

Sorption-Desorption Study of a Herbicide 2,4-Dichlorophenoxyacetic Acid on Acidic Tropical Soils.

ABSTRACT

The sorption and desorption of 2,4-dichlorophenoxyacetic acid (2,4-D) was evaluated on different soils with different range of organic matter content. The batch equilibrium technique under laboratory condition was used to determine the sorption/desorption behavior of 2,4-D in 4 different soil orders of Malaysia viz Histosols (peat), Inceptisols (Selangor and Biah) and Ultisols (Rengam and Serdang) and Oxisol (Munchong). Sorption data were fitted to the linear and Freundlich equations. The values of K_d and K_F ranged from 1.35 to 35.26 and 2.70 to 42.04, respectively. Highest sorption was observed in peat soil and the lowest was in Rengam soil. According to the sorption and desorption results, organic matter and clay seemed to be the most important factor influencing the sorption capacity of 2,4-D. Thus, the contributions of organic matter were evaluated by comparing changes in 2,4-D of sorption before and after organic matter removal. After organic matter was removed from the soils, the K_d values for sorption by Selangor and Munchong, which were calculated from linear and Freundlich equations, decreased by 26.7 % and 28.0 %, respectively. This revealed that soil organic matter greatly influenced the 2,4-D sorption. Based on their sorption capacity, the soils can be ranked in the following decreasing order: Peat > Selangor > Munchong > Biah > Serdang > Rengam Soil Series.

Keyword: 2,4-D; Linear equation; Freundlich equation; Organic matter; Clay minerals