Thesis Title Degradation of Triphenyltin Pesticides by Natural Light

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Abstract

The degradation of triphenyltin pesticide, triphenyltin hydroxide (TPTH), was studied under ambient condition of Thailand, in order to obtain preliminary data for future field work. TPTH in the form of solution, dry powder, or as adsorbed on a solid medium, was exposed to sunlight to simulate the degradation of TPTH in water, on plant, and in the soil. The experiment was carried out between May and November, 1990, which was the rainy season of Thailand. The initial concentrations of TPTH in water for the degradation experiment were 1 and 3 ppm, respectively. The half-life of TPTH in water was found to be 75 $\pm$ 3 days. One hundred microgram of dry TPTH, prepared as a thin - film powder, was studied to obtain the half - life of TPTH, which was

approximately 9 $\pm$ 1 days. The degradation of TPTH in both forms was a first order kinetic process. The degradation of TPTH adsorbed on silica gel by natural sunlight and under ultraviolet light were compared. The final degradation product was monophenyltin and/or inorganic tin via diphenyltin, similar to the degradation of other forms of TPTH by sunlight. The degradation studies were followed using three analytical techniques, which required only simple procedure for measuring the concentration of TPTH and the degradation products. The spectrofluorometric method was found to be very useful since it was specific for triphenyltin, without interference from diphenyltin and monophenyltin. The sensitivity of the method was adequate for the concentration level studied. The graphite furnace atomic absorption spectrophotometric (GFAAS) method was used to confirm that the disappearance of TPTH was the result of photodegradation and not by other processes. The thin layer chromatographic (TLC) technique was useful for indicating the route of degradation of TPTH.