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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 8 1991

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Calculation of Margins of Exposure (MOE) for Developmental Toxicity for Handlers of Goal 1.6E (Oxyfluorfen) in the Treatment of Various Crops and Fallow Land

Project No.: 9-1162
Caswell No.: 188AAA

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(for RG)

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Requested Action

Calculate Margins of Exposure (MOE) for developmental toxicity for workers exposed to oxyfluorfen from various crop uses.

Conclusion and Recommendation

Based on surrogate exposure data and a NOEL of 10 mg/kg/day for developmental toxicity in rabbits, the MOE for developmental toxicity for workers who use oxyfluorfen routinely have been calculated. These MOE range from 370 to 200,000.

HG

Review

In the June 4, 1990 memorandum from Arthur O. Schlosser of NDEB (attached), worker exposure to oxyfluorfen from various crops has been calculated.

Previously, the toxicological effect of concern was the developmental toxicity NOEL of 10 mg/kg/day in rabbits (the LEL is 30 mg/kg/day and the effect is fused sternebrae). The exposure data presented in the NDEB memorandum were not corrected for skin penetration. On the basis of a skin penetration study with nitrofen, a diphenyl ether similar to oxyfluorfen, an absorption factor of 1.0 percent will be used. (see attached memo Feb. 12, 1991)

Based on the information on pages 12 and 13 of the NDEB memorandum (attached), the following exposure information is estimated to represent the possible range of exposure. In many instances, surrogate data were used where gloves were worn by the workers, whereas the Goal 1.6E label does not specify that gloves be worn by workers.

A. Calculation of Exposure in the Cotton Fallow Bed

1. Daily dermal exposure to the mixer/loader (open pour, wearing protective gloves but not wearing protective clothing) = 414 acres treated per day x 0.5 lb/A handled x 0.93 mg ai/lb handled = 193 mg/day.

2. Daily dermal exposure to the mixer/loader (closed loading, wearing protective gloves but not wearing protective clothing) = 414 acres treated per day x 0.5 lb ai/A handled x 0.015 mg ai/lb handled = 3.1 mg/day.

3. Daily dermal exposure to the applicator (pilot) = 0.58 mg/hour x 1.2 hours/day x 0.5 (an adjustment for application rate) = 0.35 mg/day.

4. Daily dermal exposure to the flagger, if used (long-sleeved shirt and long pants, standing in the open and attempting to remain upwind of the spraying) = 3.2 mg/hour unit dermal exposure x 1.2 hours application time x 0.5 adjustment for application rate = 1.9 mg/day.

5. Daily respiratory exposure to an aerial applicator (pilot) = 0.018 mg/hour (unit exposure) x 1.2 hours application time x 0.5 adjustment = 0.011 mg/day. This is considered not significant compared to dermal exposure.

6. Daily respiratory exposure to a flagger (if used) = 0.18 mg/hour (unit exposure) x 1.2 hours application time x 0.5 adjustment = 0.11 mg/day. This is considered not significant compared to dermal exposure.

B. Exposure Estimates From Other Uses

The range of worker exposure was from 0.54 mg/day (corn) to 5.5 mg/day (citrus). Therefore, the calculations of MOE for Cotton Fallow Bed may be applicable to these other uses.

Calculation of MOE for Cotton Fallow Bed Workers

A body weight of 70 kg and a skin penetration of 1 percent are assumed to be appropriate for the calculation of risk.

	NOEL		Bwt	Dermal Penetration

MOE = 10 mg/kg/day ÷ (exposure ÷ 70 kg x 0.01)

1. Mixer/Loader (Open pour, no protective clothing, gloves)

MOE = 10 mg/kg/day ÷ (193 mg/day ÷ 70 kg x 0.01)

MOE = 370

2. Mixer/Loader (Closed loading, no protective clothing, gloves)

MOE = 10 mg/kg/day ÷ (3.1 mg/day ÷ 70 kg x 0.01)

MOE = 22,727

3. Pilot

MOE = 10 mg/kg/day ÷ (0.35 mg/day ÷ 70 kg x 0.01)

MOE = 200,000

4. Flagger

MOE = 10 mg/kg/day ÷ (1.9 mg/day ÷ 70 kg x 0.01)

MOE = 37,037

5. Pilot (respiratory) - Insignificant exposure.

6. Flagger (respiratory) - Insignificant exposure.

Attachment

cc: Arthur O. Schlosser, Chemist, Environmental Chemistry Review Section, NDEB/HED (H7509C)