ADSORPTION METHYL ORANGE USING COMPOSITE NICKEL OXIDE/ACTIVATED CARBON FROM BANANA BUNCH

ABSTRACT

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Research has been done on making NiO/AC composites from banana bunches as an adsorbent to absorb Methyl Orange. NiO/AC composites are made by mixing the activated carbon banana bunch and nickel oxide metal by the hydrothermal method at temperature of 250 ℃ for 5 hours. NiO/AC composites were characterized using XRD, FTIR, and SEM-EDX and tested the effectiveness of optimum conditions of Methyl Orange adsorption using NiO/AC composites with test parameters variation in pH, concentration, contact time, and composite NiO/AC weight analyzed using UV-Visible Spectrophotometer. The characteristic results of composites with XRD are known to be semi-crystalline composites and the shape of the structure is FCC. For FTIR results obtained functional groups C-Ni-O and Ni-O in composites with wave numbers 446.36 cm-1 and 435.9 cm-1. Characterization of SEM-EDX in composites seen flakes and chunks of white nickel oxide and has a varied pore shape and uneven surface. With the composition of nickel 1.44%, carbon 73.41%, oxygen 20.52% and silica 4.64%. The optimum condition of NiO/AC composites to absorb Methyl orange at pH 3 with optimum concentration of 20 ppm and 2 gram composite mass and the required contact time is 60 minutes. The adsorption isotherm model in the study worked Freundlich with a value (R2) of 0.7509. The adsorption kinetics in this study showed the results of work followed second order with a value (R2) of 0.9994.

Keyword : Composite NIO/AC, Hydrotermal, Kinetic Adsorption, and Isoterm Freundlich