Permethrin ; CASRN 52645-53-1

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 Permethrin

File First On-Line 03/31/1987

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	03/31/1987
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 — Permethrin
CASRN — 52645-53-1
Last Revised — 03/31/1987

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
Increased liver weights **2-Year Rat Feeding Study** **FMC Corp., 1977**	NOEL: 100 ppm (diet) (5 mg/kg/day) LEL: 500 ppm (diet) (25 mg/kg/day)	100	1	5E-2 mg/kg/day

*Conversion Factors: 1 ppm = 0.05 mg/kg/day (assumed rat food consumption)

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

FMC Corporation. 1977. MRID No. 00057105, 00070950, 00110686. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Four groups of 60 male and 60 female Long-Evans rats were dosed at either 0, 20, 100 or 500 ppm (0, 1, 5 or 25 mg/kg/day) for 104 weeks. No effects were noted at 1 mg/kg/day, but slight liver weight increases were seen at 5 mg/kg/day; this increase is considered below the level of toxicological significance. A definite effect level for liver weight increases was observed at 25 mg/kg/day.

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

UF — Based on a chronic exposure study, an uncertainty factor of 100 was used to account for inter- and intraspecies differences.

MF — None

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

Data Considered for Establishing the RfD:

1) 2-Year Feeding (oncogenic) - rat: Principal study - see previous description; core grade minimum

2) 1-Year Feeding - dog: NOEL=5 mg/kg/day; LEL=100 mg/kg/day (increased alkaline phosphatase, increased liver weights and hepatocellular swelling); core grade guideline (ICI Americas, Inc., 1982)

3) 3-Generation Reproduction - rat: NOEL=none; LEL=500 ppm (25 mg/kg/day) (offspring show centrilobular hepatocyte hypertrophy and cytoplasmic eosinophilia and buphthalmos with persistent pupillary membranes; body tremors in parents at 1000 ppm and 2500 ppm and in offspring at 2500 ppm); core grade guideline (FMC Corp., 1978)

4) Teratology - rat: Not teratogenic at 200 mg/kg; no definite maternal or fetotoxic effects evident; core grade minimum (FMC Corp., 1976a)

5) Teratology - rabbit: Not teratogenic at 400 mg/kg; no definite maternal or fetotoxic effects evident; core grade minimum (FMC Corp., 1976b)
q Other Data Reviewed:

1) 2-Year Feeding (oncogenic) - mice: Systemic NOEL=20 ppm (3 mg/kg/day); Systemic LEL=2500 ppm (375 mg/kg/day) in females (liver and lung weight increases); 500 ppm (75 mg/kg/day) in males (testis weight depression deaths); no core grade (FMC Corp., 1979)

Data Gap(s): None

I.A.5. Confidence in the Oral RfD

Study — High
Database — High
RfD — High

The critical study is of good quality and is given a high confidence rating. Additional studies are very supportive; therefore, the database is given a high confidence rating. High confidence in the RfD follows.

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

Source Document — This assessment is not presented in any existing U.S. EPA document.

Other EPA Documentation — Pesticide Registration Files

Agency Work Group Review — 10/28/1986

Verification Date — 10/28/1986

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 permethrin conducted in August 2003 did not identify any critical new studies. IRIS users who know of important new studies may provide that information to 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 — Permethrin
CASRN — 52645-53-1

Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Permethrin
CASRN — 52645-53-1

Not available at this time.

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

VI. Bibliography

Substance Name — Permethrin
CASRN — 52645-53-1

VI.A. Oral RfD References

FMC Corporation. 1976a. MRID No. 00029824, 00057099, 00070579. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

FMC Corporation. 1976b. MRID No. 00029826, 00057101, 00070580. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

FMC Corporation. 1977. MRID No. 00057105, 00070950, 00110686. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

FMC Corporation. 1978. MRID No. 00069702, 00120271. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

FMC Corporation. 1979. MRID No. 00027579, 00029495, 00044323, 00061901, 00062806, 92142033. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

ICI Americas, Inc. 1982. MRID No. 00129600, 92142031. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — Permethrin
CASRN — 52645-53-1

Date	Section	Description
10/28/2003	I.A.6	Screening-Level Literature Review Findings message has been added.

VIII. Synonyms

Substance Name — Permethrin
CASRN — 52645-53-1
Last Revised — 03/31/1987

- 52645-53-1
- AI3-29158
- AMBUSH
- BW-21-Z
- CYCLOPROPANECARBOXYLIC ACID, 3-(2,2-DICHLOROVINYL)-2,2-DIMETHYL-, 3-PHENOXYBENZYL ESTER, (+-)-, (cis,trans)-
- ECTIBAN
- EXMIN
- FMC 33297
- FMC 41655
- ICI-PP 557
- KESTREL
- NDRC-143
- NIA 33297
- OUTFLANK
- OUTFLANK-STOCKADE
- Permethrin

- PERMETRIN
- PERMETRINA
- PERMITRENE
- 3-PHENOXYBENZYL (+-)-3-(2,2-DICHLOROVINYL)-2,2-DIMETHYLCYCLOPROPANECARBOXYLATE
- (3-PHENOXYPHENYL)METHYL-3-(2,2-DICHLORETHENYL)-2,2-DIMETHYLCYCLOPROPANECARBOXYLATE
- POUNCE
- PP 557
- S-3151
- SBP-1513
- TALCORD
- WL 43479