

## عنوان مقاله:

Adsorption of Methylene Blue onto Acid Modified Raphia Taedigera Seed Activated Carbon

## محل انتشار:

نشریه پیشرفته شیمی، دوره 3، شماره 5 (سال: 1399)

تعداد صفحات اصل مقاله: 17

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## خلاصه مقاله:

In this work, the possibility of using Raphia taedigera seed as a low-cost adsorbent to remove methylene blue (MB) dye from aqueous solutions was investigated. The activated carbon was prepared by carbonization and chemical treatment of the seed with sulphuric acid to produce acid-modified Raphia taedigera seed activated carbon (RTAC). The surface morphology and bond arrangement of the RTAC were evaluated using the scanning electron microscopy (SEM) and Fourier transforms infrared spectroscopy (FTIR), respectively. The SEM analysis results revealed that the prepared adsorbent had aggregated and rough surface structure with pores and FTIR revealed the presence of several functional groups such as  $-C=O$ ,  $-OH$ ,  $-C=C-$ ,  $-N=O$  and  $-C=N-$ . The adsorption efficiency of the RTAC for the removal of the MB dye was assessed under different experimental conditions including, contact time, temperature, pH, adsorbent dosage, and dye initial concentration. The results gave the performances of 99.611% after 15 min, 99.635% at 303 K, 99.894% at pH 9, 99.256% with 0.9 g, and 99.743% for 40 mg/L for evaluating the effect of the contact time, temperature, pH, adsorbent dosage, and dye solutions initial concentration, respectively. The adsorption of the MB dye onto the RTAC conformed to Langmuir isotherm and fit best to pseudo-second-order kinetic models. Thermodynamic studies indicated a spontaneous, endothermic, feasible, and physisorption nature of the RTAC and MB dye interactions. The present study found the acid-modified Raphia taedigera seed activated carbon to be a promising low-cost adsorbent for the removal of MB dye from aqueous solution.

## کلمات کلیدی:

Raphia taedigera, Methylene blue, Adsorption Isotherm, Kinetics

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