



## Study of Surfactants Modified Jordanian Kaolinite and Its Adsorption Behavior on Methomyl, Metalaxyl and Atrazine from Aqueous Solution

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### ABSTRACT

The adsorption behavior of these pesticides were studied using Jordanian kaolinite. The increase concern of organic pollutants in the environment that can affect human health led us to search for new and environmental friendly low cost techniques and materials especially for water treatment. Jordanian kaolinite was brought from Jordan natural resources from different locations. The kaolinite was modified by cationic surfactants. The raw and modified kaolinite by cationic surfactants DDTMA-Br, TDTMA-Br and ODTMA-Br have been studied to determine their physical and chemical properties and any changes that may occur during modification of kaolinite.

Many techniques were being used to study the raw and modified kaolinite such as: X-Ray Fluorescence Spectroscopy (XRF), X-Ray Diffraction Spectroscopy (XRD), Scanning Electron Microscopy (SEM), Ultra Violet Spectroscopy (UV-Vis), Inductively Coupled Plasma (ICP/MS), Total Organic Carbon (TOC), Thermogravimetric and finally Fourier Transform Infrared Spectroscopy (FTIR). All these techniques were used to characterize modified and unmodified Jordanian kaolinite. The surface area of kaolinite was determined by applying Methylene Blue (MB) method.

The raw and modified kaolinite were applied to study the removal of some organic pollutants such: Methomyl ( $C_5H_{10}N_2O_2S$ ), Metalaxyl ( $C_{15}H_{21}NO_4$ ) and Atrazine ( $C_8H_{14}ClN_5$ ) from aqueous solution using adsorption methods.

The highest percentage of removal was measured for Methomyl by using surfactant modified kaolinite samples, with a value of 75 % for each KWS1, KWS2. While for KWS3 is 55%. The order of removal follows the sequence for kaolinite with the surfactants  $KWS1 \sim KWS2 > KWS3$ . The removal of Atrazine by using surfactant modified kaolinite samples showed that KWS2 is 58% while the lowest percentage of removal is 45% for KWS1. The order of removal for modified kaolinite samples were  $KWS2 > KWS1 > KWS3$  and. Finally, for removal of Metalaxyl by using surfactant modified kaolinite samples showed moderate values ranging from 38 % for KWS1, 48% for KWS2. The order of removal for modified kaolinite sample KW is  $KWS2 > KWS1 > KWS3$ .

**Keywords:** Kaolinite, Adsorption, Modification and Pesticides.