



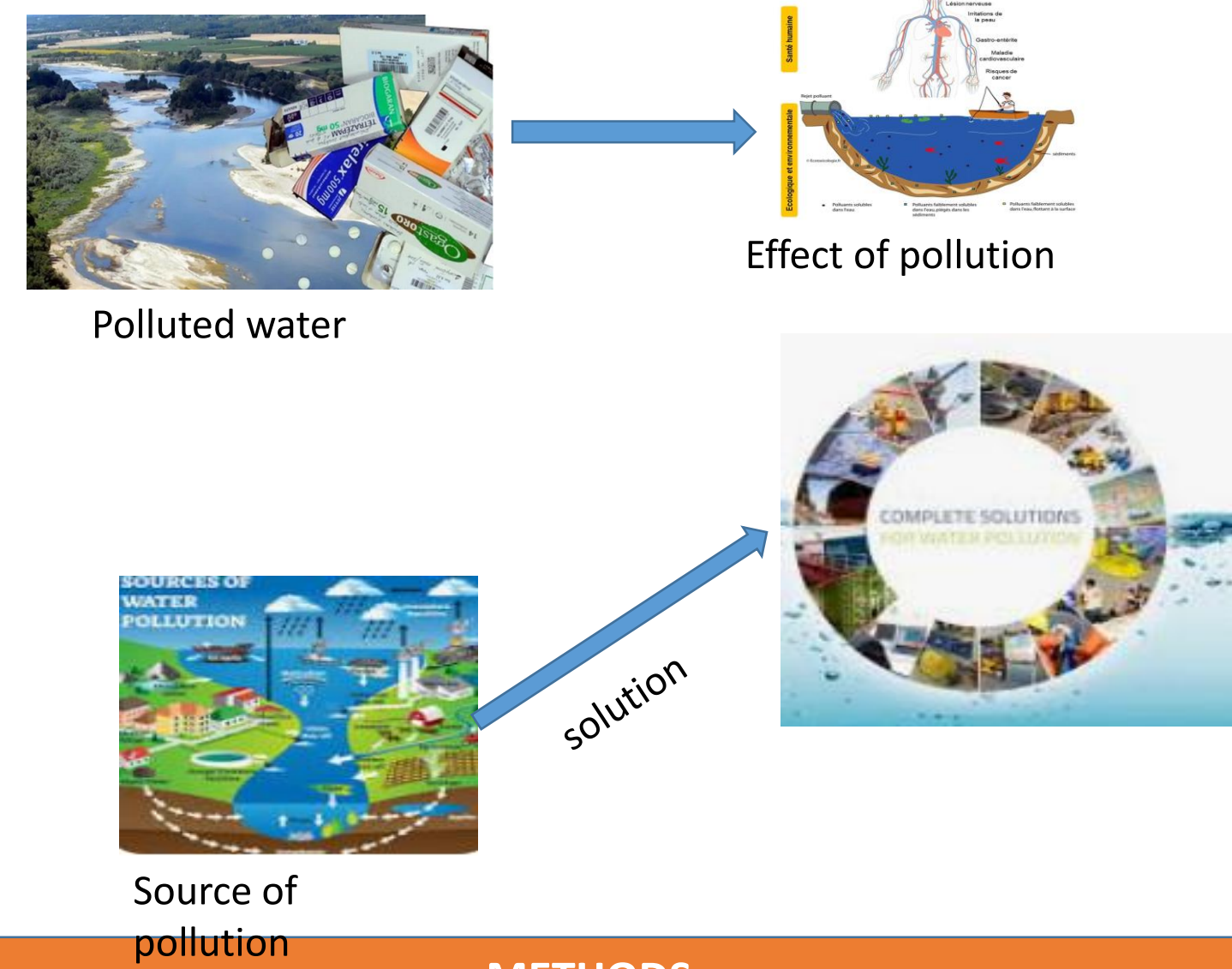
EVALUATION OF PHENOBARBITAL ADSORPTION EFFICIENCY ON BIOSORBENTS OR ACTIVATED CARBON OBTAINED FROM ADANSONIA DIGITATA SHELLS

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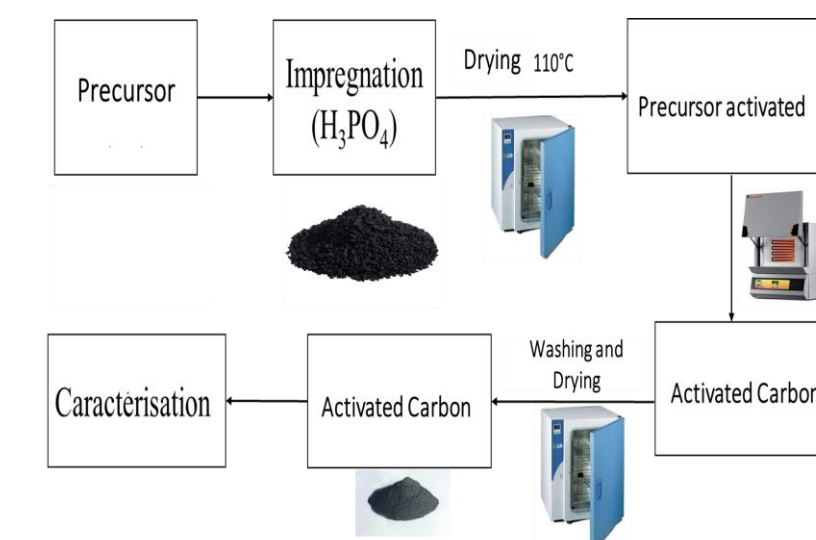
OVERVIEW

Emerging contaminants, especially pharmaceutical residues, are increasingly detected in aquatic environments because they are not efficiently removed by conventional wastewater treatment plants (Natarajan, R. et al., 2022). Phenobarbital (PHB), a widely prescribed antiepileptic drug, is considered a priority aquatic pollutant, highlighting the need for efficient and sustainable removal technologies (Magesh, N. et al., 2020).

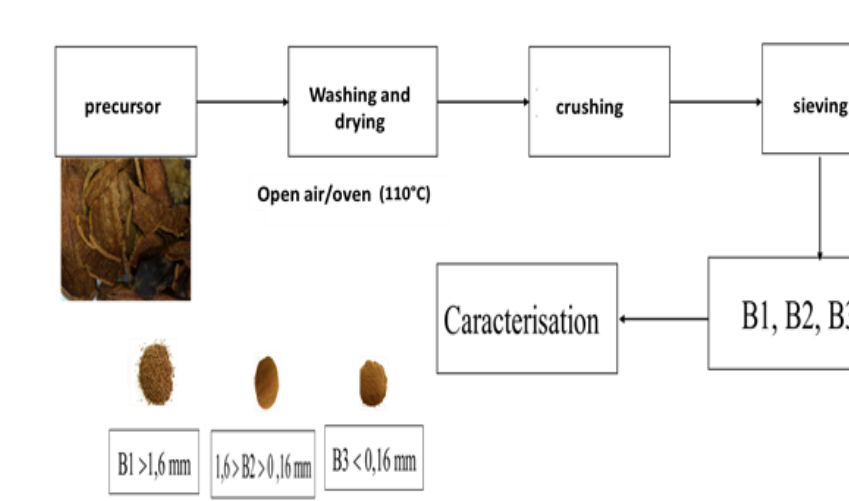


METHODS

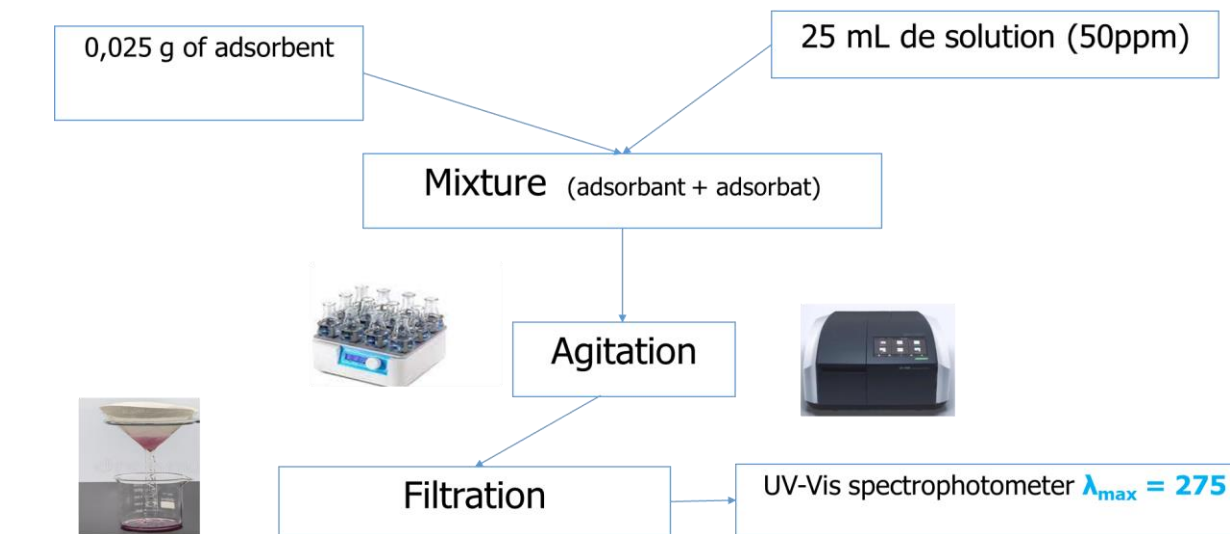
Activated carbon preparation



Biosorbent elaboration



Adsorption experiments



RESULTS

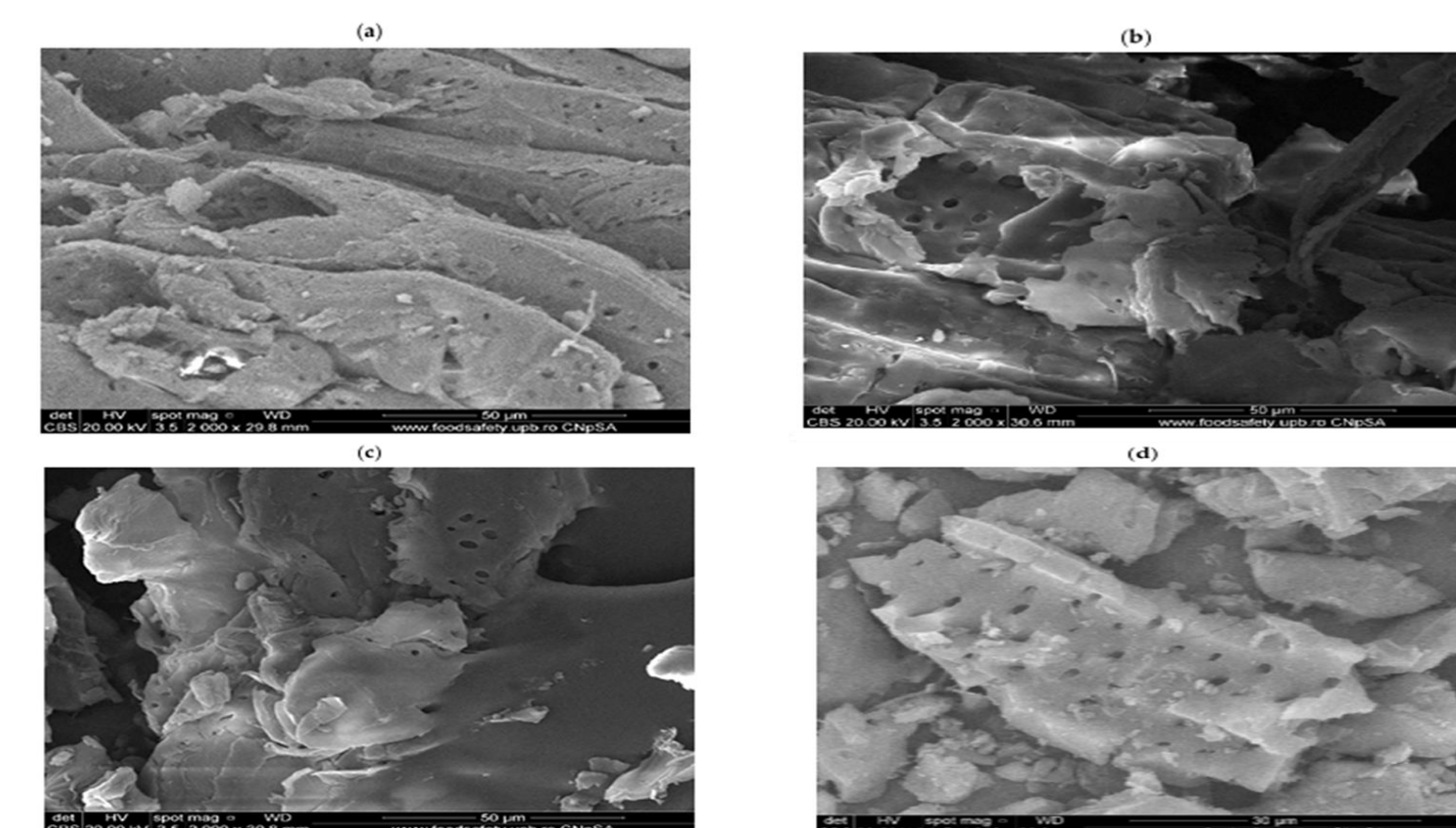


Figure 1 : SEM of biosorbents B1 diameters >1.6 mm (a); B2 diameters > 0.16 mm (b); B3 diameters < 0.16 mm(c); activated carbon (d)..

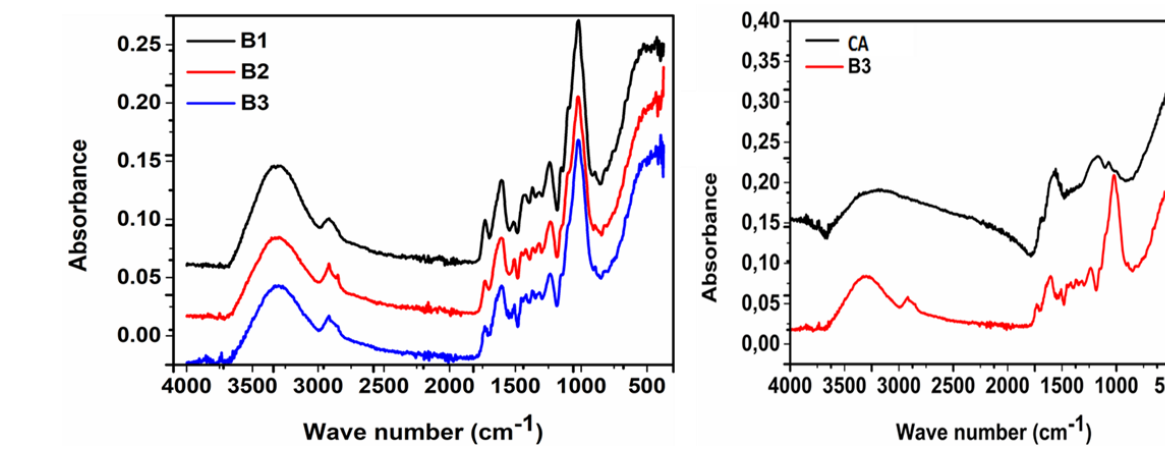


Figure 2 : FTIR analysis.

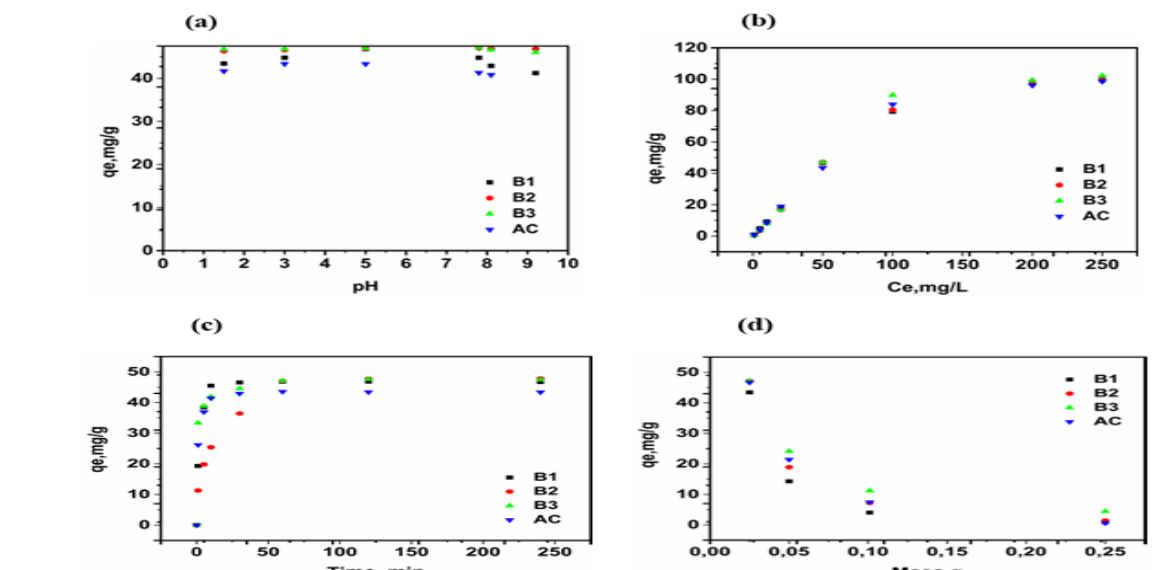


Figure 3 : Influence of working conditions: pH, (a); Initial concentration, (b); Contact time, (c); Adsorbent dose, (d) .

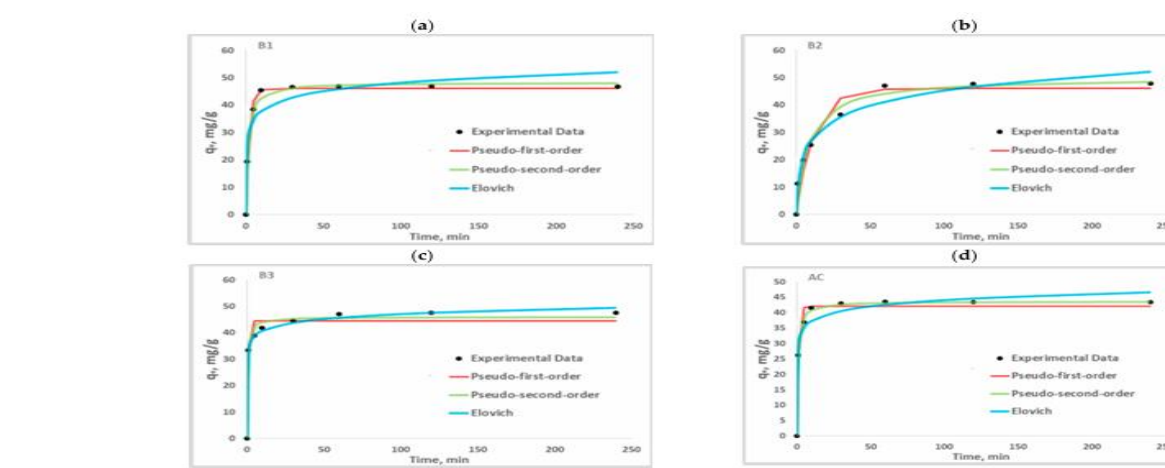


Figure 4: Pseudo-first order, pseudo-second order, Elovich kinetic model (a–d).

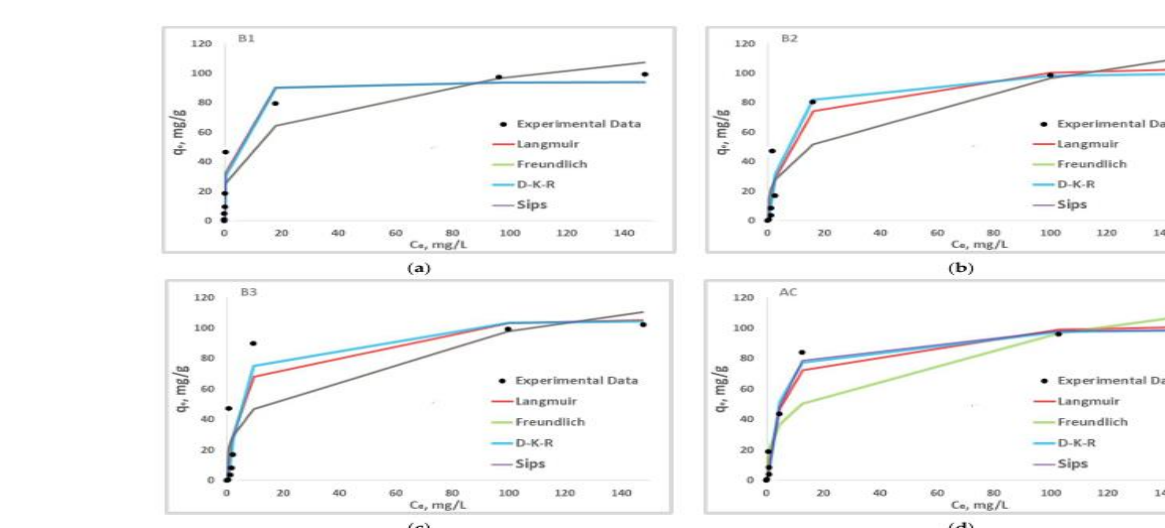


Figure 5 Langmuir, Freundlich, D-K-R and Sips isotherm adsorption model for B1 (a), B2 (b), B3 (c) and AC(d).

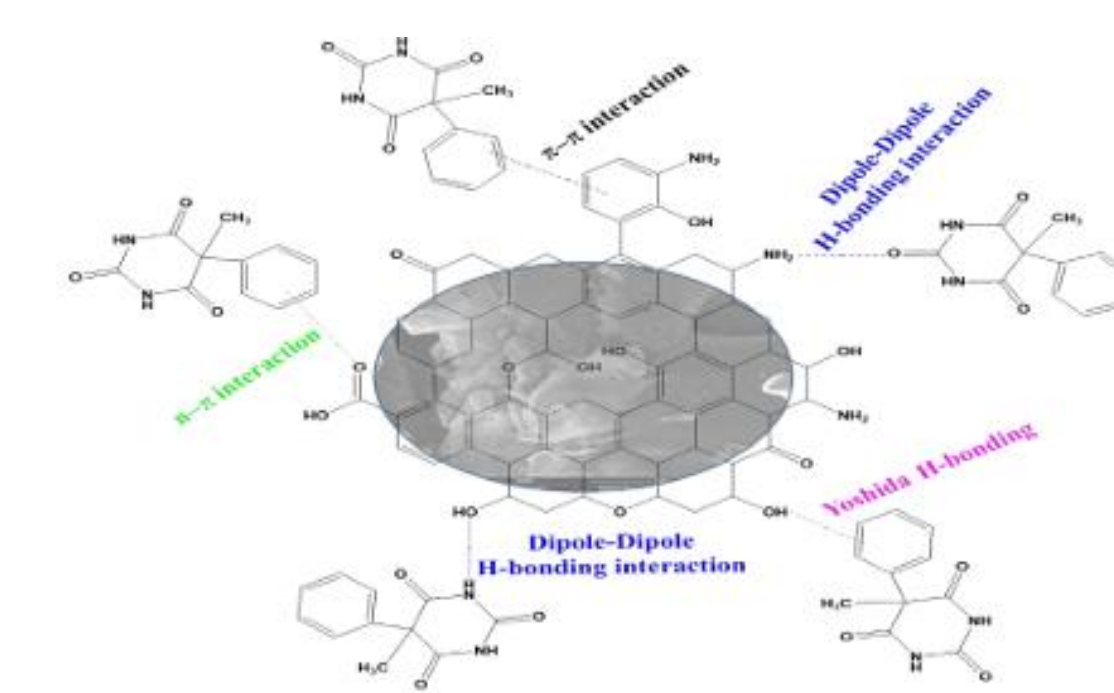


Figure 6 : Mechanism of phenobarbital adsorption.

CONCLUSION

In conclusion, biosorbents derived from baobab shells showed promising performance for the removal of phenobarbital from wastewater, with efficiency comparable to activated carbon. Their porous structure and surface functional groups enhance adsorption capacity, as confirmed by characterization and kinetic modelling. The materials are low-cost, environmentally friendly, and suitable for wastewater treatment applications. These findings highlight their potential as sustainable alternatives to conventional adsorbents. Future work will focus on regeneration studies and testing under real wastewater conditions.

Acknowledgements

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