A Preliminary Study on Absorption of Heavy Metal (Lead) From Synthetic Waste Water Using Mullet (Mugil spp.) Fish Scales

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Heavy metals are relative dense metals present in earth crust that are in high accumulation level in water bodies. Among several technologies to remove these heavy metals, biosorption is a novel concept that use in waste water facilities. This study was carried out tofind the feasibility of using mullet *(Mugilidae spp.)* fish scales as a biosorbant and find the best cost effective form of mullet fish scales to absorb heavy metal (Pb) in synthetic waste water.The effect of oven drying conditions, particle size, and dosage of fish scales and pH for the absorption of heavy metal (Pb) absorption were investigated by Atomic Absorption Spectrophotometer (AA240, 283.33 nm, Varian., Australia). The reusability was investigated with the use of nitric and hydrochloric acids. The highest mean absorption results were obtained for 3 g (98.70 0.73) of damaged 1-2 cm^2 size (92.03 ± 0.51) with oven drying conditions of 80°C (99.10 ± 0.52) for 24 hours (93.93 ± 2.38). All parameters were indicated that there was a significant difference among the treatments ($P < 0.05$). In addition to that, absorption was not depended on pH and reusable ability was high with the nitric (19.83 ± 5.66) compared to hydrochloric acid (3.09 ± 0.37). But in cost effective manner new fish scales were more applicable. The observed reason for the efficient biosorption from the fish scales were the crystal structure, chemical composition of hydroxyapatite with porous structure and the highly ordered three dimensional structure of collagen. This research revealed that, there is a high potential to use mullet fish scales as a biosorbant for treat waste water in wastewater treatment facilities and it is a rapid, cost effective and high efficient biosorbant among other biosorbants.

Keywords: Heavy metal, Biosorption, Cost effective, Hydroxyapatite, Collagen