

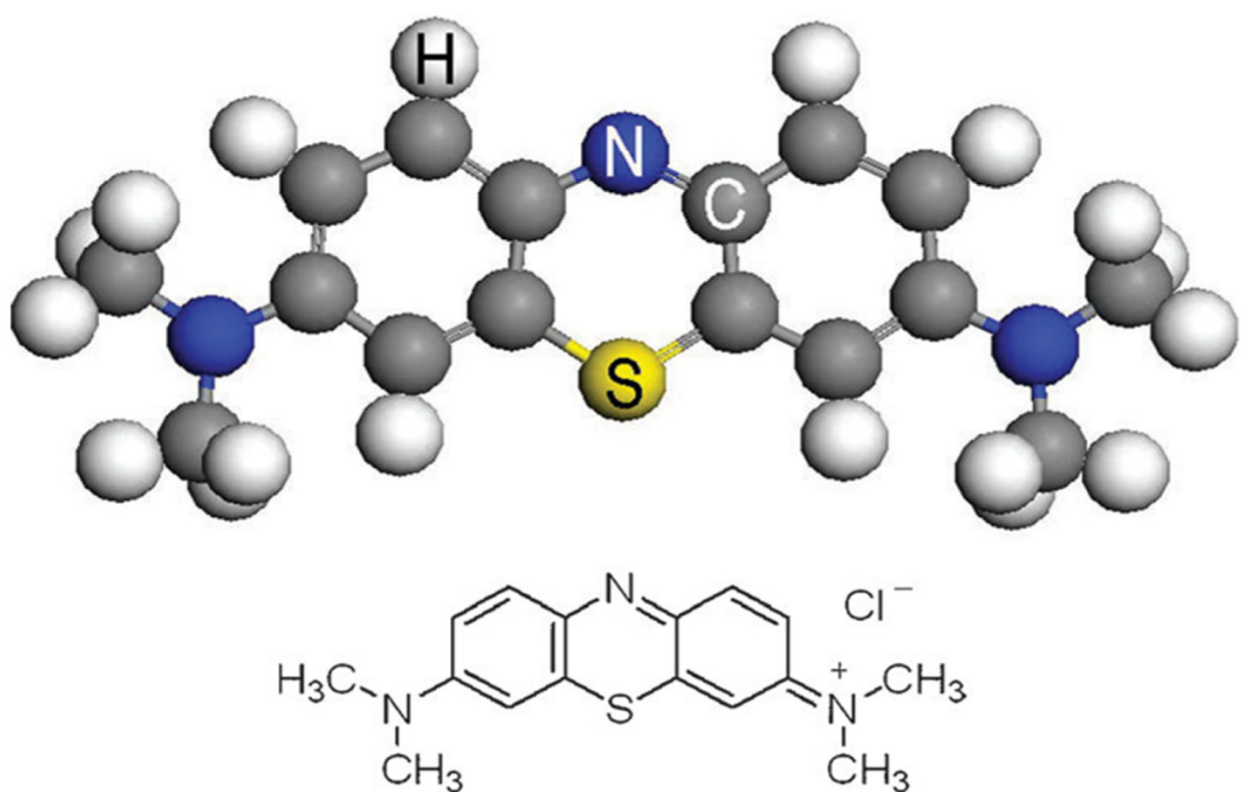
## Potential of easily prepared low cost rice husk biochar and burnt clay composite for removal of Methylene Blue dye from contaminated water.

Qudsia Ghzal<sup>a1</sup>, Tariq Javed<sup>a\*</sup> & Maryam Batool<sup>a2</sup>

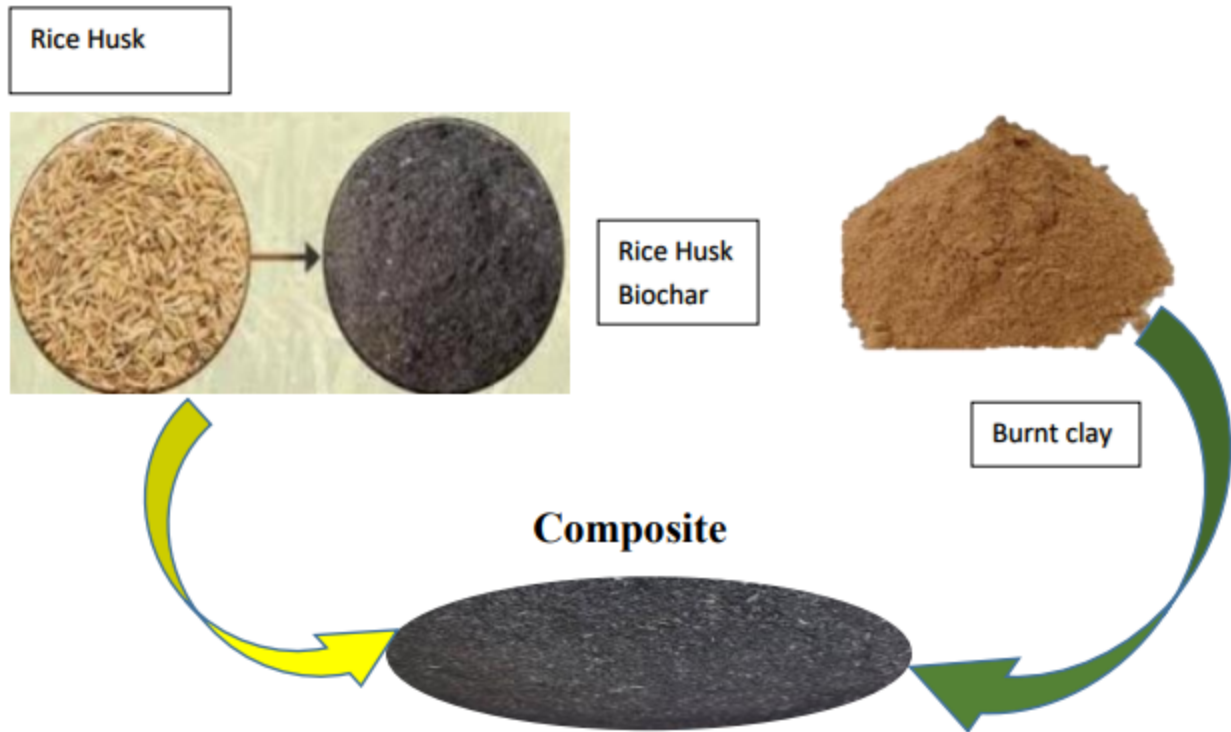
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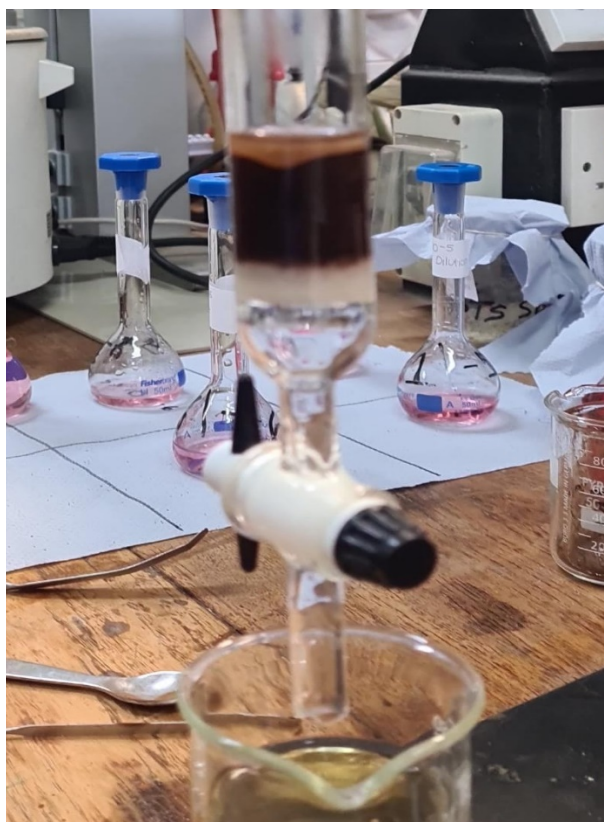
**Figure S1.** Structure of methylene blue dye (1).



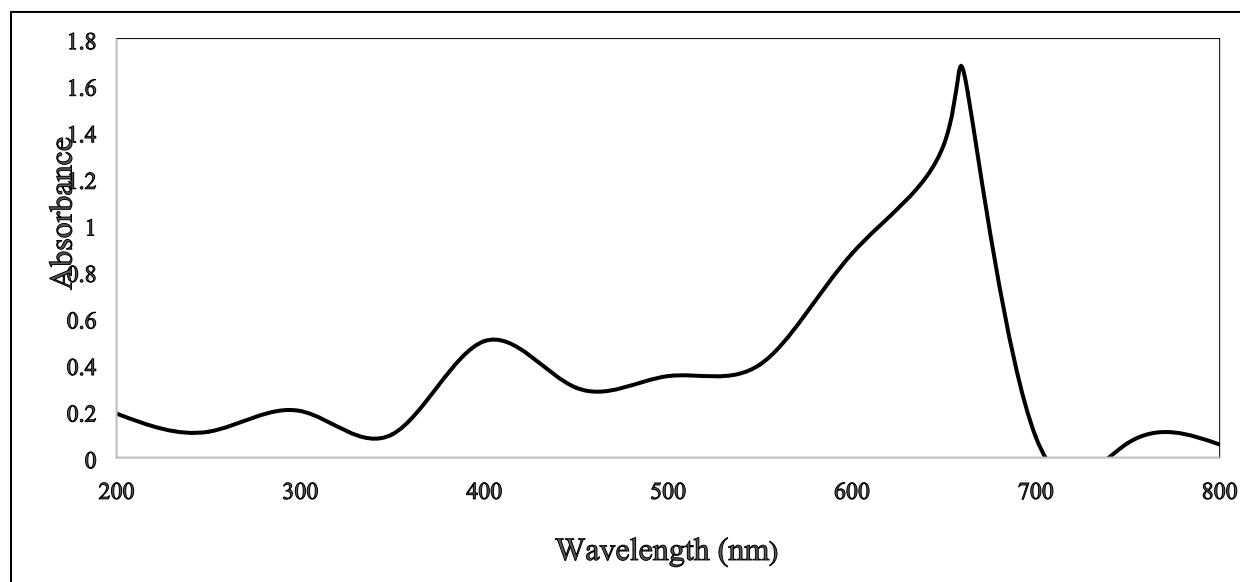
**Figure S2.** Composite preparation.



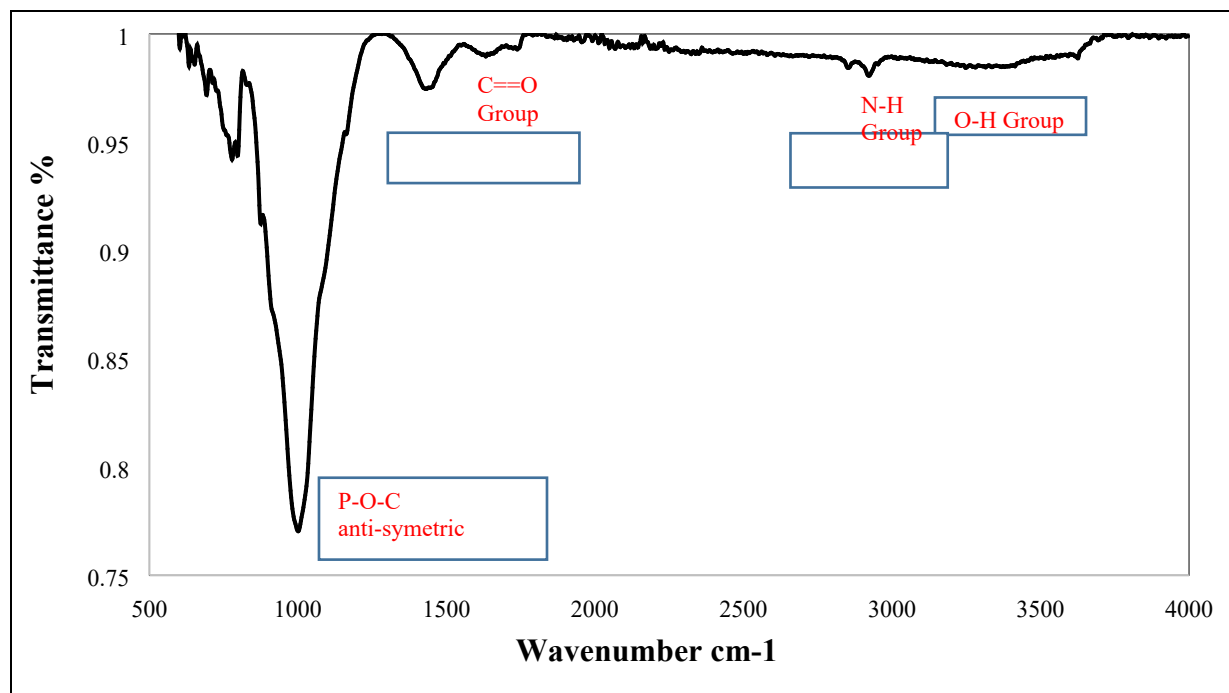
**Figure S3.** Schematic diagram of the process.



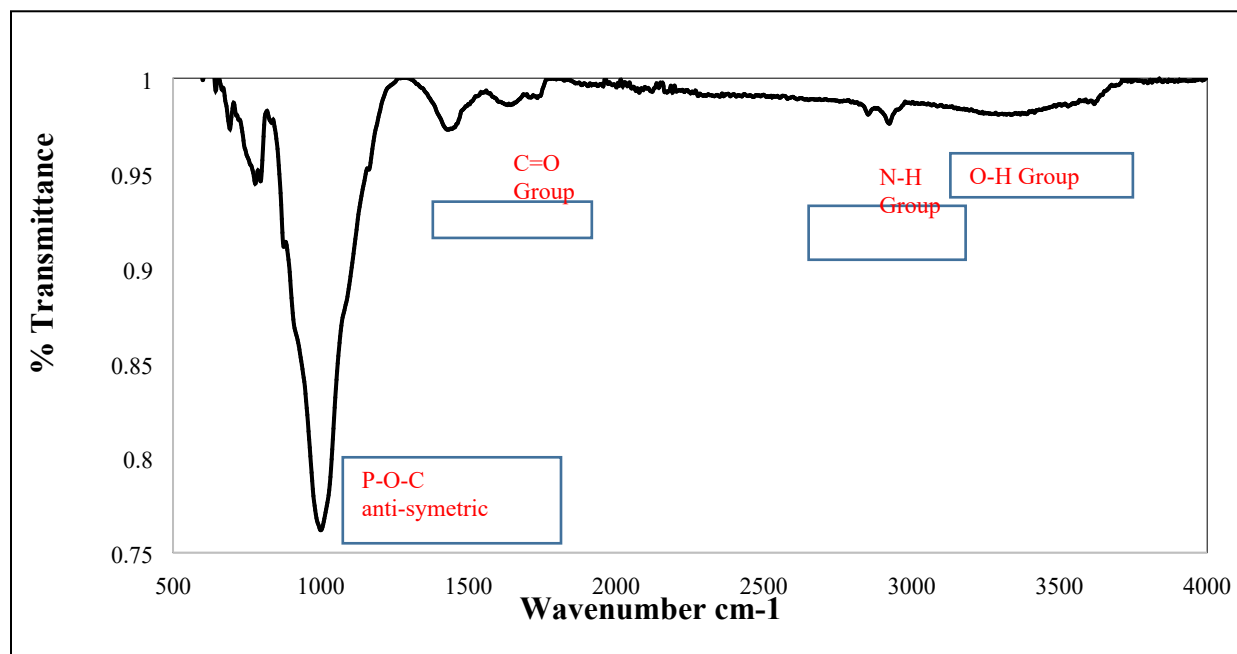
**Figure S4.** General setup for column study.



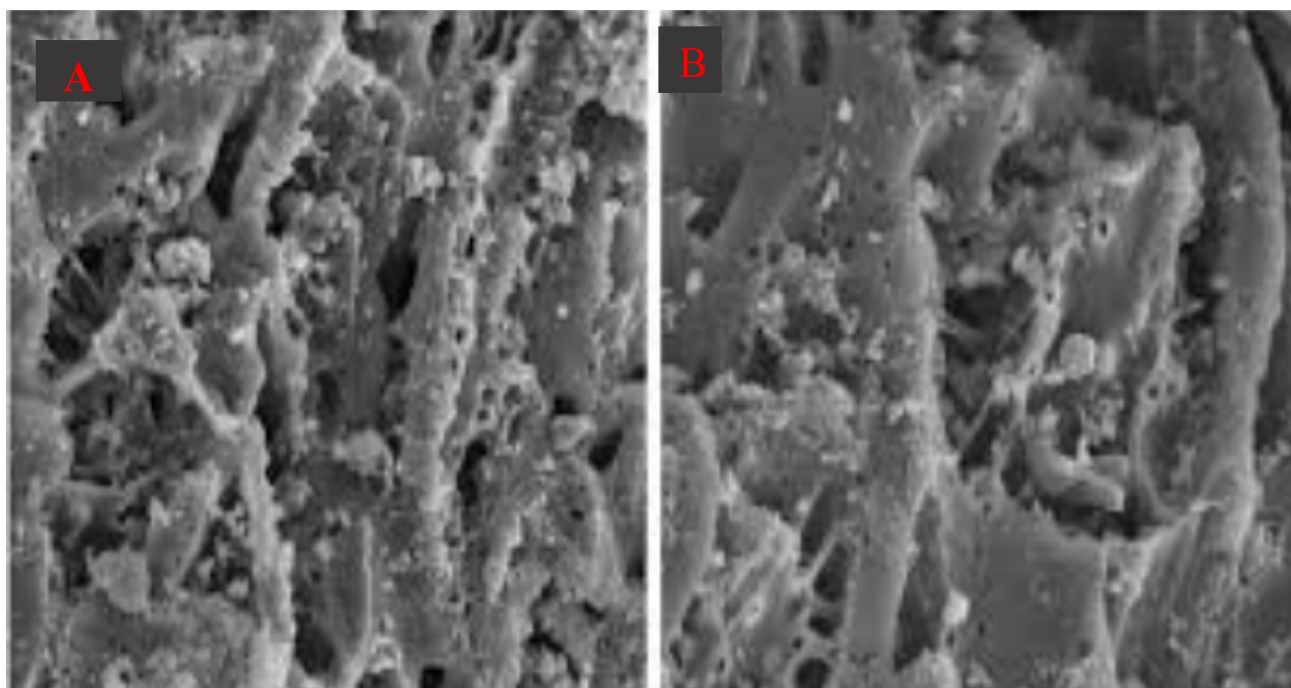
**Figure S5.** UV-VIS investigation of methylene blue dye for wavelength scan.



**Figure S6a.** FTIR spectrum of synthesized RHBC/BC adsorbent before adsorption.



**Figure S6b.** FTIR spectrum of synthesized RHBC/BC adsorbent after adsorption.



**Figure S7.** SEM image of RHBC/BC adsorbent (A) before and (B) after adsorption.

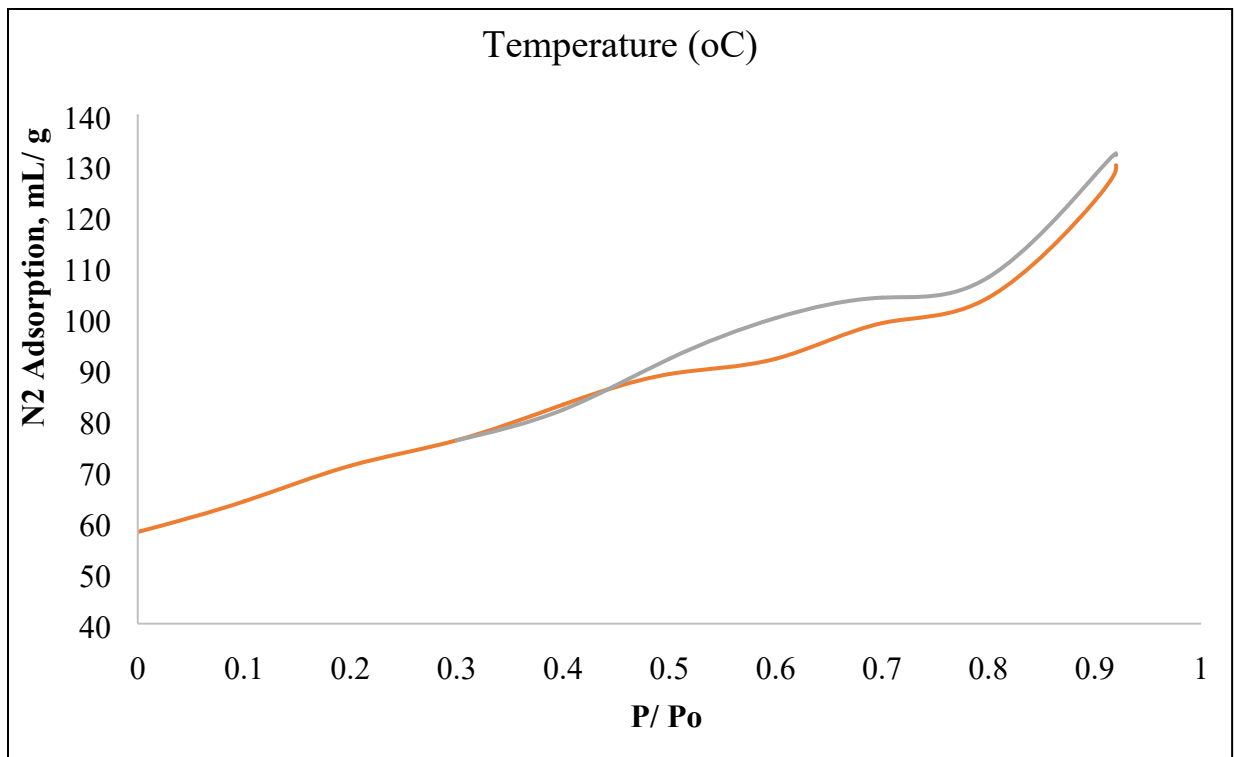
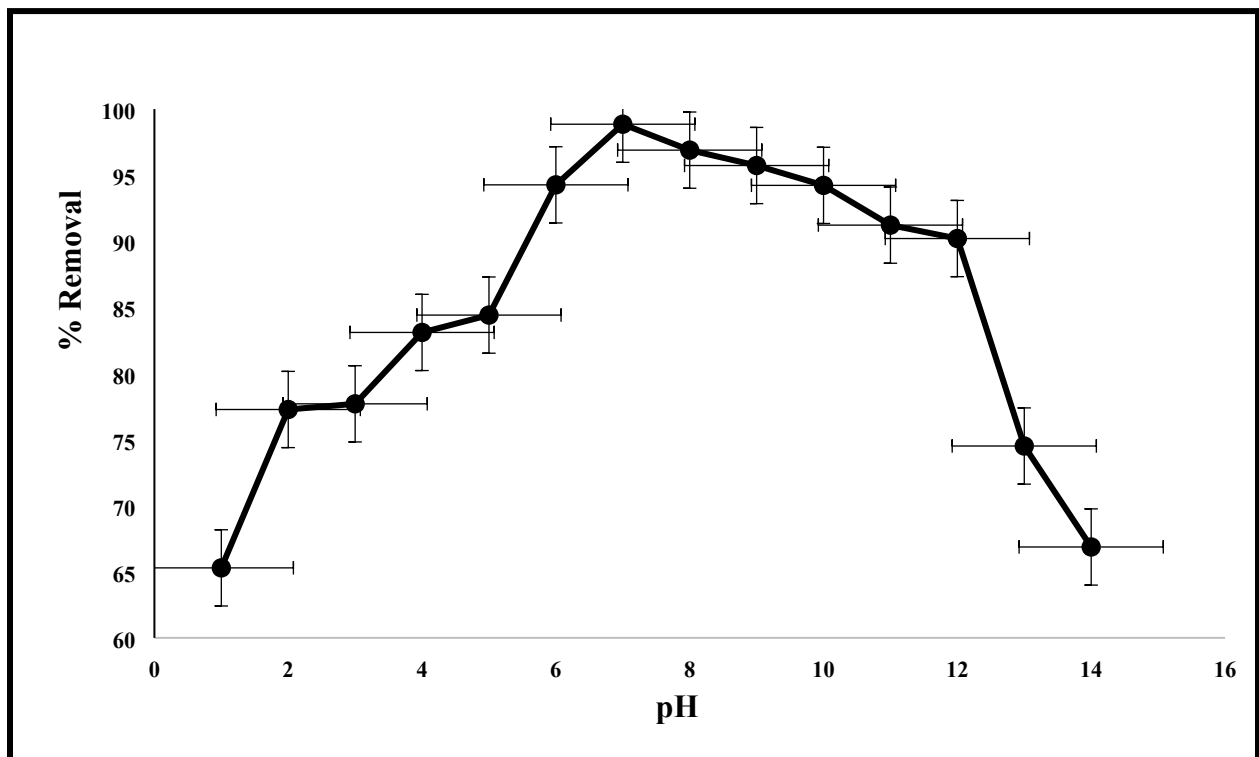
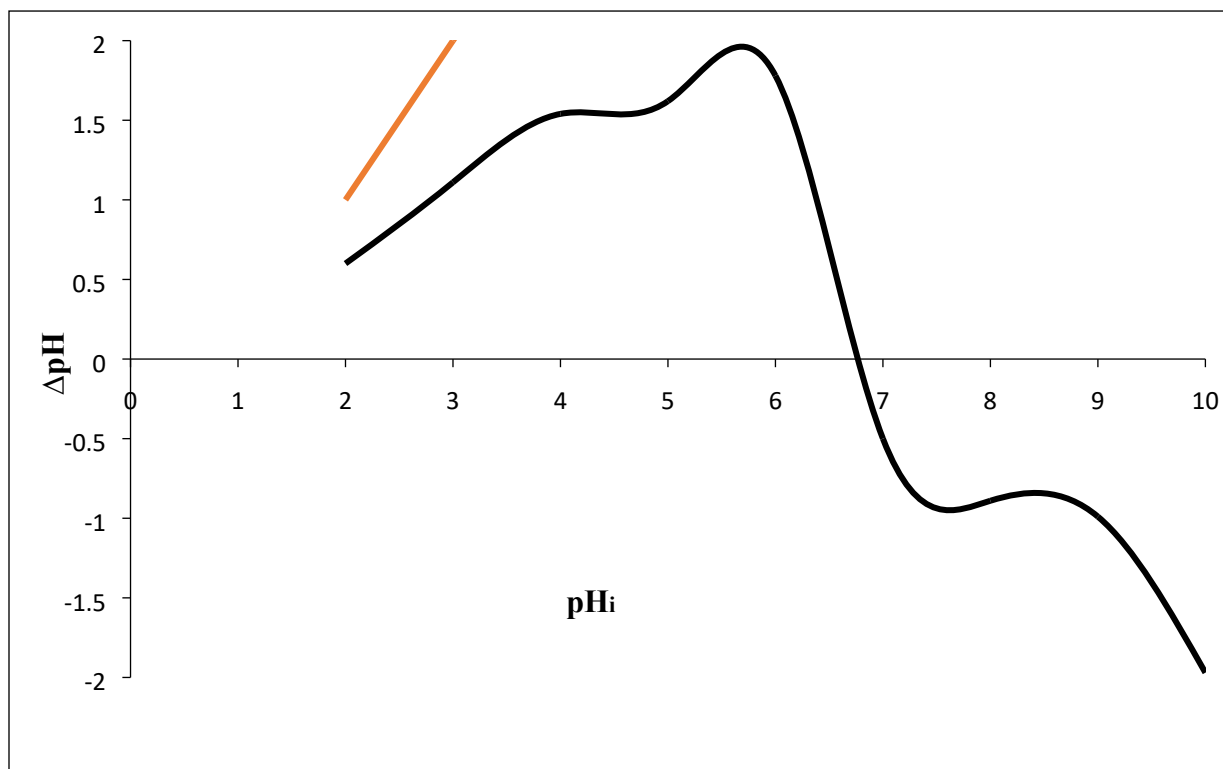


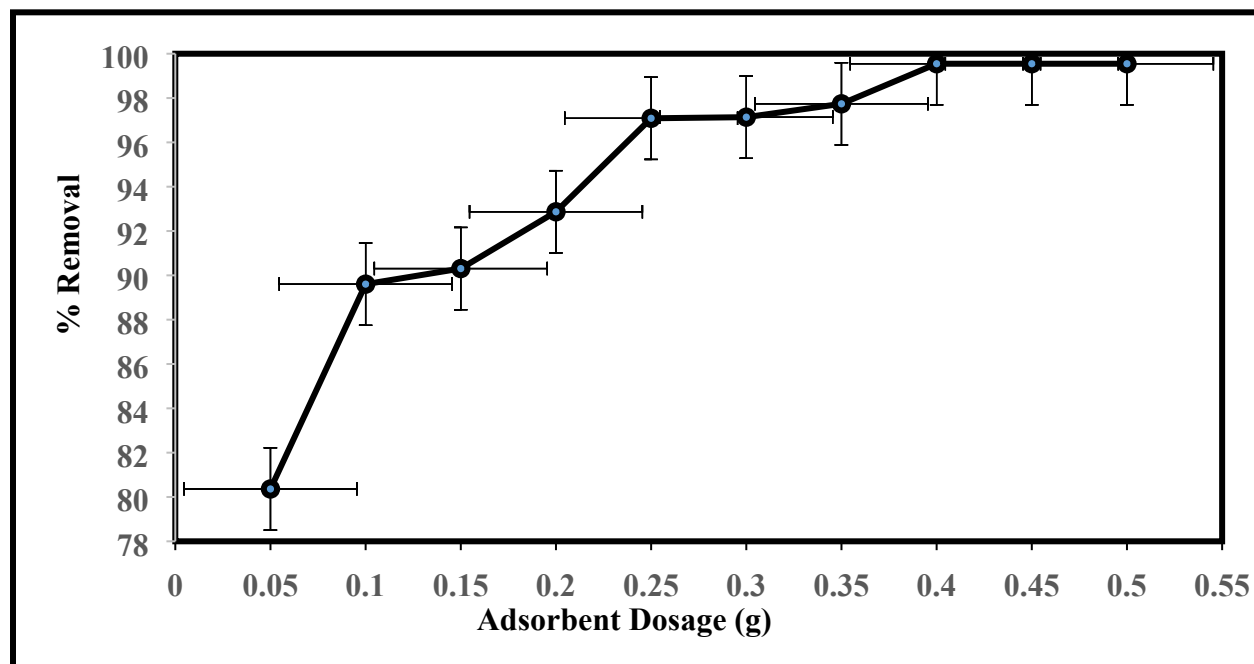
Figure S8. N<sub>2</sub> Adsorption-desorption isotherm.



**Figure S9.** Effect of pH on adsorption.

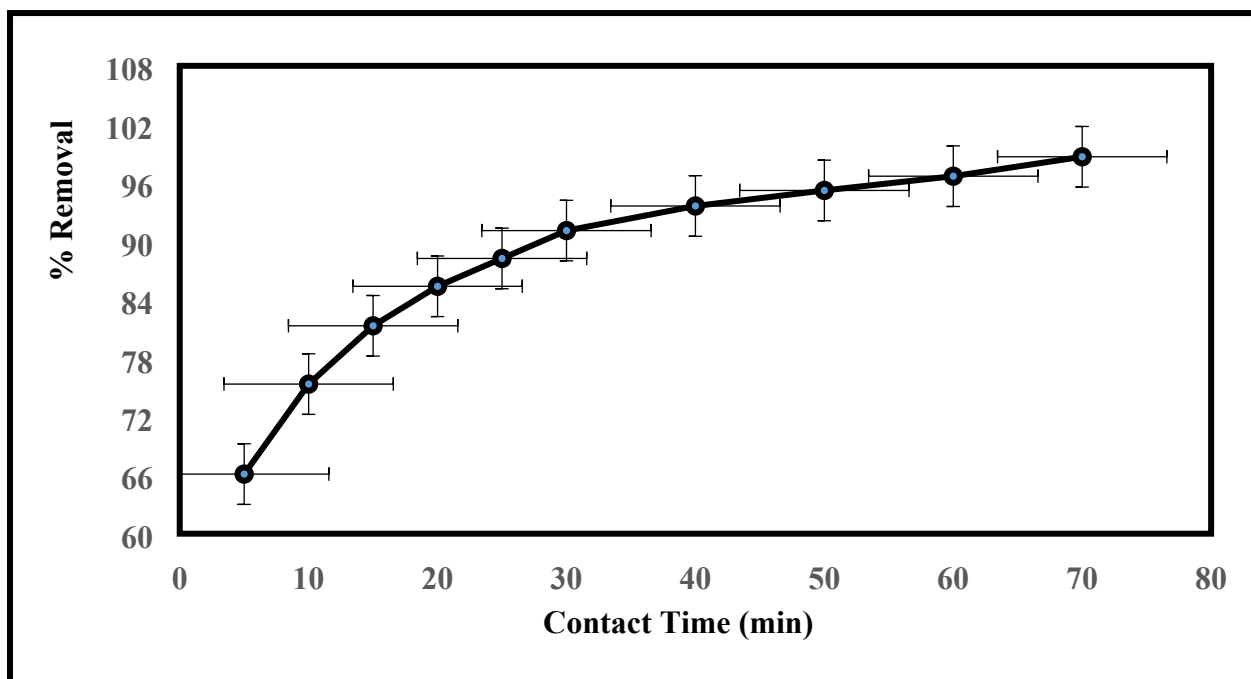


**Figure S10.**  $pH_{pzc}$  effect on adsorption of MB onto RHBC/BC.

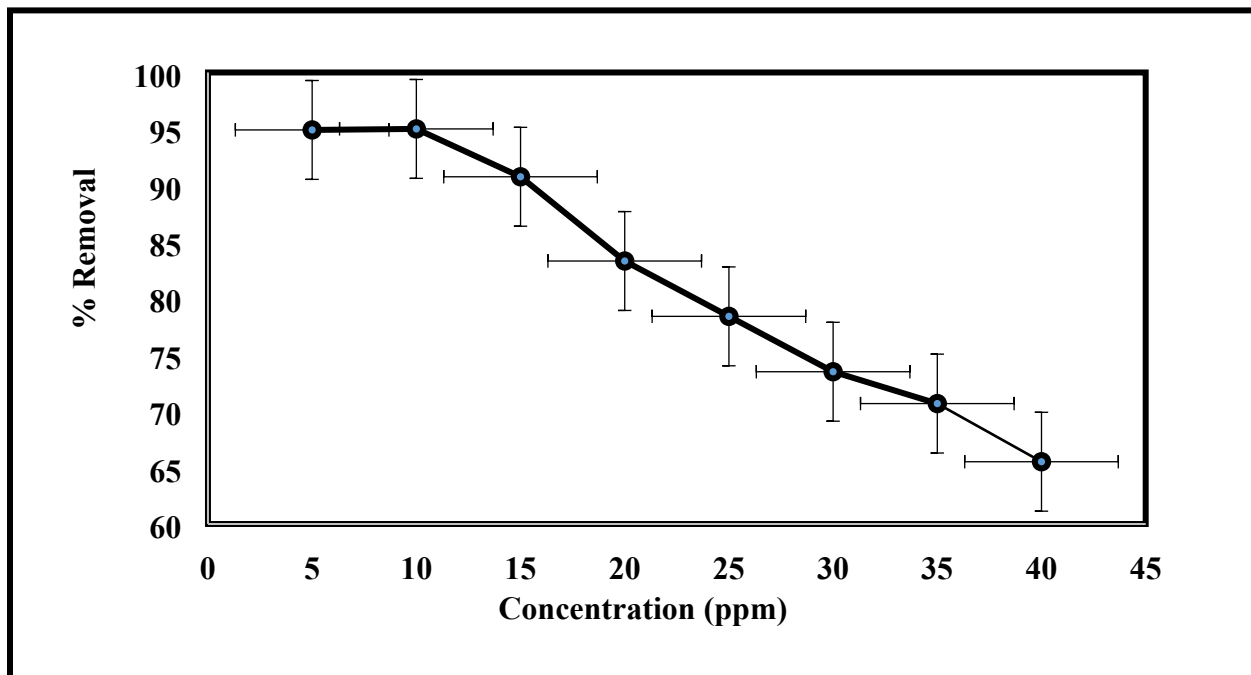


**Figure S11.** Effect of dosage of the adsorbent on MB adsorption on RHBC/BC.

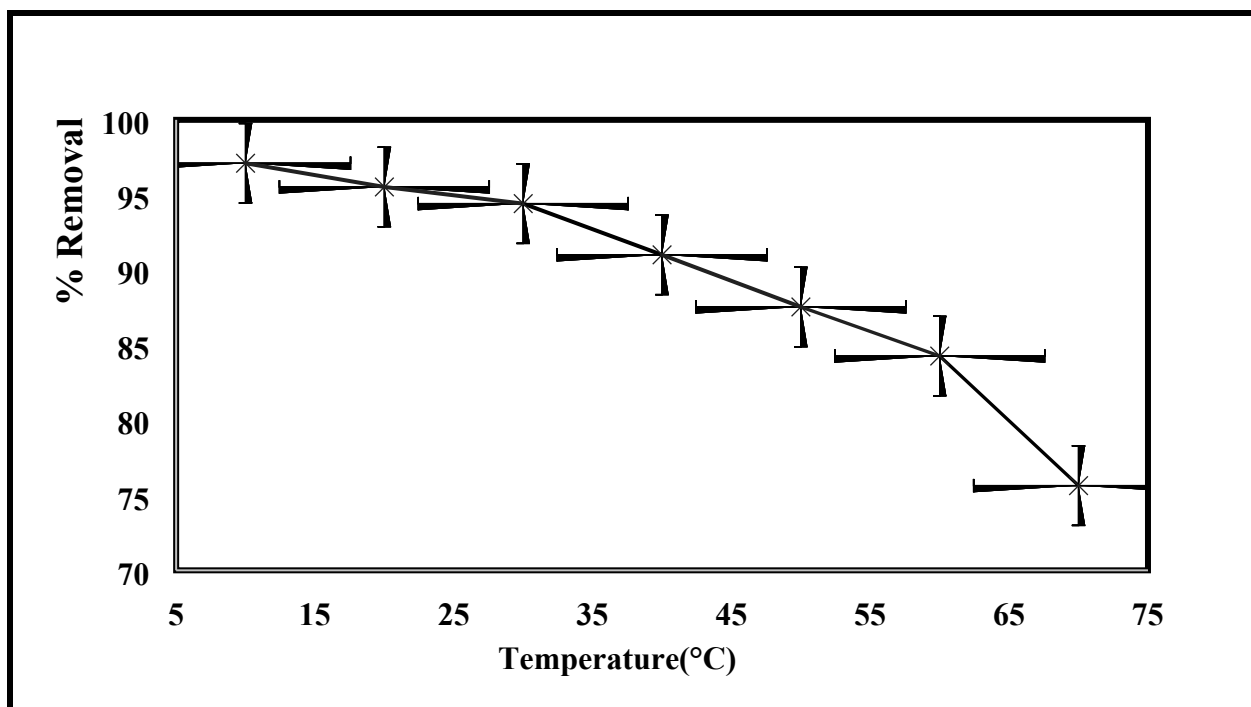




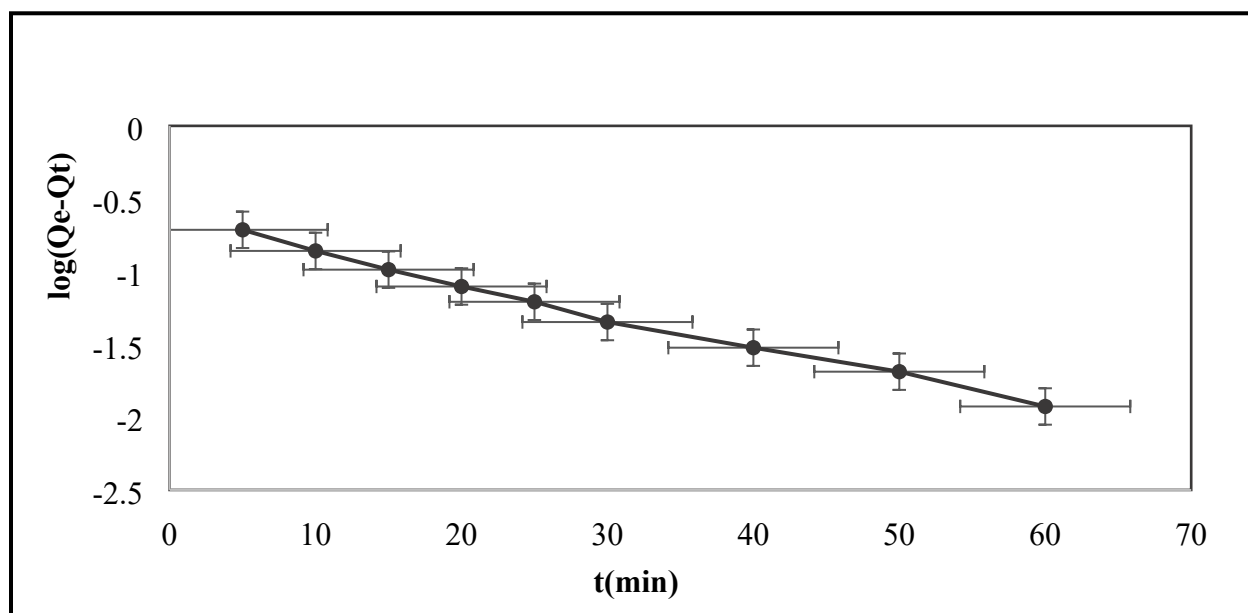
**Figure S12.** Effect of contact time on adsorption of MB onto RHBC/BC.



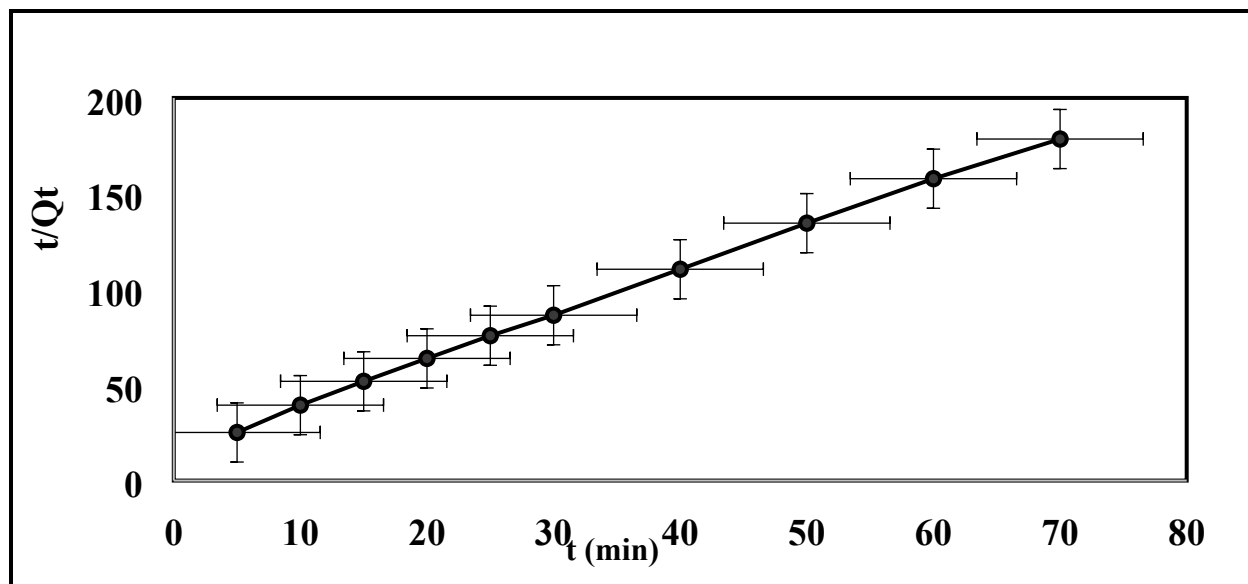
**Figure S13.** Effect of concentration of adsorbate on adsorption of MB on RHBC/BC.



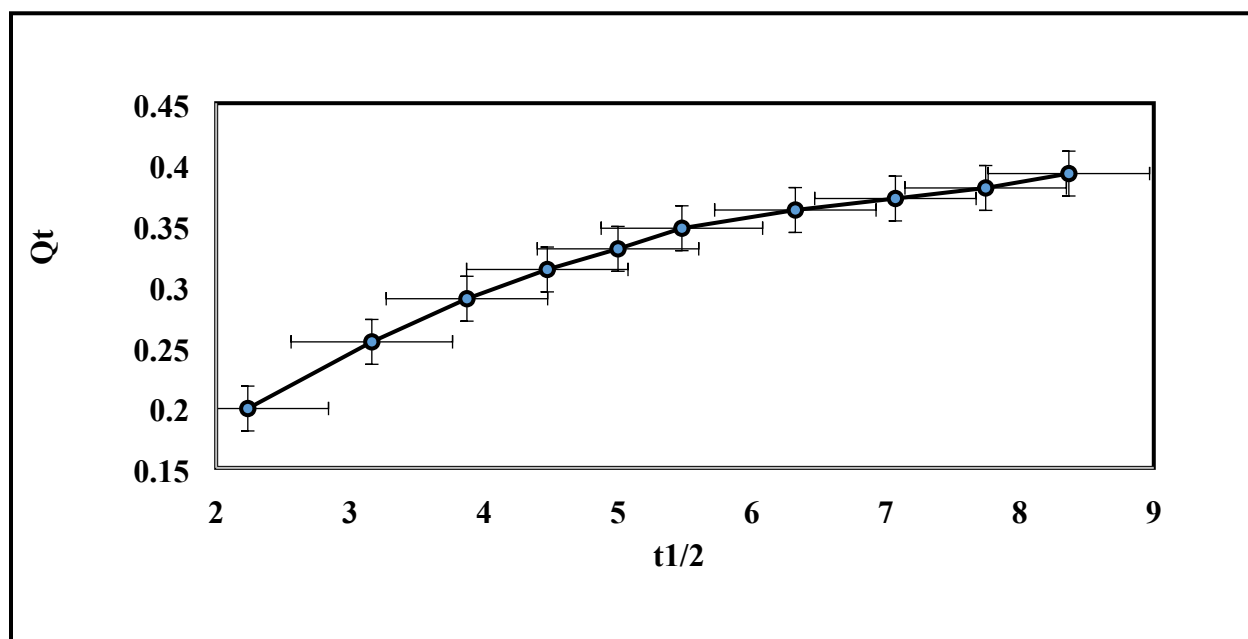
**Figure S14.** Effect of temperature on adsorption of MB on RHBC/BC.



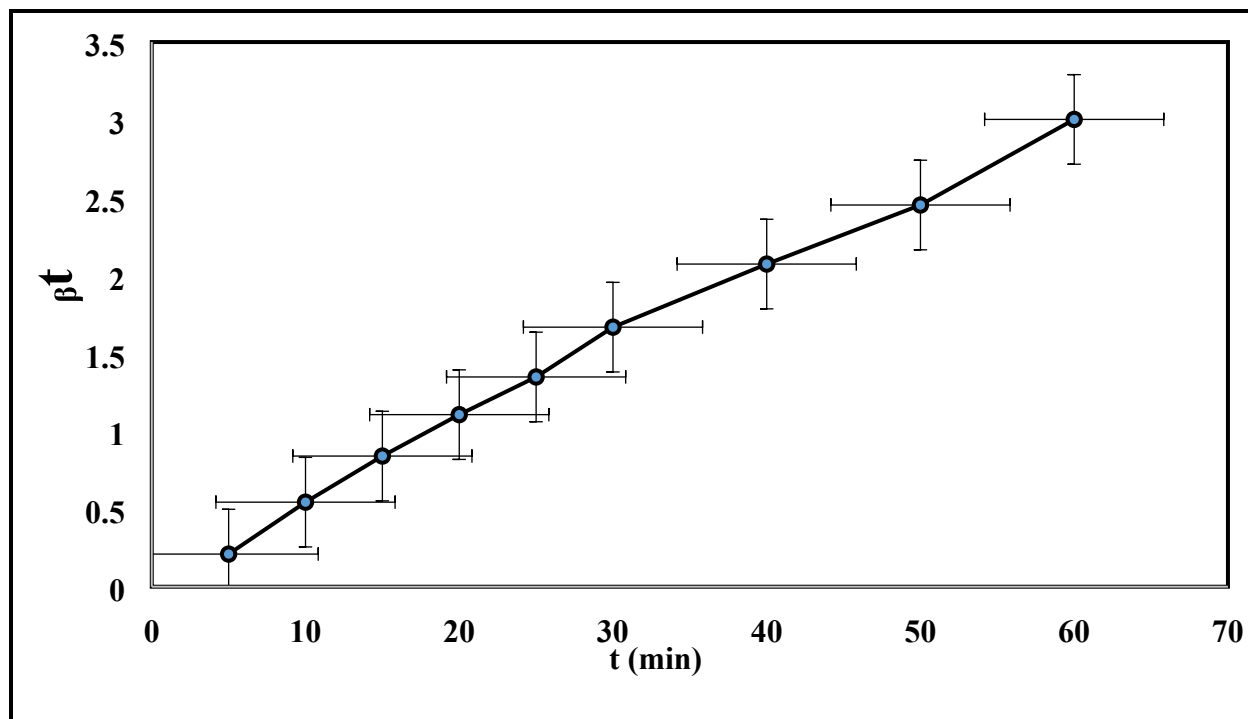
**Figure S15.** Effect of pseudo first order on adsorption of MB onto RHBC/BC.



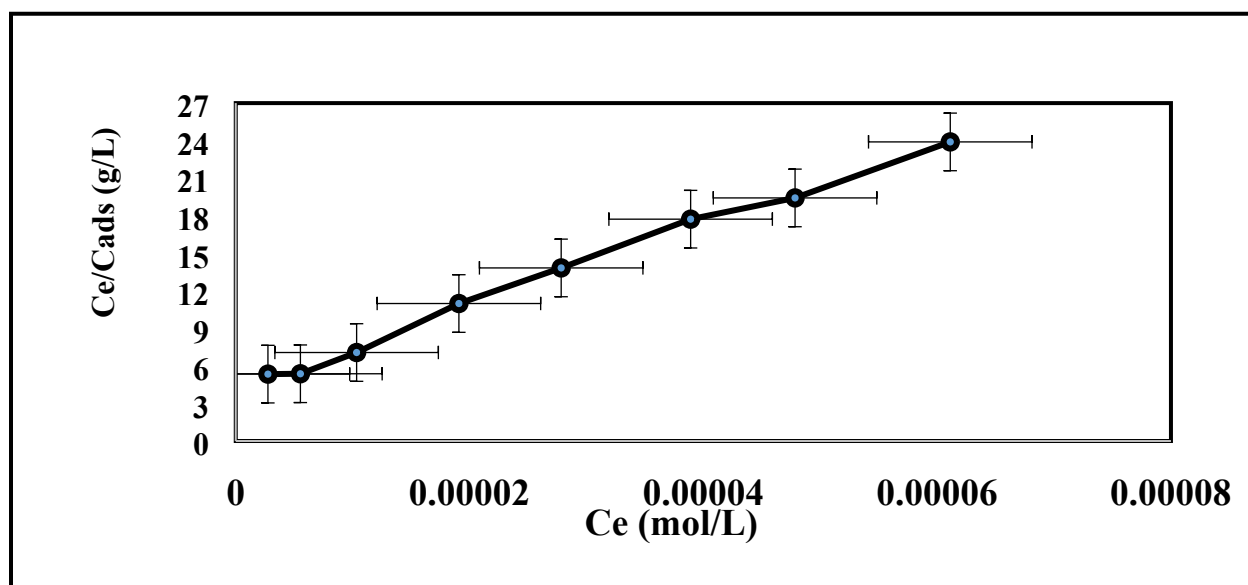
**Figure S16.** Effect of pseudo second order on adsorption of MB onto RHBC/BC.



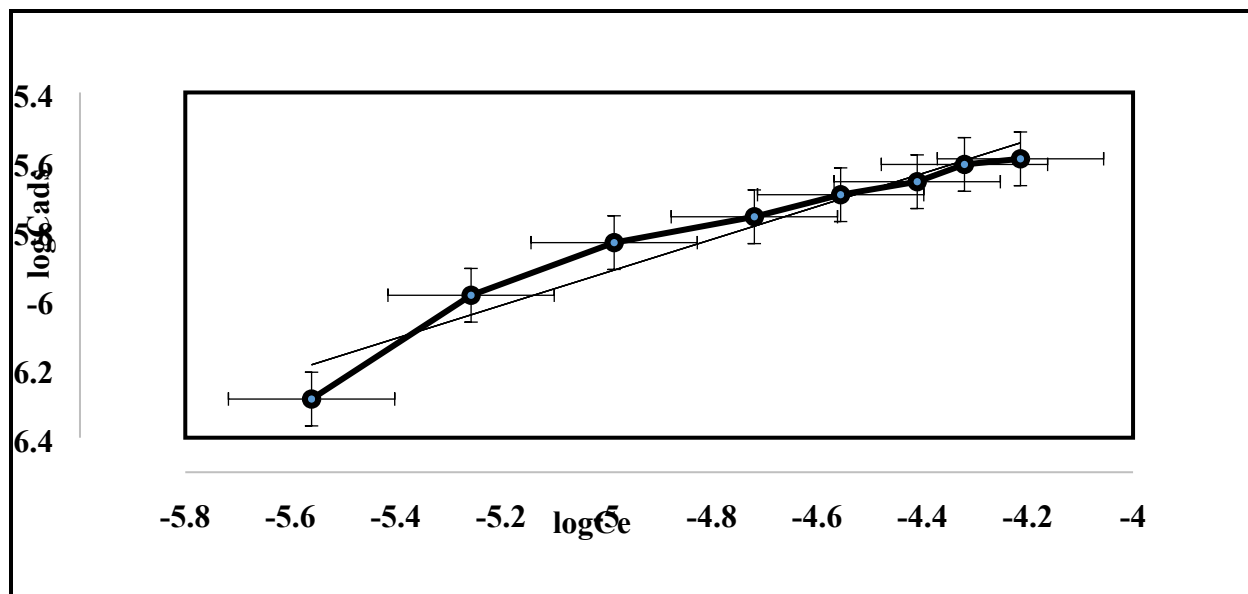
**Figure S17.** Effect of Intraparticle diffusion model on adsorption of MB onto RHBC/BC.



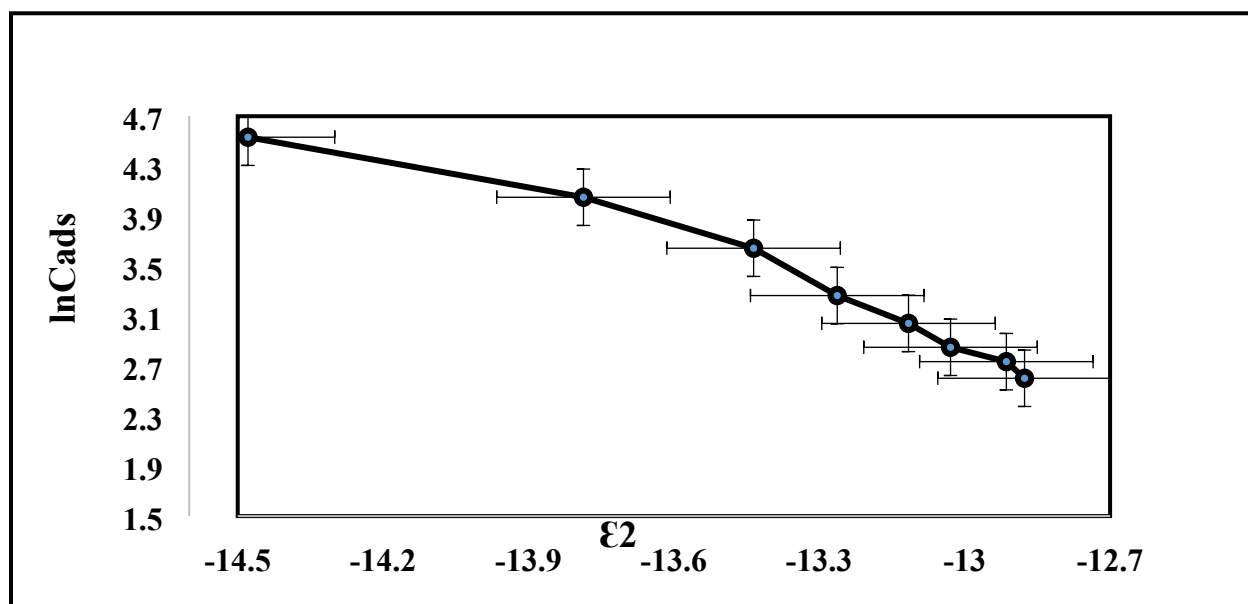
**Figure S18.** Effect of Liquid film model on adsorption of MB onto RHBC/BC.



**Figure S19.** Effect of languir isotherm on adsorption of MB onto RHBC/BC.



**Figure S20.** Effect of Freundlich isotherm on adsorption of MB onto RHBC/BC.



**Figure S21.** Effect of D-R isotherm on adsorption of MB onto RHBC/BC.

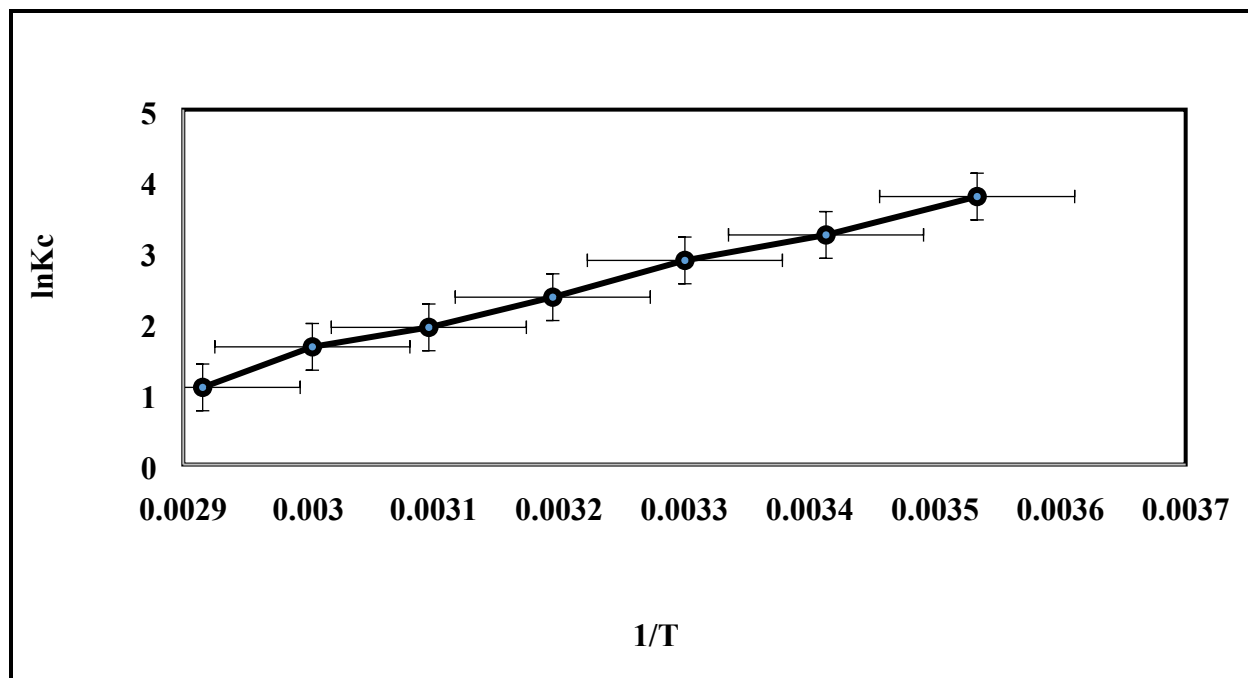
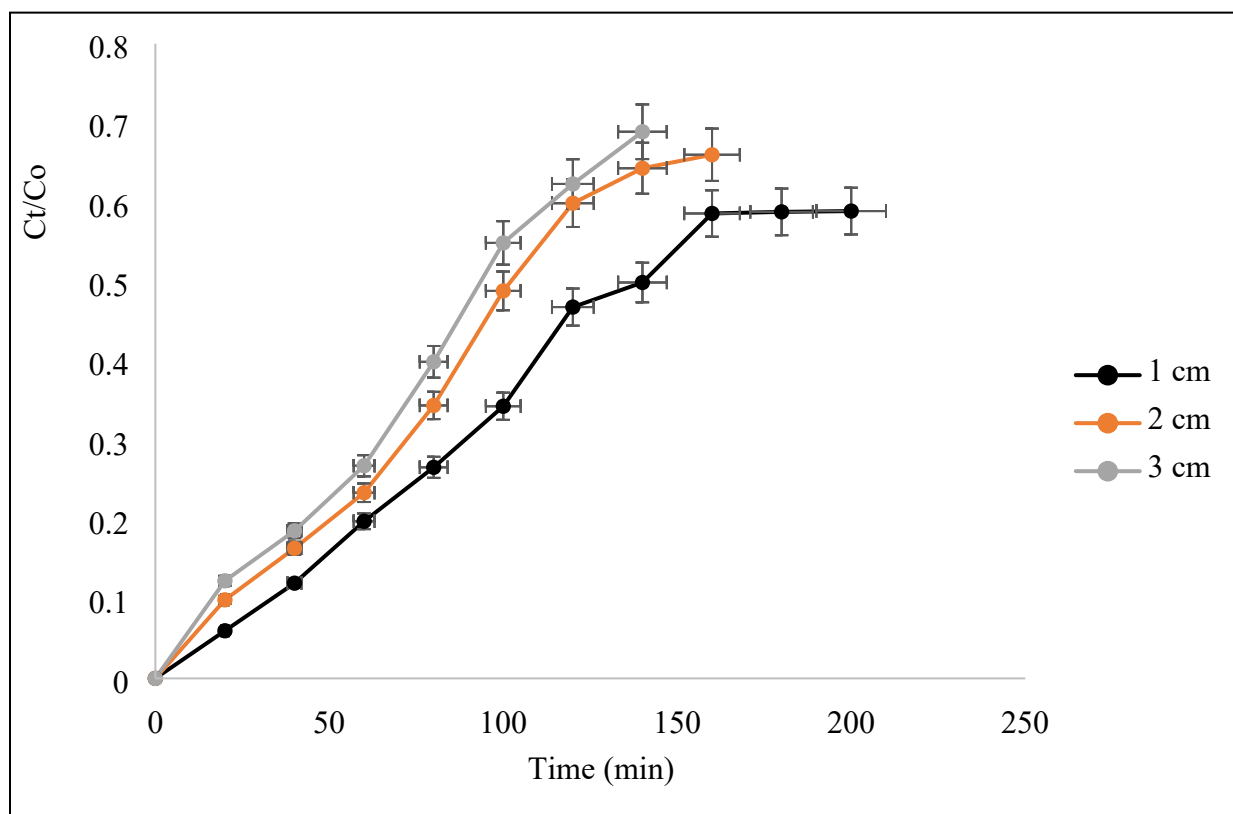
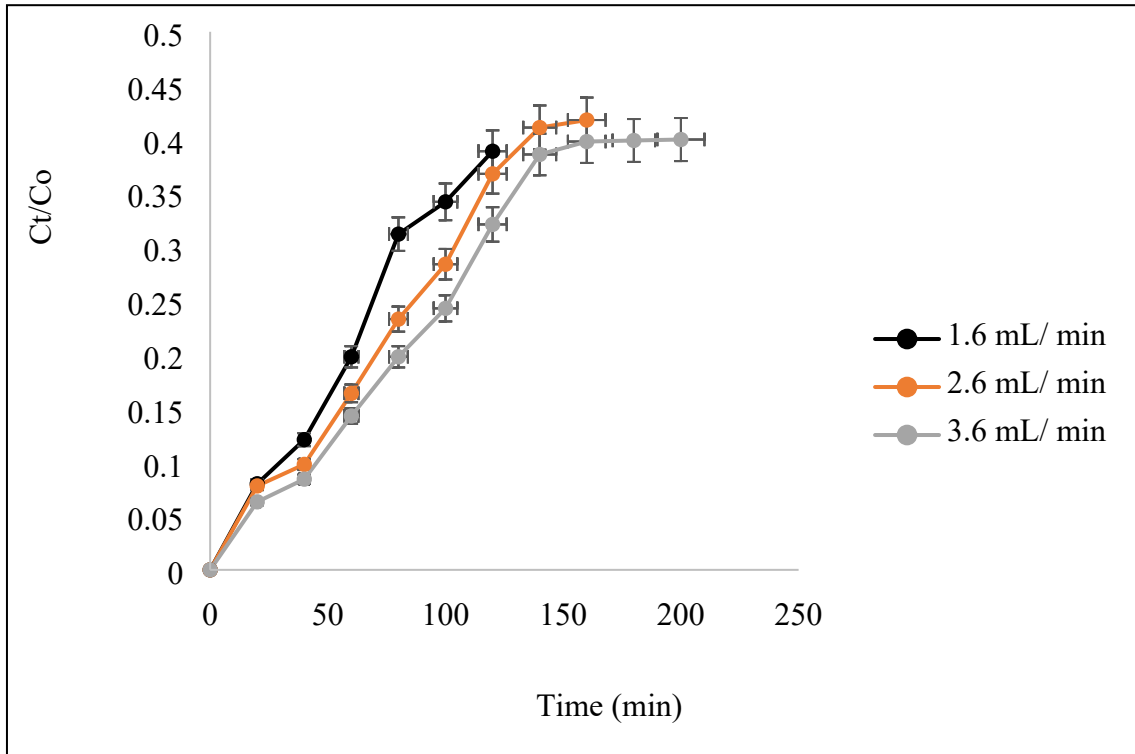


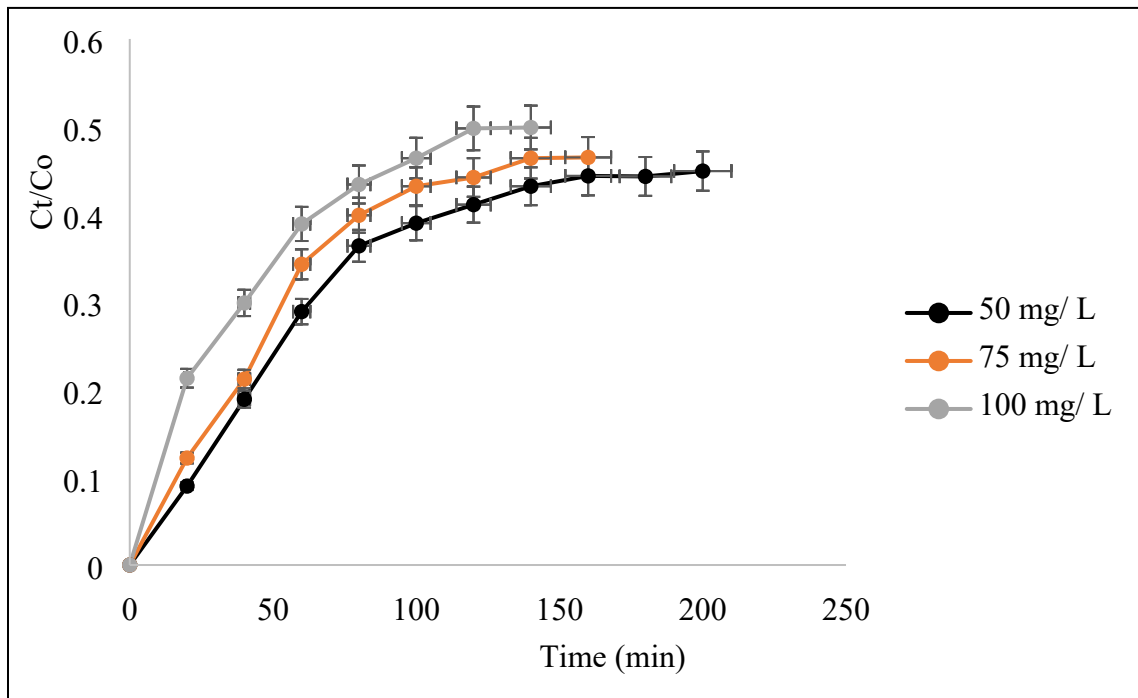
Figure S22. Relation between  $\frac{1}{T}$  and  $\ln K_c$ .



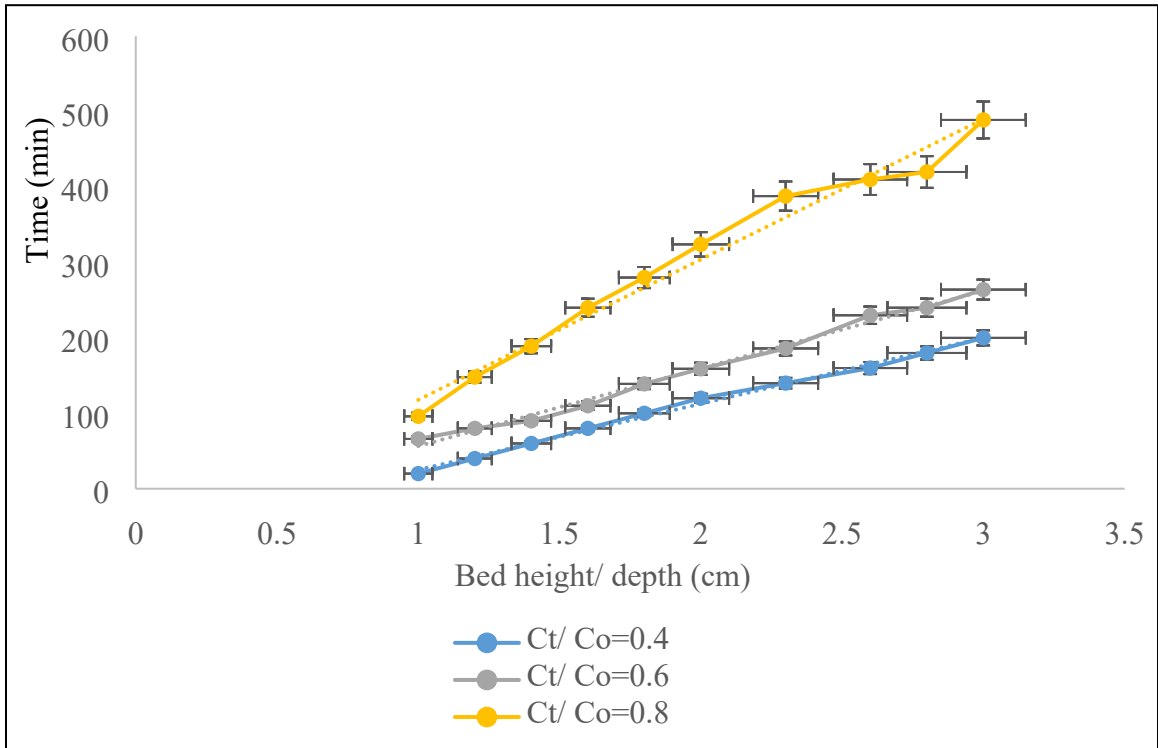
**Figure S23.** Effect of bed height on methylene blue dye adsorption.



**Figure S24.** Effect of flow rate on methylene blue dye adsorption.

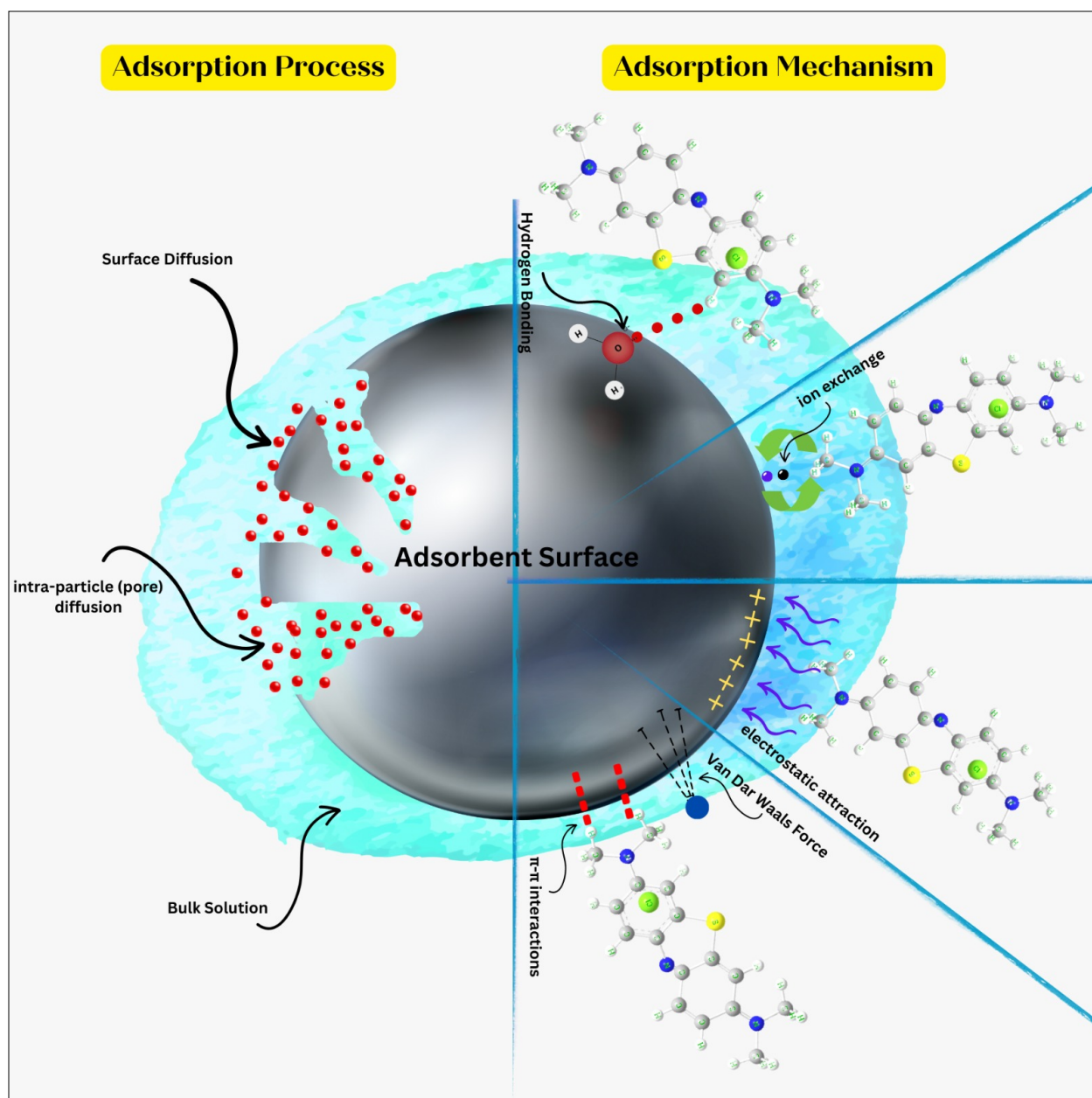


**Figure S25.** Effect of dye concentration on methylene blue dye adsorption.

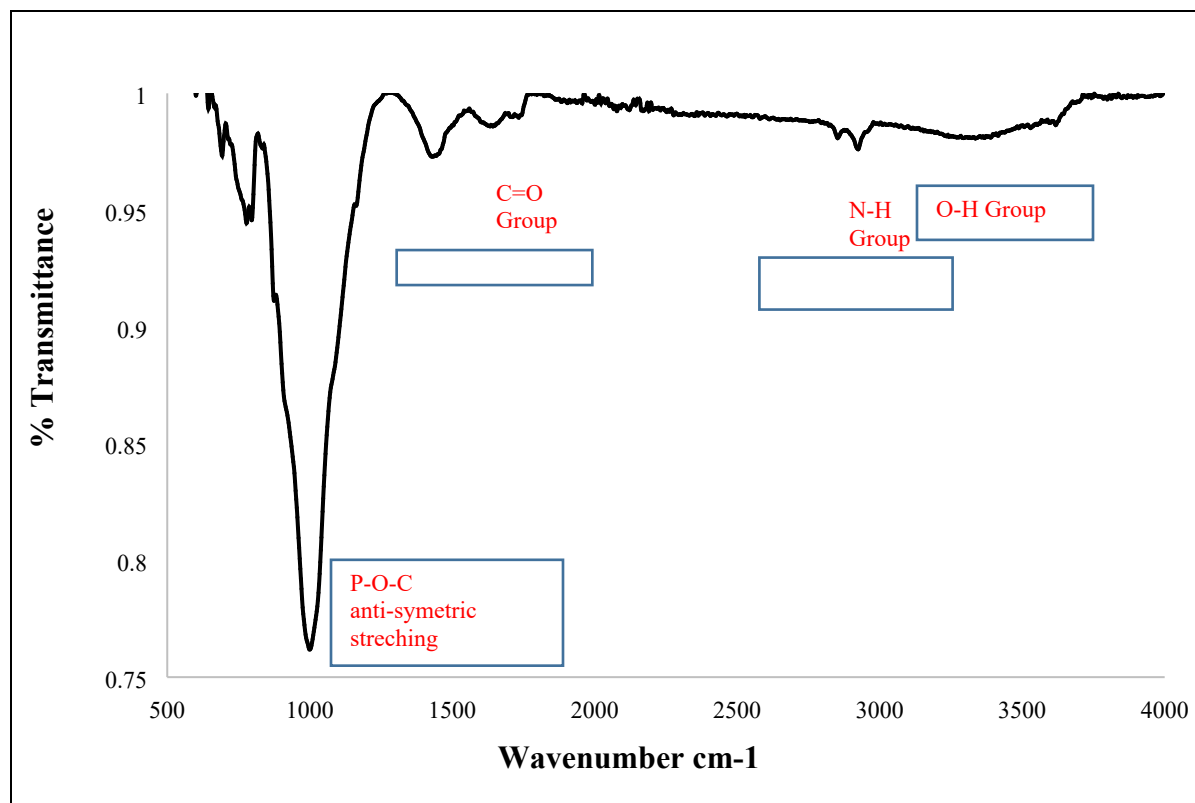


**Figure S26.** Bed depth service time (BDST) model.

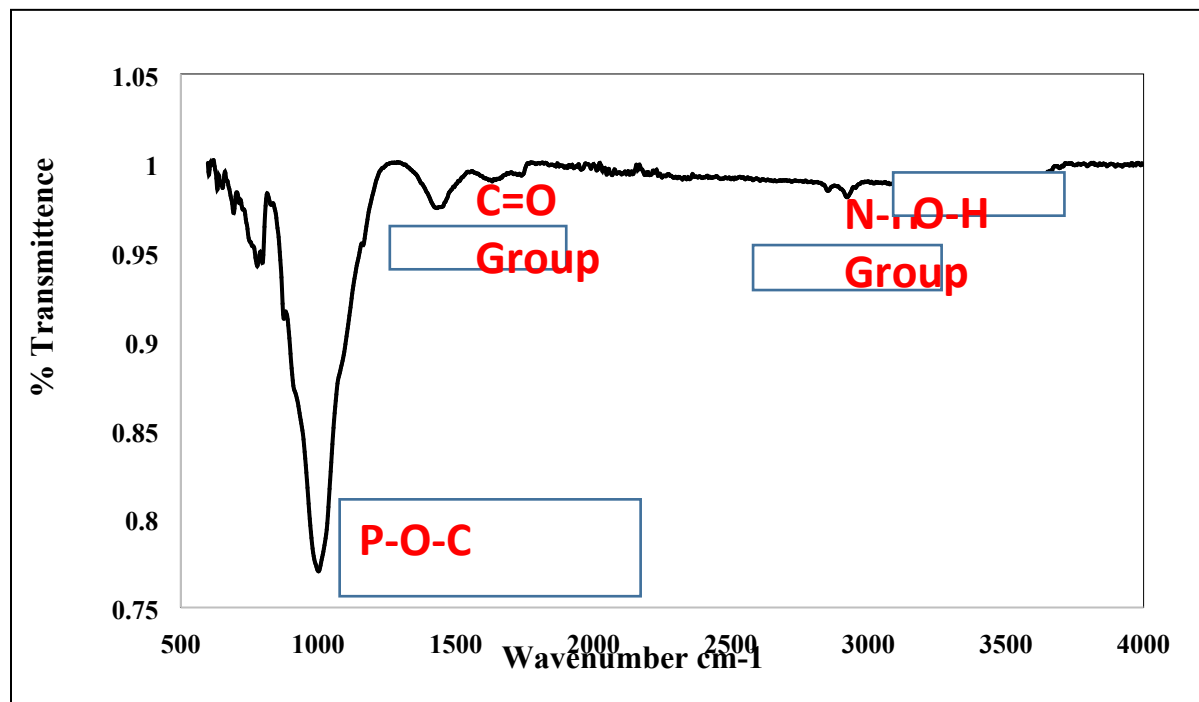




**Figure S27.** Mechanism of adsorption of MB dye onto RHBC/BC.



**Figure S28a.** FTIR spectrum of synthesized RHBC/BC adsorbent after adsorption.



**Figure S28b.** FTIR spectrum of synthesized RHBC/BC adsorbent after desorption study.

## References

1. Khan I, Saeed K, Zekker I, Zhang B, Hendi AH, Ahmad A, et al. Review on methylene blue: Its properties, uses, toxicity and photodegradation. *Water*. 2022;14(2):242.