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An investigation on the use of date palm fibers and coir pith as adsorbents for Pb(II) ions from its aqueous solution

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ABSTRACT

The adsorption process is being widely used for the removal of heavy metals from wastewater streams and many adsorbent materials are being used for this purpose. In recent years, there is a growing need for safe and economical methods for the removal of heavy metals from contaminated waters which demands the utilization of agro-waste-based materials as low-cost adsorbent materials. The present investigation deals with the use of date palm fiber and coir pith for the removal of lead ions (Pb(II)) from wastewater in a laboratory column filtration setup. The concentration of heavy metal from the effluents was analyzed using atomic absorption spectroscopy. Both the adsorbent materials were studied by changing the bed weight under different flow rates. Mathematical modeling of the breakthrough curves was carried out using Thomas model and bed depth service time model equations. The breakthrough curves showed that date palm fibers are having better adsorption efficiency compared to coir pith.

Keywords: Adsorption; Date-palm fiber; Coir pith; Mathematical models