10-28-86

REFERENCE DOSE FOR CHRONIC ORAL EXPOSURE (RfD)

Substance Name: Permethrin
CASRN: 52645-53-1

The Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis, but may not exist for other toxic effects such as carcinogenicity. 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 Oral RfD Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of compounds which 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 the Carcinogenicity Assessment Section of this file when a review of that evaluation is completed.

RfD ASSESSMENT SUMMARY TABLE

Crit. Dose: 5 mg/kg-day [Study 1 NOAEL(adj)]
UF: 100 MF: 1 RfD: 5E-2 mg/kg-day Confidence: High

Crit Effect: (1) Increased liver weights

	NOAEL (Study 1)	LOAEL (Study 1)
Reported	100 ppm (diet)	500 ppm (diet)
ADJ	5 mg/kg-day	25 mg/kg-day
Study Type	2-Year Rat Feeding Study	2-Year Rat Feeding Study
Reference	FMC Corp., 1977	FMC Corp., 1977

1) FMC Corp., 1977
2-Year Rat Feeding Study

Critical Effect: Increased liver weights

Defined Dose Levels:
NOAEL= 100 ppm (diet)
NOAEL(ADJ)= 5 mg/kg-day
LOAEL= 500 ppm (diet)
LOAEL(ADJ)= 25 mg/kg-day

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

DISCUSSION OF PRINCIPAL AND SUPPORTING STUDIES

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 (1)

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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.

UNCERTAINTY AND MODIFYING FACTORS

UNCERTAINTY FACTORS:

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

ADDITIONAL COMMENTS / STUDIES

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)

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

CONFIDENCE IN THE RfD

Study: High Data Base: High RfD: High

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

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EPA DOCUMENTATION AND REVIEW

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

Other EPA Documention: Pesticide Registration Files

Agency Work Group Review: 10/28/86

Verification Date: 10/28/86

EPA CONTACTS

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

REVISION HISTORY

01/92 RfD Add Com: Citations added