

## fosamine ammonium (Krenite) Herbicide Profile 2/85

fosamine ammonium

CHEMICAL NAME: Ammonium ethyl carbamoylphosphonate (56)  
 TRADE NAME(S): Krenite (56)  
 FORMULATION(S): Krenite brush control agent is a liquid containing 41.5% active ingredient (4 lb/gal). Krenite S brush control agent has same active ingredient content but includes a surfactant (56).  
 TYPE: Herbicide  
 BASIC PRODUCER(S): E.I. du Pont de Nemours Co., Inc.  
 Biochemicals Dept.  
 1007 Market St.  
 Wilmington, DE 19898  
 STATUS: General use  
 PRINCIPAL USES: Used as a foliar spray at rates of 1 1/2 to 3 gallons product (6 to 12 lb ai)/acre applied in late summer or early fall for control and/or growth suppression of many woody species. Susceptible treated plants normally fail to refoliate during the growing season following treatment and subsequently die. Krenite may be used on noncropland areas such as railroad, pipeline, utility and highway rights-of-way, drainage ditchbanks, storage areas, industrial plant sites and other similar areas including land adjacent to and surrounding domestic water supply reservoirs, supply stations, lakes and ponds. It is also used for field bindweed control in noncropland areas (56).  
 Registered for control and growth suppression of blackberry, white oak, water oak, red oak, loblolly pine, Virginia pine, sweet gum, sumac and black locust; salmonberry, thimbleberry, vine maple, American elder, Eastern white pine, multiflora rose, slippery elm, tree-of-heaven, wild grape, wild plum and quaking aspen; partial control and growth suppression of other brush plants such as red alder, hawthorn, wild cherry, maple, white ash, black gum, hickory, willow, sassafras, yellow poplar, elm, big leaf maple, choke cherry, persimmon, red maple, sourwood and tulip tree (yellow poplar). It is also registered for control of field bindweed. It is being evaluated for bracken (*Pteridium* sp.) and for selective use in forestry (58).  
 APPLICATION METHOD(S): As a foliar spray either by air or ground equipment (58).

### II. PHYSICAL PROPERTIES

MOLECULAR FORMULA: C<sub>3</sub> H<sub>8</sub> N O<sub>4</sub> P (62)  
 MOLECULAR WEIGHT: 153.1 (62)  
 PHYSICAL STATE: White crystalline solid (pure compound) (31v)  
 ODOR: Negligible odor (pure compound) (31v)  
 MELTING POINT: 175 C (pure compound) (31v)  
 VAPOR PRESSURE: 4 x 10<sup>-6</sup> mmHg at 25 C (pure compound) (31v)  
 SOLUBILITY: 1.79 kg/kg water at 25 C (pure compound) (62)

### III. HEALTH HAZARD INFORMATION

OSHA STANDARD: NA  
 NIOSH RECOMMENDED LIMIT: NA  
 ACGIH RECOMMENDED LIMIT: NA  
 TOXICOLOGY

#### A. ACUTE TOXICITY

DERMAL: LD<sub>50</sub> = >1,680 mg/kg (rabbit, "Krenite"); >5,000

mg/kg (rabbit, "Krenite" S) (31v).

"Krenite" - Not a primary skin irritant when applied as 25% aqueous solutions to shaved, intact, or abraded skin of guinea pigs; no evidence of sensitization. Application of 50% aqueous solutions caused reversible mild to moderate irritation in rabbits (31v).

"Krenite" S - Not a primary skin irritant when applied as 0.5 ml undiluted formulation to shaved, intact, or abraded skin of rabbits (31v).

ORAL: LD50 = 24,400 mg/kg (non-fasted male rats, "Krenite"); >7380 mg (guinea pigs, "Krenite"); >15,000 mg/kg (female beagles, "Krenite"); >5,000 mg/kg (fasted male and female rats, "Krenite" S) (31v).

INHALATION: LC50 = 56.6 mg/l a.i. (male rat, "Krenite"); >42 mg/l a.i. (female rat, "Krenite") (31v).  
LC50 = 3.20 mg/l a.i. (male rat, "Krenite" S);  
2.75 mg/l a.i. (female rat, "Krenite" S) (31v).

EYES: "Krenite" = Administration of 0.1 ml product to the rabbit eye resulted in no evidence of eye irritation.

"Krenite" S - Caused mild to no corneal opacity and temporary severe to moderate conjunctival irritation in the unwashed rabbit eyes. Eyes returned to normal within 3 days except one unwashed and one washed eye, which had lingering mild conjunctival redness, but were normal within 7 days (31v).

#### B. SUBACUTE AND CHRONIC TOXICITY:

90-day rat feeding study: Slight effects on kidneys of male rats at 5000-10,000 ppm, 1000 ppm no-effect level.

6-month dog feeding study: No nutritional, clinical hematological, biochemical, urinary, or gross pathological evidence of toxicity in the test dogs fed 10,000 ppm. Relative stomach weights were significantly high at 10,000 ppm but were associated with no other clinical or gross pathological changes.

1-generation rat reproduction study: No reproductive effects seen at 5000 ppm, the highest level fed.

Teratogenicity studies: Not teratogenic or embryotoxic in rats at 10,000 ppm, the highest level fed.

Mutagenicity studies: Not mutagenic in Ames, CHO point mutation and DNA repair (UDS) assays. Mutagenic in in vitro Cytogenetic assay, but negative in in vivo Cytogenetic assay (31v).

#### IV. ENVIRONMENTAL CONSIDERATIONS

Safe to fish and wildlife (8b).

Bluegill sunfish LC50 (96-hr) is greater than 670 ppm (formulation)

Fathead Minnow LC50 (96-hr) is greater than 1000 ppm (formulation)

Rainbow Trout LC50 (96-hr) is greater than 1000 ppm (formulation)

Bobwhite Quail LD50 is greater than 10,000 mg/kg (formulation)

Mallard Duck LD50 is greater than 10,000 mg/kg (formulation)

In a 28-day (14C) fosamine ammonium bioaccumulation study in catfish, accumulation factor (ratio of residues in fish to residues in water) was less than 12 (J. Toxic. Environ. Health. 5:957-963, 1979) (31v).

Fast disappearance rate in soil; half-life of about 7-10 days (J. Ag. & Food Chem. 27 (3) 564-571, 1979). No effects on soil microbes (Soil Science 128, 23, 1979) (31v).

LC50 (96-hr) is: for bluegill 278 mg a.i. (as e.c.)/l; for rainbow trout >415 mg a.i. (as e.c.)/l (62).

Behavior In Or On Soils

1. Adsorption and leaching characteristics in basic soil types: In

field soil studies (Florida, Delaware and Illinois) with <sup>14</sup>C-labeled ammonium ethyl carbamoylphosphonate, because of rapid degradation, there was very little or no downward movement of ammonium ethyl carbamoylphosphonate or its degradation products.

2. Microbial breakdown: Rapidly decomposed by soil microorganisms. Laboratory biometer flask tests to evaluate microbial degradation in the dark were run with <sup>14</sup>C-carbamoyl labeled ammonium ethyl carbamoylphosphonate at 4 and 20 ppm in two soil types. These tests showed that evolved <sup>14</sup>CO<sub>2</sub> accounted for 45 to 75% of original <sup>14</sup>C after 90-day incubations. Reincorporation of <sup>14</sup>C was noted, particularly in field soils.
3. Loss from photodecomposition and/or volatilization: Separate experiments which measure photodecomposition in water indicate that both artificial and natural sunlight exposures have little effect. Photosensitizers do not appear to accelerate the photodegradation process.
4. Persistence in soils: Greenhouse soil disappearance test with <sup>14</sup>C-labeled ammonium ethyl carbamoylphosphonate indicated about a 10-day half life for the intact compound. Also, under field conditions in Florida, Delaware and Illinois the half life for the compound was about 1 week. In these field studies, the half life for total <sup>14</sup>C-activity was 2 to 6 months. Much of the residual <sup>14</sup>C was reincorporated into the soil organic matter, e.g., a-humus, B-humus and soluble humin fractions.

#### References

- Han, Jerry C.Y. and R.L. Krause. 1979. Microbial Activity in Soils Treated with Fosamine Ammonium. Soil Science. 128:23-27.
- Han, Jerry C.Y. 1979. Stability of (<sup>14</sup>C) Fosamine Ammonium in Water and Soils. Agric. Food Chem. 27(3):564 (58).

#### V. EMERGENCY AND FIRST AID PROCEDURES

The chemical information provided below has been condensed from original source documents, primarily from "Recognition and Management of Pesticide Poisonings", 3rd ed. by Donald P. Morgan, which have been footnoted. This information has been provided in this form for your convenience and general guidance only. In specific cases, further consultation and reference may be required and is recommended. This information is not intended as a substitute for a more exhaustive review of the literature nor for the judgement of a physician or other trained professional.

If poisoning is suspected, do not wait for symptoms to develop. Contact a physician, the nearest hospital, or the nearest Poison Control Center.

**SYMPTOMS:** No symptoms of human intoxication have been reported. In small mammals mild diarrhea has been observed after repeated oral dosings (58).

**SKIN CONTACT:** Wash with plenty of soap and water (31v).

**EYE CONTACT:** Flush with plenty of water (31v).

#### VI. FIRE AND EXPLOSION INFORMATION

**GENERAL:** Non-flammable (Krenite) (31w).

**FIRE FIGHTING/EXTINGUISHER TYPE:** Conventional methods (water spray, CO<sub>2</sub>, foam, dry chemical). Use self-contained breathing apparatus (Krenite) (31w).

#### VII. COMPATIBILITY

Not normally used in combination with other pesticides. Somewhat corrosive to brass or copper sprayer parts (58).

#### VIII. PROTECTIVE MEASURES

**STORAGE AND HANDLING:** Aqueous formulations and spray tank solutions are stable. Subject to decomposition in dilute solution (5 ppm) under acid conditions (58).

Keep out of reach of children. Do not contaminate water, food, or feed by storage. Keep from contact with fertilizer, insecticides, fungicides, and seed. May irritate eyes, nose, throat, and skin. Avoid breathing spray or mist. Avoid contact with skin, eyes, and clothing. Do not use on food crops. Do not allow drift or spray mist to contact desirable trees, shrubs, or other plants, as injury may result. Do not apply directly to water. Do not contaminate water by cleaning of equipment or disposal of wastes (31v).

IX. PROCEDURES FOR SPILLS AND LEAKS

IN CASE OF EMERGENCY, CALL, DAY OR NIGHT

(800) 424-9300

PESTICIDE TEAM SAFETY NETWORK/CHEMTREC

Clean up promptly; do not flush with water. Absorb liquid spills with earth or sand and pick up by most effective means (Krenite) (31w).

X. LITERATURE CITED

- 8b. Thomson, W.T. 1981. Agricultural chemicals - book 2: herbicides. Revised ed. Thomson Publications, Fresno, CA. 274 pp.
- 31v. E. I. du Pont de Nemours and Company, Inc., Biochemicals Department. 1983. Technical data sheet for fosamine ammonium. Wilmington, DE.
- 31w. E. I. du Pont de Nemours and Company, Inc., Biochemicals Department. 1980. Material safety data sheet for Krenite brush control agent. Wilmington, DE.
56. Farm Chemicals Handbook, 70th ed. 1984. R. T. Meister, G. L. Berg, C. Sine, S. Meister, and J. Poplyk, eds. Meister Publishing Co., Willoughby, OH.
58. Weed Science Society of America, Herbicide Handbook Committee. 1983. Herbicide handbook of the weed science society of America, 5th ed. Weed Science Society of America, Champaign, IL. 515 pp.
62. The Pesticide Manual: A World Compendium, 7th ed. 1983. C.R. Worthing, ed. The British Crop Protection Council, Croydon, England. 695 pp.

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