

Purification of Bilge Water by Adsorption

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Abstract : Generally, bilge waters can be briefly defined as saline and greasy wastewaters. The oil and grease are mixed with the sea water, which affects many marine species. Bilge water is a complex mixture of various compounds such as solvents, surfactants, fuel, lubricating oils, and hydraulic oils. It is resulted mainly by the leakage from the machinery and fresh water washdowns, which are allowed to drain to the lowest inner part of the ship's hull. There are several physicochemical methods used for bilge water treatment such as biodegradation electrochemical and electro-coagulation/flotation. The research herein presented discusses adsorption as a method to treat bilge water and eggshells were studied as an adsorbent. The influence of operating parameters as contact time, temperature and adsorbent dose (0,2 - 2g/l) on the removal efficiency of Chemical oxygen demand, COD, and turbidity was analyzed. The bilge wastewater used for this study was supplied by Harbour Bouharoune. Chemical oxygen demand removal increased from 26.7% to 68.7% as the adsorbent dose increased from 0.2 to 2 g. The kinetics of adsorption by eggshells were fast, reaching 55 % of the total adsorption capacity in ten minutes ($T= 20^{\circ}\text{C}$, $\text{pH}=7.66$, $m=2\text{g/L}$). It was found that the turbidity removal efficiency decreased and 95% were achieved at the end of 90 min reaction. The adsorption process was found to be effective for the purification of bilge water and pseudo-second-order kinetic model was fitted for COD removal.

Keywords : adsorption, bilge water, eggshells and kinetics, equilibrium and kinetics

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