

**ARSENIC (V) REMOVAL FROM WATER BY  
MODIFIED MONTMORILLONITE (MMT) FROM  
NATURALLY OCCURRING CLAY DEPOSITS IN  
SRI LANKA**

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by

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## Abstract

Montmorillonite (MMT) nano-clay is widely used in many applications. MMT clay has been deposited and enriched in dry zone of Sri Lanka. Identifying the possibilities and methods for use of MMT clay for heavy metal removal was the objective of this research. Mainly naturally occurring clay deposits in Murukkan area were considered. Research focused on arsenic (As) removal by raw MMT clay and modified MMT clay because of the human health problems associated with excessive and long-term exposure to As. The can be either acute and chronic health issues. Purpose of the study was developing suitable and low cost adsorbent materials for arsenic removal. Only the clay particles were used to prepare the samples.

Selected MMT samples were characterized using Fourier Transform Infrared Spectroscopy (FTIR) technique. Apart from the identification the samples were modified by  $\text{FeCl}_3$  and modified clay was used to make small pellets for filter media. The pellets were fired at  $500^\circ\text{C}$  -  $600^\circ\text{C}$  temperature range in a furnace. FTIR technique was used to identify composition and functional groups present in resulted product as well as raw MMT. Modified filter media and raw samples were treated with As(V) solutions with different contact times and different pH ranges. Then filtrate of all samples were analyzed using Atomic Absorption Spectroscopy (AAS) to determine arsenic concentration and iron concentration of each samples. Results of the test prove that the MMT clay is capable of removing arsenic efficiently.