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Ecofriendly and low-cost adsorbent for efficient removal of lead and nickel from aqueous solution

Amal S. Al Rahbi*, Nalini Uthman, Wafa A. Al Rawahi, Amani Al Nabhani,
Khulod Al Maqbali, Maryam Al Hattali, Zahra Al Zuhimi

Department of Applied Sciences, University of Technology and Applied Sciences, Muscat, Oman.

* *amal.arahbi@utas.edu.om*

ABSTRACT

This study aims to investigate the removal of heavy metal from industrial waste water using a low-cost bio-adsorbent. Banana peels was treated chemically with phosphoric acid and methanol. The ability of treated banana peel to remove lead and nickel from wastewater was investigated. Adsorption experiments were performed to optimize the effect of process conditions such as adsorbent dose, pH and contact time on heavy metals removal. Banana peels treated with phosphoric acid was found to have a higher removal efficiency compared to the one treated with methanol. The maximum removal efficiency of lead and nickel was found to be 78 and 43% with the banana peels treated with phosphoric acid at pH 6 and with using 2g of treated peels. The lead removal efficiency was found to increase from 27 to 95 % with the increase of adsorbent dosage from 0.5 to 4 g, respectively. The adsorption processes for lead and nickel were well described by Langmuir and Freundlich isotherm model, respectively. The experimental results suggest that the fabricated bio adsorbent is an alternate low-cost adsorbent for waste water treatment.

Keywords: Banana peels; Bio-adsorbent; Water pollution; Lead; Nickel

*Corresponding author