REFERENCE DOSE FOR CHRONIC ORAL EXPOSURE (RfD)

Substance Name: Biphenthrin
CASRN: 82657-04-3
Primary Synonym: Talstar

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: 1.5 mg/kg-day [Study 1 NOAEL]
UF: 100 MF: 1 RfD: 1.5E-2 mg/kg-day Confidence: High

Crit Effect: (1) Tremors

	NOAEL (Study 1)	LOAEL (Study 1)
Reported	1.5 mg/kg-day	3.0 mg/kg-day
ADJ	1.5 mg/kg-day	3.0 mg/kg-day
Study Type	1-Year Dog Feeding Study	1-Year Dog Feeding Study
Reference	FMC Corporation, 1985	FMC Corporation, 1985

1) FMC Corporation, 1985
1-Year Dog Feeding Study

Critical Effect: Tremors

Defined Dose Levels:
NOAEL= 1.5 mg/kg-day
NOAEL(ADJ)= 1.5 mg/kg-day
LOAEL= 3.0 mg/kg-day
LOAEL(ADJ)= 3.0 mg/kg-day

Conversion Factors: 1 ppm = 0.025 mg/kg/day (assumed dog food consumption)

DISCUSSION OF PRINCIPAL AND SUPPORTING STUDIES

FMC Corporation. 1985. Accession No. 264637. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Beagle dogs (23 to 29 weeks of age; 4 dogs/sex/dose) were administered biphenthrin in the diet at concentrations of 0 (Group 1), 0.75 (Group 2), 1.5

(Group 3), 3.0 (Group 4), and 5.0 (Group 5) mg/kg/day for 52 weeks. Animals were inspected daily for appearance, behavior, appetite, and fecal elimination and twice daily for signs of toxicity and mortality. The findings of note include tremors in groups 4 and 5. Tremors were intermittent in one male and two females of group 4 between weeks 15 and 23. All group 5 dogs displayed tremors between weeks 15 and 29. Males appeared to display a greater incidence of tremors. Tremors did not persist past week 29. No other treatment-related effects were noted.

UNCERTAINTY AND MODIFYING FACTORS

UNCERTAINTY FACTORS:

An uncertainty factor of 100 was used, 10 each to account for the inter- and intraspecies differences.

ADDITIONAL COMMENTS / STUDIES

The NOELs for developmental effects in rats are lower than the NOEL chosen to establish the RfD. However, it is concluded that the RfD is sufficiently low to account for developmental effects, providing a significant margin of safety. Furthermore, the teratology study used dosing by gavage, which does not reflect dietary exposure.

Data Considered for Establishing the RfD

1) 1-Year Feeding - dog: Principal study - see previous description; core grade minimum

2) 2-Year Feeding (oncogenic) - rat: Systemic NOEL=50 ppm (2.5 mg/kg/day); Systemic LEL=100 ppm (5 mg/kg/day) (tremors, elevated body weight, higher but statistically significant liver and kidney organ-to-body weight ratios); core grade minimum (FMC Corp., 1986a)

3) 2-Generation Reproduction - rat: Maternal NOEL=30 ppm (1.5 mg/kg/day); Maternal LEL=60 ppm (3 mg/kg/day) (lower but statistically significant mean body weights of P1 and F1 females); Reproduction and Fetotoxic NOEL=100 ppm (5 mg/kg/day); Reproduction and Fetotoxic LEL=none; core grade minimum (FMC Corp., 1986b)

4) Teratology - rat: Maternal NOEL=1 mg/kg/day; Maternal LEL=2 mg/kg/day (HDT; tremors); Fetotoxic NOEL=1 mg/kg/day; Fetotoxic LEL=2 mg/kg/day (HDT; increased incidence of hydroureter without hydronephrosis, an equivocal finding); Teratogenic NOEL=2 mg/kg/day (HDT); Teratogenic LEL=none; core grade minimum (FMC Corp., 1984a)

5) Teratology - rabbit: Maternal NOEL=2.67 mg/kg/day; Maternal LEL=4 mg/kg/day (head and forelimb twitching); Fetotoxic and Teratogenic NOEL=8 mg/kg/day (HDT); Fetotoxic and Teratogenic LEL=none; core grade minimum (FMC Corp., 1984b)

Other Data Reviewed:

1) 13-Week Feeding - dog: NOEL=2.21 mg/kg/day; LEL=4.42 mg/kg/day (tremors); core grade minimum (FMC Corp., 1984c)

2) 90-Day Feeding - rat: NOEL=50 ppm (2.5 mg/kg/day); LEL=100 ppm (5 mg/kg/day) (tremors in some males and females during first 16 days); core grade minimum (FMC Corp., 1984d)

Data Gap(s): None

CONFIDENCE IN THE RfD

Study: Medium Data Base: High RfD: High

The critical study is of adequate quality and is given a medium confidence rating. The data base is given a high confidence rating due to the similarities of NOELs in the supporting data. High confidence in the RfD follows.

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: 02/25/88, 05/25/88, 07/20/88

Verification Date: 07/20/88

EPA CONTACTS

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BIBLIOGRAPHY

FMC Corporation. 1985. EPA Accession No. 264637. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1986a. EPA Accession No. 26194042, 26194447. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1986b. EPA Accession No. 26193335, 26193739. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1984a. EPA Accession No. 254409. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1984b. EPA Accession No. 254410. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1984c. EPA Accession No. 254408. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

FMC Corporation. 1984d. EPA Accession No. 254407. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

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REVISION HISTORY

08/88 RfD Data: Oral RfD summary on-line