HAZARDOUS SUBSTANCE ECOLOGICAL FACT SHEET

U.S. Environmental Protection Agency
Office of Toxic Substances

Chemical Name: Dibutyl ester phthalic acid
CAS Number: 84-74-2

GENERAL INFORMATION

Dibutyl ester phthalic acid (n-butyl phthalate, dibutyl phthalate, DBP) is one of several phthalic acid esters produced commercially. The major use for this phthalic acid ester is as an insect repellant for the impregnation of clothing. DBP enters the aquatic environment in discharges from industrial processes and in non-point discharges from the wide and general use of this chemical. DBP 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. Dibutyl ester phthalic acid is considered to have high 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. Dibutyl ester phthalic acid is considered to have high chronic toxicity to aquatic life.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

The chemical properties of dibutyl ester phthalic acid indicate that, after a sufficient amount of time, it will tend to be distributed in the environment as follows:

air	26.06%
soil	33.71%
water	8.70%
suspended solids	0.05%
aquatic biota	0.02%
sediment	31.46%

Dibutyl ester phthalic acid is expected to be slightly persistent in the aquatic environment.

BIOACCUMULATION IN AQUATIC ORGANISMS

The concentration of dibutyl ester phthalic acid in edible tissues of most aquatic species that are consumed by humans is expected to be much higher than 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 1,2-Benzenedicarboxylic acid, dibutyl ester

CAS number 84-74-2
Formula C16 H22 04

II. Chemical and Physical Properties from QSAR

(All temperature sensitive values assume 25 C)

Molecular Weight (g/mole)	=	278.3
Melting Point (C)	=	-35.0
Boiling Point (C)	=	340.
Vapor Pressure (mm of Hg)	=	1.20E-03
Ht Vaporization (cal/mole)	=	1.58E+04
Solubility in Water (mg/L)	=	5.13
Log P	=	4.69
pKa	=	not available for this chemical

III. Information from QSAR concerning Exposure and Fate

Bioconcentration Factor	=	2.02E+03	
Log(BCF)	=	3.30	See Veith and Kosian 1983
Absorption Coef. Log(Koc)	=	3.89	See Lyman et al. 1982
Hydrolysis Half-Life	=	50 days	

Henry's Constant	=	8.55E-05	atm-m**3/mole
Log10 (Henry's Constant)	=	-4.07	atm-m**3/mole

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

Mackay Level 1 Environmental Partitioning @25 C Fugacity = 1.077E-05 Pa

26.06 % into air
33.71 % into soil
8.70 % into water
0.05 % into suspended solids
0.02 % into aquatic biota
31.46 % 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.

LOGP WAS MORE THAN 2.18
THIS CHEMICAL IS GROUPED WITH 10 AROMATIC CHEMICALS
THAT CONTAIN ONLY CARBON, OXYGEN, NITROGEN, AND HYDROGEN.
QSAR DID NOT FIND ANY FUNCTIONAL GROUPS THAT APPEAR TO PROHIBIT
DEGRADATION. THE RANGE OF HALF-LIFE VALUES FOR CHEMICALS IN THIS
GROUP ARE BETWEEN 3 AND 17 DAYS.

IV. Toxicological Information from QSAR

Toxicity to the fathead minnow

LC50 (mg/L)	= 1.39
MATC (mg/L)	= 7.59E-02

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

There is no information in the QSAR SYSTEM which would suggest that this chemical is a potential carcinogen or mutagen.

V. AQUIRE SUMMARY

Name 1,2-Benzenedicarboxylic acid, dibutyl ester

CAS number 84-74-2

SPECIES	EFFECT	DURATION (DAYS)	E T	LIFE STAGE	CONC. (ug/l)	M U	REF NO.
AQUATIC COMMUNITY AQUATIC COMMUNITY	POP	14.00	F	NR	3700	M	11563
AQUATIC COMMUNITY AQUATIC COMMUNITY	POP	14.00	F	NR	340	M	11563
AQUATIC COMMUNITY AQUATIC COMMUNITY	POP	14.00	F	NR	3800	M	11563
AQUATIC COMMUNITY AQUATIC COMMUNITY	POP	14.00	F	NR	450	M	11563
ARTEMIA SALINA BRINE SHRIMP	HAT	1.00	S	EGG	10000	U	8728
ARTEMIA SALINA BRINE SHRIMP	HAT	3.00	S	EGG	10000	U	8729
ARTEMIA SALINA BRINE SHRIMP	MOR	1.00	S	EGG	52300	U	8728
ARTEMIA SALINA BRINE SHRIMP	TER	1.00	NR	NAUPLII	250 25000	U	10966
ARTEMIA SP BRINE SHRIMP	BCF	0.08	S	NAUPLIUS LARVAE AT 24 H DVP	0 UM 100 UM	U	15777
ARTEMIA SP BRINE SHRIMP	BCF	0.17	S	NAUPLIUS LARVAE AT 24 H DVP	0 UM 100 UM	U	15777
ARTEMIA SP BRINE SHRIMP	BCF	0.33	S	NAUPLIUS LARVAE AT 24 H DVP	0 UM 100 UM	U	15777
ARTEMIA SP BRINE SHRIMP	LD50	1.00	S	NAUPLIUS LARVAE AT 24 H DVP	8000	U	15777
CARASSIUS AURATUS GOLDFISH	PHY	0.03	S	NR	500	U	7923
CARASSIUS AURATUS GOLDFISH	PHY	0.03	S	NR	1000	U	7923
CHIRONOMUS PLUMOSUS MIDGE	BCF	1.00	NR	NR	0.18	U	736
CHIRONOMUS PLUMOSUS MIDGE	BCF	3.00	NR	NR	0.18	U	736
CHIRONOMUS PLUMOSUS MIDGE	BCF	7.00	NR	NR	0.18	U	736
CHIRONOMUS PLUMOSUS MIDGE	BCFC	1.00	F	LARVAE	0.18	M	732
CHIRONOMUS PLUMOSUS MIDGE	BCFC	3.00	F	LARVAE	0.18	M	732
CHIRONOMUS PLUMOSUS MIDGE	BCFC	7.00	F	LARVAE	0.18	M	732
CHIRONOMUS PLUMOSUS MIDGE	DVP	30.00	F	LARVAE	560	U	7688
CYPRINUS CARPIO COMMON, MIRROR, COLORED, CARP	MOR	1.79	D	NR	74 MG/KG 159 MG/KG	U	15898

DAPHNIA MAGNA WATER FLEA	BCFC	1.00 F	NR	0.08 M	732
DAPHNIA MAGNA WATER FLEA	BCFC	1.00 NR	NR	0.08 U	736
DAPHNIA MAGNA WATER FLEA	BCFC	3.00 F	NR	0.08 M	732
DAPHNIA MAGNA WATER FLEA	BCFC	3.00 NR	NR	0.08 U	736
DAPHNIA MAGNA WATER FLEA	BCFC	7.00 F	NR	0.08 M	732
DAPHNIA MAGNA WATER FLEA	BCFC	7.00 NR	NR	0.08 U	736
DAPHNIA MAGNA WATER FLEA	BCFC	14.00 F	NR	0.08 M	732
DAPHNIA MAGNA WATER FLEA	BCFC	14.00 NR	NR	0.08 U	736
DAPHNIA MAGNA WATER FLEA	LC50	2.00 R	FIRST INSTAR, < 24 H	3700 M	10579
DAPHNIA MAGNA WATER FLEA	LC50	2.00 S	< 24 H	5200 M	10614
DAPHNIA MAGNA WATER FLEA	MOR	16.00 R	< 24 H	56 M	10614
DAPHNIA MAGNA WATER FLEA	MOR	16.00 R	< 24 H	180 M	10614
DAPHNIA MAGNA WATER FLEA	MOR	16.00 R	< 24 H	560 M	10614
DAPHNIA MAGNA WATER FLEA	MOR	16.00 R	< 24 H	1800 M	10614
DAPHNIA MAGNA WATER FLEA	MOR	16.00 R	< 24 H	3200 M	10614
DAPHNIA MAGNA WATER FLEA	REP	16.00 R	< 24 H	560 M	10614
DAPHNIA MAGNA WATER FLEA	REP	16.00 R	< 24 H	1800 M	10614
GAMMARUS PSEUDOLIMNAEUS SCUD	BCF	1.00 NR	NR	0.10 U	736
GAMMARUS PSEUDOLIMNAEUS SCUD	BCF	3.00 NR	NR	0.10 U	736
GAMMARUS PSEUDOLIMNAEUS SCUD	BCF	7.00 NR	NR	0.10 U	736
GAMMARUS PSEUDOLIMNAEUS SCUD	BCF	14.00 NR	NR	0.10 U	736
GAMMARUS PSEUDOLIMNAEUS SCUD	BCFC	1.00 F	NR	0.10 M	732
GAMMARUS PSEUDOLIMNAEUS SCUD	BCFC	3.00 F	NR	0.10 M	732
GAMMARUS PSEUDOLIMNAEUS SCUD	BCFC	7.00 F	NR	0.10 M	732
GAMMARUS PSEUDOLIMNAEUS SCUD	BCFC	14.00 F	NR	0.10 M	732
GAMMARUS PSEUDOLIMNAEUS SCUD	LC50	1.00 S	NR	7000 U	732
GAMMARUS PSEUDOLIMNAEUS SCUD	LC50	1.00 NR	NR	7000 U	736
GAMMARUS PSEUDOLIMNAEUS SCUD	LC50	4.00 S	NR	2100 U	732
GAMMARUS PSEUDOLIMNAEUS SCUD	LC50	4.00 NR	NR	2100 U	736

GAMMARUS PSEUDOLIMNAEUS SCUD	LC50	4.00 S	MATURE	2100 U	666
GYMNODINIUM BREVE DINOFLAGELLATE	EC50GR	4.00 S	1000-5000 CELLS PE R ML	200 U	555
GYMNODINIUM BREVE DINOFLAGELLATE	EC50GR	4.00 S	1000-5000 CELLS PE R ML	3.4 U	555
GYMNODINIUM BREVE DINOFLAGELLATE	LC50	4.00 S	1000-5000 CELLS PE R ML	600 U	555
GYMNODINIUM BREVE DINOFLAGELLATE	LC50	4.00 S	1000-5000 CELLS PE R ML	20 U	555
HEXAGENIA BILINEATA MAYFLY	BCF	1.00 NR	NR	0.08 U	736
HEXAGENIA BILINEATA MAYFLY	BCF	3.00 NR	NR	0.08 U	736
HEXAGENIA BILINEATA MAYFLY	BCF	7.00 NR	NR	0.08 U	736
HEXAGENIA BILINEATA MAYFLY	BCFC	1.00 F	NR	0.08 M	732
HEXAGENIA BILINEATA MAYFLY	BCFC	3.00 F	NR	0.08 M	732
HEXAGENIA BILINEATA MAYFLY	BCFC	7.00 F	NR	0.08 M	732
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	1.00 S	NR	3720 U	730
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	1.00 NR	NR	3720 U	736
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	2.00 S	NR	2910 U	730
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	2.00 NR	NR	2910 U	736
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	4.00 S	NR	2910 U	730
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	4.00 NR	NR	2910 U	736
ICTALURUS PUNCTATUS CHANNEL CATFISH	LC50	4.00 S	1.4 G	2900 U	666
ISCHNURA VERTICALIS DAMSELFLY	BCFC	1.00 F	NR	0.10 M	732
ISCHNURA VERTICALIS DAMSELFLY	BCFC	7.00 F	NR	0.10 M	732
KUHLIA SANDVICENSIS AHOLEHOLE	BEH	0.01 S	30-60 MM	20000 U	10010
LEPOMIS MACROCHIRUS BLUEGILL	LC50	1.00 S	JUVENILE, 0.32-1.2 G	2100 U	5590
LEPOMIS MACROCHIRUS BLUEGILL	LC50	1.00 S	NR	1230 U	730
LEPOMIS MACROCHIRUS BLUEGILL	LC50	1.00 NR	NR	1230 U	736
LEPOMIS MACROCHIRUS BLUEGILL	LC50	2.00 S	NR	731 U	730
LEPOMIS MACROCHIRUS BLUEGILL	LC50	2.00 NR	NR	730 U	736
LEPOMIS MACROCHIRUS BLUEGILL	LC50	4.00 S	JUVENILE, 0.32-1.2 G	1200 U	5590

LEPOMIS MACROCHIRUS BLUEGILL	LC50	4.00	S	NR	731	U	730
LEPOMIS MACROCHIRUS BLUEGILL	LC50	4.00	NR	NR	730	U	736
LEPOMIS MACROCHIRUS BLUEGILL	LC50	4.00	S	1.3 G	700	U	666
NITOCRA SPINIPES HARPACTICOID COPEPOD	LC50	4.00	S	0.6-0.8MM,ADULTS	1700	U	5185
ORCONECTES NAIS CRAYFISH	LC50	4.00	S	NR	10000	U	732
ORCONECTES NAIS CRAYFISH	LC50	4.00	NR	NR	10000	U	736
ORCONECTES NAIS CRAYFISH	LC50	4.00	S	EARLY INSTAR	10000	U	666
PALAEMONETES KADIAKENSIS GRASS SHRIMP,FRESHWATER PRAWN	BCFC	1.00	F	NR	0.08	M	732
PALAEMONETES KADIAKENSIS GRASS SHRIMP,FRESHWATER PRAWN	BCFC	3.00	F	NR	0.08	M	732
PALAEMONETES PUGIO GRASS SHRIMP,FRESHWATER PRAWN	MOR		R	ZOEA	10000	M	5754
PALAEMONETES PUGIO GRASS SHRIMP,FRESHWATER PRAWN	MOR		R	ZOEA	1000	M	5754
PIMEPHALES PROMELAS FATHEAD MINNOW	BCFC	11.00	F	28-29 D, 0.091 G	4.83	M	10579
PIMEPHALES PROMELAS FATHEAD MINNOW	BCFC	11.00	F	28-29 D, 0.091 G	34.8	M	10579
PIMEPHALES PROMELAS FATHEAD MINNOW	HAT		F	EMBRYO, < 48 H	530	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	HAT		F	EMBRYO, < 48 H	970	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	2.00	S	NR	1490	U	730
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	2.00	NR	NR	1490	U	736
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	4.00	S	NR	1300	U	730
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	4.00	NR	NR	1300	U	736
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	4.00	S	0.8 G	1300	U	666
PIMEPHALES PROMELAS FATHEAD MINNOW	LC50	4.00	S	NEWLY HAT FRY	2020	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	60	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	140	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	270	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	530	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	970	M	10614
PIMEPHALES PROMELAS FATHEAD MINNOW	MOR	2.00	F	EMBRYO, < 48 H	1740	M	10614
PIMEPHALES PROMELAS	MOR	20.00	F	EMBRYO, < 48 H	60	M	10614

FATHEAD MINNOW							
PIMEPHALES PROMELAS	MOR	20.00	F	EMBRYO, < 48 H	140	M	10614
FATHEAD MINNOW							
PIMEPHALES PROMELAS	MOR	20.00	F	EMBRYO, < 48 H	270	M	10614
FATHEAD MINNOW							
PIMEPHALES PROMELAS	MOR	20.00	F	EMBRYO, < 48 H	530	M	10614
FATHEAD MINNOW							
PIMEPHALES PROMELAS	MOR	20.00	F	EMBRYO, < 48 H	970	M	10614
FATHEAD MINNOW							
RHITHROPANOPEUS HARRISII	MOR		R	NR	1	M	5009
MUD CRAB							
RHITHROPANOPEUS HARRISII	MOR		R	NR	10	M	5009
MUD CRAB							
RHITHROPANOPEUS HARRISII	MOR		R	NR	50	M	5009
MUD CRAB							
RHITHROPANOPEUS HARRISII	MOR		R	NR	100	M	5009
MUD CRAB							
RHITHROPANOPEUS HARRISII	MOR		R	NR	1000	M	5009
MUD CRAB							
SALMO GAIRDNERI	LC50	4.00	S	NR	6470	U	730
RAINBOW TROUT,DONALDSON TROUT							
SALMO GAIRDNERI	LC50	4.00	NR	NR	6470	U	736
RAINBOW TROUT,DONALDSON TROUT							
SALMO GAIRDNERI	LC50	4.00	S	1.5 G	2600	U	666
RAINBOW TROUT,DONALDSON TROUT							
SKELETONEMA COSTATUM	PGR	4.00	S	NR	500000	M	6575
DIATOM							
SKELETONEMA COSTATUM	PGR	4.00	S	NR	700000	M	6575
DIATOM							
SKELETONEMA COSTATUM	PGR	4.00	S	NR	750000	M	6575
DIATOM							
SKELETONEMA COSTATUM	PGR	4.00	S	NR	600000	M	6575
DIATOM							
TETRAHYMENA PYRIFORMIS	EC50GR	1.00	S	0.2 ML	2200	U	11258
CILIATE							

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AUTHOR(S): BUCCAFUSCO,R.J., S.J.ELLS, AND G.A.LEBLANC
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SOURCE: BULL. ENVIRON. CONTAM. TOXICOL. 26(4):446-452

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TITLE: THE EFFECTS OF THREE PHTHALATE ESTERS ON THE LARVAL DEVELOPMENT OF THE GRASS SHRIMP PALAEMONETES PUGIO (HOLTHUIS)
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SOURCE: BULL. ENVIRON. CONTAM. TOXICOL. 25(1):75-78

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AUTHOR(S): STREUFERT,J.M. AND H.O.SANDERS
YEAR: 1977
TITLE: CHRONIC EFFECTS OF TWO PHTHALIC ACID ESTERS ON MIDGE CHIRONOMUS PLUMOSUS
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AUTHOR(S): PFUDERER,P. AND A.A.FRANCIS
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TITLE: EFFECT OF PHTHALATE ESTERS ON SHRIMP
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AUTHOR(S): LOEB,H.A. AND W.H.KELLY
YEAR: 1963
TITLE: ACUTE ORAL TOXICITY OF 1,496 CHEMICALS FORCE-FED TO CARP
SOURCE: U.S. FISH. WILDL. SERV., SP. SCI. REP.- FISH. NO. 471, WASHINGTON, D.C.: 124 P.