

# Calorimetric study of adsorbate-adsorbent interactions in the methylparaben adsorption process on activated carbons

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Methylparaben (MePB) is a type of emerging contaminant, commonly present in wastewater and surface water, widely used as preservatives in cosmetics, pharmaceuticals, food and industrial. The risk associated with the presence of these pollutants in the environment is due to their classification as an endocrine disruptor<sup>1</sup>. The use of adsorbents such as activated carbon for the removal of various pollutants has been widely studied, due to the ability of this material to modify its chemical properties by pre and post-preparation treatments, as well as its textural characteristics depending on the activating agent used<sup>2</sup> and its activation temperature, generating solids with different porosity.

The adsorption of MePB in 4 activated carbons obtained from Stone African palm (*Elaeis Guineensis*) modified chemically by impregnation with  $\text{CaCl}_2$  (1-2% wt/v) and carbonized in  $\text{CO}_2$  atmosphere at 973 K and 1173 K, is presented obtaining solids with areas between 150 and 1320  $\text{m}^2\cdot\text{g}^{-1}$  and micropore volumes between 0.056 and 0.54  $\text{cm}^3\cdot\text{g}^{-1}$ . Immersion enthalpy values were found between -7.36 and -45.77  $\text{J}\cdot\text{g}^{-1}$  for the active carbons immersed in the 200 ppm MePB solution. To evaluate the efficiency of MePB adsorption on the obtained solids, the adsorption isotherms were determined in order to relate the quantities adsorbed with the immersion enthalpies and to know the intensity of the energy interactions between the MePB and the activated carbons.

## References

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2. Molina-Sabio, M. & Rodríguez-Reinoso, F. Role of chemical activation in the development of carbon porosity. *Colloids Surfaces A Physicochem. Eng. Asp.* **241**, 15–25 (2004).