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TASK 5. Development of Chemical/Physical Profile: Captan

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Final Report

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SUBMITTED TO:

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## 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<sub>2</sub>, 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<sub>2</sub> 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<sub>2</sub> evolution. Less than 9% of originally applied captan is evolved as CO<sub>2</sub> after 4 months, with four major degradation products: tetrahydrophthalamide, tetrahydrophthalamic acid, tetrahydrophthalic 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.