Abstract

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Clay's Ability to Remove Iron and Manganese from Brackish Groundwater in Comparison to Cation Exchange Risen

Having available, safe, and continuous access to potable water resources is one of the most important targets for nations nowadays. The situation in Egypt becomes harder every year with a threat of water scarcity in the future, since the river Nile is the main and almost the only water resource. Other available resources such as rainfall, groundwater, domestic sewage treatment, seawater desalination and brackish groundwater only contribute with low percentages to the total water resources in Egypt. Obstacles hindering the wide use of groundwater refer to the high cost of desalination and contamination of ground water with some heavy metals like iron and manganese. Two main methods of desalination technologies have been considered in the technological evolution (evaporation and membrane technologies). Research is rapidly running to enhance the characteristics of different membrane materials and adsorbents. Since clay minerals are considered as a natural filter by removing and accumulating contaminates in water passing through it, clay with its promising characteristics has been tested through this paper to desalinate seawater and remove iron and manganese from brackish groundwater. A comparison between different materials (adsorbents and ion exchange desalination based) will be discussed. Samples of (local clays and ion exchange resin) were prepared. A dead end setup was designed for the experiment to take place. Raw seawater of TDS 36,966 ppm and brackish groundwater solution was also prepared in lab, contaminated with iron and manganese of 50 ppm concentration, separately. Results were good as local clay achieved around 20% raw seawater desalination which could be useful for low saline brackish water desalination, local clay also achieved very promising results in iron removal of 62% from 50 ppm concentrated solution in the time that manganese removal was around 53% from same concentration. This proofs local clay future in water treatment.