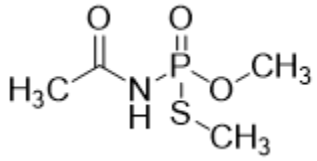
TECHNICAL BULLETIN
ACEPHATE TECHNICAL

1 INTRODUCTION

Acephate is an organophosphate insecticide used normally as a foliar spray to control chewing and sucking insects, Aphids; Leaf miners; Lepidopterous larvae; Sawflies; Thrips, Ants in Fruit; Vegetables; Potatoes; Sugarbeet; Vines; Rice; Hops; Ornamentals; Greenhouse crops including peppers, cucumbers.

2 ACTIVE INGREDIENT

Common name	Acephate (BSI, E-ISO)
IUPAC Name	O,S-dimethyl acetylphosphoramidothioate
Chemical Abstracts name	O,S-dimethyl N-acetylphosphoramidothioate
Molecular formula	$C_4H_{10}NO_3PS$
CAS number	[30560-19-1]
Structural formula	
Molecular weight	183.2
Purity	97% w/w Min

3 PHYSICOCHEMICAL PROPERTIES

Physical state	colourless solid
Melting Point	88-90°C
Vapour Pressure	0.226 mPa (24 °C)
Specific gravity/Density	1.35 (20-25 °C)
Partion co-efficient	logP = 0.89
Solubility	In water: 7.9 x 10^5 mg/l (20- 25 °C). In Organic solvents: Soluble in acetone (151), benzene (16), ethanol (>100), ethyl acetate (35), hexane (0.1)mg/l (20- 25 °C).
Stability	Hydrolysis DT50 50 d (pH 5, 7) (21 °C). Aqueous photolysis DT50 55 h.

4 APPLICATIONS

Acephate is recommended for use as foliar spray using high volume spraying equipment such as knapsack sprayer, rocking sprayer etc. having good delivery system ensuring fine droplets for better pest control.

To prepare spray solution, add the required quantity of ACEPHATE into a spray tank containing atleast half of the total quantity of water required. Add remaining water with the agitator running until the spray volume is reached. Do not add any liquid fertilizer, micronutrient or adjuvant to the spray solution until Acephate is completely dissolved. It should be completely dissolved in approximately five minutes. Dissolution rate may be slowed by cold water, lack of agitation or water containing high concentrations of Boron or Sulphur

5. MODE OF ACTION & USES

Inhibition of acetylcholinesterase (AChE) by covalent (irreversible) reaction with the enzyme at the acetylcholine binding site, blocking hydrolysis of acetylcholine and resulting in hyperexcitation.

Systemic insecticide active by both contact and ingestion, limited translocation. Converted by insects to methamidophos (q.v.), a more potent, highly mobile insecticide which may be the biologically active species.

Control of chewing and sucking insects, e.g. aphids, thrips, Lepidoptera larvae, sawflies, leaf miners, leafhoppers and cutworms, in fruit, citrus, vines, hops, olives, cotton, soybeans, peanuts, macadamia nuts, beets, brassicas, celery, beans, potatoes, rice, tobacco, ornamentals, forestry and other crops, at 500–1000 g/ha.

6. TOXICITY

Acute oral LD50	: 1030 mg/kg in rats (female) 1450 mg/kg in rats (male)
Acute dermal LD50	: >10000 mg/kg in rabbits
Acute Inhalation LC50	: >15 mg/L (4 hours) for rats.
Skin irritation	: Non-irritant to rabbits
Eye irritation	: Non-irritant to rabbits
Skin Sensitization	: Not a sensitizer to guinea pig
NOEL	: (2 y) for dogs 0.75 mg/kg b.w. daily; LOEL for rats 0.25 mg/kg b.w. daily.
ADI-RfD	: (JMPR) ADI 0.03, aRfD 0.1 mg/kg b.w. [2011]

7. ECOTOXICITY

Birds **:** Acute oral LD_{50} for mallard ducks 350, chickens 852, ring-necked pheasants 140 mg/kg.

Fish **:** LC_{50} (96 h) for bluegill sunfish 2050, rainbow trout >1000, channel catfish 2230, largemouth bass 1725 mg/l.

Daphnia : **:** EC_{50} (48 h, flow-through) 67.2 mg/l.

Algae : EC_{50} (72 h) >980 mg/l.

Other aquatic spp. LC_{50} (96 h) for crayfish 750 mg/l.

Bees :LD_{50} (contact) 1.2 µg/bee.

Worms : LC_{50} (14 d) for earthworms 23000 mg/kg soil.

Environmental fate

Animals : Metabolised to methamidophos (q.v.).

Plants : In plants, residual activity lasts for c. 10–15 d. The major metabolite is methamidophos (q.v.).

Soil/Environment :Readily biodegraded and non-persistent; soil DT50 2 d (aerobic) to 7 d (anaerobic). Aqueous DT50 (anaerobic metabolism) 6.6 d. Methamidophos (q.v.) is a soil metabolite.

8. COMPATIBILITY

Acephate is compatible with all other pesticides.

9. HANDLING & STORAGE

Handling:
Keep away from food, drink, and animal feedstuff. KEEP OUT OF REACH OF CHILDREN. Wear suitable Personal protective equipment when handling and spraying.

Storage:
Store in the original container in a dry, cool, ventilated, LOCKED area. DO NOT store in prolonged sunlight. DO NOT store with food, seed, or animal feedstuff.

The material should be transported in clearly labelled leak-proof containers.

10. DISPOSAL CONSIDERATIONS

Avoid skin contamination and inhalation of vapour, if any. Sweep-up and place in a proper container. Ensure that the container is tightly closed and labeled before transferring to a safe place for disposal.

Empty any quantity of product remaining in damaged/ leaking container into a clean container.

Manufactured by:

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