Interaction of Diclofop and Diclofop-Methyl with Al^{3+}-, Fe^{3+}-, and Cu^{2+}-Saturated Montmorillonite

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Abstract: The adsorption from chloroform solution of the herbicide diclofop, (RS)-2-(4-(2,4-dichlorophenoxy)phenoxy) propionic acid, and its methyl ester diclofop-methyl on Cu^{2+}-, Al^{3+}-, and Fe^{3+}-exchanged bentonite samples was investigated. For comparison, the complexes formed by diclofop were synthesized and studied. Diclofop adsorbed on the clays and formed carboxylate bonds to the interlayer ions. Diclofop-methyl also adsorbed, but its interaction involved the formation of hydrogen bonds with water molecules in the interlayer. Traces of diclofop were observed in both the solution and the clays after adsorption of diclofop-methyl, indicating that some hydrolysis of the ester to the corresponding acid occurred. Thus, pesticides forming neutral complexes with interlayer cations in montmorillonite in soils may be extractable by solvents and therefore released into the environment.

Key Words: Adsorption • Bentonite • Diclofop • Diclofop-methyl • Interlayer cations • Interlayer complexes • Montmorillonite • Pesticide

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