EEB BRANCH REVIEW

DATE: IN 3-2-84  OUT 4-9-84

FILE OR REG. NO. 11678-5

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 1-12-84

DATE RECEIVED BY HED 2-28-84

RD REQUESTED COMPLETION DATE 4-28-84

EEB ESTIMATED COMPLETION DATE 4-21-84

RD ACTION CODE/TYPE OF REVIEW 655/Reg. Std.

TYPE PRODUCT(S): I, D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). 252228

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Endosulfan

COMPANY NAME Makhteshim-Agan (America) Inc.

SUBMISSION PURPOSE Submission of mallard duck acute oral LD50 study in support of registration standard

SHAUGHNESSEY NO. CHEMICAL, & FORMULATION % A.I.

079401 Endosulfan - technical 97
MEMORANDUM

17 APR 1984

TO:        G. LaRocca, PM Team
           Registration Division, TS-767c

THRU:      Dave Coppedge, Head Sec. 3
           Ecological Effects Branch
           Hazard Evaluation Division, TS-769c

THRU:      Clayton Bushong, Chief
           Ecological Effects Branch
           Hazard Evaluation Division, TS-769c

Subject:   Acute Oral LD$_{50}$ Study of Mallard Duck with Endosulfan;
           Acc. No. 252228.

The following study was reviewed and is acceptable to support registrations
under the endosulfan registration standard.

(LD$_{50}$) of endosulfan technical to the Mallard duck. Prepared by
Huntingdon Research Centre, Cambridgeshire, England; submitted by

The acute oral LD$_{50}$ of technical endosulfan to Mallards (Anas platyrynchos
is 28 mg/kg (22-36 mg/kg).

John J. Rascietto
Wildlife Biologist, Sec. 3
Ecological Effects Branch
Hazard Evaluation Division, TS-769c
DATA EVALUATION RECORD

1. **CHEMICAL:** Endosulfan

2. **FORMULATION:** Technical, 97.2%


4. **REVIEWED BY:** John J. Bascietto
   Wildlife Biologist
   EEB/HED

5. **DATE REVIEWED:** 4/12/84

6. **TEST TYPE:** Avian acute oral LD₅₀
   
   A) Mallard duck (*Anas platyrhynchos*)

7. **REPORTED RESULTS:**

   
   \[ \text{LD}_50 = 28 \text{ mg/kg (22-36 mg/kg)} \]
   
   (95% c.i.)

8. **REVIEWER'S CONCLUSIONS:** The study is scientifically sound. With an \[ \text{LD}_50 = 28 \text{ mg/kg (22-36 mg/kg)} \], Endosulfan technical is considered "highly toxic" to representative waterfowl tested (mallard duck). The study fulfills the guidelines requirements for an avian acute toxicity study (oral LD₅₀) for wild waterfowl.
9. Materials/Methods

A.) Procedures - the protocol used was that recommended by the current pesticide hazard assessment guidelines (EPA - 540/9-82-024) Subdivision E, Oct., 1982.

B.) Statistical Analysis - the authors calculated the LD$_{50}$ and 95% confidence interval using the dose-mortality data and the Finney probit analysis method (Finney, D.J. 1971. Probit Analysis. 3rd ed., Cambridge University Press).

10. Results

Table 1 gives the dose-response (mortality) data given in the report. Corn oil control birds (0 mg/kg) had no mortality. Most mortality was observed within 2 hours of dose with no deaths occurring more than 4 hours after dose.

(Survivors were observed for 14 days for general health, body weight and food consumption).

<table>
<thead>
<tr>
<th>GROUP AND DOSE</th>
<th>NO DEAD/10 BIRDS PER GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Corn oil control 0 mg/kg</td>
<td>0</td>
</tr>
<tr>
<td>2. Endosulfan 5 mg/kg</td>
<td>0</td>
</tr>
<tr>
<td>3. &quot; 10 mg/kg</td>
<td>0</td>
</tr>
<tr>
<td>4. &quot; 20 mg/kg</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>5. &quot; 40 mg/kg</td>
<td>9 (90%)</td>
</tr>
<tr>
<td>6. &quot; 80 mg/kg</td>
<td>10 (100%)</td>
</tr>
</tbody>
</table>

Soon after dosing (by oral gavage) birds in groups receiving acutely toxic doses (Groups 4-6) showed signs of intoxication, i.e., unsteadiness. Survivors of the 20 and 40 mg/kg treatments continued to exhibit unsteady behavior for several hours. 9 out of 10 birds in Group 6 died within 1 1/2 hours; the last bird in Group 6 died at 4 hours after dose.

Groups 1-3 showed weight gains overall, during 7 days following treatment. Both increases and decreases in weight were seen between Days 7-14 after dose, but were "less marked" with both increases and decreases occurring within treatment groups. Food consumption appeared "normal" although variation was observed.

There were "no abnormalities" observed upon gross necropsy of all birds.

11. Reviewers Evaluation

A. Procedures: acceptable
B. Statistics: acceptable

C. Results: the results indicate that endosulfan technical is "highly toxic" to mallard ducks. The LD$_{50}$ is 28 (22-36) mg/kg. A review of the raw body weight and food consumption data provided on individuals (body weights) and group means (food consumption) shows that the authors conclusions regarding these parameters are reasonable.

D. Conclusions

1. Category: Core
2. Rationale: Guidelines study.
3. Repair: N/A