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TASK 5. Development of Chemical/Physical Profile: 2-Chloro-1-(2,4-dichlorophenyl)vinyl dimethyl phosphate; (chlorfenvinphos; SUPONA)

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2-Chloro-1-(2,4-dichlorophenyl)vinyl dimethyl phosphate;
(chlorfenvinphos; SUPONA)

1. Aqueous Degradation

Chlorfenvinphos is stable to hydrolysis except at high pH: at pH 9.1 and 38 C, the half-life is greater than 400 hours, and at pH 10.5 and 50 C, the half-life is three hours. Products of alkaline hydrolysis are 2,4-dichlorophenacyl chloride, 2,4-dichlorophenylglyoxylic acid and sodium diethyl phosphate. In a pond sprayed with 75 kg/ha, chlorfenvinphos residues in water decrease from 6.1 ppm to 2.0 ppm in five hours, and to 0.12 ppm after one month.

2. Soil Degradation

Chlorfenvinphos degrades in soil, with the rate of degradation varying with soil type, temperature, rate of application and moisture conditions. Laboratory studies show half-lives of 34 and 50 days at 100 and 72 F, respectively, in a Ripperdan soil, and a half-life of 50 days or greater at 72 F in a Sacramento clay soil. Field studies with soils treated with 4 and 8 lb ai/A show half-lives of chlorfenvinphos ranging from 2 to 12 weeks in mineral soils (unspecified) and from 16-23 weeks in a peat soil. Other field studies show 0.02-0.04 ppm chlorfenvinphos remaining after 8 months in soil (unspecified) after treatment with 1 or 2 lb ai/A, and in a clay loam soil fortified with chlorfenvinphos at 4 kg ai/A. Only 3-13% of the compound is found after 52 weeks. Field studies with a sandy loam treated with 0.25 or 1.0 kg ai/A show chlorfenvinphos residues of 0.4 and 0.5 mg/kg, respectively, immediately after treatment, and 0.5 and 0.1 mg/kg, respectively, after 90 days. Chlorfenvinphos persists longer when applied in September than when applied in May.

Laboratory studies with clay, loam, sand and peat soils fortified with 15 ppm chlorfenvinphos show the following degradation products after 4 months: 1-(2,4-dichlorophenyl)ethan-1-ol (0.06-1.0 ppm), 2,4-dichloroacetophenone (0.1-0.5 ppm), desethyl chlorfenvinphos (0.1-0.2 ppm), and salts or conjugates of desethyl chlorfenvinphos (0.05-0.06 ppm). Field studies show that at 4-6 lb ai/A, residues of 1-(2,4-dichlorophenyl)ethan-1-ol and 2,4-dichloroacetophenone do not exceed 0.2 ppm by the end of the growing season.

3. Soil Mobility

Laboratory and field studies show very little leaching of chlorfenvinphos and no detectable leaching of its degradation products in soil.

4. Accumulation

No bioaccumulation data are available for chlorfenvinphos.

References

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