Thermodynamic and Calorimetric study of new biological derivatives of chitosan/graphene oxide for the elimination of pharmaceutical compounds from aqueous solutions

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Abstract
The main scope of this research shows the results obtained from graphene oxide bio-composites with chitosan during several experiments such as their use as potential adsorbents of emerging water-soluble compounds. In this research, diclofenac sodium and paracetamol were used as probe molecules as non-steroidal anti-inflammatory drugs widely used in the pharmaceutical sector, and sodium valproate as an antiepileptic [1]. The experimental results showed that the highest adsorption capacity was presented by the compounds with the highest concentration of GO and rGO (at a concentration level of 0.5%), while the contaminants that presented the highest removal by adsorption were sodium valproate and diclofenac sodium.

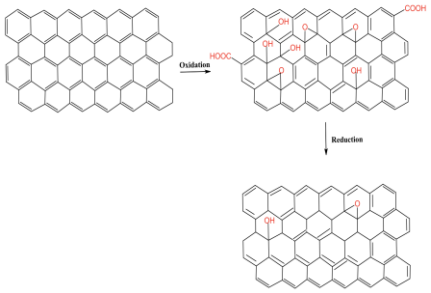

Figure 1: Graphene, Graphene Oxide and reduced Graphene Oxide.

The results show that the adsorption process seemed to end after 2 h for all compounds in the studied mixture (well-adjusted to the pseudo-second order model). The results show that the Redlich–Peterson (R–P) model offers a better agreement with the experimental data, while the adsorption capacity of the adsorbents increased with increasing temperature. In general, the highest adsorption capacities were achieved at pH 10 (55 °C)[2]. Desorption was achieved using different aqueous eluents (with pH 2-10) and organic solvents. FTIR techniques were used to characterize the composition and morphology, and the HPLC system was used to detect compounds. The calorimetric data show a good correlation between the immersion heats and the chemical and textural properties of the synthesized biocomposites[1,2].

References

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