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Optimization and activation of renewable durian husk for biosorption of lead (II) from an aqueous medium (Article)

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Abstract

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Background: Biosorption of lead Pb(II) by durian husk activated carbon (DHAC) was investigated. The main aim of this work is to explore the effect of operating variables such as pH, biosorbent dose, temperature, initial metal ion concentration and contact time on the removal of Pb(II) from synthesized aqueous medium using a response surface methodology (RSM) technique. The experimentation was performed in two sets, namely set 1 and set 2. Results: For experimental set 1, pH was set to 7.0. The optimum conditions for the remaining parameters were determined to be 0.39 g DHAC dose, 60 min contact time and 100 mg L⁻¹ of initial metal ion concentration, which yielded maximum biosorption capacity of 14.6 mg g⁻¹. For experimental set 2, 41.27 °C, 8.95 and 99.96 mg L⁻¹ were the optimum conditions determined for temperature, pH and initial Pb(II) concentration, respectively; which revealed a maximum adsorption capacity of 9.67 mg g⁻¹. Characterization of the adsorbent revealed active functional groups such as hydroxyl, carboxylic, alcohol and hemicellulose. The equilibrium adsorption data obeyed the Langmuir isotherm and pseudo-second-order kinetic models with maximum Langmuir uptake of 36.1 mg g⁻¹. Conclusions: The biosorbent was capable of reuse, so that the abundant durian husk could be utilized effectively for the removal of Pb(II) from polluted water. © 2018 Society of Chemical Industry. © 2018 Society of Chemical Industry

SciVal Topic Prominence ⓘ

Topic: Biosorption | Aqueous solution | Biosorption capacity

Prominence percentile: 99.629 ⓘ

Author keywords

[activated carbon](#) [durian husk](#) [lead \(II\) biosorption](#) [optimization](#) [wastewater](#)

Indexed keywords

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Chemicals and CAS Registry Numbers:

activated carbon, 64365-11-3, 82228-96-4; alcohol, 64-17-5; hemicellulose, 63100-39-0, 63100-40-3, 9034-32-6; lead, 7439-92-1, 13966-28-4

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