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Development of Sustainable Biocomposite Pellets Based on Carbon Black and Cassava Starch for Water Remediation

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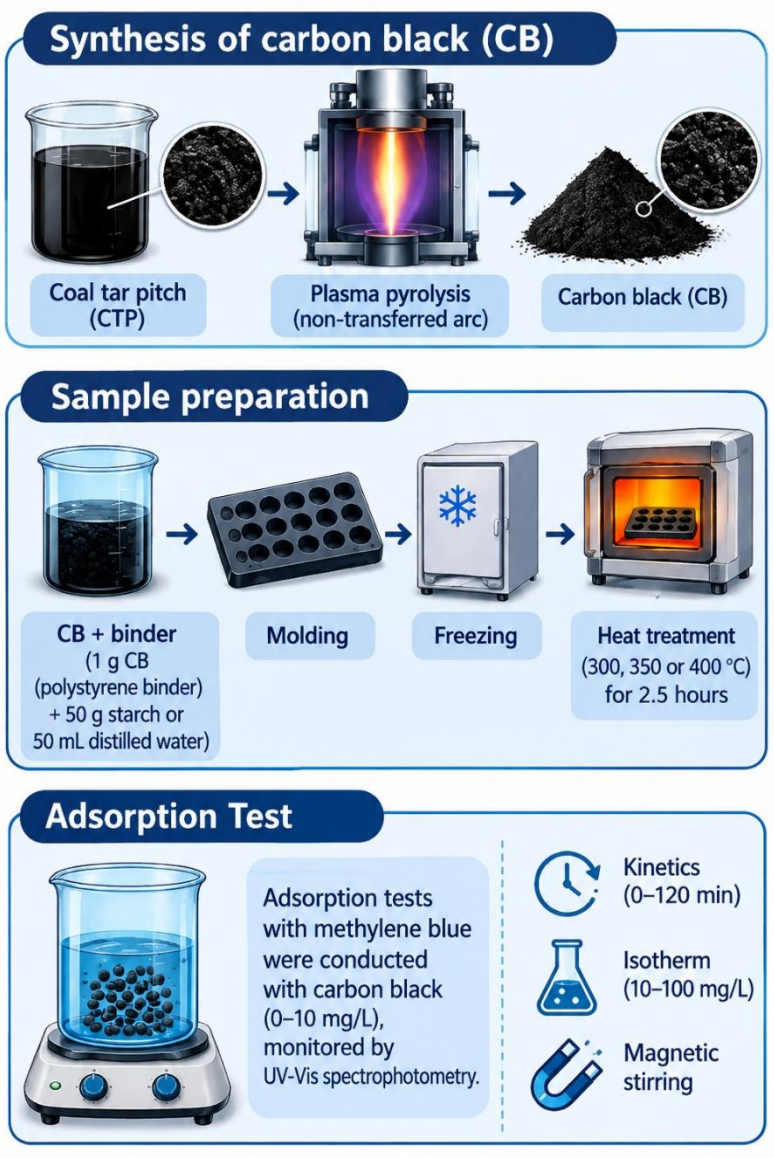
Introduction



Objectives

Synthesize carbon black/cassava starch biocomposite pellets and optimize their thermal treatment (300–400 °C) to maximize methylene blue adsorption efficiency while preserving structural integrity.

Methodology



Results and discussion

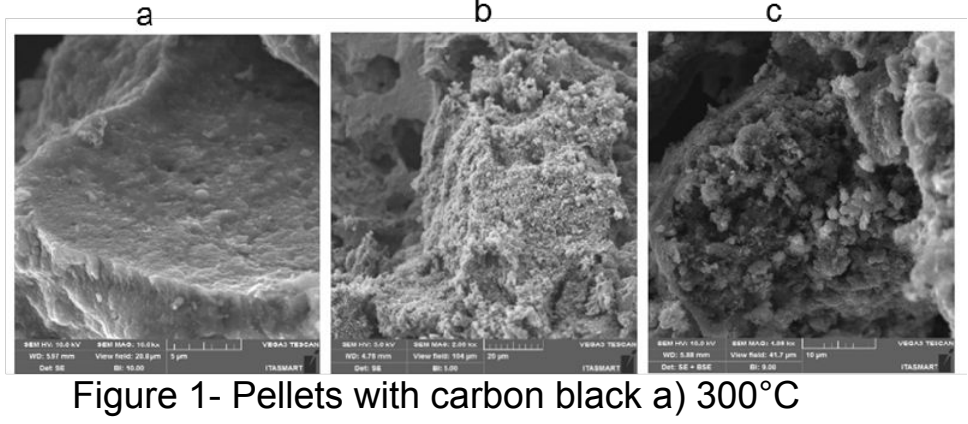


Figure 1- Pellets with carbon black a) 300°C b)350°C c) 400°C

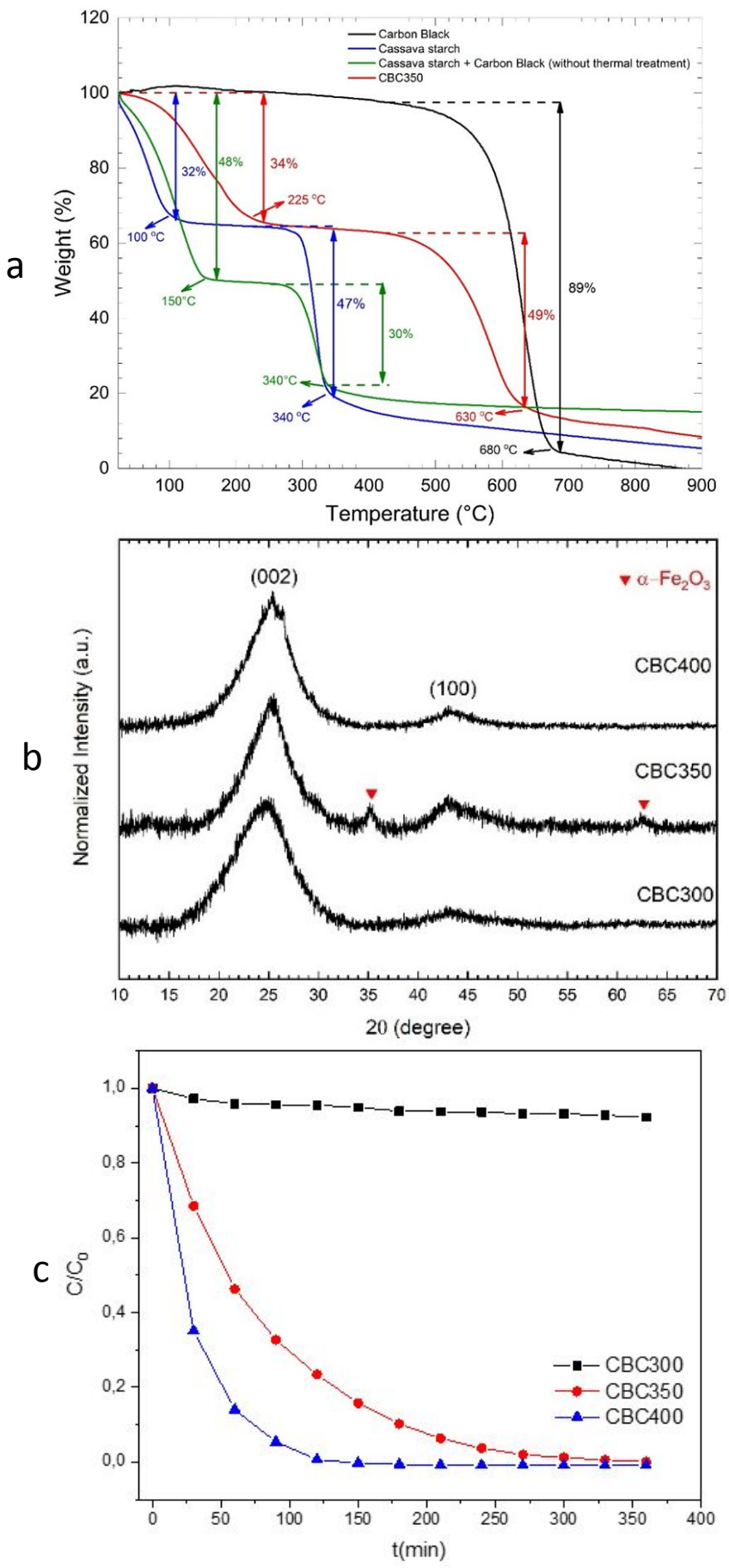


Figure 2- (a) TGA thermal profiles, (b) XRD structural patterns, and (c) C/C_0 methylene blue removal curves for the synthesized pellets.

Conclusions

Sustainable CB/cassava starch pellets were successfully synthesized. XRD, TGA, and SEM confirmed that thermal treatment drives structural reorganization, thermal stability, and porosity development. CBC350 achieved the optimal performance, reaching complete methylene blue removal within 60 min (4.88mg/g^{-1}) while preserving mechanical integrity, whereas 400 °C degraded the starch matrix and caused pellet disintegration.

Bibliographic references

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