

nicotine (Black Leaf 40) Chemical Profile 4/85

nicotine

CHEMICAL NAME: 3-(1-Methyl-2-pyrrolidyl)pyridine (56)

DEC INGRED. CODE:

TRADE NAME(S): Black Leaf 40 (56)

FORMULATION(S): Nicotine alkaloid, 95%; nicotine sulfate, 40% (56)

TYPE: Alkaloid insecticide

BASIC PRODUCERS: Chemical Formulators, Inc.
2045 Peachtree Rd., NE, Suite 200
Atlanta, GA 30309

STATUS: General use

PRINCIPAL USES: Sucking insects on plants but now largely replaced by organophosphate insecticides. Formerly used in greenhouses as a fumigant and as a paint roost for chicken lice and mites (1).

Little or no nicotine is now produced in the U.S. Limited supplies are imported from India. Two basic types of nicotine products have been marketed: the alkaloid and the sulfate. Nicotine alkaloid is relatively volatile and acts both by contact and by fumigant action. The sulfate is usually marketed as an aqueous solution containing 40% nicotine equivalent. When added to alkaline water or to soap solution the alkaloid is liberated, being then more active than the sulfate alone (56).

I. EFFICACY

To be developed.

II. PHYSICAL PROPERTIES

MOLECULAR FORMULA: C₁₀ H₁₄ N₂ (62)

MOLECULAR WEIGHT: 162.2 (62)

PHYSICAL STATE: Colorless liquid which darkens slowly and becomes viscous on exposure to air (pure compound) (62).

ODOR: Slight fishy odor when warm (14)

MELTING POINT: -80 C (pure compound) (62)

BOILING POINT: 247 C (pure compound) (62)
VAPOR PRESSURE: 5.65 Pa at 25 C (pure compound) (62)
SOLUBILITY: Miscible with water below 60 C, forming a hydrate,
and above 210 C (pure compound) (62).

III. HEALTH HAZARD INFORMATION

OSHA STANDARD: 0.5 mg/m³ averaged over an eight-hour work shift (14).
NIOSH RECOMMENDED LIMIT: None established
ACGIH RECOMMENDED LIMIT: TWA (Time Weighted Average) = 0.5 mg/m³;
STEL (Short Term Exposure Limit) = 1.5 mg/m³
(deleted); skin notation (15c).

TOXICOLOGY

A. ACUTE TOXICITY

DERMAL: LD₅₀ = 50 mg/kg (rabbit, single application) (62)

ORAL: LD₅₀ = 50-60 mg/kg (rat) (62)

B. SUBACUTE AND CHRONIC TOXICITY:

Nicotine has caused abnormalities in the offspring of laboratory animals (14).

IV. ENVIRONMENTAL CONSIDERATIONS

Little hazard to birds, fish and beneficial insects. Biological magnification unlikely (1).

Approximate Residual Period: Very short, 1 day on plants; same in soil and water (1).

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 AND SIGNS OF POISONING

Nicotine preparations, especially those using the free alkaloid, are well absorbed across the gut wall, lung, and skin. Poisoning symptoms from excessive doses appear promptly. They are due to transient stimulation, then prolonged depression, of the central nervous system, autonomic ganglia, and motor end-plates of skeletal muscle. Central nervous system injury is manifest as headache, dizziness, incoordination, tremors, then clonic convulsions leading to tonic-extensor convulsions which are often fatal. In some instances, convulsive activity is minimal and death by respiratory arrest occurs within a few minutes. Effects on autonomic ganglia give rise to sweating, salivation, nausea, abdominal pain, diarrhea, and hypertension. The heart is usually slow, and often arrhythmic. Block of skeletal muscle motor end-plates causes profound weakness, then paralysis. Death may occur from respiratory depression or from shock.

Nicotine can be measured in blood and urine to confirm poisoning (25).

SKIN CONTACT: Immediately flush the contaminated skin with water. If liquid nicotine or solutions of nicotine soak through the clothing, remove the clothing immediately and flush the skin with water. Get medical attention immediately (14).

INGESTION: If the person is conscious, give large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Do not make an unconscious person vomit. Get medical attention immediately (14).

INHALATION: Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible (14).

EYE CONTACT: Wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention immediately. Contact lenses should not be worn when working with this chemical (14).

NOTES TO PHYSICIAN:

Promptly wash contaminated skin and flush eyes with water. Ingestion of nicotine requires immediate gastric intubation, aspiration, and lavage, the latter preferably with 1.5% tannic acid solution, of 1:5000 potassium permanganate solution. Before withdrawing the lavage tube, instill 3-4 ounces of activated charcoal in a slurry of water. Diazepam and/or barbiturates may be required to control convulsions. Atropine and phenoxybenzamine (Dibenzaline) may help to control the autonomic manifestations. Positive pressure ventilation of the lungs with oxygen may be necessary to sustain life when respiration is arrested (25).

VI. FIRE AND EXPLOSION INFORMATION

GENERAL: Toxic gases and vapors (such as oxides of nitrogen and carbon

monoxide) may be released in a fire involving nicotine (14).

EXTINGUISHER TYPE: Alcohol foam, carbon dioxide, dry chemical (14).

VI. COMPATIBILITY

Generally compatible with other insecticides and fungicides (1). Contact with strong oxidizers may cause fires and explosions. Contact with strong acids may cause violent spattering (14).

VIII. PROTECTIVE MEASURES

PROTECTIVE CLOTHING: Employees should be provided with and required to use impervious clothing, gloves, face shields (8" minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with liquid nicotine (14).

Employees should be provided with and required to use splash-proof safety goggles where there is any possibility of liquid nicotine contacting the eyes (14).

PROTECTIVE EQUIPMENT: Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration or by the National Institute for Occupational Safety and Health (14).

IX. PROCEDURES FOR SPILLS AND LEAKS

IN CASE OF EMERGENCY, CALL, DAY OR NIGHT
(800) 424-9300
PESTICIDE TEAM SAFETY NETWORK/CHEMTREC

Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

If nicotine is spilled or leaked, the following steps should be taken:

1. Ventilate area of spill or leak.
2. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be reclaimed or collected and atomized in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

Waste disposal methods:

Nicotine may be disposed of:

1. By absorbing it in vermiculite, dry sand, earth or a similar

- material and disposing in a secured sanitary landfill.
2. By atomizing in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device (14).

X. LITERATURE CITED

1. Harding, W.C. 1979. Pesticide profiles, part one: insecticides and miticides. Univ. Maryland, Coop. Ext. Serv. Bull. 267. 30 pp.
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