United States
Environmental Protection
Agency

Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: ARSENAL
Reason for Issuance: Amended following industry review
Date Issued: 09/05/85
Fact Sheet Number: 63

1. Description of Chemical

Code Names: Cl 243,997 and AC 243,997

EPA Shaughnessy Code: 128821

Chemical Abstracts Service (CAS) Number: 81334-34-1

Year of Initial Registration: 1984

Pesticide Type: Herbicide

Chemical Family: Imidazolinone

U.S. and Foreign Producers: American Cyanamid Company

2. Use Patterns and Formulations

Application sites: Noncropland areas such as railroad, utility and pipeline rights-of-way, utility plant sites, petroleum tank farms, pumping installations, fence rows, storage areas, nonirrigation ditchbanks and other similar areas.

Types of formulations: Aqueous solution of isopropylamine salt

Types and methods of application: End-use product may be applied either pre-emergence or postemergence to the weeds. In most situations, the preferred method is postemergence application. Product is mixed with water and applied as a spray.

Application rates: 0.5 to 1.5 lbs. acid equivalent per acre depending on weed species and degree of infestation.

Usual carriers: Water. Drift control agent and foam reducing agent may be added if needed.

3. Science Findings

Summary science statement: Results of acute toxicity studies indicate toxicity category III. Chronic studies present no evidence of unacceptable health hazards resulting from proposed use. Ecological effects data indicate that the technical acid is practically nontoxic to avian and aquatic organisms. Additional fish and wildlife studies are required, on the salt formulation. Several data gaps exist in environmental fate.

Chemical characteristics:

Physical state:	Powder
Color:	White to off-white
Odor:	Slight acetic acid odor
Melting point:	169-173°C
Bulk density:	13.1 lb/cubic foot
Solubility:	1.0 to 1.5% in water at 25°C
Dissociation constant:	pk_1=1.9, pk_2=3.6
Octanol/Water partition coefficient:	1.3
pH:	3-3.5 as 1% solution in water at 25°C
Stability:	Stable at 25°C for at least 18 months

Toxicology characteristics:

Acute toxicology results:

Acute oral toxicity (rat):	greater than 5,000 mg/kg Toxicity category III
Acute dermal toxicity (rabbit):	greater than 2,000 mg/kg Toxicity category III
Primary eye irritation (rabbit):	Toxicity category III
Primary skin irritation (rabbit):	Toxicity category IV

Acute inhalation toxicity (rat): greater than 5.1 mg/l (nominal)
greater than 1.3 mg/l (gravimetric)
Toxicity category III

Dermal sensitization (guinea pig): Technical material is not a skin sensitizer.

Chronic toxicology results:

21-day dermal (rabbit): Systemic NOEL is 400 mg/kg/day (HDT). The NOEL for skin is 400 mg/kg/day (HDT).

Teratology (albino rat): NOEL for teratogenicity and fetotoxicity is 1,000 mg/kg/day. The NOEL for maternal toxicity is 300 mg/kg/day. The LEL is 1,000 mg/kg/day with salivation occurring in 6 of 22 females.

Teratology (albino rabbit): Test material was not teratogenic or fetotoxic at dosages up to 400 mg/kg/day (HDT). The maternal toxic NOEL is 400 mg/kg/day.

Mutagenicity: Technical material was not mutagenic in the Ames assay.

Metabolism (rat): The half-life of the technical was less than one day. There was no significant radiolabeled compound detected in tissue residues.

Major routes of exposure: Mixers, loaders and applicators would be expected to receive the most exposure via skin contact and inhalation.

Physiological and biochemical behavioral characteristics:

Foliar absorption: The product is absorbed by roots and foliage.

Translocation: The product translocates readily following absorption and is distributed between roots and foliage.

Mechanism of pesticidal action: The herbicide prevents the production of the amino acids; valine, leucine and isoleucine. Once the levels of these amino acids decrease, protein synthesis slows down and growth stops. The growing points of target plants die first. Mature, green tissue is not as rapidly affected.

Environmental characteristics:

Adsorption and leaching in basic soil types: The technical material has a moderate leaching potential. The adsorption coefficient (K) ranges from 1.7 in a clay loam soil (4.6% organic matter) to 4.9 on a silt loam soil (4.0% organic matter). The adsorbed material will desorb from soil.

Loss from photodecomposition: Technical material will photodegrade in aqueous solution with a half-life of 2.5 to 5.3 days (12 hours of sunlight/day).

Ecological characteristics:

Fish acute toxicity (Rainbow trout): greater than 100 mg/l

Fish acute toxicity (Bluegill sunfish): greater than 100 mg/l

Fish acute toxicity (Channel catfish): greater than 100 mg/l

Aquatic invertebrate toxicity (Daphnia magna): greater than 100 mg/l

Avian acute oral toxicity (Bobwhite quail): greater than 2,150 mg/kg

Avian acute oral toxicity (Mallard ducks): greater than 2,150 mg/kg

Avian dietary toxicity (Bobwhite quail): greater than 5,000 ppm

Avian dietary toxicity (Mallard ducklings): greater than 5,000 ppm

4. Summary of Regulatory Position and Rationale:

Use, formulation, manufacturing process or geographical restrictions:

Do not use on food or feed crops. Do not apply to ditches used to transport irrigation water. Do not apply where runoff water may flow onto agricultural land as injury to crops may result. Keep from contact with fertilizers, insecticides, fungicides and seeds. Do not apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. Do not use on lawns, walks, driveways, tennis courts, or similar areas. Prevent drift of spray to desirable plants. Do not use in California.

Unique label warning statements:

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of Arsenal should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined containers. Do not mix, store or apply Arsenal or spray solutions of Arsenal in unlined steel (except stainless steel) containers or spray tanks.

5. Summary of Major Data Gaps:

Ecological Effects:

The following studies are to be done with the end-use product:

Avian single-dose oral LD_{50} (1 test)
Avian dietary LC_{50} (2 tests - waterfowl and upland game bird)
Acute toxicity test for freshwater fish (2 tests - warm water and cold water species)
Acute toxicity test for freshwater aquatic invertebrates (1 test)

A waiver of above studies will be considered if data are supplied that fulfill: one avian dietary study, one freshwater fish study, an aquatic invertebrate study and demonstrate equivalent toxicity levels to the technical material.

Environmental Fate:

Nonguideline study - Application of ^{14}C Arsenal to weeds
Fish accumulation study
Field dissipation study (if field crop uses are proposed in the future)

6. Contact Person at EPA:

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