



Removal of Pharmaceutical Residues from Wastewater using Activated Carbon from Rice Husks

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Abstract

Pharmaceutical residues in discharges that end up in rivers causes disruption of aquatic ecosystems and human health.
Pyrolysis carried out 500°C and then activated by phosphoric acid to increase its porosity.



Introduction

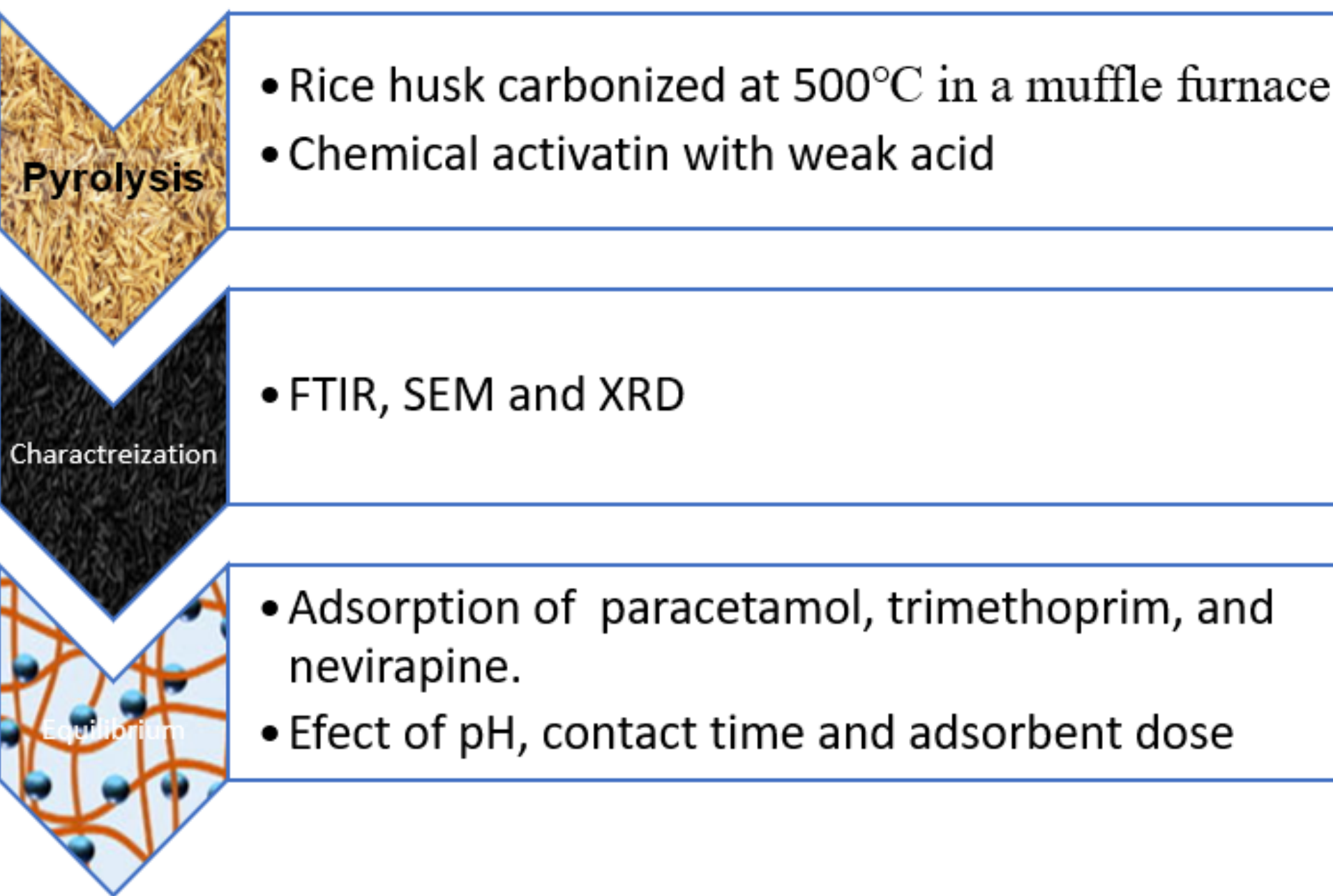


Rise in demand for pharmaceutical products.
Channeling of pharmaceutical compounds to the environment and water system
Activated carbon has unique physical-chemical properties and available.
Activation can be Physical or chemical.

Objective

To remove trimethoprim, paracetamol and nevirapine from wastewater using activated carbon made from rice husks.

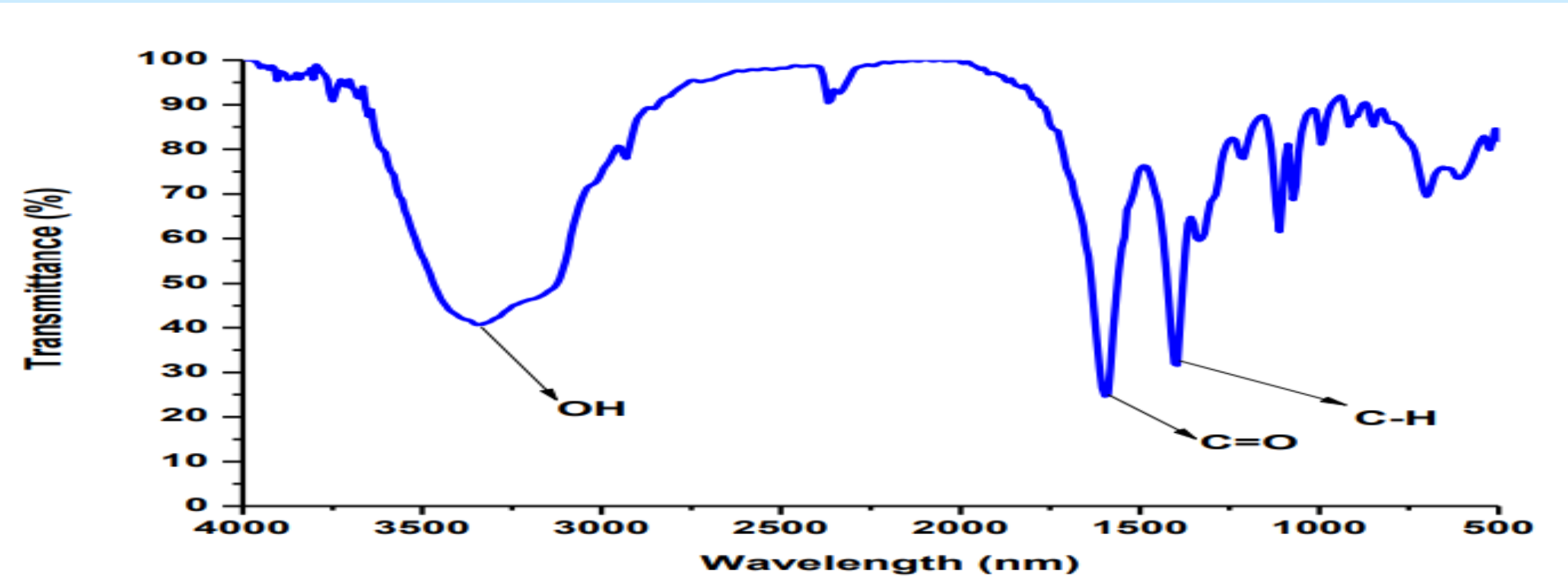
Methodology



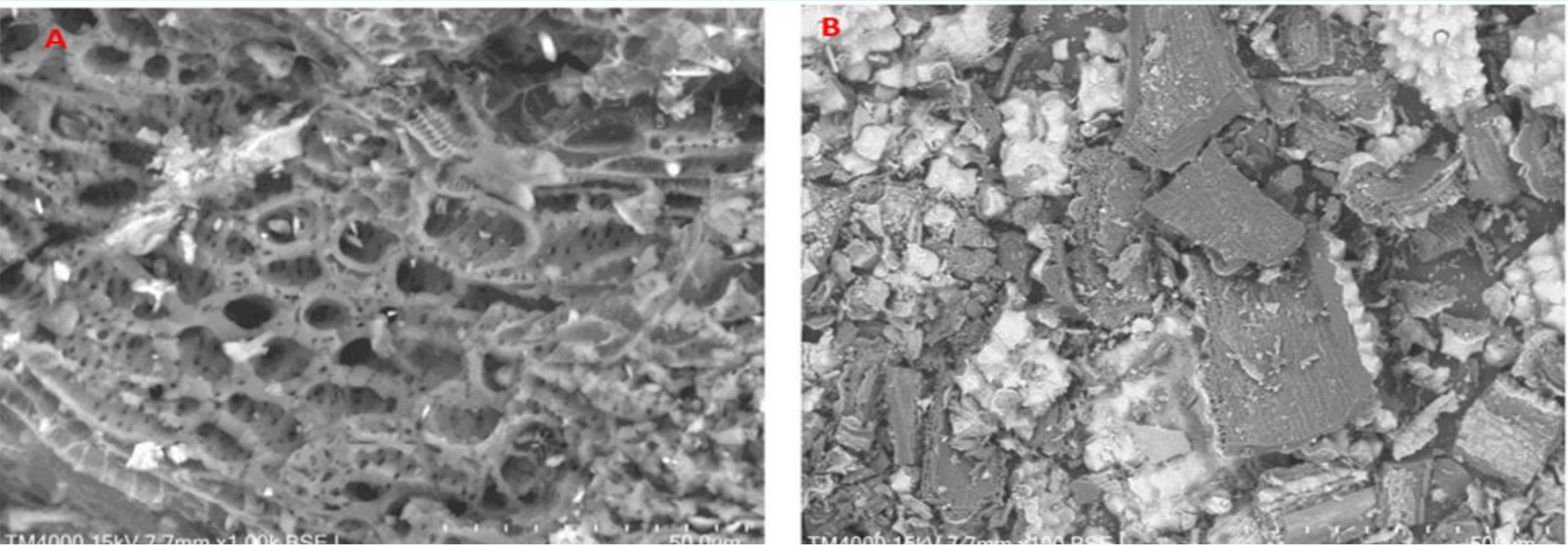
$$\% \text{ Removal} = \left(\frac{C_i - C_2}{C_i} \right) 100$$

$$q_e = \left(\frac{C_i - C_2}{M} \right) V$$

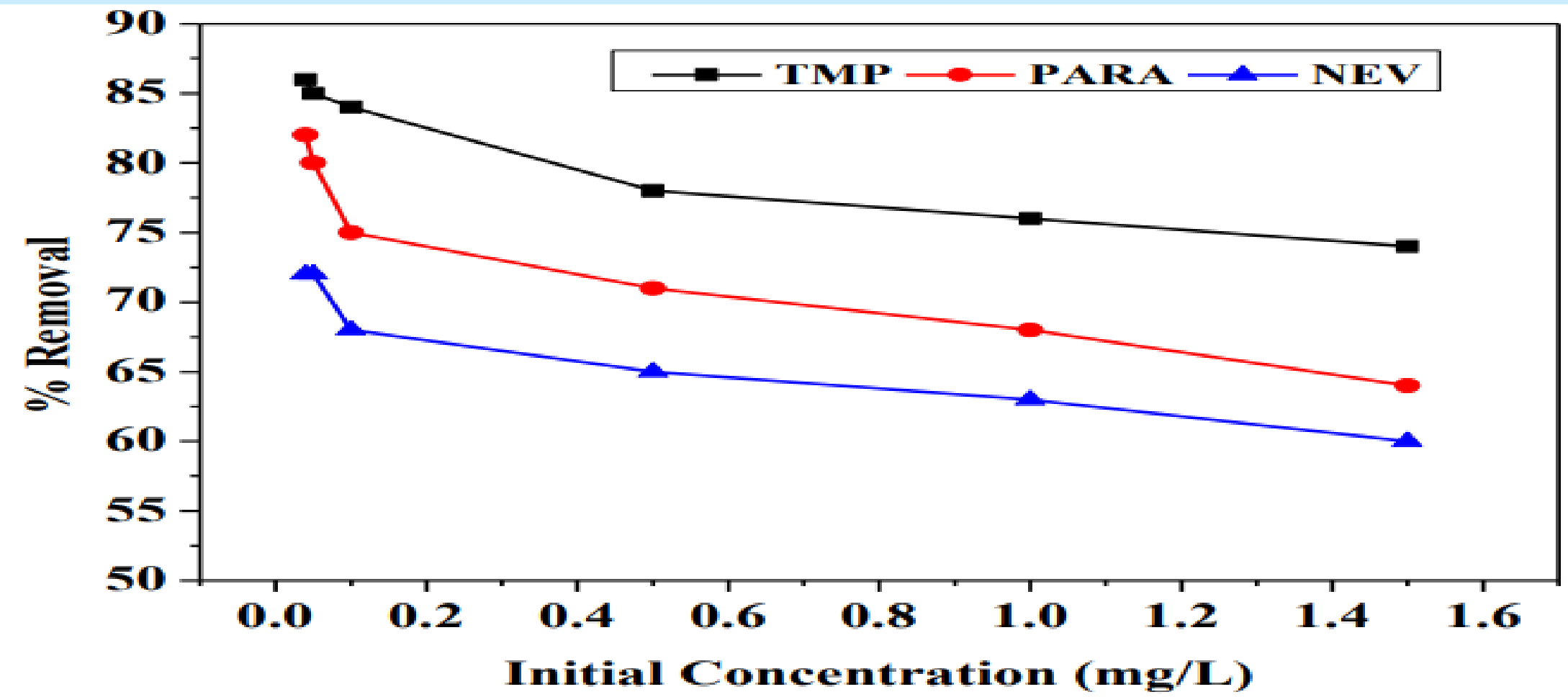
Results



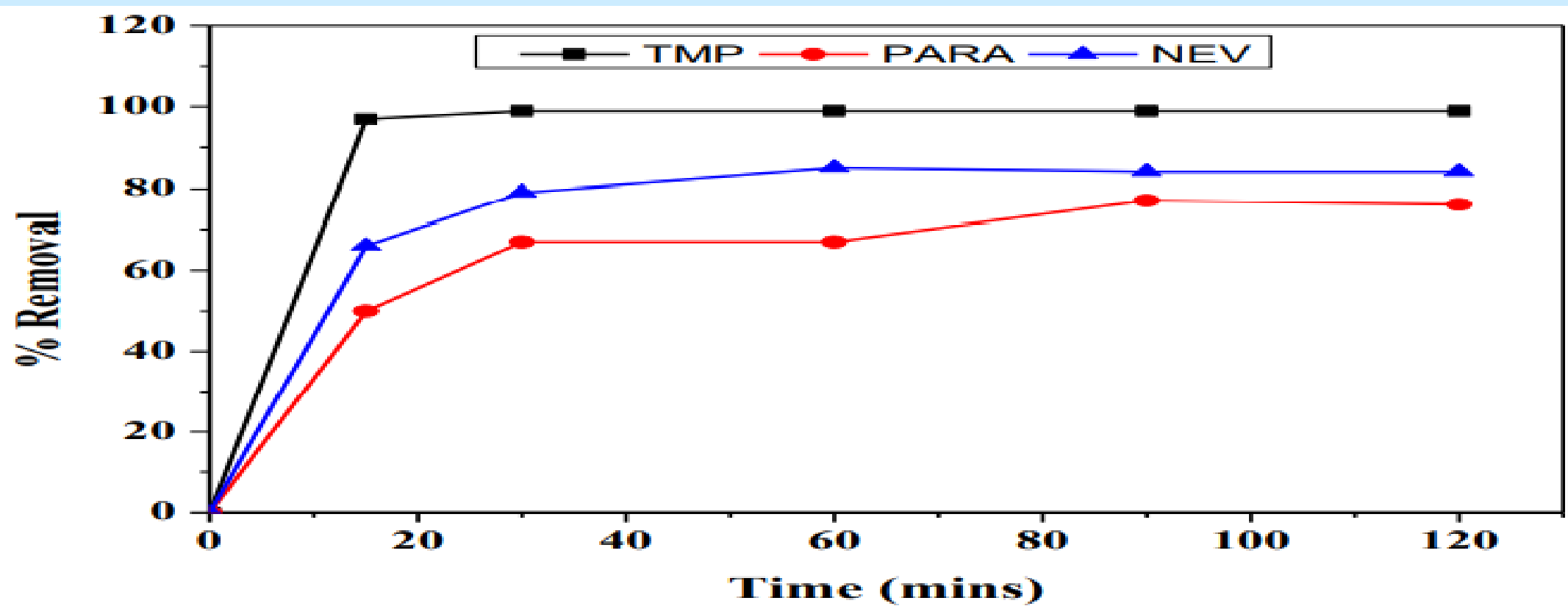
FT-IR spectrum of rice husks activated carbon carbonated at 500°C



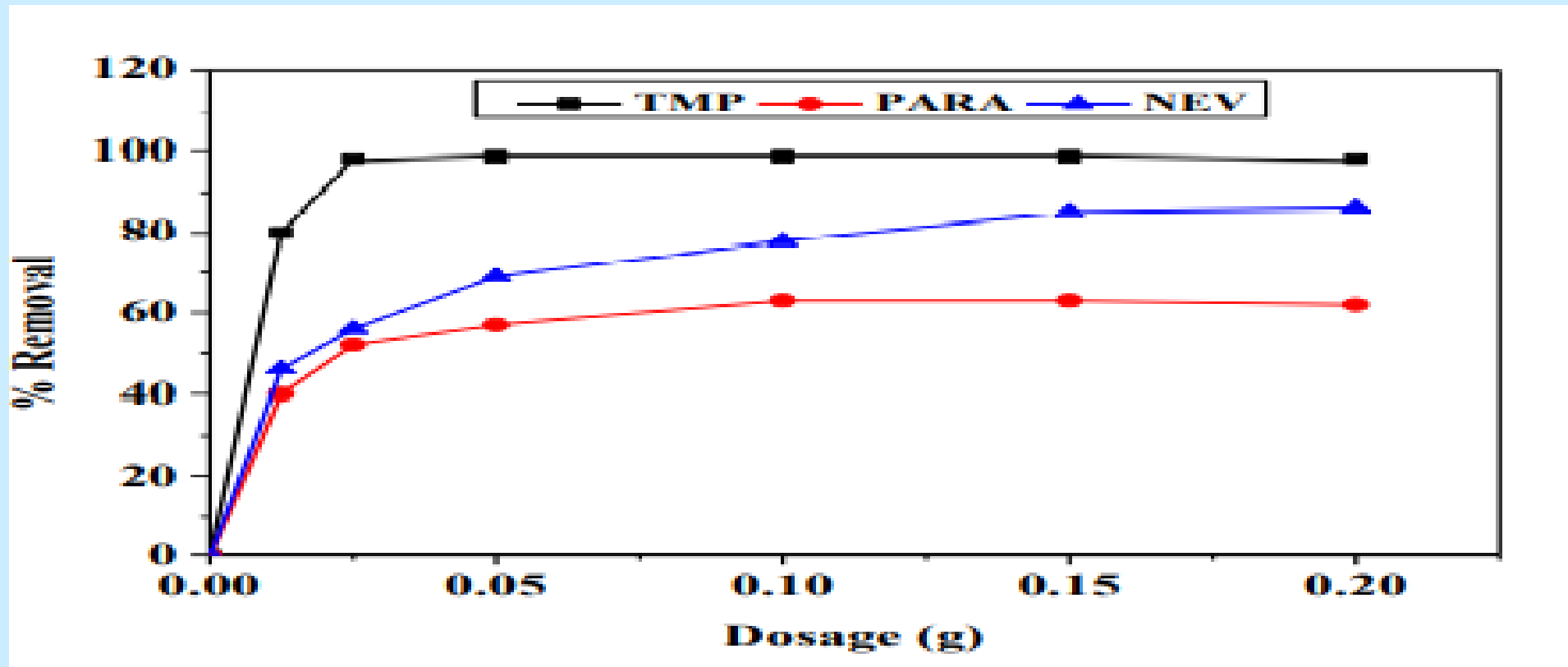
SEM micrograph of activated carbon before adsorption (A) and after adsorption of paracetamol (B)



Effect of initial drug concentration on adsorption of trimethoprim, paracetamol, and nevirapine



Effect of contact time on adsorption of trimethoprim, paracetamol, and nevirapine

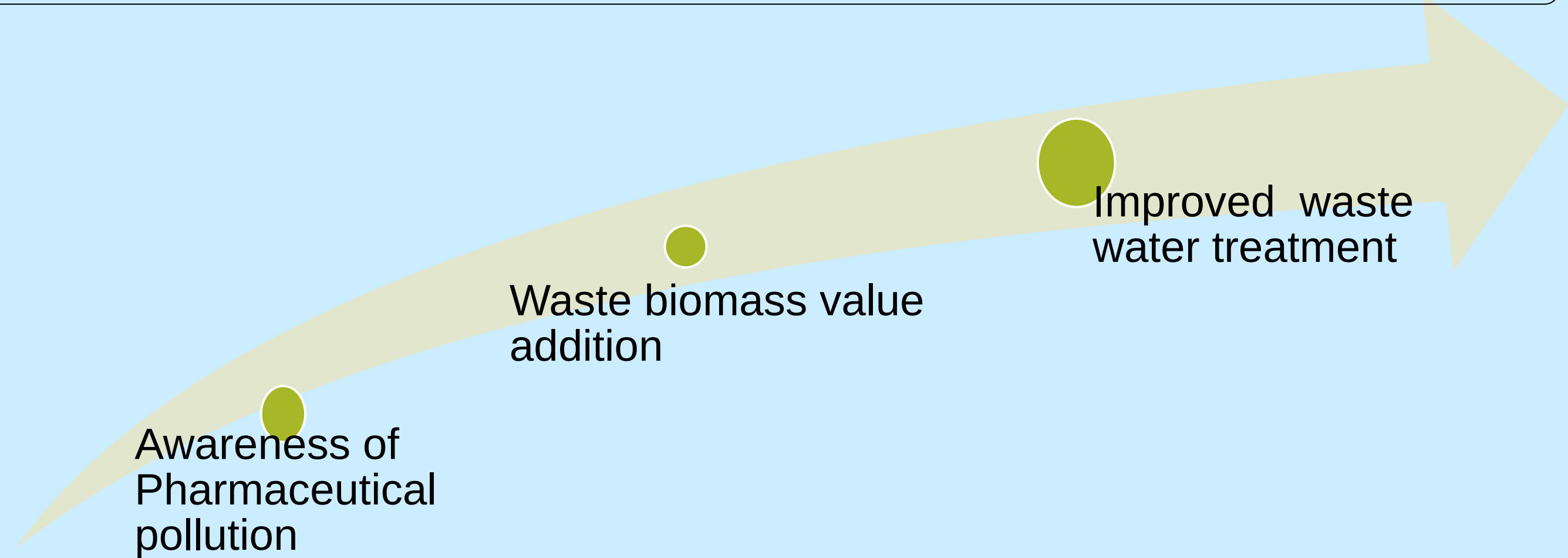


Effect of adsorbent dosage on adsorption of trimethoprim, paracetamol, and nevirapine

Conclusion

The adsorbent was highly porous with a lot of cavities which were improved by phosphoric acid activation.
Removal of the pharmaceuticals increased with increasing contact time, adsorbent dosage, and decreasing initial drug concentration.

Future work



References

Yoon, Y., Westerhoff, P., Snyder, S. A., Esparza, M. (2003). HPLC-fluorescence detection and adsorption of biphenyl A, 17β estradiol, and 17α-ethynyl estradiol on powdered activated carbon. Water Research. 37(14):3530–3537.
Khanabad, Y. O., Jafari, A., Nourmoradi, H., Taheri, F. and Saeedi, S. (2015). Adsorption of 4- chlorophenol from aqueous solution using activated carbon synthesized from aloe vera green wastes. Journal of Advances in Environmental Health Research. 3(2):120–129.

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