TASK 5. Development of Chemical/Physical Profile: Captan

Contract No. 68-01-5830

Final Report

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SUBMITTED TO:

Environmental Protection Agency
Arlington, Virginia 22202

SUBMITTED BY:

Enviro Control, Inc.
One Central Plaza
11300 Rockville Pike
Rockville, Maryland 20852

Captan

1. Aqueous Degradation

Captan hydrolyzes in water, with the hydrolysis rate increasing with pH and temperature. After 35 hours at 20 C, 5, 30, and 84% of the original compound is hydrolyzed at pH 7.6, 9.5, and 11.4, respectively. Degradation products are hydrogen sulfide, thiosulfate, sulfites, tetrahydrophthalimide, tetrahydrophthalic acid and its monoamide, CO_2, and HCl. Another study reports a 7 hour half-life of captan in water at 25 C (pH unspecified), and a third study reports the half-life of captan in Lake Superior (pH 7.6) as 7 and 1 hours at 12 and 25 C, respectively. No data on the aqueous photodegradation of captan are available, but photodegradation of captan on polyethylene does occur, with 10-17% degraded after 7 days exposure to sunlight.

2. Soil Degradation

Captan degrades in soil under aerobic conditions to CO_2 with a half-life of 2-3 weeks. Major intermediate metabolites are tetrahydrophthalimide and tetrahydrophthalamic acid, and minor products are tetrahydrophthalamide epoxide, 5,6-dihydrohexahydrophthalimide, and tetrahydrophthalic acid. Degradation of captan occurs more rapidly in moist as opposed to dry soils, with a half-life of greater than 50 days in a dry silt loam and 3.5 days in a moist silt loam. Anaerobic soil degradation of captan occurs with little CO_2 evolution. Less than 9% of originally applied captan is evolved as CO_2 after 4 months, with four major degradation products: tetrahydrophthalamide, tetrahydrophthalamic acid, tetrahydrophalic acid, and cis-6-cyano-3-cyclohexenecarboxylic acid. Captan soil residues are not found (limit of detection 0.03 ppm) 24, 72, or 168 days after planting treated soybean seeds.

3. Soil Mobility

No data on the soil mobility of captan are available.

4. Accumulation

No captan residues (0.03 ppm limit of detection) are found in soybeans harvested after planting captan treated seed (1.66 oz.ai/cut of seed). Data from a model ecosystem study show that captan is not persistent and does not accumulate in a freshwater aquatic food chain.

References:

1. EPA registration file nos. 239-EUTU, 239-EULT, 239-EULI, 239-533.

2. Initial Scientific and Microeconomic Review of Captan, U.S. Environmental Protection Agency, 1975.