Dimethyl terephthalate (DMT); CASRN 120-61-6

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the IRIS assessment development process. Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the guidance documents located on the IRIS website.

STATUS OF DATA FOR Dimethyl terephthalate (DMT)

File First On-Line 01/31/1987

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	01/31/1987
Inhalation RfC (I.B.)	not evaluated	
Carcinogenicity Assessment (II.)	not evaluated	

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name — Dimethyl terephthalate (DMT)
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Last Revised — 01/31/1987

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of

information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Chronic kidney inflammation **Rat chronic dietary study** **NCI, 1979**	NOEL: none LOAEL: 500 ppm of diet (125 mg/kg bw/day)	1000	1	1E-1 mg/kg/day

*Conversion Factors -- Rat food consumption assumed to be 5% of bw/day

I.A.2. Principal and Supporting Studies (Oral RfD)

NCI (National Cancer Institute). 1979. Bioassay of dimethyl terephthalate for possible carcinogenicity. DHEW/PUB/NIH 79-1376, NCI-CG-TR121.

In the NCI (1979) study mice and rats (50/sex/group) were fed dimethyl terephthalate (DMT) at levels of 0, 2500, and 5000 ppm (diet) for 103 weeks. A small but dose-related increase in the incidence of chronic kidney inflammation was shown for male mice and female rats; the incidence for male mice was 2/49, 4/49, and 11/49, and for female rats was 3/49, 5/49, and 8/49 for the control, low-dose and high-dose groups, respectively. Statistics were not given. Subchronic preliminary studies showed mild liver effects but no indication of kidney toxicity. The rat LOAEL is used since it is lower in mg/kg bw/day than the mouse LOAEL (125 vs. 325 mg/kg/day, respectively).

Krasavage et al. (1973) reported a statistically significant decrease in body weight gain for male Long-Evans rats fed DMT at about 1000 mg/kg/day for 96 days. Dose levels of 250 and 500 mg/kg/day DMT reduced body weight gain slightly, but the reductions were not statistically significant. Hematologic, clinical chemistry, liver and kidney weight, and histopathologic parameters were similar in treated and control animals. Krasavage et al. (1973) also reported

significantly reduced weight of offspring at weaning for rats fed DMT at 500 and 1000 mg/kg bw/day for 2-3 months. No effects were observed at 250 mg/kg bw/day.

Short-term studies in rats have shown that levels of about 500-1000 mg/kg/day DMT are associated with urinary acidosis and attendant calciuria. DMT at 1500 mg/kg/day is associated with the induction of bladder stones. No other information on the chronic toxicity of DMT was found.

The interpretation of the NCI (1979) data as evidence of dose-related effects for kidney inflammation is weakened by the low number of doses and magnitude of response and the lack of statistical support. However, the effect is observed in two species, and short-term studies show urinary tract effects at higher doses.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF — The UF of 1000 includes uncertainties in the following areas: extrapolation of experimental animal data to man, the range of human sensitivity, and extrapolation from a LOAEL to a hypothetical NOEL.

MF — None

I.A.4. Additional Studies/Comments (Oral RfD)

Data adequately assessing the teratogenic potential of DMT are not found

I.A.5. Confidence in the Oral RfD

Study — Medium
Database — Low
RfD — Low

The medium confidence level assigned to the principal study reflects both the strengths (large number of animals, extensive histopathology, length of study) and the weaknesses (lack of other toxicologic parameters, limited dose range) inherent to a study primarily designed to assess carcinogenic potential. The database is rated low because of the general lack of supporting data and the absence of a NOAEL. Overall confidence in the RfD is low.

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document — U.S. EPA, 1984

The ADI in the 1984 Health and Environmental Effects Profile has received an Agency Review with the help of two external scientists.

Other EPA Documentation — None

Agency Work Group Review — 10/09/1985

Verification Date — 10/09/1985

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the RfD for Dimethyl terephthalate (DMT) conducted in November 2001 identified one or more significant new studies. IRIS users may request the references for those studies from the IRIS Hotline at hotline.iris@epa.gov or (202)566-1676.

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name — Dimethyl terephthalate (DMT)
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Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Dimethyl terephthalate (DMT)
CASRN — 120-61-6

This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.

III. [reserved]
IV. [reserved]
V. [reserved]

VI. Bibliography

Substance Name — Dimethyl terephthalate (DMT)
CASRN — 120-61-6

VI.A. Oral RfD References

Krasavage, W.J., F.J. Yanno and C.J. Terhaar. 1973. Dimethyl terephthalate (DMT). Acute toxicity subacute. Feeding inhalation studies in male rats. Am. Ind. Hyg. Assoc. J. 34(10): 455-462.

NCI (National Cancer Institute). 1979. Bioassay of Dimethyl Terephthalate for Possible Carcinogenicity. DHEW/PUB/NIH 79-1376, NCI-CG-TR121.

U.S. EPA. 1984. Health and Environmental Effects Profile for Dimethyl Terephthalate. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste, Washington, DC.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — Dimethyl terephthalate (DMT)
CASRN — 120-61-6

Date	Section	Description
12/03/2002	I.A.6.	Screening-Level Literature Review Findings message has been added.

VIII. Synonyms

Substance Name — Dimethyl terephthalate (DMT)
CASRN — 120-61-6
Last Revised — 01/31/1987

- 120-61-6
- 1,4-BENZENEDICARBOXYLIC ACID, DIMETHYL ESTER
- DIMETHYL 1,4-BENZENEDICARBOXYLATE
- DIMETHYLESTER KYSELINY ISOFTALOVE
- DIMETHYL p-PHTHALATE
- Dimethyl Terephthalate
- DMT
- METHYL 4-CARBOMETHOXYBENZOATE
- NCI-C50055
- TEREPHTHALIC ACID, DIMETHYL ESTER
- TEREPHTHALIC ACID METHYL ESTER