Removal of Cadmium Ions from Industrial Waste Water by Low Cost Adsorbents

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Water is essential for life. Waste water treatment is important for both the reuse of water and environmental protection. Removal of heavy metal from waste water is a big challenge. Cadmium, among the heavy metals, is the most dangerous for human health, for animals and plants. Cadmium emerges in waste water from different industrial activities such as metal plating, cadmium-nickel batteries, phosphate fertilizers, mining pigments, stabilizers, metallurgy, ceramics, photography, textile printing, sewage sludge, alkaline batteries and electroplating. In some cases such as in the Dubai Gabal Ali waste water plant, the produced water, after treatment, contains levels of cadmium higher than allowed to be used for irrigation or to be discharged to the ground water reservoir. The cost of removal of cadmium at this concentration level from this large volume of water with conventional treatment processes is extremely expensive. Therefore, developing a low cost method for removal of this metal at this concentration level is important. Generally, adsorption is one of the most effective techniques for removing heavy metals from polluted water. So, to search for efficient, low cost adsorbents such as local indigenous rocks and biomass is important. In the present study, some local indigenous rocks such as dolomite, barite and calcite from different places in the UAE will be tested for the removal of cadmium from waste water. Additionally, tests of using activated carbon produced from biomass (date palm leaves and date palm pits) for removing of cadmium from waste water will be conducted. The effect of the waste water pH, adsorbent dose, cadmium ion concentration, contact time and temperature on the adsorption processes will be studied by batch and dynamic adsorption experiments

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