

D171726 & D161567  
DPBARCODE (RECORD)  
121601  
SHAUGHNESSY NO

REVIEW NO.

EEB REVIEW

DATE IN: 12-3-91 OUT: 1-23-92  
ASSIGNED: 12-6-91  
CASE # : 194562  
SUB. # : S406663  
ID # : 10182-EUP-LU

DATE OF SUBMISSION 10-15-91

DATE RECEIVED BY EFED 12-3-91

SRRD/RD REQUESTED COMPLETION DATE 2-15-92

EEB ESTIMATED COMPLETION DATE 2-15-92

SRRD/RD ACTION CODE/TYPE OF REVIEW 714 EUP AMND

MRID #(S) \_\_\_\_\_

DP TYPE 001

PRODUCT MANAGER, NO. JOANNE MILLER 23 JESSE MAYES

PRODUCT NAME(S) ACETOCHLOR 6.4EC

TYPE PRODUCT SELECTIVE HERBICIDE

COMPANY NAME ICI AMERICA'S

SUBMISSION PURPOSE REVIEW AMENDMENT TO PREVIOUSLY SUBMITTED  
EUP PROPOSAL, ADD ADDITIONAL ACREAGE

COMMON CHEMICAL NAME ACETOCHLOR, ACENIT

REVIEWER: MIKE DAVY

## Ecological Effects Branch Review

Chemical: Acetochlor (ICIA5676 6.4EC)

### 100 Submission and Purpose and Label Information

#### 100.1 Submission Purpose and Pesticide Use

The registrant (ICI Agricultural Products) is requesting an Experimental Use Permit (EUP) to conduct field testing on popcorn and field corn for 1992 and 1993 with ICIA5676 6.4EC herbicide (acetochlor). This review will address two EUP requests made by ICI. The EUP submitted under D161567 and an amendment under D171726.

#### 100.2 Formulation Information

Active Ingredient:

Acetochlor.....70.87%

Inert Ingredients.....29.13%

Contains 6.4 pounds active ingredient per gallon.

#### 100.3 Application Methods, Directions, Rates

##### 1. States, amounts, acreage

The listing of the states, amounts and acreage are attached. This testing will be located at 43 states in 1992 and 1993 involving a total of 3740 and 7840 acres and 3300 and 6600 pounds of active ingredients respectively.

##### 2. Directions for application

ICIA5676 6.4EC will be applied with liquid or dry fertilizer and/or in water and may be tank mixed with atrazine, bladex, or gramoxone extra (with a surfactant nonionic active ingredient) according to the labeled rates. The application rate ranges from 1 pint/A (0.8 lbs. ai) to 3 pints/A (2.4 lbs. ai) for field corn or popcorn. Application is to be done as preemergence, pre-plant incorporation, or postplant-preemergence in conventional or no-tillage systems. The application is to be done only once before the corn plant emerges from the surface.

#### 100.4 Target Organisms

Target pests will include barnyardgrass, broadleaf signalgrass, ragweed, crabgrass, fall panicum, field sandbur, giant foxtail, goosegrass, green foxtail, lambquarters, red rice, pigweed, seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow foxtail and yellow nutsedge.

## 100.5 Precautionary Labeling

### Environmental Hazards

"Do not apply directly to water or wetlands. Do not contaminate water when disposing of equipment washwaters."

## 101 Hazard Assessment

### 101.1 Discussion

The maximum labeled rate of this product is 3 pint/A (2.4 lbs. ai) applied to conventional, reduced tillage, or no-tillage systems. Only one treatment of this product is to be applied to corn. Since the label did not prohibit aerial application we would assume that aerial application as well as ground application will be used.

Data from EFGWB suggest that acetochlor is stable in aquatic systems with a hydrolytic half life greater than 24 months and is moderately to highly mobile in soil adsorption and column leaching studies. Microbial metabolism is a major pathway of degradation for acetochlor. This product dissipates in <3 days when applied to California sandy soil. However, it may be stable on foliage since photodegradation and volatilization are negligible. The mode of action for acetochlor is adsorption through the coleoptile of germinating seedlings and secondarily via the root system.

#### **Terrestrial exposure**

Below are the maximum expected residues (ppm) on vegetation immediately after one application of 2.4 lb. ai/A (based on Hoerger and Kenaga, 1972).

range grass	grass	leaves & leafy crop	forage crop & insect	Pods with seeds	grain	fruits
576	264	300	139	28	24	16

#### **Aquatic exposure**

Aquatic exposure will occur via runoff from ground application and via both runoff and spray drift from aerial applications. The following represents a scenario of runoff into a 1 acre pond from a 10 acre drainage basin.

#### A. Ground Application

Assuming the product is applied to a 10 acre field by ground equipment and 5% runoff occurs, the water concentration in an adjacent 1 acre field 6 feet deep could be 73.2 ppb (0.073 ppm) (10A x 2.4 lb. ai/A x 5% x 61 ppb). In 6 inches of water, the concentration could be 881 ppb (0.881 ppm).

#### B. Aerial Application

Assuming this product is applied aerially to a 10 acre field and 5% runoff occurs, the water concentration in an adjacent 1 acre field 6 feet deep could be 51 ppb or 0.05 ppm ( $([10A \times 2.4 \text{ lb. ai/A} \times 60\% \text{ application efficiency} \times 5\% \text{ runoff}] + [2.4 \text{ lb. ai/A} \times 5\% \text{ drift}]) \times 61 \text{ ppb}$ ). In 6 inches of water, the concentration could be 616 ppb (0.616 ppm).

### 101.2 Likelihood of Adverse Effects to Nontarget Organisms

#### Terrestrial Organisms

Data from avian single-dose oral and dietary studies indicate that acetochlor is slightly toxic to birds (mallard duck  $LD_{50}$  = 1788 mg/kg; bobwhite and mallard dietary  $LC_{50}$ 's >4610 and >4171 ppm, respectively).

Acetochlor is slightly toxic to mammals with a lowest oral  $LD_{50}$  of 1550 mg/kg rats. The systemic and reproductive NOEL for rats was 500 ppm, respectively, in a two-generation reproduction test. The reproduction study concluded in a decreased weight gain in pups. However, HED has identified that acetochlor is a carcinogenic risk to mammals, affecting the liver and sinus areas.

EEB has chronic avian concerns primarily because acetochlor is carcinogenic to mammals. In addition, available data suggest that acetochlor is persistent. EEB concludes, therefore that some chronic risks appear likely to mammals and birds under the conditions of the EUP. Avian reproduction studies have been submitted and are currently in review.

The daily maximum expected residues do not exceed the avian acute  $LC_{50}$  (>1788 ppm). However, these residues do exceed the mammalian NOEL (500 ppm). Based on the use rates on the label, a scenario may exist when acetochlor may exceed the grazing or herbivore mammalian NOEL's on tall grass. It appears that mammals may have chronic hazards to acetochlor at the maximum labeled rate. Under the conditions of the EUP, with minimal acreage and one time spraying, chronic effects are lessened.

### Beneficial Insects

Application to corn will not result in exposure of bees to acetochlor since the application is made at a time when the chemical will not be present on the pollen grains. No hazard is expected since this pesticide tested practically nontoxic to honey bees in an acute study and will not be available to the bees.

### Aquatic Organisms

It seems that acetochlor would have moderately acute effects on daphnids (Daphnia  $LC_{50}$  = 8.2 ppm) and bluegill ( $LC_{50}$  = 1.6 ppm) and is highly toxic to trout ( $LC_{50}$  = 0.38 ppm). **Adverse acute effects are expected** for fish (rainbow trout) at the labeled rate of acetochlor on corn.

### Plants

The Ecological Effects Branch has reviewed the Selenastrum capricornutum nontarget aquatic plant (123-2) study submitted by ICI.

The  $EC_{50}$  value for the Selenastrum capricornutum aquatic plant is 1.43 ppb and is less than the above the aquatic EEC scenario described above. From the above aquatic EEC scenario, it could be assumed that acetochlor would have an adverse impact on aquatic plants from ground or aerial application in corn fields.

### 101.3 Endangered Species Considerations

The endangered species triggers are as follows:

Birds: .....	178 ppm ( $LC_{50}$ 1788/10)
Mammals: * .....	1500 ppm ( $LC_{50}$ 15000 ppm/10)
Fish: .....	0.02 ppm ( $LC_{50}$ 0.38 ppm/20)
Aquatic Invertebrates: .....	0.41 ppm ( $LC_{50}$ 8.2 ppm/20)
Plants: .....	1.43 ppb ( $EC_{50}$ 1.43 ppb)

\* Based on the  $LD_{50}$  of 1500 mg/kg for the female rat.

A summary of the effect levels for acetochlor is as follows:

Acute oral $LD_{50}$ for mallard duck .....	1788 mg/kg
Dietary $LC_{50}$ for bobwhite quail .....	4610 ppm
for mallard duck .....	4171 ppm
Acute oral $LD_{50}$ for female rat .....	1500 mg/kg
Acute static toxicity for <u>Daphnia magna</u> .....	8.2 ppm
for bluegill sunfish .....	1.6 ppm
for rainbow trout .....	0.38 ppm
Acute toxicity- aquatic plants <u>Selenastrum capricornutum</u> ...	1.43 ppb

The maximum estimated residues on terrestrial food items (576 ppm) do not exceed 1/10th the lowest mammalian LC<sub>50</sub>'s. The estimated residues on long grass items do exceed the chronic systemic and reproductive NOEL for rats of 500 ppm. Therefore, **adverse chronic effects could be anticipated** for endangered mammals. The EEB is unable to address chronic risk to birds at this time.

The aquatic EEC (0.881 ppm) in water adjacent to treated areas exceeds that for endangered aquatic invertebrates and fish. The aquatic EEC in water adjacent to treated areas does exceed the EC<sub>50</sub> for aquatic plants. Therefore, **adverse effects are anticipated** for endangered/threatened plants, aquatic invertebrates and fish.

#### 101.4 Adequacy of Data

Seventeen studies with acetochlor were submitted by ICI for review under the current EPA guidelines. The following table indicates the status of each:

<u>Study type</u>	<u>MRID#</u>	<u>Category</u>
71-1 Oral Toxicity to Mallard	415651-29	Core
71-2 Dietary toxicity to Mallard	415651-30	Core
71-2 Dietary Toxicity to Bobwhite	415651-31	Core
71-4 Reproduction in Mallard	415920-09	In Review
71-4 Reproduction in Bobwhite (Vol. 1 & 2)	415920-10	In Review
72-1 Acute Toxicity to Rainbow Trout	415651-32	Core
72-1 Acute Toxicity to Bluegill Sunfish	415651-33	Core
72-2 Toxicity to <u>Daphnia magna</u>	415651-34	Core
72-4 <u>Daphnia magna</u> life cycle	415651-38	In Review
72-4 Chronic Tox. to Fathead Embryo/Larv	415920-11	In Review
72-3 Acute Toxicity to Mysid Shrimp	415651-35	Core
72-3 Acute Toxicity to Pacific Oyster	415651-36	Core
72-3 Acute Toxicity to Sheepshead Minnow	415651-37	Core
123-1 Seed Emerge & Vegetat Vigor-Plants	415651-40	Invalid
123-2 Growth & Reprod. of Aquatic Plant ( <u>Selenastrum capricornutum</u> )	415651-41	Core
141-1 Acute Toxicity to Honey Bee	415651-41	Core
----- Histopathological Report on LD <sub>50</sub> of Bobwhite	419633-04	In Review

The available data were sufficient to assess acute hazards to nontarget organisms for this EUP.

For registration under section 3, the following studies are requirements that are currently in review:

- 71-4 Avian reproduction studies for mallard and bobwhite
- 72-4 Chronic toxicity to fathead embryo and larvae and Daphnia magna life cycle.

For registration under section 3, the following studies are requirements that have been satisfied:

- 71-1 Oral toxicity to mallard
- 71-2 Dietary toxicity to mallard and bobwhite
- 72-1 Acute toxicity to trout, bluegill
- 72-2 Acute toxicity to Daphnia magna
- 72-3 Acute toxicity to mysid shrimp, pacific oyster and sheepshead minnow
- 123-2 Acute toxicity to aquatic plant- Selenastrum capricornutum

For registration under section 3, the following studies are currently outstanding:

123-2 Aquatic plant studies for freshwater diatoms, Lemna gibba, Skeletonema costatum and Anabaena flos-aquae because acetochlor is a herbicide.

123-1 Germination and seedling emergence studies and vegetative vigor studies for non-target plants because acetochlor is a herbicide.

Aerial droplet size (201-1) and Aerial field drift (201-2) studies because EEB has concerns for drift to non-target organisms.

In addition to the above, further data for registration under section 3 may be required depending on the results of the above and their impact on non-target organism: e.g. aquatic and terrestrial field studies.

#### 101.5 Adequacy of Labeling

Labeling is not adequate. Since the trout  $LC_{50}$  is <1 ppm, the Environmental Hazard Statement must read:

"This product is toxic to fish. Do not apply directly to water, areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters."

As a warning to the user concerning the hazard of drift to plants and aquatic organisms, EEB suggests the following statement that can be inserted with the Environmental Hazard Statement in a section 3 registration:

"This herbicide is phytotoxic at low concentrations. Non-target plants may be adversely affected from drift. Do not apply when weather conditions favor drift or runoff from areas treated."

Conclusion

EEB has completed a risk assessment of acetochlor (ICIA5676 6.4EC) and has determined that birds and mammals should not be adversely affected from the use of this chemical under the conditions of the EUP. Risk to aquatic organisms may be substantial but the limited acreage involved in the EUP and one time application are mitigating factors.

EEB **can not** fully evaluate the potential risk to endangered species of mammals, birds, fish, aquatic organisms and plants. We do have sufficient information to conclude that if acetochlor is used adjacent to a location of an endangered species habitat, endangered species **will be adversely affected**. We are unable to determine what risk are involved without **specific** locations of the sites of the proposed EUP.

See section 101.4 for status of data requirements.

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