The preparation of an activated carbon from apricot stones (ASAC) with H_3PO_4 activation and its ability to remove the Coomassie blue (CB) from aqueous solutions are reported in this study. The spectroscopy method is used to get information on interactions between the functional groups of the adsorbent and the CB. Batch adsorption experiments were first undertaken to assess the effect of various parameters on the removal efficiency of CB. It was observed that under optimized conditions up to 98.022 mg/g could be removed from solution at 50°C. The equilibrium experimental data were analysed using Langmuir and Freundlich isotherm equations. An error-based statistic study showed that the isotherm data are well described by the Freundlich model. The suitability of the kinetic models for the adsorption of CB onto ASAC was also investigated. It was found that the adsorption kinetics of the dye obeyed pseudo-second-order kinetic model. The evaluation of thermodynamics parameters such as activation energy of adsorption (E_a: 66.161 kJ/mol) predicted the chemisorption nature of the sorption process. The negative Gibbs free energy ($-\Delta G° = 15.21–19.27$ kJ/mol) and negative enthalpy change ($\Delta H° = -55.088$ kJ/mol) indicated, respectively, the spontaneous and exothermic nature of the reaction