Soontree Khuntong 2010: Adsorption Kinetics of Carbamate Pesticides in Rice Field Soil. Doctor of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor. Cheema Soralump, Ph.D. 115 pages.

Two extractive methods: ultrasonic and Soxhlet extraction with petroleum ether:acetone (1:1, v/v) were compared for extraction efficiencies of carbofuran in rice field soil. In this study, Soxhlet provided slightly higher extraction efficiency (83.13%) than ultrasonic extraction (75.55%). The amount of carbofuran was determined by ultrasonic extraction followed by reverse phase HPLC: Intersil ODS as analytical column and 50% acetonitrile-water with flow rate of 1.2 ml/min as mobile phase and detector at 210 nm. The relative error of the method was 0.47% with percentage of recoveries varied from 84 to 77% in the concentration ranges of $10 - 40$ mg l^{-1} of spiked soil samples. High amount of residues found in the plots that contained high organic contents. . K_{oc} were 1.91×10^{-3} and 7.46×10^{-3} mg l^{-1} calculated from K_d and half-life of adsorbed carbofuran and GUS indexes (6.37 and 5.82) calculated from K_{oc} presented an high lixiviation potential. The adsorption of carbofuran in soil reached equilibrium within 23 h. The percentage of adsorption varied from almost 30% to 80% depending on concentrations of carbofuran. The Freundlich isotherms; $q = KC_f^{1/n}$; for the two lines provided the correlation coefficients of 0.9281 and 0.9097, respectively. The distribution coefficients, K were 7.07×10^{-5} and 2.79×10^{-5}. The Freundlich adsorption exponent (1/n) values which were greater than unity (2.5092 and 2.1248) in the two adsorption time. The positive ΔG indicated nonspontaneous reaction. The adsorption kinetics corresponded to the first order reaction with the half-life of 8.9 days and 0.0799 mg d^{-1} of adsorption rate. The desorption rate was 0.0288 mg kg^{-1}, soil d^{-1}. The percentages of desorption was approximately 55% from the beginning to 21 h.

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