

HAZARDOUS SUBSTANCE ECOLOGICAL FACT SHEET

U.S. Environmental Protection Agency
Office of Toxic Substances

Chemical Name: o-Toluidine
CAS Number: 95-53-4

GENERAL INFORMATION

o-Toluidine (2-aminotoluene, o-methylaniline, 2-methyl benzenamine) is a manufactured chemical. It is used in the manufacture of various dyes, printing textiles, blue-black, and making various colors fast to acids. o-Toluidine is expected to enter the aquatic environment in industrial and municipal effluents. o-Toluidine is highly soluble in water.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute or short-term ecological effects are severe effects upon aquatic animals or plants, such as death or complete immobilization, which occur following exposure to a chemical in water for a relatively short period of time, such as four days or less. o-Toluidine is considered to have moderate acute toxicity to aquatic life.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic or long-term ecological effects are generally subtle effects upon aquatic animals or plants, such as reductions in long-term survival, growth, or reproduction; or changes in appearance or behavior following exposure to a chemical in water for a sufficient period of time to include either a complete life-cycle or a significant portion of a life-cycle. o-Toluidine is considered to have moderate chronic toxicity to aquatic life.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

The chemical properties of o-Toluidine indicate that, after a sufficient amount of time, it will tend to be distributed in the environment as follows:

air	15.75%
soil	0.24%
water	83.78%
suspended solids	< 0.01%
aquatic biota	< 0.01%
sediment	0.23%

o-Toluidine is expected to be slightly persistent in the aquatic environment.

BIOACCUMULATION IN AQUATIC ORGANISMS

The concentration of o-toluidine in edible tissues of most aquatic species that are consumed by humans is expected to be about the same as the average concentration that was present in the water in which the organisms had been living.

U.S. Environmental Protection Agency
Environmental Research Laboratory-Duluth

I. Chemical Identification

Name Benzenamine, 2-methyl-
CAS number 95-53-4
Formula C7 H9 N

II. Chemical and Physical Properties from QSAR

(All temperature sensitive values assume 25 C)

Molecular Weight (g/mole) = 107.2
Melting Point (C) = -24.0
Boiling Point (C) = 200.
Vapor Pressure (mm of Hg) = 0.317
Ht Vaporization (cal/mole) = 1.07E+04
Solubility in Water (mg/L) = 8.33E+03
Log P = 1.56
pKa = 4.29

III. Information from QSAR concerning Exposure and Fate

Bioconcentration Factor = 6.85
Log(BCF) = 0.836 See Veith and Kosian 1983
Absorption Coef. Log(Koc) = 2.19 See Lyman et al. 1982
Hydrolysis Half-Life > 1000 days

Hydrolysis is not likely to be an important transformation mechanism for this chemical

Henry's Constant = 5.36E-06 atm-m**3/mole
Log10 (Henry's Constant) = -5.27 atm-m**3/mole

Lyman et al. 1982. would conclude that a chemical with these properties will volatilize slowly from open water. See page 15-15.

Mackay Level 1 Environmental Partitioning @25 C Fugacity = 6.505E-06 Pa
15.75 % into air
0.24 % into soil
83.78 % into water
0.00 % into suspended solids
0.00 % into aquatic biota
0.23 % into sediment

Biodegradation Half-life Analysis

***** QSAR OPENED SUBFILE 2 FOR AROMATIC CHEMICALS *****
EVALUATIONS OF DEGRADATION WITHIN THIS SUBFILE WERE BASED
ON 86 OR ABOUT 32 % OF THE CHEMICALS IN THE DATA BASE.

THERE ARE 25 CHEMICALS IN THE DEGRADATION
DATA BASE WITH A BENZENE RING AND A LOGP OF < 2.18. HALF-LIFE FOR
ALL THESE CHEMICALS RANGE FROM 2 TO 16 DAYS.

IV. Toxicological Information from QSAR

Toxicity to the fathead minnow

LC50 (mg/L)	=	25.3
MATC (mg/L)	=	6.33

Phytotoxicity Assessment

The rules for distinguishing substructures which may have inhibitory effects on plant growth and development are being formulated by Dr. Fumihiko Hayashi of the Office of Toxic Substances, Washington, D.C.
HERD/EEB Room E431 Phone (202)382-4278.

This chemical does not contain structural features which the QSAR SYSTEM now regards as highly toxic to algae or aquatic plants.

Genetic/Mutagenic Assessment

This is an ORTHOTOLUIDINE DERIVATIVE which may be carcinogenic. A review may be found in "Carcinogenic Aromatic Amines and Related Compounds" by D.B. Clayson et al. 1976. Chapter #8, Chemical Carcinogens C.E. Searle (Ed), ACS.

V. AQUIRE SUMMARY

Name Benzenamine, 2-methyl-
CAS number 95-53-4

SPECIES	EFFECT	DURATION E (DAYS) T	LIFE STAGE	CONC. M (ug/l) U	REF NO.
AGMENELLUM QUADRUPLICATUM BLUE-GREEN ALGAE	PGR	3.00 S	NR	10 UG U	7217
AGMENELLUM QUADRUPLICATUM BLUE-GREEN ALGAE	PGR	3.00 S 7.00	NR	1 UG U	7217
ANACYSTIS AERUGINOSA BLUE-GREEN ALGAE	PGR	8.00 S	NR	310 U	15134
CARASSIUS AURATUS GOLDFISH	LC50	2.00 NR	NR	124000 U	10786
CHILOMONAS PARAMECIUM CRYPTOMONAD	PGR	2.00 NR	NR	237000 U	5719
CYPRINIDAE MINNOW, CARP FAMILY	LC50	2.00 NR	NR	78500 U	10786
CYPRINODONTIDAE KILLIFISH, TOPMINNOW FAMILY	BCF	2.00 NR	NR	150000 U	11613
CYPRINODONTIDAE KILLIFISH, TOPMINNOW FAMILY	LC50	2.00 S	NR	750000 102700 U	10786
CYPRINODONTIDAE KILLIFISH, TOPMINNOW FAMILY	LC50	2.00 F	NR	100000 U	10786
DAPHNIA MAGNA WATER FLEA	LC50	1.00 S	24 H	26000 U	5718
ELASMOPUS PECTINICRUS SCUD	LC50	1.00 R	ADULT	40000 U	5013
ELASMOPUS PECTINICRUS SCUD	LC50	2.00 R	ADULT	40000 U	5013
ELASMOPUS PECTINICRUS SCUD	LC50	4.00 R	ADULT	40000 U	5013
ENTOSIPHON SULCATUM FLAGELLATE EUGLENOID	PGR	3.00 S	INIT CULTURE TURBI DITY REPORTED	76000 U	5303
LEUCISCUS IDUS IDE, SILVER OR GOLDEN ORFE	LC50	S	NR	117000 U	547
SCENEDESMUS QUADRICAUDA GREEN ALGAE	PGR	S	NR	6300 U	7453
SCENEDESMUS QUADRICAUDA GREEN ALGAE	PGR	7.00 S	INIT CULTURE TURBI DITY REPORTED	6300 U	5303
SCENEDESMUS QUADRICAUDA GREEN ALGAE	PGR	8.00 S	NR	6300 U	15134
SELENASTRUM CAPRICORNUTUM GREEN ALGAE	GRO	8.00 S 10.00	NR	5000000 U	5189

TETRAHYMENA PYRIFORMIS
CILIATE

EC50GR

1.00 S 0.2 ML

520000 U 11258

REFERENCES:

REF. NUMBER: 547
AUTHOR(S): JUHNKE, I. AND D. LUEDEMANN
YEAR: 1978
TITLE: RESULTS OF THE INVESTIGATION OF 200 CHEMICAL COM-
POUNDS FOR ACUTE FISH TOXICITY WITH THE GOLDEN ORFE
TEST
SOURCE: Z.F. WASSER-UND ABWASSER-FORSCHUNG 11(5):161-164
(COMPLETE GERMAN, AND ENGLISH TRANSLATION AVAIL)

REF. NUMBER: 5013
AUTHOR(S): LEE, W. Y. AND J. A. C. NICOL
YEAR: 1978 B
TITLE: INDIVIDUAL AND COMBINED TOXICITY OF SOME PETROLEUM
AROMATICS TO THE MARINE AMPHIPOD ELASMOPUS-PECTENI-
CRUS
SOURCE: MAR. BIOL. 48(3):215-222

REF. NUMBER: 5189
AUTHOR(S): HSIEH, Y.-P., M. B. TOMSON, AND C. H. WARD
YEAR: 1980
TITLE: TOXICITY OF WATER-SOLUBLE EXTRACTS OF NO. 2 FUEL
OIL TO THE FRESHWATER ALGA SELENASTRUM
CAPRICORNUTUM
SOURCE: DEV. IND. MICROBIOL. 21:401-409

REF. NUMBER: 5303
AUTHOR(S): BRINGMANN, G. AND R. KUHN
YEAR: 1980
TITLE: COMPARISON OF THE TOXICITY THRESHOLDS OF WATER
POLLUTANTS TO BACTERIA, ALGAE, AND PROTOZOA IN THE
CELL MULTIPLICATION INHIBITION TEST
SOURCE: WATER RES. 14(3):231-241 (AUTHOR RESPONSE USED)

REF. NUMBER: 5718
AUTHOR(S): BRINGMANN, G. AND R. KUHN
YEAR: 1977
TITLE: BEFUNDE DER SCHADWIRKUNG WASSERGEFAHRDENDER STOFFE
GEGEN DAPHNIA MAGNA. (THE TOXICITY OF WATERBORNE
CONTAMINANTS TOWARDS DAPHNIA MAGNA)
SOURCE: Z. WASSER ABWASSER FORSCH. 10(5):161-166 (IN GERMAN
WITH ENGLISH SUMMARY)

REF. NUMBER: 5719
AUTHOR(S): BRINGMANN,G., R.KUHN, AND A.WINTER
YEAR: 1980
TITLE: BESTIMMUNG DER BIOLOGISCHEN SCHADWIRKUNG WASSERGE-
FAHRDENDER STOFFE GEGEN PROTOZOEN. III.
SAPROZOISCHE FLAGELLATEN. (DETERMINATION OF THE...
SOURCE: Z. WASSER ABWASSER FORSCH. 13(5):170-173 (IN GERMAN
WITH ENGLISH SUMMARY)

REF. NUMBER: 7217
AUTHOR(S): WINTERS,K., J.BATTERTON, AND C.VAN BAALEN
YEAR: 1978
TITLE: ANILINES: SELECTIVE TOXICITY TO BLUE-GREEN ALGAE
SOURCE: SCIENCE 199(4333):1068-1070

REF. NUMBER: 7453
AUTHOR(S): BRINGMANN,G. AND R.KUHN
YEAR: 1977 A
TITLE: GRENZWERTE DER SCHADWIRKUNG WASSERGEFAHRDENDER
STOFFE GEGEN BAKTERIEN (PSEUDOMONAS PUTIDA) UND
GRUNALGEN (SCENEDESMUS QUADRICAUDA) IM...
SOURCE: Z. WASSER ABWASSER FORSCH. 10(3-4):87-98 (IN
GERMAN WITH ENGLISH SUMMARY)

REF. NUMBER: 10786
AUTHOR(S): TONOGAI,Y., S.OGAWA, Y.ITO, AND M.IWAIDA
YEAR: 1983
TITLE: STUDIES OF THE SYNCOPIC EFFECT OF ANILINE
DERIVATIVES ON FISH. I. THE PROBLEM CONCERNING THE
DETERMINATION OF MEDIAN LETHAL CONCENTRATION ...
SOURCE: J. HYG. CHEM. (EISEI KAGAKU) 29(5):280-285
(JPN) (ENG-ABS)

REF. NUMBER: 11258
AUTHOR(S): YOSHIOKA,Y., Y.OSE, AND T.SATO
YEAR: 1985
TITLE: TESTING FOR THE TOXICITY OF CHEMICALS WITH
TETRAHYMENA PYRIFORMIS
SOURCE: SCI. TOTAL ENVIRON. 43(1-2):149-157

REF. NUMBER: 11613
AUTHOR(S): OGAWA,S., Y.TONOGAL, Y.ITO, AND M.IWAIDA
YEAR: 1983
TITLE: STUDIES OF THE SYNCOPIC EFFECT OF ANILINE
DERIVATIVES ON FISH. II. RELATION BETWEEN THE
SYNCOPIC EFFECT AND THE AMOUNT OF ANILINE ...
SOURCE: J. HYG. CHEM. (EISEI KAGAKU) 29(5):286-291
(JPN) (ENG-ABS)

REF. NUMBER: 15134
AUTHOR(S): BRINGMANN,G. AND R.KUHN
YEAR: 1978
TITLE: TESTING OF SUBSTANCES FOR THEIR TOXICITY THRESHOLD:
MODEL ORGANISMS MICROCYSTIS (DIPLOCYSTIS)
AERUGINOSA AND SCENEDESMUS QUADRICAUDA
SOURCE: MITT. INT. VER. THEOR. ANGEW. LIMNOL. 21:275-284
(AUTHOR COMMUNICATION USED)