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Comparative and optimization studies of adsorptive strengths of activated carbons produced from steam- and CO₂-activation for BPOME treatment (Article)

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Abstract

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This study basically compared the adsorptive efficacies of powdered activated carbons (PACs) produced from palm empty fruit bunches (EFB) in the treatment of a non-simulated biotreated palm oil mill effluent (BPOME). Each of the PACs was produced from two different methods namely steam- and CO₂ activation routes. This test was performed with the main aim of obtaining an appropriate activated carbon suitable for the treatment of BPOME. The steam activated PAC was found to possess higher adsorptive strength as compared with that of CO₂ activation with the operating conditions of 150 rpm agitation for 60 min with varying dosage of PAC from 0.5 - 5.0 g. The steam activated PAC performed better than the CO₂ activated PAC with a record uptake of up to 81%, 92% and 89% for Chemical Oxygen Demand (COD), Manganese (Mn) and Hydrogen Sulfide (H₂S) respectively as compared with the uptake of 67%, 90% and 87% from the CO₂-activated PAC. Furthermore, a 2-level full factorial design of experiment was utilized to assess the effects of three factors on adsorption. The highest removal efficiencies for COD, Mn and H₂S were found to be 83.1%, 93.6% and 89.8% at adsorbent dosage 5 g, agitation speed 200 rpm and contact time 60 min. © 2014 AENSI Publisher All rights reserved.

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
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