

**IDENTIFICATION OF A COST EFFECTIVE METHOD TO
REMOVE HEAVY METALS FROM INDUSTRIAL
WASTEWATER IN RUBBER INDUSTRY**

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ABSTRACT

Wastewater from rubber processing factories may contain heavy metals (Cr, Hg, Cu and Zn) which can be accumulated in water sources. Biosorption is a novel method to remove heavy metals from aqueous solutions. Fish scales can be used as a good biosorbant owe to their complex three dimensional composite structure with collagen and hydroxyapatite with high porosity and crystalline structure. This study was carried out to find the feasibility of mullet (*Mugilidae* spp.) fish scales and to compare with activated carbon to be used as a biosorbant and to find a simple and cost effective method to remove heavy metals from synthetic and industrial wastewater from rubber factories. Heavy metal analysis was conducted using Atomic Absorption Spectrophotometer and 3 g of damaged 1-2 cm² size fish scales which were oven dried at 80 °C for 24 hours were used as the optimum parameters for fish scales and 25 % (w/w) CaCl₂ treated coconut shell charcoal powder (oven dried at 100 °C for 30 minutes) were used as the optimum parameters of activated carbon. For analysis, 50 ml volume of samples were used and for the synthetic wastewater 100 ppm concentrated samples were used each from above mentioned elements. Industrial wastewater (pH=7.44) was obtained from a local rubber glove factory. As with results with the industrial wastewater, heavy metal Cr absorbance of fish scale was high (93.92 %) compared to activated carbon (68.10 %). With the synthetic wastewater, heavy metal absorbance of fish scales were 99.74±0.08 % for Cd, 99.60±0.06 % for Cr, 98.79±0.06 % for Cu, 97.75±0.41 % for Pb and absorbance of activated carbon were < 95 % for Cd, 99.16±0.20 % for Cr, 99.61±0.26 % for Cu, 98.75±0.12 % for Pb. The research disclosed that there is a high potential to develop an efficient and cost effective biosorbant from mullet fish scales to remove heavy metals from industrial wastewater effluents of rubber processing factories.