Extraction of Cr(VI) from Aqueous solution Using Bioderived Carbon: A Sustainable Approach

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Introduction

- Due to rapid development in industrial sectors, the contamination of heavy metals has spread widely across the environment, wreaking havoc on humans and the environment .

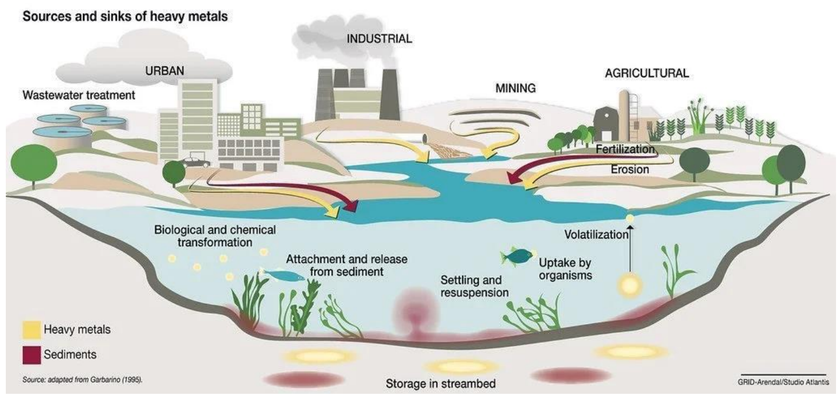


Fig 1. Sources and sinks of heavy metals

How do heavy metals gets into ecosystem?

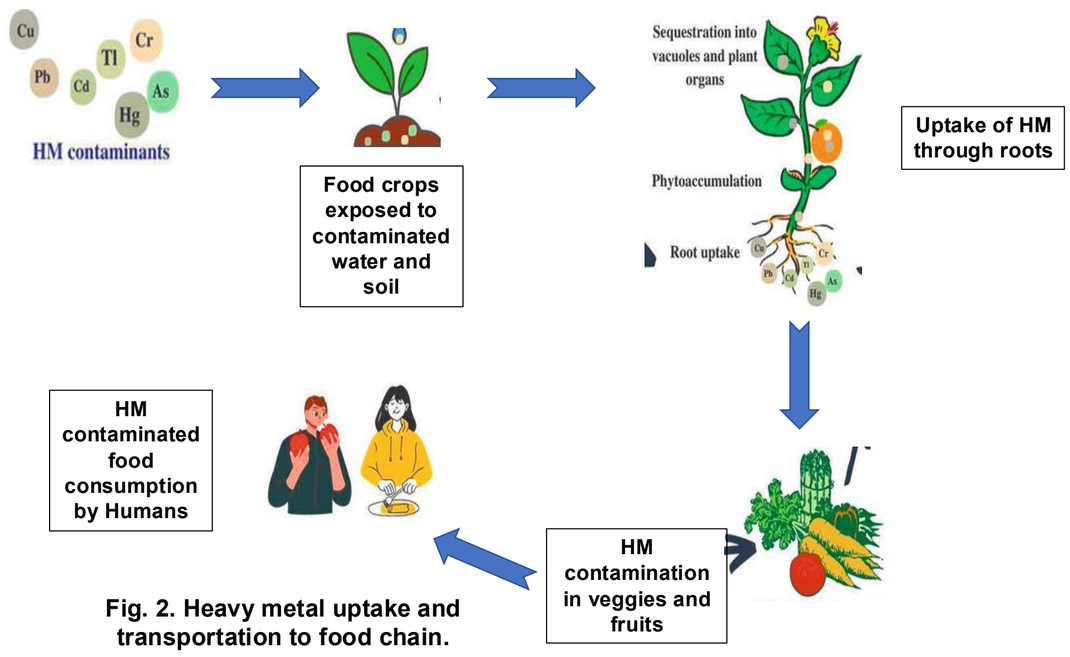
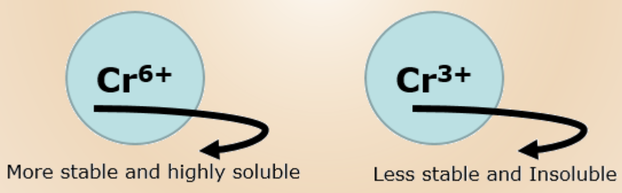


Fig. 2. Heavy metal uptake and transportation to food chain.

Problem Statement

- Among the various heavy metals Chromium (Cr) is ranked as fifth of the potentially worst toxic elements.



WHO drinking water guidelines says the greatest permissible cutoff for Cr is 0.05 mg/L

Ojectives

- **Most of the methods and materials used for Cr(VI) removal is not environment friendly, expensive and cannot be reused.**
- **To develop a low cost and environment friendly material for efficient removal of Cr(VI) from aqueous solution**

Characterization and Adsorption studies

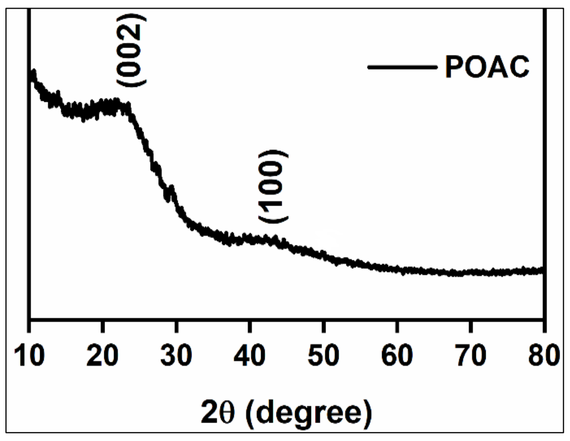


Fig 2. XRD pattern

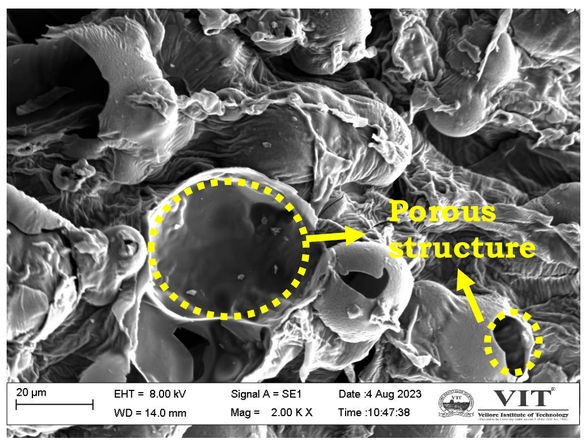
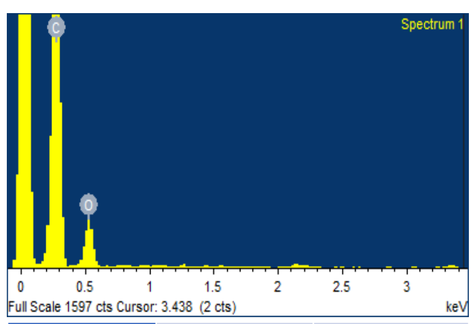


Fig 3. FESEM



Element	Weight%	Atomic%
C K	78.28	82.76
O K	21.72	17.24

Fig 3. EDAX and Elemental Analysis

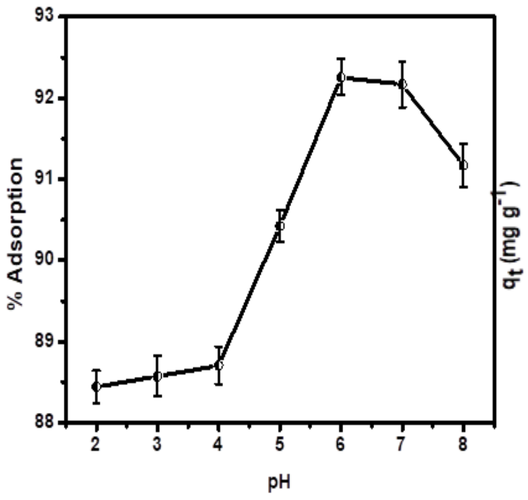


Fig 5 Influence of pH

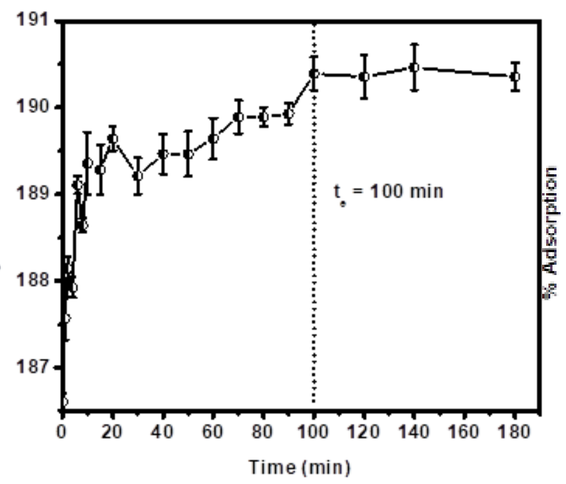


Fig 5 Adsorption Kinetics

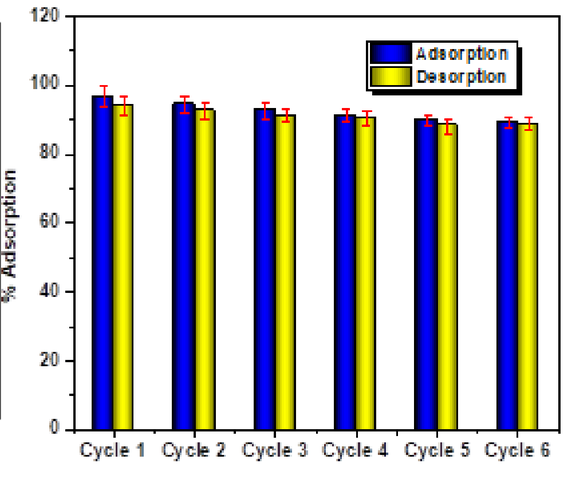


Fig 5 Reusability

Results and Discussions

- Carbon was prepared from waste onion peels using hydrothermal method.
- XRD and EDAX confirms the formation of carbon.
- SEM images shows the high porous structure of bioderived carbon.
- Maximum Cr(VI) adsorption happens at pH6 (q_e = 196 mg L^{-1} Cr(VI))
- Adsorption process achieved equilibrium within 100 min.
- Bioderived Carbon shows excellent reusability.

Conclusion

Results obtained from studies confirms that the Activated carbon derived from waste onion peels is a potential adsorbent for Cr(VI) removal

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