FOREWORD INTRODUCTION

PBTC

CAS N°: 37971-36-1

Substance

End Point	:	**IDENTIFIERS, PHYSICAL AND CHEMICAL PROPERTIES**
Chemical Name	:	**1,2,4-Butanetricarboxylic acid, 2-phosphono-**
Common Name	:	**PBTC**
CAS Number	:	**37971-36-1**

Synonyms

Bayhibit AM
PBS-AM
Phosphonobutanetricarboxylic acid
2-Phosphono-1,2,4-butanecarboxylic acid

Properties & Definitions

Molecular Formula	:	**C7H11O9P**
Molecular Weight	:	**270.13**
Melting Point	:	**-15C**
Boiling Point	:	**ca. 100C**
Flash Point	:	**>100C**
Density	:	**1.3 g/cm3 at 20C**
Vapour Pressure	:	**11.4 kPa (85.5 mmHg) at 50C**
Water Solubility	:	**completely miscible**
General Comments	:	Purity of industrial product (commercial product): 50% aqueous solution. The vapour pressure of the pure compound is assumed to be very low.

Overall Evaluation

PRESENTLY OF LOW PRIORITY: NO FURTHER WORK IS RECOMMENDED

The production volume of PBTC is 1000 - 10000 t/y in Germany. PBTC is used as additive for cooling water and industrial cleaning agents. PBTC is classified as "non biodegradable" but is photolically degraded in water. The most sensitive environmental species to PBTC is the alga Scenedesmus subspicatus (72h-NOEC = 17.8 mg/L). The substance has low acute toxicity. It produced negative results in two Ames tests one in vitro chromosomal aberration test. The NOAEL for repeated dose toxicity is 375 mg/kg body weight and no embriotoxicity or teratogenicity was recorded up to a dose of 1000 mg/kg. An estimated dose of low concern EDLC of 3.75 mg/kg was derived.
The highest aquatic local PEC due to its use as additive in cooling waters was estimated to be 10 - 100 ug/L. Consumer and occupational exposure is expected to be low. The highest calculated worst-case occupational exposure level is 0.5 mg/kg/day which is considerably lower than the EDLC.
In conclusion, PBTC represents no risk to the environment or to humans.

EXPOSURE

ENVIRONMENTAL EXPOSURE

ENVIRONMENTAL FATE

2-Phosphono-1,2,4-butanetricarboxylic acid is completely miscible with water. The vapour pressure of the commercialized product in Germany is 11400 Pa at 50C. This reflects the sum of the water vapour pressure and the PBTC vapour pressure. The vapour pressure of the pure compound is assumed to be very low; with a SAR (Screening Assessment Report)-method a Henry's law constant of 1.19xE-21 Pa-m3/mol was estimated. As the compound is miscible with water, it was not considered necessary to experimentally determine its log Pow and it could not be estimated by standard estimation methods. At pH 7, the anion PBTC-4 is existing (pKa4 = 6.43). The chemical structure of the compound does not indicate a high tendency to accumulate in biota though. Due to the chelating properties of PBTC, complexation with suspended matter in surface waters and subsequent loading of the sediment is possible.

Based on these indications, the main environmental target-compartment of 2-phosphono-1,2,4-butanetricarboxylic acid would be the hydrosphere (and possibly the sediment), with no significant tendency to evaporate or to accumulate in biota.

PBTC is not readily biodegradable (OECD 301 D & E: 0% after 28 days). In a Zahn-Wellens-Test (OECD 302 B) with activated sludge from an industrial treatment plant, PBTC in the form of tetra sodium salt was only degraded up to 17% in 28 days. In the modified SCAS test (OECD 302 A), no biodegradation was observed during 126 days. According to OECD criteria, PBTC has therefore to be regarded as "non biodegradable". Nevertheless, primary degradation was observed with bacteria isolated from surface water, sediment and sewage sludge, under the condition that inorganic phosphate is not sufficiently available in the test medium. Hydrolitic degradation is not to be expected.
Although PBTC as a free acid does not absorb visible light, in the presence of photochemically induced sensitizers, photooxidative degradation was observed (half-lives of 4.3 - 6.4 h with 5 and 50 mg/L NO3). Furthermore, in a field test with the PBTC/Fe-complex, a half-life of 7 days at a water depth of 40 cm was recorded.

The most relevant degradation process in the hydrosphere is therefore photooxidative transformation.

CHELATING PROPERTIES

As a chelating agent, PBTC might reduce the elimination of heavy metals by adsorption on activated sludge. A remobilization of heavy metals out of river sediment might be expected.
The only experimental results on the mobilization of heavy metals by PBTC were observed in a laboratory flocculation and filtration assembly. Varying concentrations of PBTC had little effect on the elimination of Fe-ions and orthophosphate. PBTC-itself was eliminated in ratios between 60 and 100%.
A final assessment of the influences of these properties is not possible at this time.

ELIMINATION IN WASTE WATER TREATMENT PLANTS

As shown above, biodegradation of PBTC in waste water treatment plants cannot be expected to a significant extent.
With the results of a SCAS-Test, a partition coefficient activated sludge/water can be estimated: with a PBTC (free acid) concentration of 64 mg/L and an inoculum concentration of 3 g (dry weight)/L, ca. 60% of substance was adsorbed, the resulting partition coefficient K would be ca. 500 L/kg. Assuming an organic carbon content of the used activated sludge of 40% , a Koc-value of 1250 L/kg can be estimated. In a Zahn-Wellens Test performed with the tetra sodium salt of PBTC, no adsorption was observed.
It can therefore be concluded that for PBTC emitted into waste water in the form of the free acid, high elimination rates due to adsorption are to be expected. For PBTC/metal complexes adsorption is not to be expected though.

Furthermore, for treatment plants with a chemical phosphate elimination stage (see above), high rates of PBTC-elimination can be achieved.

For the following exposure assessment, a realistic worst case situation needs to be described. As it cannot be assumed, that all domestic waste water treatment plants include a phosphate elimination stage, and as PBTC will mostly be rejected into waste water as a metal-complex, no relevant adsorption onto sewage sludge can be expected. On a provisional basis, an elimination rate of 10 % will be assumed.

EXPOSURE ASSESSMENT

AQUATIC COMPARTMENT

a) COOLING WATERS

Considering the use pattern of 2-phosphono-1,2,4-butanetricarboxylic acid, it becomes clear that the highest local exposure to the aquatic compartment is due to its occurrence in cooling waters (max. concentration 10 mg/L). As a matter of fact, cooling waters are usually not treated in a waste water treatment plant but emitted directly into surface water (88 % of industrial cooling water in Germany):

-the concentration of PBTC in the cooling water amounts to 1 - 10 mg/L;

-supposing a dilution factor of 100 upon emission into surface waters, we would obtain a PEC of 10 - 100 ug/L.

b) INDUSTRIAL CLEANING AGENTS

PBTC-containing cleaning agents are mostly used in the food processing industry. The following exposure scenario can be established:

-the process related waste water produced by the food processing industry in Germany amounts to 161634000 m3/y;

-assuming an even distribution of the yearly used amount (maximum 500 t/y), in order to get a rough estimation, a concentration of PBTC of ca. 3 mg/L in the waste water can be calculated;

-about 16% of this waste water is emitted directly into surface water. Assuming a dilution factor of 100, a resulting PEC of 30 ug/L can be calculated;

-the remaining 84% are treated either on site (38%) or directed to a domestic waste water treatment plant (46%). Lower resulting PECs are to be expected for treated waste water. For waste water directed towards a domestic waste water treatment plant, the influent will be further diluted. With a dilution factor of 10, an influent concentration of 0.3 mg/L can be calculated.

The above scenario assumes an even distribution of PBTC in the waste water produced by food processing industry. Locally, higher concentrations can occur.

TERRESTRIAL COMPARTMENT

In the above exposure scenarios for the aquatic compartment, elimination factors of 10% in waste water treatment plants were assumed. This reflects a worst case assumption for predicting the PBTC-concentration in the aquatic compartment.

On the other hand, considering that large amounts of PBTC are treated in domestic waste water treatments, an exposure of the terrestrial compartment through landspreading of sewage sludge from domestic waste water treatment plants has to be expected to some extent. A Koc-value of 1250 L/kg for the free acid can be estimated (compare above).
Assuming that 10% of the released PBTC remains in umcomplex form, the following scenario can be established:

-with an influent concentration in domestic waste water treatment plants of 0.3 mg/L, the free acid concentration amounts to 30 ug/L;

-with a sewage sludge/water partition coefficient of 500, the resulting concentration in sewage sludge amounts to 15.5 mg/kg (dry weight).

-the resulting concentrations in soil and grassland are:

PECarable soil = 8.7 ug/kg dwt
PECgrass land = 10.3 ug/kg dwt

with: application rates: 1.7 t dwt/ha/y for arable soils & 1.0 t dwt/ha/y for grass land soil depth: 20 cm for arable soil & 10 cm for grass land bulk density: 1500 kg/m3.

CONSUMER EXPOSURE

There is no public use of the substance, therefore consumer exposure is not exptected.

OCCUPATIONAL EXPOSURE

The product is an aqueous solution of PBTC. PBTC is produced as a solid and solved in water thereafter. The reactions during the production process are performed in water. In no step of the process is PBTC separated from the solution. Furthermore the compound has a very low vapour pressure and volatilisation is not to be expected.

There are no measured values on occupational exposure available.
When used as a scale inhibiting agent in cooling water circuits, in cooling towers PBTC containing sprays may be generated. As operators usually work at the cooling tower only occasionally, the inhalative exposure is limited.
Cleaning agents containing PBTC usually are preparations with a high content of alkali (e.g. sodium hydroxide). As these preparations are corrosive to skin, they are not sprayed by operators.

For assessment purposes, the following worst-case scenarios of possible exposure are nevertheless presented:

(i) Dermal exposure via splashing in manufacture, trans-shipment or use. The material supplied to formulators or directly for use is a 50% aqueous solution.

(ii) Dermal exposure via contact with industrial cleaning fluids, which contain 1-3% of PBTC (the final concentration in the cleaning solution is about 10 - 200 mg/L).

As shown above, the inhalational exposure through sprays from cooling towers is also possible, but as the concentration in cooling water amounts to 1 - 10 mg/L, this exposure would be low compared to the assumed dermal exposure calculated below.

In both of the above cases, the DERMAL exposure model was used to calculate the potential annual dermal dose rate. In each case a default skin exposure area of 795 cm2 was assumed. Slightly different values were used for the density of the formulation, reflecting the available information from the manufacturer and defaults within DERMAL.

In both cases below, it is important to note that the calculated doses refer to solutions on the skin, not of an absorbed dose.

(i) 50% solution

events per year	use scenario	annual dermal dose mg/y	daily dermal dose mg/y	d.d.d. per 70 kg man mg/kg/day	d.d.d. over 365 days mg/y	d.d.d. 365 days 70 kg man mg/kg/day
10	rare	177	17.7	0.25	0.5	0.001
100	intermittent	1770	17.7	0.25	4.8	0.07
400	1-2 times/day	7080	29.5	0.42	19.4	0.28
480	2 times/day	8490	35.4	0.50	23.3	0.33

d.d.d. = daily dermal dose

(ii) 3% solution

events per year	use scenario	annual dermal dose mg/y	daily dermal dose mg/y	d.d.d. per 70 kg man mg/kg/day	d.d.d. over 365 days mg/y	d.d.d. 365 days 70 kg man mg/kg/day
400	1-2 times/day	340	1.4	0.02	0.93	0.01
480	2 times/day	408	1.7	0.02	1.12	0.01

The appropriate daily dose may be calculated in different ways:

-Dividing by the total number of working days in the year (ca. 240, accounting for holidays and weekends). This is only appropriate where the number of events is greater than 240. Hence for 400 events in (i), the daily dose = 7080/240 = 29.5 mg/day. However, for 400 events over the full calendar year, the daily dose would be 19.4 mg/day.

-Averaging the dose received over 10 or 100 events as doses received on individual days, leading to a calculated daily dose of 17.7 mg/day.

There are good reasons for believing that the above assumptions are over-conservative, in terms of incidence rates, likely exposure incidences and use of protective equipment (e.g. gloves). However, the objective of the calculations is to indicate areas which warrant further investigation, not to produce a final calculated risk.

ASSESSMENT OF ENVIRONMENTAL HAZARDS

2-Phosphono-1,2,4-butanetricarboxylic acid has a low tendency to pass from water to air. There is no information about a direct emission into the atmosphere. A significant hazard for the atmosphere is not to be expected.

There is no direct exposure of the terrestrial compartment to be expected. An indirect exposure of the terrestrial compartment is possible through landspreading of sewage sludge only. The concentration in the spreaded sludge is expected to be low (about 8 - 10 ug/kg dwt). As the expected concentrations in the aquatic compartment are much higher than dose in the terrestrial compartment, an assessment will be performed for the aquatic compartment only.

A hazard assessment of the hydrosphere can be performed with safety factors.

Based upon the EU-Technical Guidance Document, an assessment factor of F = 10 can be chosen, as long-term NOECs are available for species of several trophic levels.

Based upon the OECD-Guidance-Document for the initial assessment of aquatic effects, a safety factor of F = 10 would also be sufficient.

Based upon a safety factor of 10 and the lowest aquatic effect concentration of 17.8 mg/L (Scenedesmus subspicatus), a PNEC of 17.8/10 = 1.78 mg/L is derived.

Subsequently, the PEC/PNEC ratio becomes:

$$\text{PEC/PNEC} = \frac{100 \text{ (maximum PEC in the aquatic compartment)}}{-----} = 0.056$$

As PEC/PNEC < 1,2-phosphono-1,2,4-butanetricarboxylic acid represents presently no significant risk for the aquatic compartment.

HUMAN TOXICITY

The available information on toxicity gave no evidence of damage in doses up to 375 mg/kg body weight. There is no evidence of embryo-toxicity, teratogenicity or genotoxicity. The EDLC (estimated dose of low concern) was calculated to be 3.75 mg/kg body weight, which is considerably larger than the highest calculated worst case occupational daily dose of 0.5 mg/kg/day. The exposure scenarios presumed 100% absorption by the skin. Had the EDLC been lower (and assuming that the exposure scenarios were reasonable), a better assessment of the real adsorption would bave been needed. The high water solubility suggests that it is not absorbed.

CONCLUSIONS AND RECOMMENDATIONS

Based on the available data on toxicity and the data on occupational exposure and exposure of the general population, 2-phosphono-1,2,4-butanetricarboxylic acid is of low concern.
For the environment, the highest exposure is expected for the aquatic compartment. Based on the available effect data on aquatic organisms, no risk to the environment could be deduced.

Production-Trade

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Production

Quantity	*Year*
1000-10000 t - P	
5000-10000 t - IM	**1993**

General Comments : About 500-1000 tonnes are used in Germany, the rest is exported. There is no information about the destination. There is no information about imported volumes. Data on production volumes in other countries are not available.

References

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Production-Trade

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FIN**

General Comments : In Finland, the compound is imported in the form of a 50% aqueous solution. The imported volume is not known.

References

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Uses

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Use

Quantity	*Year*	*Comments*
		The use pattern of PBTC in Germany is as follows:
200-400 t/y		Additive for cooling water systems as anti-scaling agent. The final concentration in the cooling water amounts to 1 - 10 mg/L.
250-500 t/y		Additive for industrial cleaning agents. The cleaning agents contain approximately 1 - 3% PBTC. The final concentration in the cleaning solution is about 10 - 200 mg/L. PBTC - containing cleaning agents are mostly used in the food processing industry.
40-80 t/y		Small amounts of PBTC are used in the textile industry and in the cleaning and bleaching agents.

References

Secondary References : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Uses

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Use

Quantity	*Year*	*Comments*
		Use category: non-dispersive use.
40 %		Use category: additive for cooling water systems, approximately 40% of produced quantity.
60 %		Use category: additive for industrial cleaning agents, approximately 60% of produced quantity.

References

Secondary References : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Uses

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **SWE**

Use

Quantity	Year	Comments
		PBTC is used in Sweden, where the commercialized products contain less than 10% active substance. According to the Swedish product register, PBTC is used in industrial cooling water only.

References

Secondary References : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Uses

Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FIN**

Use

Quantity	Year	Comments
		In the Finnish product register, PBTC is reported as a component for the production of detergents.

References

Secondary References : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **Pathway into the Environment and Environmental Fate.**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Pathway and Transport

Pathway : **INDST**

Quantity Transported

General Comments : In the waste water treatment plants phosphonates tend to sorb to sludge (50%).

References

Primary Reference : **MABFAI**
Metzner, G. Muenchener Beitraege zur Abwasser-, Fischerei- und Flussbiologie, 44, 232-336, (1990)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **Pathway into the Environment and Environmental Fate.**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Pathway and Transport

Pathway description : Effluent from industry

Quantity Transported

General Comments : Considering the use pattern of PBTC, it becomes clear that the highest local exposure to aquatic compartment is due to its occurrence in cooling waters (maximum concentration 10 mg/L). As a matter of fact, cooling waters are usually not treated in a waste water treatment plant but emitted directly into surface water (88% of industrial cooling water in Germany).

References

Primary Reference : **SBUEW***
Wasserversorgung und Abwasserbeseitigung in Bergbau und Verarbeitendem Gewerbe und bei Warmekraftwerken fuer die offentliche Versorgung, 19(2.2), (1987)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **Pathway into the Environment and Environmental Fate.**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Pathway and Transport

Pathway : **INDST**

Quantity Transported

Medium	*to Medium*	*Quantity*	*Time*	*Year*	*to Year*
AQ	**to AQ**	**100-1000 kg/y**			

Into the waste water treatment plant.

General Comments : Exposure during production occurs only during drumming. According to the German producer, emission from production or formulation sites is possible.

References

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **Pathway into the Environment and Environmental Fate.**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Pathway and Transport

Pathway : **LOAD**

Quantity Transported

Medium	*to Medium*	*Quantity*	*Time*	*Year*	*to Year*
BIOTA	**to BIOTA**				

The chemical structure of the compound does not indicate a high tendency to accumulate in biota.

AQ	**SURF**	**to AQ**	**SURF**

Due to the chelating properties of PBTC, complexation with suspended matter in surface waters and subsequent loading of the sediment is possible.

AQ	**to SED**

The main environmental target-compartment of PBTC would be the hydrosphere (and possibly the sediment).

AQ	**to SOIL**

The main environmental target-compartment of PBTC would be the hydrosphere (and possibly the sediment), with no significant tendency to evaporate or to accumulate in biota.

References

Secondary Reference : **!SIDSP***

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**CONCENTRATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Subject

Organism	*Medium*	*Specification*	*Lifestage*	*Sex*
	AQ	**SURF**		

Test Results

Matrix	*Concentrations*	*Spec.*	*Date*
	1-10 mg/L In the cooling water		

General Comments : Supposing a dilution factor of 100 upon emission into surface water, we would obtain a PEC (predicted environmental concentration) of 10-100 ug/L.

References

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**CONCENTRATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Subject

Organism	*Medium*	*Specification*	*Lifestage*	*Sex*
	AQ	**FRESH**		

Species/strain/system : Cooling water

Test Results

Matrix	*Concentrations*	*Spec.*	*Date*
In cooling water	**1-100 ppm**		

General Comments : The compound is released into the environment particularly in aquatic systems after the use as additive for cooling water system. In industrial cleaning application the waste water is usually treated in waste water treatment plant.

References

Secondary Reference :

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **HUMAN INTAKE AND EXPOSURE**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*
HUMAN			**SKN**		

Species/strain/system : Cleaning agents

Test Results

General Comments : Cleaning agents containing PBTC usually are preparations with a high content of alkali (e.g. sodium hydroxide). As these preparations are corrosive to skin, they are not sprayed by operators.

References

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **HUMAN INTAKE AND EXPOSURE**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*
HUMAN	**AIR**	**OCC**	**IHL**		

Species/strain/system : PBTC-containing sprays

Test Results

General Comments : When used as a scale inhibiting agent is cooling water circuits, in cooling towers PBTC containing sprays may be generated. As operators usually work at the cooling tower only occasionally, the inhalative exposure is limited.

References

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**HUMAN INTAKE AND EXPOSURE**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*
HUMAN			**IHL**		

Test Results

General Comments :

There is no public use of the substance, therefore consumer exposure is not expected. Occupational exposure: the product is an aqueous solution of PBTC. PBTC is produced as a solid and solved in water thereafter. The reactions during the production processes are performed in water. In no step of the process PBTC is separated from the solution. There are no measured values on occupational exposure available.

References

Secondary Reference :

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**BIODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

Species/strain/system : Effluent from waste water treatment plant

Test Method and Conditions

Test method description : OECD Guideline 301E "Ready Biodegradability: Modified OECD Screening Test"; (1988).

(An)aerobic : **AEROB**

Exposure

Dose / Concentration : **10 mg/L**

Test Results

Quantity	*Time*	*Comments on result*
0 %	**28 d**	Related to DOC; no degradation observed after 28 days.

General Comments : The results indicate the substance is "not readily biodegradable". Title of the report: Abschlussbericht.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**BIODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SLUDG**

Species/strain/system : Activated sludge, domestic (adapted)

Test Method and Conditions

Test method description : Directive 84/449/EEC, C.6 "Biotic Degradation - Closed Bottle Test"; (1976); GLP: no

(An)aerobic : **AEROB**

Exposure

Exposure Period : **30 d**

Test Results

Quantity	*Time*	*Comments on result*
	30 d	No degradation observed after 30 days under the test conditions used.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**BIODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SLUDG**

Species/strain/system : Anaerobic sludge

Test Substance

Description of the test substance : Other test substance: tetrasodium salt of PBTC

Test Method and Conditions

Test method description : EPA-Method Guideline 796.3140; GLP: yes. End point: development of CH4 + CO2.

(An)aerobic : **ANAER**

Exposure

Dose / Concentration : **20 mg/L**

Test Results

Quantity	*Time*	*Comments on result*
0 %	**56 d**	Related to DOC; no degradation observed after 56 days under test conditions used.

General Comments : The results indicate the substance is "not anaerobically degradable".

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **BIODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SLUDG**

Species/strain/system : Inoculum: Activated sludge, industrial

Test Substance

Description of the test substance : Other test substance: tetrasodium salt of PBTC

Test Method and Conditions

Test method description : DIN 38412 Teil 25; OECD 302B; "Biodegradation; Zahn-Wellens Test" (1989); GLP: yes

(An)aerobic : **AEROB**

Exposure

Dose / Concentration : **408 mg/L**

Test Results

Quantity	*Time*	*Comments on result*
17 %	**28 d**	Related to DOC; degradation after 28 days under the test conditions used.

General Comments : The results indicate the substance is "not inherently biodegradable".

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1989)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **BIODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SLUDG**

Species/strain/system : Inoculum: activated sludge

Test Method and Conditions

Test method description : Determination of the biodegradability of anionic synthetic surface active agents. OECD, Paris (1971); (1973); GLP: no

(An)aerobic : **AEROB**

Test Results

General Comments : Under test conditions no biodegradation observed.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1973)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **BIODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SLUDG**
	AQ	**SEW**

Species/strain/system : Activated sludge

Test Method and Conditions

Test method description : OECD Guideline 302 A "Inherent Biodegradability: Modified SCAS Test" (1988).

(An)aerobic : **AEROB**

Exposure

Exposure Period : **126 d**
Dose / Concentration : **20 mg/L**
Exposure comments : Daily addition of waste water from a treatment plant influent with 20 mg/L DOC of test substance during 126 days.

Test Results

Quantity	*Time*	*Comments on result*
0 %		Related to DOC; no biodegradation observed under the test conditions used.
60 %		Related to DOC; maximum elimination in the first day which was probably due to adsorption on sludge. Also bacterial inhibition was observed.

General Comments : The results indicate the substance is "not inherently biodegradable". Title of the report: Abschlussbericht des UBA-FE- Vorhaben Wasser.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **BIODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**

Test Subject

Organism	*Medium*	*Specification*
	AQ	**SURF**

Test Results

General Comments : The only possible contribution of PBTC to the eutrophication of surface water would be through its degradation to ortho- phosphate. The biodegradation tests have shown that significant biodegradation in surface waters is to be expected. The only identified way of ortho-phosphate formation is through photooxidative degradation of certain PBTC-metal complexes. As this process is relevant only near the surface of water bodies, the overall contribution of PBTC to the eutrophication of surface waters is probably low.

References

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**PHOTODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**FIELD**
Geographic Area	:	**FRG**

Test Results

Quantity		*Time*	*Comments on result*
50 %	T/2	**4.3-6.4 h**	Half-life with 5 and 50 mg/L NO3. In the presence of photochemically induced sensitizers.
50 %	T/2	**7 d**	Half-life in a field test with the PBTC/Fe- complex, at a water depth of 40 cm.

General Comments : The most relevant degradation process in the hydrosphere is photooxidative transformation.

References

Secondary Reference : **!SIDSP***

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**PHOTODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**FIELD**
Medium	:	**AQ**
Specifications	:	**FRESH**
Geographic Area	:	**FRG**
Species/strain/system	:	Schlachtensee Lake (Berlin, Germany)

Test Substance

Description of the test substance : Other test substance: PBTC/Fe complex

Test Method and Conditions

Test method description : Light source: sunlight; method: measured; (1988); GLP: no; direct photolysis; global intensity:1893 mW/cm2, over 7 days; absorption spectrum: 254 450 nm.

Exposure

Dose / Concentration : **0.01 mol/m3**

Test Results

Quantity		*Time*	*Comments on result*
50 %	T/2	**7 d**	Measured half-life; approximately 7 days in the depth of 40 cm
65 %		**7 d**	Degradation after 7 days in the depth of 0 cm (water depth)
45 %		**7 d**	Degradation after 7 days in the depth of 50 cm (water depth)
0 %			Degradation after 7 days in the depth of 250 cm (water depth)

General Comments : The apparition of H3PO4 was determined. Title of the report: Abschlussbericht des UBA-FE-Vorhabens Wasser.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **PHOTODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Medium : **AQ**
Geographic Area : **FRG**

Test Substance

Description of the test substance : Other test substance: PBTC (in buffered solution)

Test Method and Conditions

Test method description : Exposure of samples in natural sunlight (measured), (1990); GLP: no

Exposure

Dose / Concentration : **100 mg/L**

Test Results

Quantity	*Time*	*Comments on result*
77.2 %	**50 d**	Photodegradation at daylight after 50 days at pH5
12 %	**50 d**	Photodegradation at daylight after 50 days at pH7
100 %	**28 d**	Photodegradation at daylight after 50 days at pH9

References

Primary Reference : **TXLVAE**
Held, S. Zum Textilveredlung, 24(11), 394-398, (1989)

Secondary Reference : **!SIDSP***
SIDS/OECD. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **PHOTODEGRADATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Medium : **AQ**
Geographic Area : **FRG**

Test Substance

Description of the test substance : Other test substance: PBTC/Fe complex

Test Method and Conditions

Test method description : Light source: Hg-lamp; light spectrum: 254 nm; quantum yield: 0.27. Method: determination of quantum yield with monochromatic light at 254 nm (measured) (1988); intensity: 15 W; GLP: no

Exposure

Dose / Concentration : **0.05 mol/m3**

Test Results

Quantity	*Time*	*Comments on result*
1 %		Degradation with 0.1 mol/m3 -OH and 0.1 mol/m3 PBTC/Fe.

General Comments : The influence of OH-radicals on the degradation was determined and found to be negligible. (To prove the direct photolysis).

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**PHOTODEGRADATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Medium	:	**AQ**
Geographic Area	:	**FRG**

Test Substance

Description of the test substance	:	Other test substance: PBTC-dissodium salt

Test Method and Conditions

Test method description	:	Light source: Xenon lamp; light spectrum: 290-1220 nm. Indirect photolysis; sensitizer: NO3 (concentration 5 and 50 mg/L). Method: Suntest, measured; (1990). Intensity of light source: 11.2-13.7 mW/cm2; GLP: no
Temperature	:	**25 C**

Exposure

Dose / Concentration	:	**10 mg/L**

Test Results

Quantity		*Time*	*Comments on result*
50 %	T/2	**4.3-6.4 h**	Measured half-life

General Comments	:	No hydrolysis at ambient temperature.

References

Primary Reference	:	**BAYIP*** Bayer AG. Untersuchungen zum Photobbau von Bayhibit. Bericht Nr.anc47 (Investigations on Photodegradation of Bayhibit. Report No.anc47), anc47, (1990)
Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**HYDROLYSIS**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Results

General Comments	:	Hydrolytic degradation is not be expected.

References

Secondary Reference	:	**SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**SORPTION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Results

General Comments	:	In the waste water treatment plants with tertiary treatment (flocculation with Al- or Fe- salts) approximately 100% of PBTC sorbs to sludge. Title of the report: Abschlussbericht des UBA-FE-Vorhabens Wasser.

References

Primary Reference	:	**UBARP*** UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 35-57, (1988)
Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**SORPTION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Medium	:	**SLUDG**
Specifications	:	**AQ**
Species/strain/system	:	Activated sludge/water

Test Method and Conditions

Test method description	:	SCAS test; with the results of the test, a partition coefficient of activated sludge/water can be estimated.
Organic Matter Content	:	**40 %**

Exposure

Dose / Concentration	:	In a Zahn-Wellens test performed with the tetrasodium salt of PBTC, no adsorption was observed.

Test Results

Quantity	*Time*	*Comments on result*
60 %		Approximately adsorbed; with a PBTC (free acid) concentration of 64 mg/L and an inoculum concentration of 3 g (dry weight)/L.

General Comments : A Koc value of 1250 L/kg can be estimated. It can therefore be concluded that for PBTC emitted into waste water in the form of the free acid, high elimination rates due to adsorption are to be expected. PBTC/metal complex adsorption is not expected. Title of the report: Risk Assessment of Notified New Substances.

References

Primary Reference : **EECTG***
Risk Assessment of Notified New Substances. Technical Guidance Document in Support of the Risk Assessment. Directive 93/67EEC, 93/67

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **SORPTION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Medium : **SLUDG** **RIVER**
Specifications : **AQ** **SED**
Species/strain/system : Activated sludge

Test Results

General Comments : As a chelating agent PBTC might reduce the elimination of heavy metals by adsorption on activated sludge. A remobilization of heavy metals out of river sediment might be expected. The only experimental results on the mobilization of heavy metals by PBTC were observed in a laboratory flocculation and filtration assembly. Varying concentrations of PBTC had little effect on the elimination of Fe-ions and orthophosphates. A final assessment of the influences of these properties is not possible at this stage.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, (1986)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**EVAPORATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Results

General Comments	:	The compound has a very low vapour pressure; with a SAR-method a Henry's law constant of 1.19E-21 Pa.m3/mol was estimated, therefore volatilization is not to be expected.

References

Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**BIOCONCENTRATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Geographic Area	:	**FRG**

Test Results

General Comments	:	In consequence of the miscibility with water, there is no bioconcentration tendency to be expected.

References

Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

[redacted]

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**

Frequency : **1 X**
Dose / Concentration : **4000 mg/kg BW**

Test Substance

Description of the test substance : Tetrasodium salt, commercial product
Purity Grade : **TG**

Test Method and Conditions

Test method description : Single dermal application, post-exposure period 19d; GLP: yes

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
RAT			**SKN**			**LD50**	Dermal LD50 for rats was established as > 4000 mg/kg.

General Comments : Report No. 19382

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1990)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

[redacted]

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**

Exposure Period : **4 h**
Dose / Concentration : **>1979 mg/m3 AIR**

Test Substance

Description of the test substance : Tetrasodium salt, 41.4% solution in water

Test Method and Conditions

Test method description : Aerosol, dynamic inhalation; GLP: no

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
RAT			**IHL**			**LD50**	Inhalation LD50 for rats was established as > 1979 mg/m3/4h.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**

Frequency : **1 X**
Dose / Concentration : **4000 mg/kg BW**

Test Substance

Description of the test substance : Tetrasodium salt, commercial product

Test Method and Conditions

Test method description : Single oral application, post-exposure period 14d; GLP: yes

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
RAT			**ORL**			**LD50**	Oral LD50 for rats was established as > 4000 mg/kg body weight.

General Comments : Report No. 19383

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1990)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**MAMMALIAN ACUTE TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Frequency	:	**1 X**
Dose / Concentration	:	**20.1 mL/kg**

Test Substance

Description of the test substance	:	Tetrasodium salt, 41.8% solution in water

Test Method and Conditions

Test method description	:	Single oral application, post-exposure period 14d; GLP: no

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
RAT			**ORL**		**M**	**LD50**	

References

Primary Reference	:	**BADSR*** Bayer AG. Bayer AG Data Short Report, (1971)
Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**MAMMALIAN ACUTE TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Frequency	:	**1 X**
Dose / Concentration	:	**16.2 mg/kg**

Test Substance

Description of the test substance	:	Tetrasodium salt, 41.8% solution in water

Test Method and Conditions

Test method description	:	Single oral application, post-exposure period 14d; GLP: no

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
MOUSE			**ORL**		**M**	**LD50**	

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1971)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MAMMALIAN ACUTE TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**

Frequency : **1 X**
Dose / Concentration : **6500 mg/kg BW**

Test Substance

Description of the test substance : 50% aqueous solution

Test Method and Conditions

Test method description : Single oral application, post-exposure period 14 days; GLP: no

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
RAT			**ORL**			**LD50**	Oral LD50 for rats was established as >6500 mg/kg body weight.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1979)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Wistar rats

Test Substance

Description of the test substance : Tetrasodium salt

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Period : **3 mo**
Dose / Concentration : **50-5000 mg/kg DIET**
Exposure comments : Rats were fed diet containing 0, 50, 200, 1000, 0r 5000 ppm for 90 days.

Test Results

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

No symptoms of toxicity were observed. Haematological, biochemical, pathological or histopathological parameters were unaffected.

NOAEL

NOAEL: 375 mg/kg body weight

General Comments : A 90-day test (rat feeding study with the tetrasodium salt, up to 5000 mg/kg diet for 12 weeks) showed no substance related effects. NOAEL of 375 mg/kg body weight (5000 mg/kg/diet) was derived. OECD/SIDS conclusion: "Low toxicity, no damage in oral doses up to 375 mg/kg/body weight." Report No. 6176.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MUTAGENICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Salmonella typhimurium TA98, TA100, TA1535, TA1537

Test Substance

Description of the test substance : Commercial product, 49% solution in water
Purity Grade : **TG**

Test Method and Conditions

Test method description : Amest test. Directive 84/449/EEC, B.14 "Other effects - Mutagenicity (Salmonella typhimurium - Reverse Mutation Assay)"; GLP: yes

Exposure

Dose / Concentration : **16-1000 ug/ PLATE**
Exposure comments : Test performed with and without metabolic activation.

Test Results

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

Negative results for mutagenicity, with and without metabolic activation.

General Comments : Report No. 21134

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MUTAGENICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Salmonella typhimurium TA98, TA100, TA1535, TA1537

Test Substance

Description of the test substance : Commercial product, 45-50% solution in water
Purity Grade : **TG**

Test Method and Conditions

Test method description : Ames test; GLP: yes

Exposure

Dose / Concentration : **20-12500 ug/ PLATE**
Exposure comments : Test with and without metabolic activation

Test Results

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

Negative results with and without metabolic activation.

General Comments : Report No. 6821

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1979)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MUTAGENICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Chinese hamster lung cells, V79

Test Method and Conditions

Test method description : Cytogenetic Assay. OECD Guide-line 473 "Genetic Toxicology": In vitro Mammalian Cytogenetic Test; GLP: yes

Exposure

Dose / Concentration : **125-2500 ug/mL**
Exposure comments : Concentrations of 125, 250 and 500 ug/mL without S9-mix and 625, 1250 or 2500 ug/mL with S9-mix were used.

Test Results

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

Negative results with and without metabolic activation.

References

Primary Reference : **FBAUDP**
May, Ch. Forschungsbericht - Bundesanstalt fuer Arbeitsschutz und Unfallforschung, (1993)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **MUTAGENICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : CFW1 Mice

Test Substance

Description of the test substance : 50% solution in water

Test Method and Conditions

Test method description : Micronucleus Assay. OECD Guide-line 474, Genetic Toxicology Micronucleus Test; GLP: yes

Exposure

Exposure Type : **ACUTE**
Frequency : **1 X**
Dose / Concentration : **2000 mg/kg BW**
Exposure comments : Single oral application in gavage.

Test Results

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

Negative result in Micronucleus test.

General Comments : Report No. 9300322

References

Primary Reference : **HENKK***
Henkell KGaA, (1993)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **SENSITIZATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : DHPW guinea pigs

Test Substance

Description of the test substance : Tetrasodium salt, 32.6%

Test Method and Conditions

Test method description : Maximization test according to M. Kligman; GLP: yes

Test Results

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

Not sensitizing

General Comments : Report No. 19052A

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1990)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : Tetrasodium salt, 41.8% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure comments : Application to the ear, post-exposure observation 7 days.

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Exposure

Exposure Type : **ACUTE**
Dose / Concentration : **0.5 mL**
Exposure comments : Application on back skin, patch test, intact or abraded skin. No data on application period, post-exposure observation period 72 hours. GLP: no

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1971)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : Tetrasodium salt, 41.4% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure Period : **24 h**
Exposure comments : The tested substance was applied to the ear, application period 24 hours, post-exposure observation 7 days.

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : New Zealand rabbits

Test Substance

Description of the test substance : 50% solution in water

Exposure

Exposure Type : **ACUTE**
Exposure Period : **24 h**
Exposure comments : Applied to the ear, application period 24 hours, post-exposure observation 7 days.

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1977)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : 50% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure comments : Post-exposure observation 7 days.

Test Results

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

weak irritant

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1977)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : Tetrasodium salt, 41.8% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure comments : Post-exposure observation 7 days.

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**IRRITATION**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : Tetrasodium salt, 41.8% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type	:	**ACUTE**
Dose / Concentration	:	**0.1 mL**
Exposure comments	:	Post-exposure observation 72 hours.

Test Results

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

Not irritating

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1971)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **IRRITATION**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Rabbit

Test Substance

Description of the test substance : Tetrasodium salt, 41.4% solution in water

Test Method and Conditions

Test method description : GLP: no

Exposure

Exposure Type : **ACUTE**
Dose / Concentration : **0.1 mL**
Exposure comments : Post-exposure period 7 days.

Test Results

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

Weak irritant

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1976)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **TERATOGENICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Wistar rats

Test Substance

Description of the test substance : Commercial product, 49% solution in water.
Purity Grade : **TG**

Test Method and Conditions

Test method description : OECD Guide-line 414 "Teratogenicity"; GLP: yes

Exposure

Exposure Type : **SHORT**
Exposure Period : **6-15 TDP**
Dose / Concentration : **100-1000 mg/kg BW**
Exposure comments : Doses of 0, 100, 300 or 1000 mg/kg body weight were administered from 6 to 15 day of gestation.

Test Results

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

NEF

No embryotoxicity or teratogenicity was recorded up to the highest administered dose of 1000 mg/kg body weight.

NEF

No maternal toxicity.

NOEL

Parental NOEL: 1000 mg/kg/body weight/day.

NOEL

NOEL for offspring: 1000 mg/kg body weight /day.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1984)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Geographic Area : **FRG**

Test Subject

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

Species/strain/system : Green algae (Scenedesmus quadricauda) and microalgae (Nostoc muscorum)

Test Substance

Description of the test substance : Non-complexed PBTC

Test Method and Conditions

Test method description : Growth of algae on synthetic nutrient solution with non-complexed PBTC as sole P-source; photometric determination of growth at 436 nm; control with K2HPO4 as P-source. Concentrations: 6.9 mg/L & 0.34 mg/L as related to P-results:6.11.94.

Exposure

Exposure Period : **10 d**
15 d
Dose / Concentration : **0.34-6.9 mg/L**

Test Results

The test species could not use the phosphonate as P-source.

General Comments : The test with two algae species has shown that PBTC cannot be used as a P-source by algae. Biological processes in waste water treatment plants are not affected by PBTC. Title of the report: Abschlussbericht des UBA-FE-Vorhabens Wasser.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

Species/strain/system : Algae (Chlorella, Kessleri)

Test Substance

Description of the test substance : Other test substance: active substance PBTC

Test Method and Conditions

Test method description : Test auf algizide Wirkung. Interne Testvorschrift der Hankel KGaA

Exposure

Exposure Period : **14 d**
Dose / Concentration : **500->500 mg/L**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
	DEATH				
Mortality at > 500 mg/L					
	NEF				
No visible effects at 500 mg/L					

General Comments : Analytical monitoring: no

References

Primary Reference : **ZWABAQ**
Kaestner, W. and Gode, P. Zeitschrift fuer Wasser und Abwasser Forschung, 16(2), 39-47, (1983)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Test Guideline "Algal Inhibition Test" (C.3); Directive 67/548/EEC (Draft 1992); (1994) end point: biomass; GLP: yes

Exposure

Exposure Period : **72 h**
Dose / Concentration : **8-140 mg/L**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
BIOMA	**EC10**				

EC10 for 72 hours = 8 mg/L

BIOMA	**EC50**				

EC50 for 72 hours = 140 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC).

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1994)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Test Guideline "Algal Inhibition Test" (C.3); Directive 67/548/EEC (Draft 1992); (1994); end point: growth rate; GLP: yes

Exposure

Exposure Period : **72 h**
Dose / Concentration : **>1081 mg/L**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
BIOMA	**EC50**				

EC50 for 72 hours > 1081 mg/L

BIOMA	**EC10**				

EC10 for 72 hours > 33.3 - <65.5 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC).

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1994)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Test Guideline "Algal Inhibition Test" (C.3); Directive 67/548/EEC (Draft 1992); GLP: yes

Exposure

Exposure Period : **72 h**
Dose / Concentration : **17.8-33.3 mg/L**

Test Results

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

NOEC (no observed effect concentration) for 72 hours = 17.8 mg/L

BIOMA	**LOEC**				

LOEC (lowest observed effect concentration) for 72 hours = 33.3 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC). The statistically derived NOEC is higher in this case than the EC10- value.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1994)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: neutralized 50% solution of PBTC

Test Method and Conditions

Test method description : Bestimmung der biologischen Schadwirkung toxischer Abwasser gegen Algen. DEV, L 9 (1968); (1975); end point: cell count; GLP: no

Exposure

Exposure Period : **96 h**
Dose / Concentration : **860 mg/L**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
BIOMA	**EC10**				

EC10 for 96 hours = 860 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

Species/strain/system : Pseudomonad bacteria (Aeromonas hydrophila)

Test Substance

Description of the test substance : Other test substance: neutralized 50% solution of PBTC

Test Method and Conditions

Test method description : Bestimmwng der biologischen Schadwirkung toxischer Abwasser gegen Bakterien. DEV, L 8 (1968) modifiziert; (1975) GLP: no ;end point: biomass.

Exposure

Exposure Period : **24 h**
Dose / Concentration : **>=68800 mg/L**

Test Results

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

EC0 for 24 hours >= 68800 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

Species/strain/system : Bacteria bioluminescent (Photobacterium phosphorein)

Test Method and Conditions

Test method description : DIN 38412 part 7B (draft May 1987); (6 September 1994); end point: inhibition of bioluminescence.

Exposure

Exposure Period : **30 mi**
Dose / Concentration : **>2500 mg/L**

Test Results

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

EC0 for 30 minutes > 2500 mg/L

General Comments : Title of the report: Abchlussbericht des UBA-FE-Vorhabens Wasser.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Semi-static; "Prolonged Study with Daphnia magna: Effects on Reproduction" (Proposal for an uptdate of OECD Guideline 202, Part II; Draft 6/5/1991); (1994). End point: immobilization; GLP: yes

Exposure

Exposure Period : **21 d**
Dose / Concentration : **>1071 mg/L**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
---	---	---	---	---	---
	EC50				

EC50 for 21 days > 1071 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC).

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Semi-static; "Prolonged Toxicity Study with Daphnia magna: Effects on Reproduction" (Proposal for an update of OECD Guideline 202, Part II; Draft 6-5-1991); (1994); end point: reproduction rate; GLP: yes

Exposure

Exposure Period : **21 d**
Dose / Concentration : **104-<1071 mg/L**

Test Results

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

NOEC

NOEC for 21 days = 104 mg/L

LOEC

LOEC (lowest observed effect concentration) for 21 days = 329 mg/L

EC50

EC50 for 21 days greater than 329 mg/L and less than 1071 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC).

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: active substance PBTC

Test Method and Conditions

Test method description : Daphnien-Kurzzeittest, DIN 38412 Teil 11, Bestimmung der Wirkung von Wasserinhaltsstoffen auf Kleinkrebse; GLP: no

Exposure

Exposure Period : **24 h**
Dose / Concentration : **180-350 mg/L**

Test Results

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

EC0

EC0 for 24 hours = 180 mg/L

EC50

EC50 for 24 hours = 265 mg/L

EC100

EC100 for 24 hours = 350 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **ZWABAQ**
Kaestner, W. and Gode, P. Zeitschrift fuer Wasser und Abwasser Forschung, 16(2), 39-47, (1983)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

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

Test Method and Conditions

Test method description : DIN 38412 part 11

Exposure

Exposure Period : **24 h**
Dose / Concentration : **313-1250 mg/L**
Exposure comments : The test solution was not neutralized (pH 4.8 - 5.4).

Test Results

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

EC0

EC0 for 24 hours = 313 mg/L

EC50

EC50 for 24 hours = 747 mg/L

EC100

EC100 for 24 hours = 1250 mg/L

EC50

In a second test at pH 5 - 5.5 the EC50 was 1113 mg/L

General Comments : Analytical monitoring: no. The above results are nominal concentrations. Title of the report: Abschlussbericht des UBA-FE-Vorhabens Wasser.

References

Primary Reference : **UBARP***
UBA. Abschlussbericht des UBA-FE-Vorhabens Wasser Phosphorverbindungen, 102 06 322, 32-57, (1988)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

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

Test Substance

Description of the test substance : Other test substance: neutralized 50% solution of PBTC

Test Method and Conditions

Test method description : Bestimmung der biologischen Schawdwirkung toxischer Abwasser gegen niedere Metazoen. DEV, L 11 (1986); (1979); GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure Period : **24 h**
Dose / Concentration : **>500 mg/L**

Test Results

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

EC0 for 24 hours > 500 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1979)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

Species/strain/system : Rainbow trout (Onchorhynchus mykiss)

Test Substance

Description of the test substance : Other test substance: neutralized 50% solution of PBTC

Test Method and Conditions

Test method description : Static; Bestimmung der akuten Wirkung von Stoffen auf Fische. Arbeitskreis "Fischtest" im Hauptausschuss "Detergentien" (15.10.73); (1975) GLP: no

Exposure

Exposure Type	:	**ACUTE**
Exposure Period	:	**48 h**
Dose / Concentration	:	**3440 mg/L**

Test Results

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

LC0 for 48 hours = 3440 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1975)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

Species/strain/system : Golden orfe (Leuciscus idus)

Test Substance

Description of the test substance : Other test substance: active substance PBTC

Test Method and Conditions

Test method description : Static; Bestimmung der Wirkung von Wasserinhaltstoffen auf Fische, DIN 38412 Teil 15; GLP: no

Exposure

Exposure Period : **48 h**

Test Results

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

LC0 for 48 hours = 500 mg/L

LC50

LC50 for 48 hours greater than 500 mg/L

LC100

LC100 for 48 hours greater than 500 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **ZWABAQ**
Kaestner, W. and Gode, P. Zeitschrift fuer Wasser und Abwasser Forschung, 16(2), 39-47, (1983)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**PBTC**
CAS Number	:	**37971-36-1**
Study type	:	**LAB**
Geographic Area	:	**FRG**

Test Subject

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

Species/strain/system : Zebrafish (Brachydanio rerio)

Test Substance

Description of the test substance : Other test substance: 39.66% PBTC

Test Method and Conditions

Test method description : Semi-static; UBA Verfarhrensvorschlag "Verlaengerter Toxizitaetstest beim Zebrabaerbling Brachydanio rerio" (Schwellenkonzentration der letalen und anderer Wirkungen; NOEC; mindestens 14 Tage) (1-2-1984); (1994); GLP: yes

Exposure

Exposure Period : **14 d**
Dose / Concentration : **>=1042 mg/L**

Test Results

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

NOEC (no observed effect concentration) for 14 days >= 1042 mg/L

General Comments : Analytical monitoring: yes; author also cited (IC). PBTC's effective concentration had effect on mortality, lenght and weight.

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1994)

Secondary Reference : **!SIDSP***
OECS/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **PBTC**
CAS Number : **37971-36-1**
Study type : **LAB**
Geographic Area : **FRG**

Test Subject

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

Species/strain/system : Golden orfe (Leuciscus idus)

Test Substance

Description of the test substance : Other test substance: neutralized 50% solution of PBTC

Test Method and Conditions

Test method description : Static; Bestimmung der akuten Wirkung von Stoffen auf Fische. Arbeitskreis "Fischtest" im Hauptausschuss "Detergentien" (15.10.73); GLP: no

Exposure

Exposure Type : **ACUTE**
Exposure Period : **72 h**
Dose / Concentration : **>=2000 mg/L**

Test Results

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

LC0 for 72 hours >= 2000 mg/L

General Comments : Analytical monitoring: no

References

Primary Reference : **BADSR***
Bayer AG. Bayer AG Data Short Report, (1973)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, (1994)