EVALUATION OF ION REMOVAL CAPACITY OF LOW COST NATURALLY AVAILABLE MURUNKAN CLAY FOR DESALINATION OF WATER

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Many attempts for cost effective methods of desalination of sea water have being reported. However none of them have proven to be economically efficient and environmental friendly. This study focuses on exploring desalination capacity of Murunkan clay to be used as a low-cost, efficient, eco-friendly and sustainable material to be used in domestic or regional level desalination plants.

Murunkan clay was chosen as a suitable material due to its high abundance of Montmorillonite (MMT) because of which the ion exchange capacity of the clay is high (80 meq).

Water samples from the Negombo lagoon were used for the study. Optimization of ion removal was accomplished varying the clay mass and contact time. Reusability of filter material was studied by regenerating the clay. In order to achieve maximum ion removal, repeated filtrations were done. All measurements were replicated.

X-Ray diffraction patterns before and after acid treatment for Murunkan clay did not show any change in major peaks except reduction of noise and disappearance of minor peaks. The concentrations of Na^+, K^+, Mg^{2+} and Ca^{2+} before treatment were found to be 30,112, 634, 2123 and 1,147 ppm, respectively based on atomic absorption spectrophotometric measurements. For 50 cm^3 lagoon water sample optimum period for the maximum removal of Na^+, Ca^{2+} and Mg^{2+} ions was 1 h and of K^+ was 2 h. Further, the Optimum clay doses for maximum removal

of ions were (2.000 ± 0.001) g except for Ca^{2+} that was (1.000 ± 0.001) g. Acid treated clay demonstrated a higher potential to remove all ions except Ca^{2+} as compared to that of raw clay. Raw clay and acid treated clay showed a maximum total percentage removal at 1 h c and 3h respectively. In evaluating ion removal by repeated filtrations using Murunkan clay all ions showed a cumulative high removal after two times filtrations except for Mg^{2+}. Treating the clay in distilled water followed by acid treatment increased the ion removal capacity compared to that of treating the clay in reverse order. The total percentage removal of ions by regenerated clay was higher (34.2%) compared to that of raw clay (28.9%).