

Evaluation of removal and adsorption of endrin on activated Albanian clays.

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Abstract

The fate of persistent organic pollutants (POP) in soils and sediments has been of great concern due to their toxicity, persistency and bioaccumulation. Sorption is an important process determining the fate of POPs on soils and sediments. It has been discovered previously that clay minerals may have a great potential on adsorbing pesticides.

This study aims to shed light on the utilization of the adsorbent properties of Albanian clays in their natural and activated form in the practice of cleaning surface and ground waters contaminated with different pesticides. Initially, the adsorption process of endrin, a nonionic persistent organochlorine pesticide, to Prrenjasi (region in Albania) clay was investigated. In addition, trying to improve clay adsorptive properties, a comparison was made using different solutions as activators. CH₃COOH (20%) and HNO₃ (20%) were used as a traditional form of activating clays and NaCl (0.5M) as well leading to the aim on finding new activation solutions based on the physical and chemical properties of the contaminants. Meanwhile an important aspect of these processes is the contact time, which varies from 2 – 672 hours.

The obtained results reveal that Prrenjasi clay activated with NaCl shows the highest adsorption towards endrin, followed by HNO₃, CH₃COOH activated clays and finally natural clay. Within the first 2 hours of contact time endrin desorbs up to 77% of the initial amount contained in the clay. Meanwhile during the whole process up to 95.5 % of endrin is desorbed from the clay. NaCl activated clay samples used on this study for the removal of endrin from aqueous solutions turn out to be an effective, low-cost and environmentally friendly method on the treatment of contaminated waters.