

Dyes and pigments have been used in many industries for colorization purpose but they pose hazards to the environment and end users of water. Therefore, it is important to remove this pollutant from waste water before their final disposal. This study aimed to investigate the removal of methylene blue by cost effective, ecofriendly, high-efficiency bio-sorbent from activated coffee husk. The process was carried out using chemical activation (H₃PO₄) process. Fourier transform infrared spectroscopy and surface analyzer (Brunauer-Emmett-Teller) were used to characterize the adsorbent. The specific surface area adsorbent was obtained as 28.54 m²/g. The maximum removal efficiency was obtained as 96.9% at pH of 5, initial dye concentration of 20 mg/L, adsorbent dosage of 0.8 g/50 mL, for contact time of 50 min and 30°C temperature on the activation surface of coffee husk. Langmuir model was found to fit the equilibrium data for methylene blue adsorption with 6.82 mg/g at 30°C. The adsorption process follows the pseudo-second-order model. Thermodynamics analysis showed that the adsorption of methylene blue on to the activated coffee husk was a spontaneous and endothermic process. The experimental data obtained in the present study proved that coffee husk is a suitable bio-sorbent in removal of cationic dyes.