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## Adsorption behavior of modified *Glossogyne tenuifolia* leaves as a potential biosorbent for the removal of dyes

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### ABSTRACT

*Glossogyne tenuifolia* leaves were modified with various chemical methods including aqueous ammonia, lauric acid solution, and a combination of both to prepare the adsorbents for removing Congo red (CR) and malachite green (MG) dyes from an aqueous solution. The effects of different concentrations of the modifying agents (aqueous ammonia and lauric acid solution), of different liquid/solid ratios, and of different modification times on dye removal efficiency were investigated. The adsorbents were analyzed by scanning electron microscopy (SEM), Fourier transform infrared analysis (FTIR), and the gas sorption system. The special functional groups were linked successfully onto the surface of the most effective adsorbent, which displayed damaged and separated fibers on the surface and had the largest specific surface area. The isotherm and kinetic adsorption data can be described well by the Freundlich isotherm model and the pseudo-second-order model, respectively. The positive enthalpy change ( $\Delta H^\circ$ ) and negative free energy change ( $\Delta G^\circ$ ) confirmed that the CR and MG adsorptions were endothermic and spontaneous. The adsorbent prepared from *Glossogyne tenuifolia* leaves showed the potential to remove CR and MG dyes from aqueous solutions in a wide range of concentrations.

**Keywords:** adsorption, *Glossogyne tenuifolia*, isotherm, kinetic, thermodynamic

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