

Toxicity Assessment of Fungicide Containing Thiram 80% WP using *Eisenia fetida* and *Allium cepa* as Indicator Species

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Ecotoxicology is the science of contaminants in the biosphere and their effects on the components of the biosphere. Predicting the exposure and effect of contaminants is difficult for all relevant ecological entities. Agrochemicals are used extensively in fields to kill pests and weeds, which may exert toxic effects on other non-target species including earthworms and common onion. This research was conducted to evaluate the acute and chronic toxic effects of a commercial fungicide containing Thiram 80% WP, which is carbamate, on *Eisenia fetida* (earthworms) and *Allium cepa* (Common Onion). Earthworms are better indicators of the health of the soil because 60% - 80% of soil biomass represents earthworms. In this study earthworm species, *Eisenia fetida* was used because they can be bred within two weeks. *Allium cepa* is used in this study because they have a high absorbent level and high root growth rate. *Eisenia fetida* was exposed directly to aqueous solutions in five different concentrations (6 mg/L, 8 mg/L, 10 mg/L, 12 mg/L, and 14 mg/L) while distilled water was used as the control. Six *Eisenia fetida* were used in each sample and three replicates were performed. After 48-h exposure to Thiram 80% WP mortality of *Eisenia fetida* increased along the concentration gradient. Overall results of the acute toxicity test of *Eisenia fetida*, indicated an LC₅₀ value of 12.636 mg/L and any behavioral changes could not be observed. Acute toxicity was evaluated to *Allium cepa*, by 72-h experiment of root growth with a range of fungicide concentrations (40 mg/L, 80 mg/L, 120 mg/L, 160 mg/L, and 200 mg/L) and tap water was used as the control. After 72-h exposure to Thiram 80% WP, root growth of *Allium cepa* was reduced along concentration gradient and overall results indicated an EC₅₀ value of 22.183 mg/L. Recommended formulations of fungicide Thiram 80% WP of 640 g/hectare – 1600 g/hectare, and LC₅₀ value for earthworms is 560 mg/kg of soil. According to the results fungicide Thiram 80% WP can be concluded as toxic, but further studies should be conducted to evaluate the acute and chronic effects.

Keywords: Toxicity, Fungicide, Thiram 80% WP, *Eisenia fetida*, *Allium cepa*