

Abstract :

The present study consists of comparing the retention of paracetamol dispersed in aqueous solutions by two different natural adsorbents commonly found in Algeria, namely olive stones (OS) and date pits (DP). Comparative study was carried out using adsorption parameters such as contact time, temperature and initial concentration of paracetamol. The kinetic study revealed that adsorption on both adsorbents follow the pseudo-second-order equation but the values of adsorption capacity, q_e , and the rate constant, k_2 , are found to be 37.12 mg g^{-1} and $0.0128 \text{ g mg}^{-1} \text{ min}^{-1}$, respectively, for OS, which are significantly higher than those obtained for DP which are 29.74 mg g^{-1} and $0.0032 \text{ mg g}^{-1} \text{ min}^{-1}$, respectively, on the other hand, data of equilibrium has been well adjusted by the Langmuir isothermal model. The adsorption of paracetamol on these adsorbents is exothermic and spontaneous with $\Delta S^\circ = -71.0 \text{ J mol}^{-1} \text{ K}^{-1}$ and $\Delta H^\circ = -30.4 \text{ kJ mol}^{-1}$ for OS and $\Delta S^\circ = -10.2 \text{ J mol}^{-1} \text{ K}^{-1}$ and $\Delta H^\circ = -6.1 \text{ kJ mol}^{-1}$ for DP. The results indicate that the OS was more efficient with a removal percentage greater than 98% compared with the DP which is about 78%, these results are similar to those found by scanning electron microscopy in the OS which represent porous structure with a number of pores larger than those observed for DP and even the X-ray fluorescence analysis shows that the surface nature of OS contains a significant percentage of calcium contrary to DP which has a higher percentage in potassium.