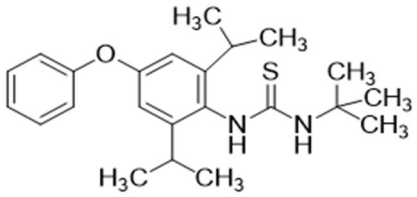
TECHNICAL BULLETIN
DIAFENTHIURON TECHNICAL

1. INTRODUCTION

Diafenthiuron is an insecticide and acaricide without regulatory approval for use in the EU. An insecticide and acaricide effective against phytophagous mites and other sucking pests like, Aphids; Whiteflies; Spidermites; Diamondback moth; thrips; Jassids in Cotton; Fruit trees; Ornamentals; Soybeans.

2. ACTIVE INGREDIENT

Common name	Diafenthiuron (BSI, E-ISO)
IUPAC Name	1-tert-butyl-3-(2,6-diisopropyl-4-henoxyphenyl) thiourea
Chemical Abstracts name	N-[2,6-bis(1-methylethyl)-4-phenoxyphenyl]-N'-(1,1-dimethylethyl) thiourea
Molecular formula	$C_{23}H_{32}N_2OS$
CAS number	[80060-09-9]
Structural formula	
Molecular weight	384.6
Purity	98.00% w/w Min

3. PHYSICOCHEMICAL PROPERTIES

Physical state	White powder
Melting Point	144.6-147.7°C
Vapour Pressure	<0.002 mPa (25 °C)
Specific gravity/Density	1.09 (20-25 °C)

Partion co-efficient	logP = 5.76
Solubility	In water: 0.06 mg/l (20- 25 °C). In Organic solvents: Soluble in acetone (320), n-hexane (9.6), methanol (47), n-octanol (26), toluene (330) g/l (20- 25 °C).
Stability	Hydrolysis DT_{50} 3.6 d (pH 7) (25 °C). Aqueous photolysis DT_{50} 1.6 h (pH 7) (25 °C).

4. APPLICATIONS

Diafenthiuron is used as broad-spectrum insecticide to control sucking insects and mites. It is an inhibitor of mitochondrial respiration and also exhibits trans laminar action with vapourising effect for better insects and mite control.

Cotton: 1st spray during initial appearance of pests and repeat one or two sprays at 15 days interval depending on pest intensity.

Add the required amount of Diafenthiuron to clean water in half filled spray tank with the agitator or by-pass in operation. Maintain agitation while filling tank with remainder of water. Agitation must also be maintained throughout the spray operation. For effectiveness Diafenthiuron requires thorough spray coverage. To be ensure that equipment properly calibrated before spray for correct volume.

5. MODE OF ACTION & USES

Inhibition of mitochondrial ATP synthase resulting in disruption of ATP production. Insecticide and acaricide active by both contact and ingestion. Kills larvae, nymphs and adults and also has some ovicidal activity. Pro-pesticide - oxidised in the presence of light, or metabolically in vivo, with loss of sulfur to the corresponding carbodiimide, which is believed to be the biologically active species.

USES - Control of Tetranychidae, Tarsonemidae, Aleyrodidae, Aphididae and Jassidae in cotton, field crops, fruit, ornamentals and vegetables, *Plutella xylostella* in brassicas, *Anticarsia gemmatalis* in soybeans and *Alabama argillacea* in cotton, at 300–500 g/ha.

6. TOXICITY

Acute oral LD50 : 2070 mg/kg in rats

Acute dermal LD50 : >2000 mg/kg in rats

Acute Inhalation LC50 : 0.558 mg/L (4 hours) for rats.

Skin irritation	: Not an irritant to rats
Eye irritation	: Not an irritant to rabbits
Skin Sensitization	: Not a sensitizer to guinea pig
NOEL	: (90 d) for rats 4, dogs 1.5 mg/kg b.w. daily

7. ECOTOXICITY

Birds **:** Acute oral LD50 for bobwhite quail and mallard ducks >1500 mg/kg. Dietary LC50 (8 d) for bobwhite quail and mallard ducks >1500 mg/kg diet.

Fish **:** LC_{50} (96 h) for Acute oral LD50 for bobwhite quail and mallard ducks >1500 mg/kg. Dietary LC50 (8 d) for bobwhite quail and mallard ducks >1500 mg/kg diet.

Daphnia **:** LC_{50} (48 h) (48 h) 0.00015 mg/l.

Algae **:** EC_{50} (72 h) for *Scenedesmus subspicatus* >50 mg/l.

Bees **:** LD_{50} 2.1 (oral) (48 h), 1.5 (contact) (48 h) µg/bee.

Worms **:** LC_{50} (14 d) for earthworms c. >1000 mg/kg soil.

Environmental fate

Animals : Study of the absorption, distribution and excretion in rats demonstrated that the major portion of the dose was excreted with the faeces. The compound is degraded to yield its corresponding carbodiimide, which, in turn, reacts with nucleophiles like water and fatty acids to form urea and fatty acid derivatives.

Plants : In plants, diafenthiuron shows a complex metabolism pattern in all crops investigated (cotton, tomatoes and apples). Uptake of residue activity by plants from soil is low.

Soil/Environment: Diafenthiuron and its main metabolites show a strong sorptivity to soil particles. Degradation in soils proceeds rapidly: DT50 <1 h to 1.4 d.

8. COMPATIBILITY

Diafenthiuron is Compatible with all 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.

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