FOREWORD INTRODUCTION

2,3,5,6-TETRACHLOROPYRIDINE

CAS N°: 2402-79-1

Substance

End Point	:	**IDENTIFIERS, PHYSICAL AND CHEMICAL PROPERTIES**
Chemical Name	:	**Pyridine, 2,3,5,6-tetrachloro-**
Common Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
RTECS Number	:	**UT8225000**

Properties & Definitions

Molecular Formula	:	**C5HCl4N**
Molecular Weight	:	**216.87**
Melting Point	:	**90.5C**
Boiling Point	:	**251.6C**
Vapour Pressure	:	**2.7E-3kPa(0.02mmHg) at 25C**
Octanol/Water Partition Coefficient	:	**log Pow = 3.627 at 25C calculated**
Water Solubility	:	**29.4-30.2mg/l at 25C**
General Comments	:	GLP not specified. Vp = 1.09kPa (8.20mmHg) at 112C was also measured. Log Pow = 3.627 at 25C calculated by using Pomona Medchem structural fragment method. For the above AQSOL, the shaker flask method was used. AQSOL = 22.6mg/l at 20C measured by a column elution method is also given.

Overall Evaluation

SIDS INITIAL ASSESSMENT

This substance is presently of low priority for further work.

SUMMARY OF REASONS SUPPORTING THE RECOMMENDATION

Environmental release of 2,3,5,6-tetrachloropyridine is low. It is made and used solely as a chemical intermediate.

Potential exposure of humans to 2,3,5,6-tetrachloropyridine is limited and is also mitigated by personal protective procedures. Production is >10000 tons/year.

Volatilization into atmosphere is the main transfer mechanism. Transformation rates for hydrolysis and biodegradation are relatively slow. Photodegradation is the main mechanism for removal from environment.

Half-lives of 2,3,5,6-tetrachloropyridine are 1 week by direct photolysis in air, 1 year by direct photolysis in water (50cm depth), 3 years by photooxidation in atmosphere.

Available toxicity studies in animals treated with 2,3,4,5-tetrachloropyridine support a low health risk to humans especially considering the low exposure potential. The acute oral toxicity in rats is moderate (LD50 = 1.4g/kg, males; 1.2g/kg, females). No remarkable effects were observed for mutagenicity (Ames assay for mutations, in vivo mouse micronucleus test for chromosomal aberrations) and reproductive toxicity (no effect level = 150mg/kg/day in rats).

Repeated dose testing in rats indicate liver and kidney changes as possible human health risks; however, although EPA disagreed with the sponsor on the no-effect level for liver effects (25 or 150mg/kg/day), there was agreement on the operational no-effect level of 25mg/kg/day based on kidney effects. Although 2,3,5,6-tetrachloropyridine is moderately toxic to fish, algae, and daphnia, the environmental risk appears to be low due to low releases.

Production-Trade

Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Geographic Area : **USA**

Production

Quantity	*Year*
>10000 T - P	**1988-1990**

General Comments : The Dow chemical company is the sole producer and user of 2,3,5,6-tetrachloropyridine within the OECD member countries. The product is shipped to a single chloropyrifos production site in the U.S.A. and a single chloropyrifos production site in the U.K. A third minor use site is located outside the OECD member countries.

References

!SIDSP*
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 4, (1993)

Processes

Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Process

Process comments : No specific data on production processes.

References

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

Uses

Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Use

Quantity	*Year*	*Comments*
>10000 T		Used solely as an intermediate in the synthesis of chloropyrifos in U.S.A. and U.K. A minor amount used outside the OECD countries.

References

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	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Geographic Area	:	**USA**

Quantity Transported

General Comments : Environmental release is considered extremely low due to manufacturing process controls.

References

Secondary Reference : **!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	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**

Evaluations

Evaluation text : The plant is constructed with secondary containment around all process equipment and process areas. All 2,3,5,6-tetrachloropyridine leaks and spills are contained and cleaned up in an appropriate manner and the resulting waste is disposed of by incineration. No spills contact surface water. All storm water and process area rinse down water is collected and treated by steam stripping and carbon bed absorption to remove organic contamination. This water is then recycled for use on site. No process contact water is discharged to surface waters. The 2,3,5,6-tetrachloropyridine manufacturing process is anhydrous and does not generate any waste water streams requiring disposal (one of the two production sites). Due to the relatively high volatility and low water solubility of 2,3,5,6-tetrachloropyridine, volatilization into the atmosphere would be the primary transfer mechanism. Rates of transfer for hydrolysis and biodegradation are relatively slow and would not contribute significantly to the removal of 2,3,5,6-tetrachloropyridine from the environment. The dominant mechanism for removal of 2,3,5,6-tetrachloropyridine from the environment would be due primarily to photodegradation.

References

Secondary Reference : **!SIDSP***

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 8, (1993)

Study

End Point	:	**HUMAN INTAKE AND EXPOSURE**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**

Evaluations

Evaluation text	:	The number of workers potentially exposed to 2,3,5,6-tetrachloropyridine and the level (concentration) of exposure is low in that there are only two production sites and two use sites within the OECD member countries, the production and use is limited to a single company (DOW), the synthesis and use is highly controlled through plant engineering to prevent exposure, and worker activity is governed by an extensive industrial hygiene and safety program. There is no significant consumer exposure to 2,3,5,6-tetrachloropyridine as this chemical is not sold as a consumer product and is not found in the end product in significant quantities (<1%). The Dow Industrial Hygiene Guide (IHG) or time weighted average exposure limit is 2mg/m3 (0.223ppm). American Conference of Governmental Industrial Hygienist and Occupational Safety and Health Administration exposure levels have not been established. In incidences where short term exposures have the potential to exceed the DOW IHG, additional protective equipment is recommended.

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	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Study type	:	**LAB**
Geographic Area	:	**USA**

Test Subject

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

Species/strain/system : Municipal waste water treatment plant, secondary effluent.

Test Method and Conditions

Test method description : OECD Guideline 301A, "Ready Biogradability Modified AFNOR test". GLP: YES

(An)aerobic : **AEROB**

Exposure

Exposure Period	:	**28 d**
Dose / Concentration	:	**1.0 mg/l**
Exposure comments	:	Inoculum adjusted to 5.0+/-3.0x10E+7 cells/ml

Test Results

Quantity		*Time*	*Comments on result*
50 %	LOSS	**95 d**	T/2 for killed controls samples
50 %	LOSS	**126 d**	T/2 for biological active samples

General Comments : Although some loss of 2,3,5,6-tetrachloropyridine was observed, there was no significant differences in the rate of disappearance between the killed controls and biologically active samples. According to OECD Guidelines 2,3,5,6-tetrachloropyridine is not readily biodegradable nor does it possess inherent biodegradability. These results are consistent with others that suggest chlorinated pyridines, in general, are resistant to biodegradation.

References

Primary Reference : **#DOWCH***
Sorci, J. J. and West, R. J. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 5-6, (1993)

Study

End Point	:	**PHOTODEGRADATION**	
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**	
CAS Number	:	**2402-79-1**	
Study type	:	**LAB**	
Medium	:	**AIR**	**AQ**
Specifications	:	**-**	**FRESH**
Geographic Area	:	**USA**	

Test Method and Conditions

Test method description : An assessment of test methods for photodegradation of chemicals in the environment, ECETOC technical report No. 3 (1981). Rate of aqueous photolysis, Harris, J. (1990).

Test Results

Quantity		*Time*	*Comments on result*
50 %	LOSS	**1 wk**	For direct photolysis in the air
50 %	LOSS	**1 y**	For direct photolysis in water at an average water column depth of 50cm.
50 %	LOSS	**3 y**	For photooxidation in the atmosphere (a computer model estimation).

General Comments : The combined photodegradation processes investigated provided evidence that 2,3,5,6-tetrachloropyridine would be expected to degrade photolytically in the environment.

References

Primary Reference :

#DOWCH*

Sorci, J. J. and West, R. J. Dow Chemical Company Document, (1992)

Secondary Reference :

!SIDSP*

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

Study

End Point	:	**HYDROLYSIS**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Study type	:	**LAB**
Medium	:	**AQ**
Specifications	:	**FRESH**
Geographic Area	:	**USA**

Test Method and Conditions

Test method description	:	OECD Guideline 111, GLP: yes.
Temperature	:	**70 C**
pH	:	**4-9**

Test Results

Quantity		*Time*	*Comments on result*
<2 %	LOSS	**10 d**	At PH = 9: >98% recovery at 70C.

General Comments : 2,3,5,6-Tetrachloropyridine was hydrolytically stable at pHs of 4, 7 or 9 up to a temperature of 70C. 2,3,5,6-Tetrachloropyridine recovery was >98% after 10 days at pH9 and 70C. No degradation products were detected following analyses by high pressure liquid chromatography.

References

Primary Reference : **#DOWCH***
Sorci, J. J. and West, R. J. Dow Chemical Company Document, (1992)

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

Study

End Point	:	**SORPTION**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Specifications	:	**AIR AQ SOIL**
Geographic Area	:	**USA**

Test Method and Conditions

Test method description	:	A multi-media equilibrium partitioning computer model, that accounted for six separate environmental compartments: air, water, soil, sediment, suspended aquatic matter and biota. (Mackay and Paterson, 1981).

Test Results

Quantity	*Time*	*Comments on result*
<2 %		Estimated sorption based on physical properties of log Kow = 3.322 and estimated log Koc = 3.128 (absorption coefficient).

General Comments : None of the test chemical was expected to partition into suspended aquatic matter or biota. Assumptions used: the volume dimensions of the compartments were defined and constant, and were assumed to be well-mixed and homogeneous.

References

Secondary Reference :

!SIDSP*

OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 7-8, (1993)

Study

End Point	:	**EVAPORATION**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Medium	:	**AIR**
Geographic Area	:	**USA**

Test Method and Conditions

Test method description : A multi-media equilibrium partitioning computer model that accounted for six separate environmental compartments: air, water, soil, sediment, suspended aquatic matter and biota (Makay and Paterson, 1981)

Test Results

Quantity		*Time*	*Comments on result*
86 %	LOSS		Estimated at equilibrium (model simulations).

General Comments : Assumptions used: the volume dimentions of the compartments were defined and constant, and were assumed to be well-mixed and homogeneous. The high degree of volatilization was most likely due to the relatively high vapor pressure of 2,3,5,6-tetrachloropyridine.

References

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	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**

Evaluations

Evaluation text	:	All process vents are abated by thermal oxidation. Due to its low vapor pressure, 2,3,5,6-tetrachloropyridine would be expected to be only a minor component of the vent stream to the thermal oxidizer. Any heavy organic material generated in the process is treated by thermal oxidation to recover heat and chloride value. Source tests on the thermal oxidizer have demonstrated greater than 99.99% destruction efficiency. 2,3,5,6-tetrachloropyridine is a minor component of the heavy stream (typically < 1%) and emissions from this operation would be expected to be insignificant.

References

Secondary Reference	:	**!SIDSP*** OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10-16, (1993)

Study

End Point	:	**MAMMALIAN ACUTE TOXICITY**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Species/strain/system	:	Fischer 344 rats
Dose / Concentration	:	**1182-1414 mg/kg BW**

Test Method and Conditions

Test method description	:	Single doses of 500, 1000 or 2000mg/kg/body weight were administered by oral gavage to 5 rats/sex to determine acute lethal dose. EPA Health Effects Test Guidelines (1982).

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
RAT			**ORL**		**M** **F**	**LD50**	The acute oral LD50 was calculated to be 1414mg/kg/body weight for males and 1182mg/kg/body weight for females.

References

Primary Reference : **#DOWCH***

Jeffery et al. Dow Chemical Company Document, (1987)

Secondary Reference : **!SIDSP***

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

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RAT			**ORL**		**M**	**10/GROUP**	**10**
					F	**10/GROUP**	**10**

Species/strain/system : Sherman rats

Test Method and Conditions

Test method description : Clinical observation, body weights, feed consumption, hematology, clinical chemistry, organ weights, and gross and histopathologic alterations studied. GLP: YES.

Exposure

Exposure Type : **SHORT**
Exposure Period : **91 d**
Dose / Concentration : **1-100 mg/kg BW/d**

Test Results

Organ	*Effect*	*Rev.*	*OnSet*	*Sex*	*Affected in Exposed - Controls*
KIDNY	**SIZE**			**M**	
KIDNY	**COLOR**				

Males fed 100 or 30mg/kg/day had increased kidney weight and pale kidneys.

KIDNY **CHNG** **M**

Reversible degenerative kidney changes (hyaline droplets) in males fed 100, 30 or 10mg/kg/day.

LIVER **SIZE** **M**

Increased average liver weight in males 100mg/kg/day but no compound related change observed microscopically.

NEF

No evidence of compound-related effects was observed in males receiving 3 or 1mg/kg/day and in females at 10mg/kg/day or below.

KIDNY **NEF** **F**

No kidney change at any dosage level.

LIVER **SIZE** **F**
SPLN

Slight weight increase in females at 100 or 30mg/kg/day but no compound related changes were observed microscopically.

NAEL

100mg/kg/day in males and females.

General Comments : The hyaline droplet formation was rat specific and considered reversible and therefore of little relevance to humans. The increased liver and spleen weights were considered incidental and of no toxicological significance in the lack of histopathological changes in these organs.

References

Primary Reference : **#DOWCH***
Mc Collister, S. B. and Sparschu, G. L. Dow Chemical Company Document, (1969)

Secondary Reference : **SIDSP***
Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 17-18, (1993)

Study

End Point : **MAMMALIAN TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

Organism	*Medium*	*Specification*	*Route*	*Lifestage*	*Sex*	*Number exposed*	*Number controls*
RAT			**ORL**	**ADULT**	**M**	**15/GROUP**	**15**
					F	**15/GROUP**	**15**

Species/strain/system : Sprague Dawley rats

Test Method and Conditions

Test method description : Combined Repeated Dose and Developmental Toxicity Study. Feed consumption, body weight, clinical chemistry, hematology organ weights, gross and histopathology and fertility were evaluated.

Exposure

Exposure Type : **SHORT**
Exposure Period : **52 d**
Dose / Concentration : **5-150 mg/kg /d**
Exposure comments : Oral gavage. After 2 weeks of dosing, parental rats were mated to produce F1 litters. Dosing continued through gestation and lactation period and all animals were killed following lactation day 4.

Test Results

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

No significant treatment-related effects were observed on clinical alterations, feed consumption, body weight or body weight gain at any dose level.

KIDNY	**COLOR**			**M**	
KIDNY	**SIZE**				
KIDNY	**CHNG**				

Parental males fed 150mg/kg/day, had pale kidneys, increased kidney weight and protein droplet nephropathy. (The protein droplet is considered to be not specific and not relevant to human risk assessment).

LIVER	**SIZE**			**M**	
LIVER	**STRUC**				

In males fed 150mg/kg/day, increased liver weight and centrilobular hypertrophy of hepatocytes consistent with compensatory increases of metabolic activity (not toxicologically significant).

	BIOCH				

Alterations in a number of clinical chemistry parameters were also observed in females given 150mg/kg/day and were considered secondary to renal and hepatic effects.

	NOAEL				

Dose or concentration at which no toxic effects were observed: males = 150mg/kg/day, females = 25mg/kg/day.

References

Primary Reference : **#DOWCH***
Zielke, G. Y., Jano, B. L. and Breslin, W. J. Dow Chemical Company Document, (1992)

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

Study

End Point : **MUTAGENICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

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

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

Test Method and Conditions

Test method description : Modified Ames test (preincubation modification). The concentration of the solutions were verified analytically and were comparable to the targets. OECD Guideline 471. GLP: YES.

Exposure

Dose / Concentration : **0.5-166.7 ug/ PLATE**
Exposure comments : Doses of 0.5 to 50ug/plate without activation and 1.67 to 166.7ug/plate with activation.

Test Results

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

The test material did not induce mutagenic response in any of the tested strains, and was classified as negative for mutagenicity in the Ames test under the experimental conditions used.

General Comments : The minimum concentrations of test substance at which toxicity to bacteria was observed were: 166.7ug/plate with metabolic activation and 50ug/plate without metabolic activation.

References

Primary Reference : **#DOWCH***
Samson, Y. E. and Gollapudi, B. B. Dow Chemical Company Document, (1991)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 18-19, (1992)

Study

End Point : **MUTAGENICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

Organism	Medium	Specification	Route	Lifestage	Sex	Number exposed	Number controls
MOUSE			**ORL**		**M**	**5/DOSE**	**5**
					F	**5/DOSE**	**5**

Species/strain/system : CD-1

Test Method and Conditions

Test method description : OECD Guideline 474. Concentrations in the solutions were verified analytically. Groups of animals were sacrificed after 24, 48, and 72 hours. 1000 polychromatic erythrocytes (PCE) were evaluated from each surviving animal for the frequency of micronucleated polychromatic erythrocytes (MN-PCE).

Exposure

Exposure Type : **ACUTE**
Dose / Concentration : **22.5-930 mg/kg BW**
Exposure comments : Administered by single oral gavage at doses: 0 (negative control), 22.5, 75.0 and 225.0mg/kg/body weight in males and 0, 93.0, 310.0 and 930.0mg/kg/body weight in females for the mouse bone marrow micronucleus test. Positive controls received at 120mg/kg/body weight of cyclophosphamide.

Test Results

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

No significant increase in the frequencies and occurrence of MN-PCE in groups treated with the test material as compared with negative controls. Positive control showed significant increase in the number of micronucleus-polychromatic erythrocytes (MN-PCE).

General Comments : The test material was considered to be negative under the experimental conditions used in testing.

References

Primary Reference : **#DOWCH***
Samson, Y. E. and Gollapudi, B. B. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 19-20, (1992)

Study

End Point : **REPRODUCTION**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

Organism	Medium	Specification	Route	Lifestage	Sex	Number exposed	Number controls
RAT			**ORL**		**M**	**15/GROUP**	**15**
					F	**15/GROUP**	**15**

Species/strain/system : Sprague-Dawley rats

Test Method and Conditions

Test method description : This evaluation is a part of Combined Repeated Dose Reproductive/Developmental Toxicity Screening.

Exposure

Exposure Type : **SHORT**
Exposure Period : **52 d**
Frequency : **1 X/d**
Dose / Concentration : **5-150 mg/kg BW**
Exposure comments : Groups of 15 adult males and 15 adult females were given the tested substance at dose levels : 0, 5, 25 or 150mg/kg/body weight per day by oral gavage for approximately 52 days. After two weeks the parental rats were mated for two weeks. Dosing continued through lactation day 4, followed by sacrifice.

Test Results

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

No effects attributed to treatment were observed on the pregnancy rate, time to mating, gestation length, number of corpora lutea or implantations, preimplantation or postimplantation loss, fertility indices, liter size, neonatal growth or survival, or testes and epididymides

weights at any dose level. No gross or histopathologic alterations of sex organs were observed at 150mg/kg/body weight per day dose level.

General Comments : See record number 6585 in file 10 (mammalian toxicity) for non-reproductive effects.

References

Primary Reference : **#DOWCH***
Zielke, G. J. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 21-22, (1992)

Study

End Point : **TERATOGENICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Study type : **LAB**

Test Subject

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

Species/strain/system : Sprague-Dawley (4 day old rats)

Test Method and Conditions

Test method description : This evaluation is a part of Combined Repeated Dose Reproductive/Developmental Toxicity Screening.

Exposure

Exposure Type : **SHORT**
Dose / Concentration : **5-150 mg/kg BW**
Exposure comments : Evaluation of teratogenicity potential from "in utero" exposure to 2,3,5,6-tetrachloropyridine at dosage levels: 0, 5, 25 or 150mg/kg/body weight per day to dams, preceded by premating parental exposure for two weeks.

Test Results

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

No substance related changes were observed to the in utero development and survival through 4 days of life.

General Comments : No anatomical nor structural changes were observed. See other results listed in repeated dose toxicity and reproductive toxicity studies.

References

Primary Reference : **#DOWCH***
Zielke, G. J. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 21-22, (1992)

Study

[redacted]

End Point : **AQUATIC ACUTE TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Species/strain/system : Waterflea (Daphnia magna) Straus
Exposure Period : **48 h**
Dose / Concentration : **1.93-2.14 mg/l**

Test Method and Conditions

Test method description : Exposure concentrations were analyzed as unfiltered (dissolved and undissolved) and filtered samples. OECD Guideline 202. Acute test. GLP specified for test.

Test Results

Organism	*Medium*	*Spec.*	*Route*	*Lifestage*	*Sex*	*Effect*	*Effect Comments*
CRUS	**AQ**	**FRESH**				**LC50**	LC50 for 48h = 2.13mg/l for unfiltered samples and 1.93mg/l for filtered samples (calculated by the probit method). The 48h mortality threshold concentrations for unfiltered samples = 2.14mg/l and for filtered samples = 2.05mg/l.

General Comments : Tetrachloropyridine is moderately toxic to daphnia magna straus according to the categorization system used by the US EPA although a 24h LC50 value was not calculated. The 24h mortality data is presented in the Dow Chemical Company report (unpublished).

References

Primary Reference : **#DOWCH***
Milazzo, D. P. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10, (1993)

Study

[redacted]

End Point : **AQUATIC ACUTE TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Species/strain/system : Waterflea (Daphnia magna) Straus
Exposure Period : **2-21 d**
Dose / Concentration : **1.94-2.67 mg/l**

Test Method and Conditions

Test method description : Long-term tests. OECD Guideline 202. GLP specified for test. A flow-through life-cycle toxicity test. EC50 values for immobility. Reproduction and growth were calculated using mean analyzed exposure concentration.

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
CRUS	**AQ**	**FRESH**				**LC50**	LC50 for 2 days = >2.67mg/l LC50 for 21 days = 1.94mg/l

References

Primary Reference : **#DOWCH***
Milazzo, D. P. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10-11, (1993)

Study

End Point : **AQUATIC ACUTE TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Species/strain/system : Rainbow trout (Oncorhynchus mykiss)
Exposure Period : **24-96 h**
Dose / Concentration : **1.5-2.3 mg/l**

Test Method and Conditions

Test method description : OECD Guideline 203. Flow-through test. GLP specified for test. LC50 values determined by linear interpolation. Acute test.

Test Results

Organism	Medium	Spec.	Route	Lifestage	Sex	Effect	Effect Comments
FISH	**AQ**	**FRESH**				**LC50**	LC50 for 24h = 2.3mg/l; for 48h = 1.5mg/l; for 72h = 1.5mg/l; for 96h = 1.5mg/l.

References

Primary Reference : **#DOWCH***
Weinberg, J. T. et al. Dow Chemical Company Document, (1991)

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

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**2,3,5,6-tetrachloropyridine**
CAS Number	:	**2402-79-1**
Study type	:	**LAB**
Geographic Area	:	**USA**

Test Subject

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

Species/strain/system : Waterflea (Daphnia magna) Straus

Test Method and Conditions

Test method description : OECD Guideline 202; GLP specified for test

Exposure

Exposure Type	:	**ACUTE**
Exposure Period	:	**48 h**
Dose / Concentration	:	**0.80-15.9 mg/l**
Exposure comments	:	Exposure concentrations were analyzed as unfiltered (dissolved and undissolved) and filtered samples.

Test Results

NOEC (no observed effect concentration); 1.27mg/l for unfiltered samples.

NOEC for 1mg/l for filtered samples.

General Comments : 2,3,5,6-tetrachloropyridine is moderately toxic to daphnia magna straus, according to the categorization system used by the USA EPA.

References

Primary Reference : **#DOWCH***
Milazzo, D. P. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Geographic Area : **USA**

Test Subject

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

Species/strain/system : Rainbow trout (oncorhynchus mykiss) walbaum

Test Method and Conditions

Test method description : OECD guideline 203. Flow-through test. GLP specified for test.

Exposure

Exposure Type : **ACUTE**
Exposure Period : **96 H**
Dose / Concentration : **0.33-0.94 mg/l**

Test Results

No observed effect concentration NOEC for 96H=0.33mg/l The 96-H mortality threshold concentration was 0.94mg/l

References

Primary Reference : **#DOWCH***
WEINBERG, J.T. ET AL. Dow Chemical Company Document, (1991)

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

Study

End Point	:	**AQUATIC TOXICITY**
Chemical Name	:	**2,3,5,6-Tetrachloropyridine**
CAS Number	:	**2402-79-1**
Study type	:	**LAB**
Geographic Area	:	**USA**

Test Subject

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

ALGAE

Species/strain/system : Green algae (Selenastrum capricornutum) Printz

Test Method and Conditions

Test method description : OECD Guideline 201. "Algae Growth Inhibition Test". GLP specified for test.

Exposure

Exposure Period	:	**72-120 h**
Dose / Concentration	:	**0.71-31.6 mg/l**
Exposure comments	:	Control set used: an algae assay medium (AAM) control with acetone. Tests were set in triplicate with initial cell density of 10000 cells/ml.

Test Results

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

EC50 (total cell count/ml) at 72h = 16.8mg/l (6.6-28.1mg/l)

POPUL	**SIZE EC50**				

EC50 (total cell count/ml) at 92h = 14.1mg/l (4.9-23.3mg/l)

POPUL	**SIZE EC50**				

EC50 (total cell count/ml) at 120h = 13.9mg/l (6.2-21.6mg/l)

POPUL	**INHIB EC50**				

EC50 (growth rate) at 72h = 9.7mg/l (1.7-55.8mg/l)

POPUL **INHIB**
EC50

EC50 (growth rate) at 96h = 8.5mg/l (1.6-45.1mg/l)

POPUL **INHIB**
EC50

EC50 (growth rate) 120h = 8.2mg/l (1.4-49.7mg/l)

POPUL **NEF**

NOEC (total cell count/ml) at 72h = 6.8mg/l

POPUL **NEF**

NOEC (total cell count/ml) at 92h and 120h = 3.3mg/l

General Comments : The EC50 values and the 95% confidence intervals based on initial measured concentrations, were determined on the endpoints.

References

Primary Reference : **#DOWCH***
Milazzo, D. P. and Servinsky, M. F. Dow Chemical Company Document, (1991)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 3-16, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Geographic Area : **USA**

Test Subject

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

Species/strain/system : Waterflea (Daphnia magna) Straus

Test Method and Conditions

Test method description : Long-term test. OECD Guideline 202. GLP specified for test. A flow-through life-cycle toxicity test.
(An)aerobic : **AEROB**

Exposure

Exposure Period : **2-21 d**
Dose / Concentration : **0.25-2.67 mg/l**

Test Results

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

EC50 (immobilization) for 48h = >2.67mg

BEHAV
EC50

EC50 (immobilization) for 21d = 2.48mg/l

BEHAV

No observed effect concentration NOEC (immobilization) for 21d = 1.18mg/l

BEHAV

Lowest observed effect concentration LOEC (immobilization) for 21d = 1.78mg/l. The NOEC's and LOEC's for survival were not statistically determined. But were estimated by observation.

BEHAV

Maximum acceptable toxicant concentration MATC (immobilization) for 21d = 1.45mg/l

NEF

NOEC (mortality) for 21d = 0.31mg/l

NEF

LOEC (mortality) for 21d = 0.61mg/l

NEF

MATC (mortality) for 21d = 0.43mg/l

References

Primary Reference : **#DOWCH***
Milazzo, D. P. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10-11, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**
Geographic Area : **USA**

Test Subject

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

Species/strain/system : Waterflea (Daphnia magna) Straus

Test Method and Conditions

Test method description : Long-term test. OECD Guideline 202. GLP specified for test. A flow-through life-cycle toxicity test.

(An)aerobic : **AEROB**

Exposure

Exposure Period : **2-21 d**

Dose / Concentration : **0.25-2.67 mg/l**

Test Results

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

EC50 (reproduction-mean total young/adult) at 21d = 1.10mg/l

REPRO **FUNCT**

NOEC (reproduction-mean total young/adult) for 21d =1.18mg/l

REPRO **FUNCT**

LOEC (reproduction-mean total young/adult) for 21d =1.78mg/l

REPRO **FUNCT**

MATC (reproduction-mean total young/adult) for 21d =1.45mg/l

SIZE
EC50

EC50 (growth) for 21d = > 2.67mg/l.

NEF

NOEC (growth) for 21d = 1.78mg/l

NEF

LOEC (growth) for 21d = 2.67mg/l

RETAR **SIZE**

MATC (growth) for 21d = 2.18mg/l

General Comments : For further information see record No. 6494, same file.

References

Primary Reference : **#DOWCH***
Milazzo, D. P. et al. Dow Chemical Company Document, (1992)

Secondary Reference : **!SIDSP***
OECD/SIDS. Screening Information Data Set (SIDS) of OECD High Production Volume Chemicals Programme, 10-11, (1993)

Study

End Point : **AQUATIC TOXICITY**
Chemical Name : **2,3,5,6-Tetrachloropyridine**
CAS Number : **2402-79-1**

Test Subject

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

Species/strain/system : Fathead minnow (Pimephales promelas Rafinesque)

Test Substance

Description of the test substance : 2,3,5,6-Tetrachloropyridine

Test Method and Conditions

Test method description : Static, GLP: NO.

Exposure

Exposure Type : **ACUTE**
Exposure Period : **72-96 h**

Test Results

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

Maximum safe concentration is 1mg/l.

LD100

Fatalities at 2mg/l.

References

Primary Reference : **#DOWCH***
Alexander, H. C. and Batchelder, T. L. Dow Chemical Company Document, (1975)

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