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Adsorption of Cd(II) and Pb(II) from Aqueous Solutions by Using Pods of Acacia Karoo

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Abstract : With the increase in industrialization, the presence of heavy metals in wastewater streams has turned into a serious concern for the ecosystem. The metals diffuse through the food chains, causing various health hazards. Conventional methods used to remove these heavy metals from water have some limitations, such as cost, secondary pollution due to sludge formation, recovery of metal, economic viability at low metal concentrations, etc. Many of the biomaterials have been investigated by researchers for the adsorption of heavy metals from water solutions as an alternative technique for the last two decades and have found promising results. In this paper, the batch study on the use of pods of acacia karoo for the adsorption of Cd(II) and Pb(II) from aqueous solutions has been reported. The effect of various parameters on the removal of metal ions, such as pH, contact time, stirring speed, initial metal ion concentration, adsorbent dose, and temperature, have been established to find the optimum parameters through one parameter optimization. Further, kinetic, equilibrium, and thermodynamic studies have been conducted. The pods of acacia karoo have shown great potential for adsorption of Cd(II) and Pb(II) from aqueous solutions and have proven to be a better and more economical alternative for the purpose.

Keywords : adsorption, heavy metals, biomaterials, Cadmium(II), Lead(II), pods of acacia karoo
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