

Application of degreased coffee beans for the removal of Malachite Green from aqueous solution

김동수*, Mi-Hwa Baek, Christianah Olakitan Ijagbemi,
Se-Jin O
이화여자대학교 환경공학과
(dongsu@ewha.ac.kr*)

This study reports on the feasibility of employing degreased coffee beans (DCB) as adsorbent for Malachite Green (MG) removal in dyeing wastewater. The iodine value (IV), specific surface area (SSA) and porosity of the raw coffee beans (RCB) used in the study increased after the degreasing process, resulting in significant increase in the adsorption of MG onto DCB. Employing a batch experimental set-up, optimum conditions for complete color removal and adsorption of MG by DCB was studied considering parameters such effect of degreasing process, adsorbent dosage, initial dye concentration, reaction temperature and pH. Adsorbed amount of MG by DCB increased with increasing pH, DCB dosage, temperature and initial MG concentration. The rate of the adsorption reaction followed the pseudo second-order kinetics with the sorption isotherm well fitted to the Freundlich and the Langmuir isotherm models. Thermodynamic studies revealed that the adsorption processes is spontaneous and endothermic in nature. DCB can effectively remove MG from dyeing process wastewater.