

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: October 21, 1977

SUBJECT: Bicep 4.5L Herbicide EPA File Symbol 100-EUP-58 3
Caswell No: 63 Shaughnessy #080803

FROM: Toxicology Branch
Registration Division

TO: Libby Zink
Special Registration Division

Thru: O. E. Paynter
Chief, Toxicology Branch



Releaseable

Atrazine/Review # 12/10-21-77/10 pages

Recommendation

The acute oral LD₅₀, dermal LD₅₀, inhalation LC₅₀, skin and eye irritation studies are adequate. However, the label must be altered to reflect the severe ocular hazard as indicated in the 2 eye irritation studies.

The signal word "Danger" is required, followed by the addition of the precautionary statements: "Keep out of reach of children" Corrosive. Causes eye damage and skin irritation. Do not get in eyes, on skin or clothing. Wear goggles or face shield and rubber gloves when handling. Harmful if swallowed, inhaled or absorbed through the skin. Avoid breathing vapors or spray mist.

First Aid: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse.

*No RPAR criteria have been exceeded.

Review

The data submitted on the formulation were reviewed by L. Chitlik on 2/23/76. The results of the studies and their classification are summarized below:

1. Acute Oral Toxicity Study - (Industrial Bio-Test, IBT #601-07539, 11/7/75, submitted by Ciba-Geigy, Acc. #224074)

LD₅₀ = 4,680 mg/kg

Toxic Signs: Hypoactivity, salivation, muscular weakness, diarrhea, ruffled fur and rhinitis.

Ptosis, labored breathing, tremors and convulsions were observed only at the highest dose level (6,834 mg/kg).

Necropsy: red, discolored lungs; pale, discolored livers; pale, discolored kidneys and gastroenteritis.

TOX Category: III

Classification: Core-Minimum Data

(1) food consumption and bodyweight were not determined daily.

2. Acute Dermal Toxicity Study - (Industrial Bio-Test, IBT #601-07539, 11/7/75, submitted by Ciba - Geigy, Acc. #224074).

LD₅₀ > 2,000 mg/kg (no mortalities occurred)
Toxic Signs: well defined erythema, mild to moderate edema and focal, superficial, second degree burns.

Necropsy: unremarkable

TOX Category: III

Classification: Core-Minimum Data

- (1) although only one dose level was tested, the results of the dermal study are definitive since no deaths occurred. This corresponds well with results from the acute oral study, i.e. low acute toxicity of the test material.

3. Primary Eye Irritation Study - (Industrial Bio-Test IBT #601-07539, 11/7/75, submitted by Ciba - Geigy, Acc. #224074).

Washed Eyes: minor irritation of the conjunctivae, clearing by 72 hours.

Unwashed Eyes: corneal opacity in 3/3 animals at 72 hours, in 1/3 animals at 7 days, clearing by 14 days.

TOX Category: I

Classification: Core-Minimum Data

- (1) although data on only 3 animals with unwashed eyes were reported, the results are definitive - the material is a severe ocular irritant.

4. Primary Skin Irritation Study - (Industrial Bio-Test, IBT #601-07539, 11/7/75, submitted by Ciba - Geigy, Acc. #224074).

P. I. = 2.3/8.0

TOX Category: IV

Classification: Core-Minimum Data

- (1) readings were not made on 2 intact and 2 abraded skin sites.

5. Acute Aerosol Toxicity Study - (Industrial Bio-Test, IBT #663-07440, 10/21/75, submitted by Ciba - Geigy, Acc. #224074).

LC₅₀ > 14.4 mg/L (no mortality occurred)

Toxic Signs: salivation, dyspnea, ptosis and hypoacitivity clearing within 16 hours post-exposure.

Necropsy: unremarkable

TOX Category: IV

Classification: Core-Minimum Data

- (1) although only 1 dose level was tested, the level was sufficiently high to adequately define the toxicity of the test material.

The following 2 studies are newly submitted and reviewed below:

6. Primary Eye Irritation Study - (Industrial Bio-Test, IBT #601-08061, 1/23/76, submitted by Ciba-Geigy, Acc. #230687)

0.1 ml. of the test material was instilled into the right eye of each of 6 New Zealand albino rabbits. The cornea, iris and palpebral conjunctiva were graded for irritation and injury, according to Draize, at 1, 24, 48 and 72 hours and at 14 days post-instillation.

Results

Corneal opacity was present in 6/6 rabbits at 48 hours, 4/6 rabbits at 72 hours, 2/6 rabbits at 7 days and in 0/6 rabbits at 14 days.

TOX Category: I

Classification: Core-Minimum Data

- (1) an eye wash study was not performed in this experiment.

7. Acute Dermal Toxicity Study with a 1:4 Aqueous Suspension of Bicep 4.5 L - (Industrial Bio-Test, IBT #601-08061, 12/29/75, submitted by Ciba-Geigy, Acc. #230687)

2 male and 2 female New Zealand albino rabbits had the test material applied, at a rate of 16000 mg/kg, to the clipped skin of their backs under an occlusive dressing. The skin was abraded on 1/2 of the animals. At the end of the 24 hour exposure period the residual test material was removed. Observations for mortality, local skin reactions and behavioral abnormalities were continued for a period of 14 days post-administration. Necropsies were performed.

Results

LD₅₀ >16000 mg/kg (no deaths occurred)

Toxic Signs: barely perceptible to pale red erythema

Necropsy: unremarkable

TOX Category: N/A

Classification: Core-Minimum Data

- (1) although too few dose levels were tested, the results are definitive.

Notes:

- 1) Atrazine is on the list of pesticides potentially containing nitrosamines (see memo from PSO, 10/6/76)
- 2) The tolerance for atrazine on corn is in part supported by the following IBT data:

Atrazine

° 90-Day Subacute Oral with CGA-18762 Technical in Rats - (IBT #622-03719, 1/4/73)

° 90-Day Subacute Oral with CGA-18762 Technical in Dogs - (IBT #611-03715, 3/8/74)

° Acute Oral Toxicity Studies with CGA-18762 Metabolites in Albino Mice - (IBT #601-04896, 4/11/74)

William Greear

William Greear

Bicep™ 4.5L

3

Herbicide

For weed control evaluation
in corn grown for grain
excluding popcorn

FOR EXPERIMENTAL USE ONLY

Active Ingredients:

Atrazine: 2-chloro-4-ethylamino-6-isopropylamino-s-triazine	20.8%
Atrazine related compounds	1.1%
Metolachlor: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)acetamide	27.5%
Inert Ingredients:	50.6%
Total:	100.0%

Bicep 4.5L contains 4.5 lbs.
active ingredients per gal.

Keep Out of Reach of Children.

WARNING:

See additional precaution statements
at the end of this label.

EPA Experimental Use Permit No. 100-EUP-

EPA Est. No. 100-NC-2

Not for sale to any person other than a participant or
cooperator of the EPA-approved Experimental Use Program.

General Information

Bicep 4.5L is a selective herbicide for control of most annual grasses and certain broadleaf weeds in corn grown for grain.

Note (Bicep 4.5L and Tank Mixtures): Use only on corn grown for grain. Do not use on sweet corn or popcorn. Corn forage and fodder should not be grazed or fed to livestock or used for silage.

Sprayer Equipment: Use conventional spray equipment that provides accurate and uniform application. Screens and strainers should be no finer than 50-mesh. Rinse sprayer thoroughly with clean water immediately after use.

Mixing Instructions: Shake well before using. Bicep 4.5L may be mixed with water or fluid fertilizer and applied as a spray. Fill spray tank one-half to three-fourths full with water or fluid fertilizer, add the proper amount of Bicep 4.5L, then add the rest of the water or fluid fertilizer. Provide sufficient agitation during mixing and application to maintain a uniform suspension.

To determine the compatibility of Bicep 4.5L plus other herbicides with fluid fertilizer, pour the products into a small container of fluid fertilizer in the proportions shown in the following table:

Herbicides	Rate per acre	Teaspoons added per pint of fluid fertilizer*
Bicep 4.5L + Paraquat CL	4 qts. + 2 pts.	4 tsp. + 1 tsp.
Bicep 4.5L + Roundup®	4 qts. + 1.5 qts.	4 tsp. + 1.5 tsp.
Bicep 4.5L + Roundup	4 qts. + 4 qts.	4 tsp. + 4 tsp.

*Assuming 25 gallons per acre. For changes in spray volume or herbicide rate, make appropriate changes in the ingredients of the compatibility test.

After thorough mixing, let stand for 5 minutes. If the fertilizer-herbicide combination remains mixed or can be remixed readily, the mixture is compatible and can be sprayed.

Extremely dry weather following application of Bicep 4.5L may reduce effectiveness. Cultivate if weeds develop.

Precaution: Under high moisture conditions on coarse-textured soils, some injury or stunting may occur following the use of Bicep 4.5L. The crop will normally outgrow this effect.

Directions for Use

Postemergence

Bicep 4.5L applied early postemergence controls these weeds:

barnyardgrass (watergrass)
crabgrass
fall panicum
giant foxtail
green foxtail
signalgrass (Brachiaria)
witchgrass
yellow foxtail
yellow nutsedge
cocklebur
jimsonweed

kochia
lambsquarters
morningglory
pigweed
prickly sida
puncturevine
purslane
ragweed
Russian thistle
smartweed
velvetleaf

Application: Apply early postemergence using the appropriate rate from Table 1. This treatment may be applied up to the time grass and broadleaf weeds are 2 inches tall and the corn has no more than 4 leaves. Application to weeds larger than 2 inches will generally not give satisfactory control, and application to corn beyond the 4-leaf stage may injure the crop. Occasional corn leaf burn may result, but this should not affect growth or yield. Apply with a conventional ground sprayer in a minimum of 15 gals. of spray mixture per acre, or by aircraft in a minimum of 2 gals. of spray mixture per acre. Do not apply in fluid fertilizer as injury may occur.

Table 1: Postemergence

Soil texture	Broadcast rate per acre
COARSE Sand, loamy sand, sandy loam	2.4 qts.
MEDIUM Loam, silt loam, silt	3.2 qts.
FINE Sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay, clay	3.2-4 qts.*

*For cocklebur, yellow nutsedge, and velvetleaf control on fine-textured soils above 3% organic matter, apply 4 qts. of Bicep 4.5L per acre.

Rotational Crops: 1) If replanting is necessary, corn may be replanted immediately. Do not make a second application. 2) Corn may be planted the year following treatment. Other crops may be planted 18 months following application.

Tank Mixture of Bicep 4.5L plus Paraquat CL or Roundup for Reduced-Tillage Systems

In reduced-tillage systems where corn is planted directly into a cover crop, established sod, or previous crop residues, Paraquat CL or Roundup may be used in combination with Bicep 4.5L. These tank mixtures control existing vegetation and provide preemergence control of the following weeds:

barnyardgrass (watergrass)	cocklebur
crabgrass	horseweed
fall panicum	lambsquarters
giant foxtail	morningglory
green foxtail	pigweed
signalgrass (Brachiaria)	prickly lettuce
witchgrass	purslane
yellow foxtail	ragweed
yellow nutsedge	smartweed
carpetweed	velvetleaf

Application: Apply before, during, or after planting but before corn emerges, at the appropriate rate in Table 2. Add Paraquat CL or Roundup at the following broadcast rates:

Paraquat CL: 1-2 pts. per acre plus 8 oz. of X-77 Spreader per 100 gals. of spray mixture, for control of existing weeds.

Roundup: 1.5 qts. per acre for control of existing annual weeds, or 2-4 qts. per acre for existing perennial weeds. See the Roundup label for weeds controlled.

Apply in 20-60 gals. of water or fluid fertilizer per acre with ground equipment.

Table 2: Reduced-Tillage Corn

Soil texture	Broadcast rate per acre
COARSE Sand, loamy sand, sandy loam	2.4 qts.
MEDIUM Loam, silt loam, silt	3.2 qts.
FINE Sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay, clay	3.2-4 qts.*
Muck or peat soils	NOT RECOMMENDED

*For cocklebur, yellow nutsedge, and velvetleaf control on fine-textured soils above 3% organic matter, apply 4 qts. of Bicep 4.5L per acre.

Rotational Crops: 1) If replanting is necessary, corn may be replanted immediately. Do not make a second broadcast application. 2) Corn may be planted the year following treatment. Other crops may be planted 18 months following application.

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Triple rinse (or equivalent) and dispose of in an incinerator or landfill approved for pesticide containers, or bury in a safe place. Consult federal, state, or local disposal authorities for approved alternative procedures.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

Causes eye irritation. Do not get in eyes. Harmful if swallowed, inhaled, or absorbed through the skin. Avoid breathing vapors or spray mist. Avoid contact with skin or clothing. Wash thoroughly after handling. Avoid contamination of food or feed.

First Aid: In case of contact with eyes, immediately flush eyes with plenty of water for at least 15 minutes and call a physician. In case of contact with skin, flush with plenty of water and get medical attention if irritation persists. Remove and wash contaminated clothing before reuse.

Environmental Hazards

Keep out of any body of water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from areas treated.

Physical or Chemical Hazards

Do not use or store near heat or open flame..

BicepTM trademark of CIBA-GEIGY for the prepackaged mixture of atrazine and metolachlor
U.S. Patent No. 3,937,730 (metolachlor)

Roundup[®] trademark of Monsanto Company for glyphosate

Agricultural Division
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September 15, 1977