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Influence of the organic complex concentration on adsorption of herbicide in organic modified montmorillonite

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Pesticides are recognized as an important source of potential pollution to soil and water due to their mobility and degradation in soils. Results presented in this paper show impact of the organic complex concentration on the adsorption of herbicides (acetochlor) at the surface of the organic modified montmorillonite. In this work, natural montmorillonite from Bogovina, located near Boljevac municipality, was used for organic modification. Cation-exchange capacity of this montmorillonite was determined by extraction with ammonium acetate (86 mmol/100g of clay). Montmorillonite have been modified first with NaCl and than with two organic complexes, hexadecyltrimethylammonium bromide (HDTMA) and phenyltrimethylammonium chloride (PTMA). For both organic complexes, three saturation concentrations were selected for monitoring of the herbicide adsorption (43 mmol/100g of clay (0.5 CEC), 86 mmol/100g of clay (1 CEC) and 129 mmol/100g of clay (1.5 CEC)). Changes in the properties of the inorganic and organic bentonite have been examined using the X-ray powder diffraction (XRPD) and batch equilibrium method. Increase in basal spacing (d) of montmorillonites saturated with 1.5 CEC of organic cation indicate that sorption of PTMA and HDTMA can exceed the saturation of 1 CEC. Both organic montmorillonites have shown higher uptake of the herbicide, compared to the inorganic montmorillonite. Comparing the values Freundlich coefficients in batch equilibrium method, (presented in the form of log Kf and 1/n), it can be seen that the sorption decreases in the series: 0.5CEC> 1CEC> 1.5CEC> NaM, for both organic montmorillonites.