

## Enhanced Paracetamol Adsorption Using Titanium-Coated Biochar Prepared via Magnetron Sputtering

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### INTRODUCTION & AIM

#### Pharmaceuticals



- Combats the sensation of moderate pain



- Reduce the ability to transmit pain signals



- Colds, headaches, body, tooth, back, muscle, mild pain from arthritis, and menstrual cramps

#### Associated risks

#### Health

Intoxication

Liver Damage

Drug hepatitis

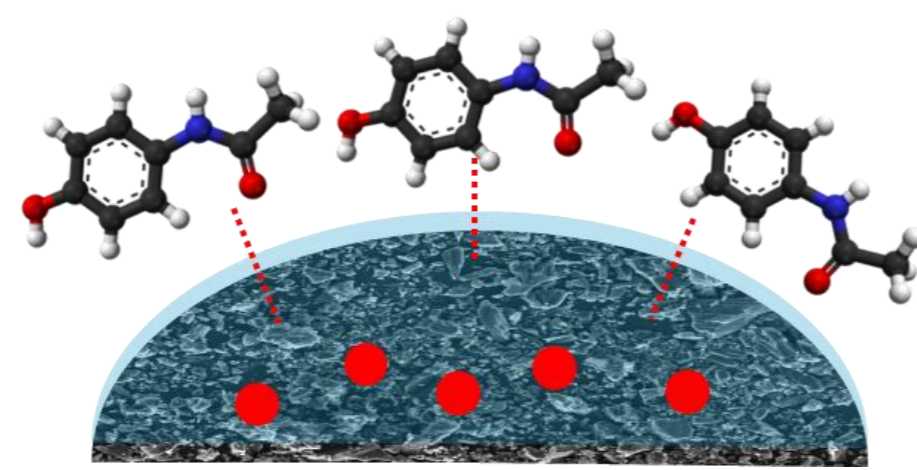
#### Environment

Unmetabolized paracetamol

Aquatic matrices

Rivers and groundwater

#### Remediation method

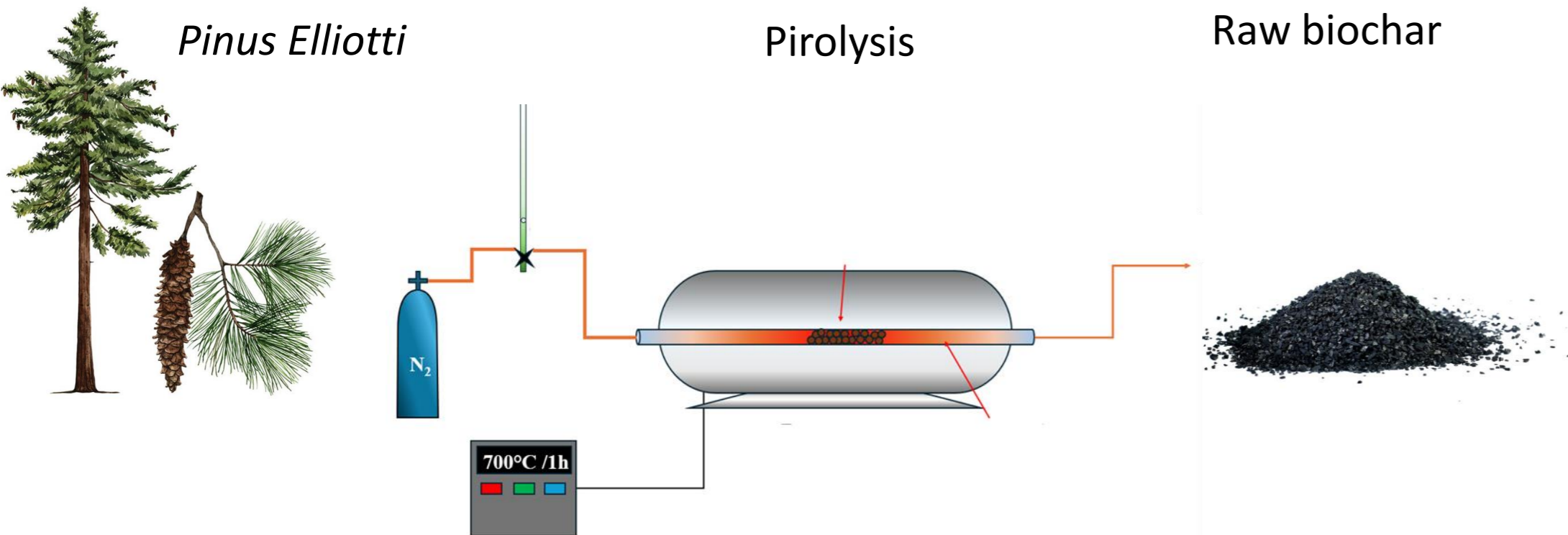


### METHOD

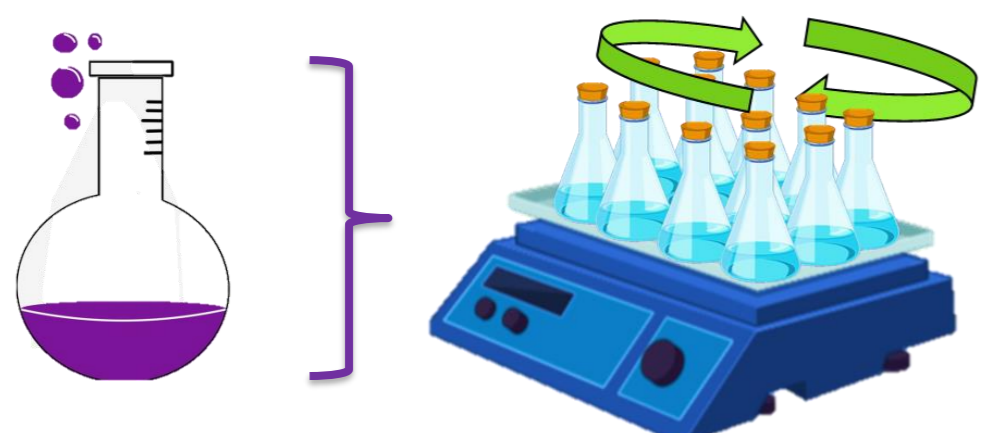
*Pinus Elliotti*

Pirolisis

Raw biochar



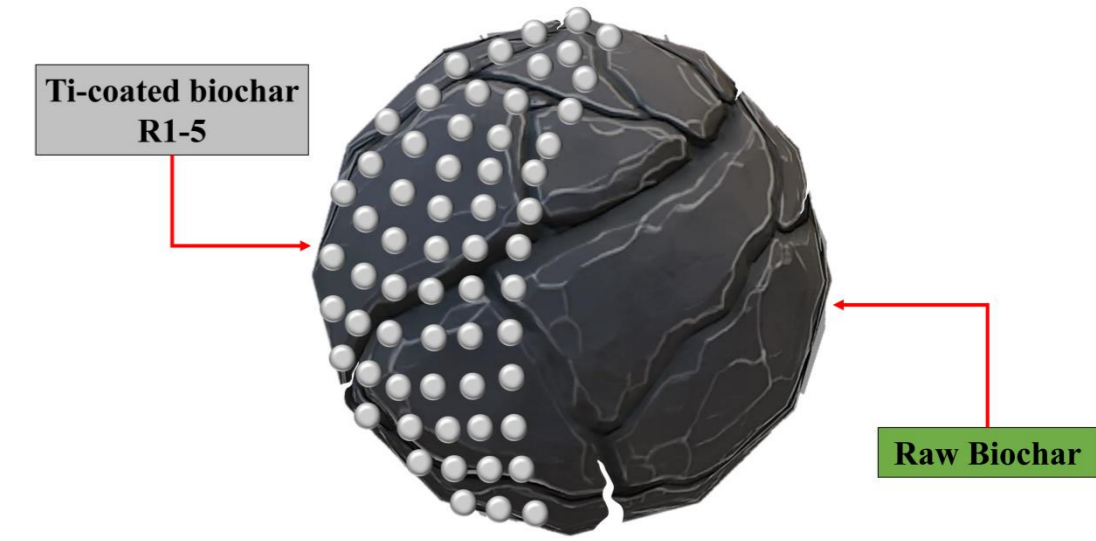
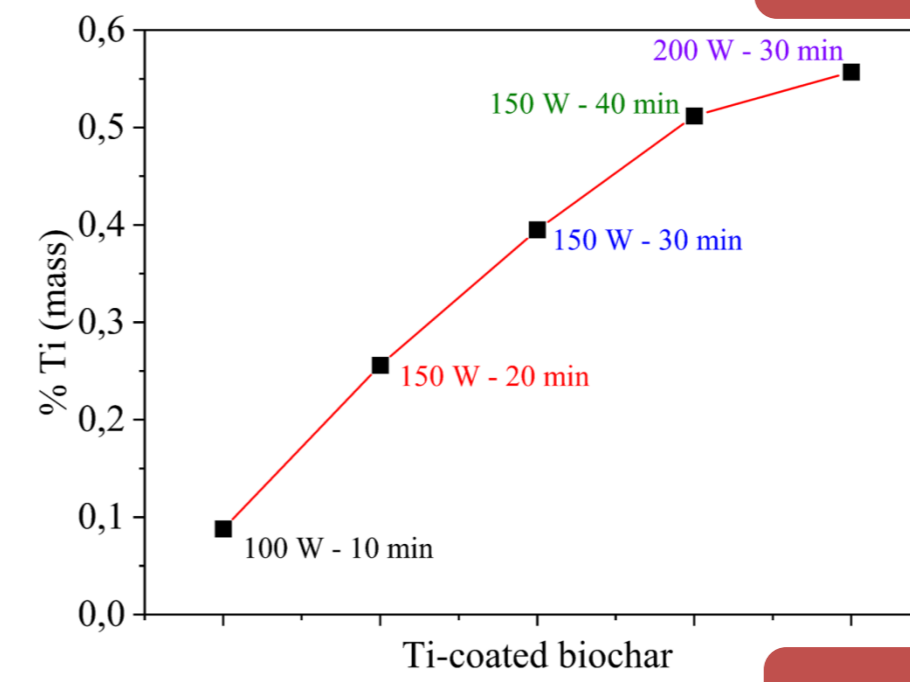
200 W - 30 min	R5
150 W - 40 min	R4
150 W - 30 min	R3
150 W - 20 min	R2
100 W - 10 min	R1



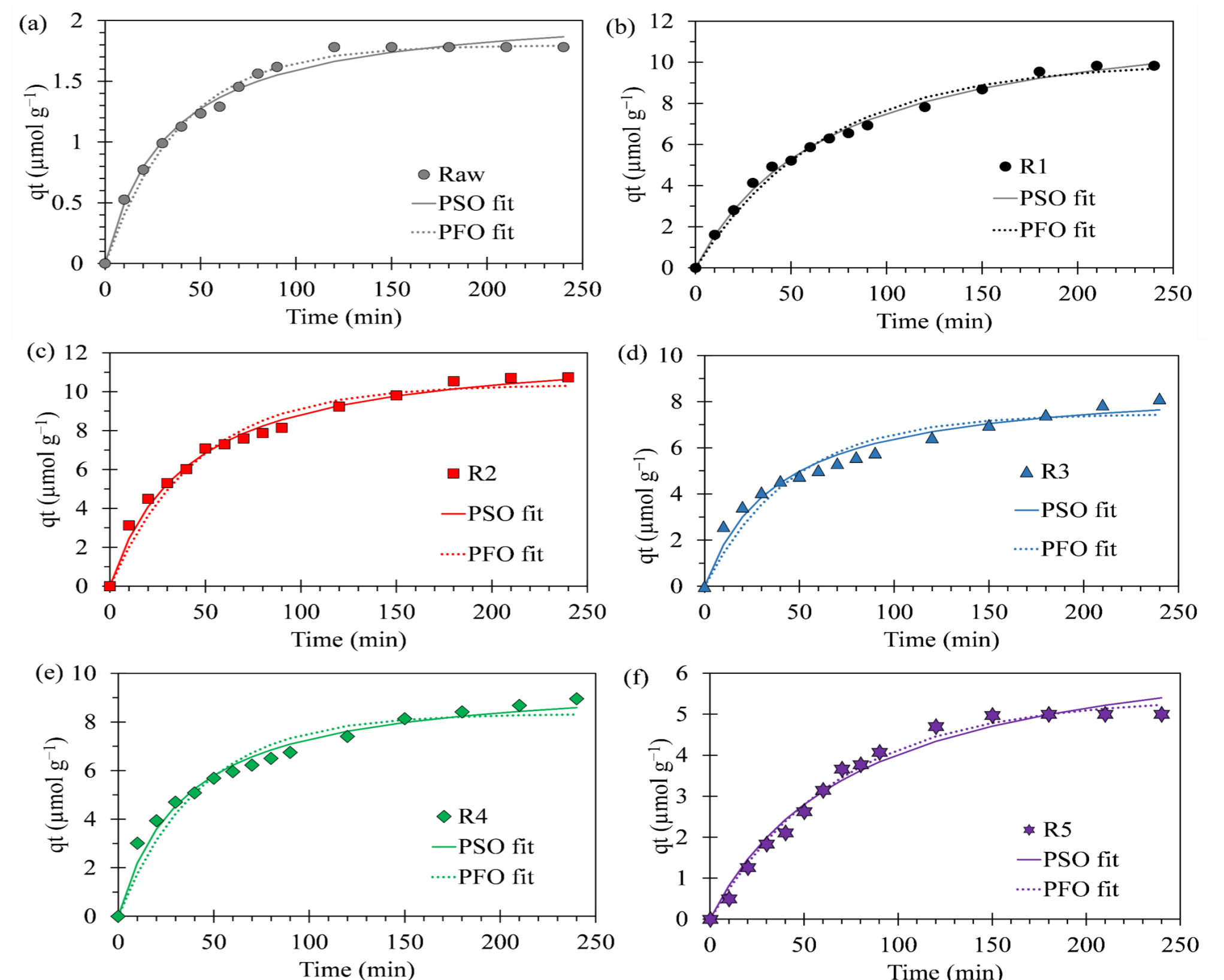
- 10 ml of solution
- 10 a 100  $\mu\text{mol L}^{-1}$
- 0,02 g of adsorbent
- Neutral pH

### RESULTS & DISCUSSION

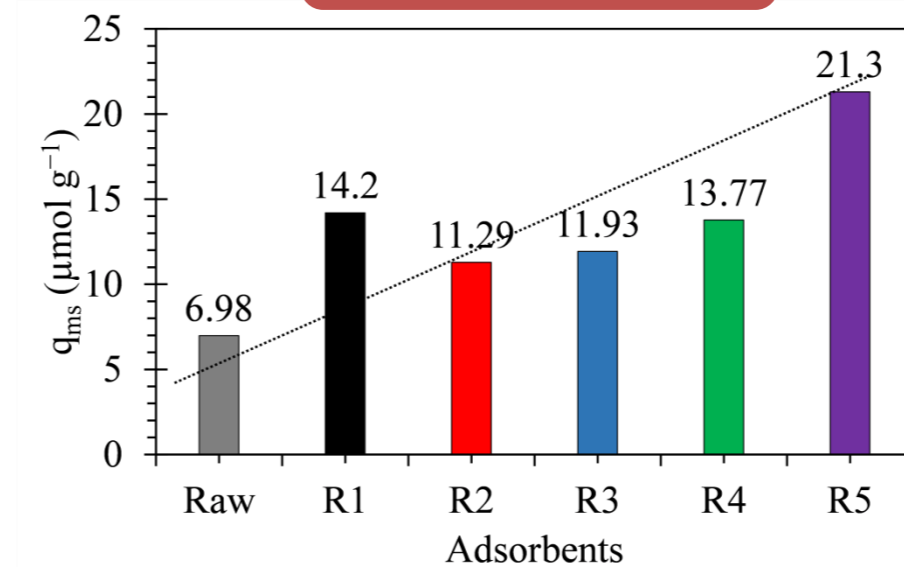
#### Coating conditins



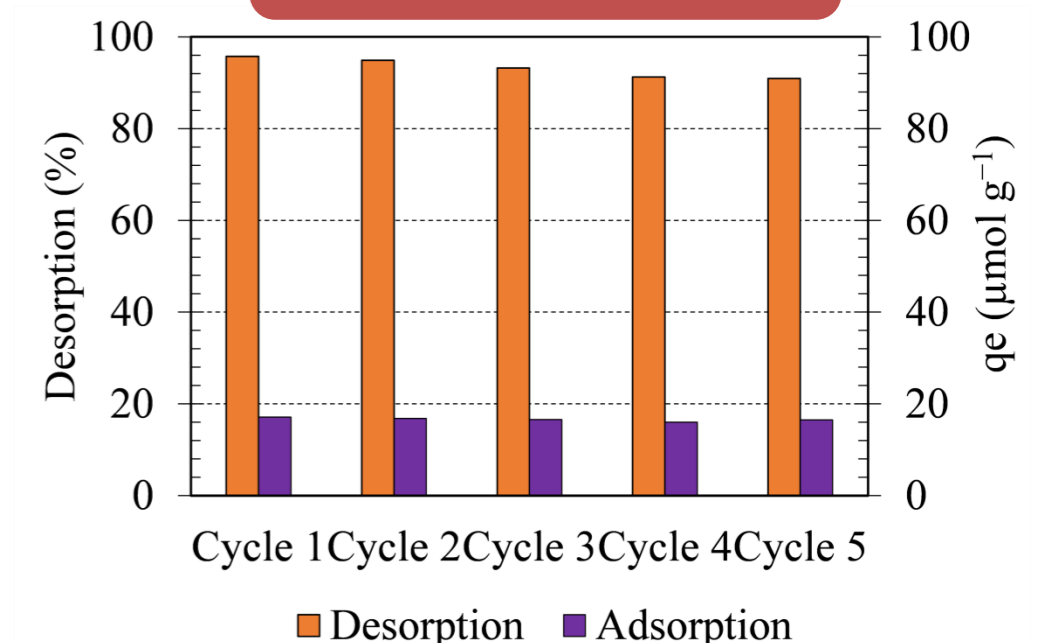
#### Fast Kinetics



#### Sips isotherm Adsorption capacity



#### 8 cycles Reusability and Stability



### CONCLUSION

- Titanium-coated biochars offer enhanced paracetamol adsorption
- Synergistic effects of modified surface chemistry and increased active sites
- Good reusability of the material

### FUTURE WORK / REFERENCES

Chidiac, A. S., Buckley, N. A., Noghrehchi, F., & Cairns, R. (2023). Paracetamol (acetaminophen) overdose and hepatotoxicity: mechanism, treatment, prevention measures, and estimates of burden of disease. *Expert Opinion on Drug Metabolism & Toxicology*, 19(5), 297–317.

Alberto, A. L., dos Santos, B. L. B., Godinho, M., Aguzzoli, C., Vieira, Y., Silva, L. F. O., ... & Dotto, G. L. (2025). Magnetron sputtering of niobium thin films onto wood biochar to increase the selectivity for electrostatic attraction of anionic brilliant blue dye. *Journal of the Taiwan Institute of Chemical Engineers*, 167, 105828.