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Adsorption of Chlorinated Pesticides in Drinking Water by Carbon Nanotubes

Authors : Hacer Sule Gonul, Vedat Uyak

Abstract : Intensive use of pesticides in agricultural activity causes mixing of these compounds into water sources with surface flow. Especially after the 1970s, a number of limitations imposed on the use of chlorinated pesticides that have a carcinogenic risk potential and regulatory limit have been established. These chlorinated pesticides discharge to water resources, transport in the water and land environment and accumulation in the human body through the food chain raises serious health concerns. Carbon nanotubes (CNTs) have attracted considerable attention from on all because of their excellent mechanical, electrical, and environmental characteristics. Due to CNT particles' high degree of hydrophobic surfaces, these nanoparticles play critical role in the removal of water contaminants of natural organic matters, pesticides and phenolic compounds in water sources. Health concerns associated with chlorinated pesticides requires the removal of such contaminants from aquatic environment. Although the use of aldrin and atrazine was restricted in our country, repatriation of illegal entry and widespread use of such chemicals in agricultural areas cause increases for the concentration of these chemicals in the water supply. In this study, the compounds of chlorinated pesticides such as aldrin and atrazine compounds would be tried to eliminate from drinking water with carbon nanotube adsorption method. Within this study, 2 different types of CNT would be used including single-wall (SWCNT) and multi-wall (MWCNT) carbon nanotubes. Adsorption isotherms within the scope of work, the parameters affecting the adsorption of chlorinated pesticides in water are considered as pH, contact time, CNT type, CNT dose and initial concentration of pesticides. As a result, under conditions of neutral pH conditions with MWCNT respectively for atrazine and aldrin obtained adsorption capacity of determined as 2.24 µg/mg ve 3.84 µg/mg. On the other hand, the determined adsorption capacity rates for SWCNT for aldrin and atrazine has identified as 3.91 µg/mg ve 3.92 µg/mg. After all, each type of pesticide that provides superior performance in relieving SWCNT particles has emerged.

Keywords : pesticide, drinking water, carbon nanotube, adsorption
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