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SYNTHESIS AND CHARACTERIZATION OF COMPOSITE MEMBRANE FOR DIALYSIS APPLICATION: ADSORPTION AND RESPONSE SURFACE METHODOLOGY FOR THE REMOVAL OF PHENOL FROM WATER

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Abstract

The present study investigates the elaboration and performance of a new Powdered Activated Carbon composite membrane to be used in the elimination of phenol from aqueous solution. The characterization of membranes was determined by Fourier transforms infrared spectroscopy, X-ray diffraction, Thermal gravimetric analysis and Scanning electron microscopy analysis. The effect of treatment, the several parameters such as initial phenol concentration and adsorbent mass have been investigated in batch experiments as well as pH solution on the adsorption process using activated carbon composite membranes. Adsorption isotherm non-linear studies indicate that the Langmuir isotherm provides an adequate fit to the isotherm data. The maximum monolayer adsorption capacity was found 103.08 mg/g. Response surface methodology was used to optimize the adsorption capacity of phenol at equilibrium time and the corresponding operating conditions. The highest adsorption capacity of phenol was theoretically predicted to be 4 mg/g, at which the initial phenol concentration was 20 mg/L, adsorbent dose 0.1 g/L, and agitation speed 250 rpm.

Key words: composite membrane, dialysis, isotherms, powdered activated carbon, response surface methodology

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