TECHNICAL DATA BULLETIN
DICHLORVOS (DDVP)

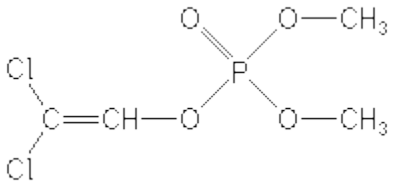
1. INTRODUCTION

Dichlorvos is used to control household, public health, and stored product insects. It is effective against mushroom flies, aphids, spider mites, caterpillars, thrips, and white flies in greenhouse, outdoor fruit, and vegetable crops. Therapeutically, dichlorvos is used to treat a variety of parasitic worm infections in dogs, livestock and humans. Dichlorvos can be fed to livestock to control botfly larvae in the manure. It acts against insects as both a contact and a stomach poison. Dichlorvos is available in aerosol and soluble concentrate formulations. It is used as a fumigant and has been used to make pet collars and pest strips.

Dichlorvos is one of a class of insecticides referred to as organophosphates. These chemicals act by interfering with the activities of cholinesterase, an enzyme that is essential for the proper working of the nervous systems of both humans and insects. Please refer to the Toxicology Information Brief on cholinesterase-inhibition for a more detailed description of this topic.

2. ACTIVE INGREDIENT

Common name	: dichlorvos: dichlorfos; DDVP
IUPAC name	: 2,2-dichlorovinyl dimethyl phosphate
Chemical Abstracts name	: 2,2-dichloroethenyl dimethyl phosphate
CAS RN:	[62-73-7]
EEC no.	: 200-547-7
Structural formula	



3. PHYSICOCHEMICAL PROPERTIES

Mol. wt.: 221.0; M.f.: $C_4H_7Cl_2O_4P$; Form: Colourless liquid; (tech., colourless-to-amber liquid, with an aromatic odour). B.p.: 234.1 °C/1x10^5 Pa (OECD 103); 74 °C/1.3x10^2 Pa. V.p.: 2.1 10^3 mPa (25 °C) (OECD 104). KOW: logP = 1.9 (OECD 117); 1.42 (separate study). Henry: 2.58x10^{-2} Pa m3 mol-1 S.g./density: 1.425 (20 °C) (OECD 109). Solubility: In water c. 18 g/l (25 °C). Completely miscible with aromatic hydrocarbons, chlorinated hydrocarbons and alcohols; moderately soluble in diesel oil, kerosene, isoparaffinic hydrocarbons, and mineral oils. Stability: Stable

to heat. Slowly hydrolysed in water and in acidic media, and rapidly hydrolysed by alkalis, to dimethyl hydrogen phosphate and dichloroacetaldehyde; DT_{50} (est.) 31.9 d (pH 4), 2.9 d (pH 7), 2.0 d (pH 9) (22 °C). F.p.: >100 °C (DIN 51758); 172 °C (Pensky-Martens closed cup, $1x10^5$ P

4. APPLICATIONS

Biochemistry: Cholinesterase inhibitor.

Mode of action: Insecticide and acaricide with respiratory, contact, and stomach action. Gives rapid knockdown.

Uses: Control of household and public health insect pests, e.g., flies, mosquitoes, cockroaches, bedbugs, ants, etc.; stored-product pests in warehouses, storerooms, etc.; flies and midges in animal houses; sciarid and phorid flies in mushrooms; sucking and chewing insects, and spider mites in a wide range of crops, including fruit, vines, vegetables, ornamentals, tea, rice, cotton, hops, glasshouse crops, etc. Also used as a veterinary anthelmintic.

Phytotoxicity: Non-phytotoxic when used as directed, except to some varieties of chrysanthemum.

Formulation types: AE; EC; GR; HN; KN; OL; SL; Impregnated strip.

Compatibility: Incompatible with alkaline materials, chinomethionat, and dichlofluanid.

5. TOXICITY

Oral: Acute oral LD_{50} for rats c. 50 mg/kg.

Skin and eye: Acute percutaneous LD_{50} for rats c. 90 mg/kg. Slight skin and eye irritant (rabbits).

Inhalation: LC_{50} (4 h) for rats 340 mg/m3; (1 h) for rats 455 mg/m3.

NOEL: (2 y) for rats 10 mg/kg diet.

ADI: 0.004 mg/kg b.w.

Toxicity class: WHO (a.i.) Ib; EPA (formulation) I

EC hazard: T R24/25

6. ECOTOXICITY

Birds: Acute oral LD_{50} for bobwhite quail 24 mg/kg. Sub-acute oral LD_{50} (8 d) for Japanese quail 300 mg/kg.

Fish: LC_{50} (96 h) for rainbow trout 200, golden orfe 450 ug/l (both 500 EC).

Daphnia: LC_{50} (48 h) 0.19 ug/l.

Algae: EC_{50} (5 d) for Scenedesmus subspicatus 52.8 mg/l.

Bees: Acute oral LD_{50} 0.29 ug/bee.

7. ENVIRONMENTAL FATE

Animals: In mammals, following oral administration, rapidly degraded in the liver by hydrolysis and O-demethylation, with a half-life of c. 25 minutes.

Plants: Rapidly decomposed in plants.

Soil/Environment: Non-persistent in the environment, with rapid decomposition in the atmosphere. Undergoes hydrolysis in damp media, with the formation of phosphoric acid and CO_2. But G. Keller et al. say soil metabolites are dichloroethanol, dichloroacetic acid and dichloroacetaldehyde; DT_{50} c. 10 h. Half-lives <1 d in biologically active soils and water systems.

8. 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.

9. DISPOSAL CONSIDERATIONS

Packages or surplus material & washing from the machines & containers should be disposed of in a safe manner so as to prevent environmental water pollution. The used packages shall not be left outside to prevent their re-use. Packages shall be broken & buried away from habitation