
A Note on the Adsorption of Organic Molecules on Clays¹

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Abstract: Results of adsorption studies of several pesticides on soils and clays show that the application of the reduced concentration concept to adsorption can either reduce the temperature effect on the isotherms, eliminate it altogether (e.g., parathion adsorption on Netanya soil), increase the temperature dependence (e.g., β -BHC adsorption on Ca-bentonite) or even reverse the temperature dependence of the isotherms (e.g., parathion adsorption on Ca-attapulgitite).

Literature and experimental data for the adsorption of parathion by Ca-attapulgitite and by attapulgitite with organic exchangeable cations of different sizes demonstrate that for many surface interactions the terms organophilic or hydrophilic are misleading. Organic compounds which are insoluble in water and soluble in apolar solvents will not necessarily adsorb preferentially on "organophilic" surfaces. The specific interactions between adsorbate and adsorbent and steric considerations (in addition to the relative solubility of the organic molecule in water and apolar solvents and the organophilic or hydrophilic nature of the surface) will determine the partition between the adsorbed and the solution phase. An outstanding example is the order of adsorption of parathion on attapulgitite: HDMA-attapulgitite > Ca-attapulgitite > TMA-attapulgitite. This order is neither directly nor inversely related to the "organophilic" nature of the surfaces.

Key Words: Adsorption • Attapulgitite • Organophilic • Parathion • Reduced Concentration

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