000 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
---	---	---	---	---	---

EC10

Effective concentration (EC) for respiration inhibition test was 490.5mg/l

EC50

For respiration inhibition test >1000mg/l

EC100

For respiration inhibition test >> 1000mg/l

General Comments : No toxicity was observed in saturated solution.

References

Primary Reference : **#HOECH***
Hoechst A.G., 88-514

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
CRUS	**AQ**	**FRESH**					

Species/strain/system : Water flea (Daphnia magna)

Test Substance

Purity Grade : **TG 80%**

Test Method and Conditions

Test method description : Procedure was based on protocols in: method for acute toxicity tests with fish, macroinvertebrates, and amphibiants (U.S. EPA 1975).

Exposure

Exposure Period : **48 h**
Dose / Concentration : **13-22 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	EC0				

For 48h = < 13mg/l

EC50

For 48h = 22mg/l. This is a nominal value.

General Comments : According to Thomas (in: Lyman, W. J. et al. 1982) camphene is a substance which volatilizes rapidly from water to air (Henry-constant = (10701 Pa) x (m3/mol)). Due to that it is not possible to realize a long-term daphnia test in conformity to the OECD Guidelines. For EC50, according to the author, the vessels were covered with a plastic wrap secured with an elastic band.

References

Primary Reference : **BECTA6**
Leblanc, G. A. Bulletin of Environmental Contamination and Toxicology, 24(5), 684-691, (1980)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 16-17, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
FISH	**AQ**	**FRESH**					

Species/strain/system : Zebrafish (Brachydanio rerio)

Test Substance

Vehicle - Solvent : Ethanol (cosolvent)

Test Method and Conditions

Test method description : OECD Guideline 203 Acute Fish Toxicity Test. To avoid stripping effect no aeration was done during test period. Static test. GLP: yes

Exposure

Exposure Period : **48-96 h**
Dose / Concentration : **125 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	LC0				

Lethal concentration for 48h: 125mg/l, LC for 96h: 125mg/l

General Comments : This is a nominal value. The test with Zebrafish having been performed in an open system. Already at the begining of the test, the concentration of the compound is less than 10% of the nominal value, the result could not be validated. No data on prolonged toxicity early life-stage test.

References

Primary Reference : **#HOECH***
Hoechst A.G., 88.0254

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 15, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **Camphene**
CAS Number : **79-92-5**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
FISH	**AQ**	**ESTUA**					

Species/strain/system : Sheepshead minow (Cyprinodon variegatus)

Test Substance

Vehicle - Solvent : Acetone or triethyleneglycol in stock solution

Test Method and Conditions

Test method description : Static; methods for active toxicity tests with fish, macroinvertebrates and amphibians (U.S. EPA 1975). All data 95% confidence limits. Test was realized using natural seawater.

Exposure

Exposure Period : **96 h**
Dose / Concentration : **1.0 mg/l**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	EC0				

Effective concentration for 96h = 1.0mg/l

References

Primary Reference : **BECTA6**
Heitmuller, P. T., et al. Bulletin of Environmental Contamination and Toxicology, 27, 596-604, (1981)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 15, (1993)

Study

End Point : **TERRESTRIAL ACUTE TOXICITY**

Chemical Name : **Camphene**
CAS Number : **79-92-5**

Species/strain/system : Redwinged blackbirds (Agelaius phoeniceus)
Exposure Period : **18 h**
Dose / Concentration : **96 mg/l**

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
BIRD						**LD50**	LD50 equal or higher than 96mg/kg (estimated LD50 based on food consumption data over a 18h period).

References

Primary Reference : **AECTCV**
Schafer, E. W., et al. Archives of Environmental Contamination and Toxicology, 12, 355-382, (1983)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 21, (1993)

Substance

[redacted]

Chemical Name : **CAMPHENE**
Reported Name : **CAMPHENE**
CAS Number : **79-92-5**

Area	Type	Subject	Spec.	Description	Level / Summary Information :
CAN	REG	TRNSP LABEL PACK	-	CLASS RQR	PIN (PRODUCT IDENTIFICATION NO.): NA9011. CLASS (4.1): FLAMMABLE SOLID. SPECIAL PROVISIONS: 40. PACKING GROUP III, (I=GREAT DANGER, III=MINOR DANGER). PRESCRIBED BY THE TRANSPORTATION OF DANGEROUS GOODS REGULATIONS, UNDER THE TRANSPORTATION OF DANGEROUS GOODS ACT (ADMINISTERED BY THE DEPARTMENT OF TRANSPORT). THE ACT AND REGULATIONS ARE INTENDED TO PROMOTE SAFETY IN THE TRANSPORTATION OF DANGEROUS GOODS IN CANADA, AS WELL AS PROVIDE ONE COMPREHENSIVE SET OF RULES APPLICABLE TO ALL MODES OF TRANSPORT ACCROSS CANADA. THESE ARE BASED ON UNITED NATIONS RECOMMENDATIONS. THE ACT AND REGULATIONS SHOULD BE CONSULTED FOR DETAILS. RECORDS ARE ENTERED UNDER THE PROPER SHIPPING NAME FOUND IN THE REGULATIONS; THIS MAY INCLUDE VERY GENERAL GROUPS OF CHEMICAL SUBSTANCES. ***Title :*** ***Reference :*** ***Effective Date :*** 06DEC1990 ***Last Amendment :*** **CAGAAK, 124, 26, 5523, 1990** ***Entry / Update :*** OCT1991 **CANADA GAZETTE PART II**

Substance

[redacted]

Chemical Name :
Reported Name : **CAMPHENE**
CAS Number : **79-92-5**

Area	Type	Subject	Spec.	Description	Level / Summary Information :
USA	REG	TRNSP PACK LABEL	-	PRMT CNTRL RQR	NOT LIMITED IN PASSENGER AIRCRAFT AND PASSENGER RAILCAR. NOT LIMITED IN CARGO AIRCRAFT. MAY BE TRANSPORTED IN CARGO AND PASSENGER VESSELS ON DECK AND BELOW DECK AWAY FROM HEAT.; Summary - THIS REGULATION LISTS AND CLASSIFIES THOSE MATERIALS WHICH THE DEPARTMENT OF TRANSPORTATION HAS DESIGNATED AS HAZARDOUS MATERIALS FOR SHIPPING PAPERS, PACKAGE MARKING, LABELING, AND TRANSPORT VEHICLE PLACARDING APPLICABLE TO THE SHIPMENT AND TRANSPORT OF THOSE HAZARDOUS MATERIALS. ***Title :*** HAZARDOUS MATERIALS REGULATIONS, PART 172-HAZARDOUS MATERIALS TABLES AND HAZARDOUS MATERIALS COMMUNICATIONS REGULATIONS ***Reference :*** **CFRUS*, 49, 172, 101, 1984** ***Effective Date :*** OCT1991 **Code of Federal Regulations** ***Last Amendment :*** **CFRUS*, 49, 172, 101, 1990** ***Entry / Update :*** NOV1991 **Code of Federal Regulations**