

Abstract

Description of the subject. The present study concerns the preparation of activated coal (AC) from bitter almond (*Prunus amygdalus*) shells (BASh), a fruit that grows spontaneously in the Setif region (northeast Algeria). Obtaining and characterizing activated coal was the valorization method adopted here. Objectives. The aim of this study was to elucidate the feasibility of the chemical activation of BASh in order to obtain two types of activated coal (AC). Method. The two ACs were obtained from BASh by acid (CAa) and basic (CAb) activation. The final products were investigated for their different physicochemical characteristics: angle of repose, ash, differential screening calorimetry, etc. In the case of CAa, the modeling of the adsorption kinetic of methylene blue (MB), as well as of adsorption isotherms, was also performed. Results. The activation mode seemed to affect unequally the different physicochemical characteristics of both the obtained coals. On the other hand, the adsorption kinetics of the MB by CAa was correctly described by the pseudo-2nd-order model ($R^2 = 0.999$). Concerning the modeling of the adsorption isotherm, of the three models tested, the Freundlich model appeared to be the most appropriate to fit the experimental data ($R^2 = 0.898$, mean relative error (MRE) = 38.638 and root mean square error (RMSE) = 1.039). In addition, the activated shell showed an interesting capacity for MB adsorption, estimated at 99.05%. Conclusions. Results confirmed the possibility of the valorization of BASh in the form of AC, taking into account the positive socio-economic impacts for the region and beyond