Novel banana peel/graphene oxide derived biosorbent for water purification

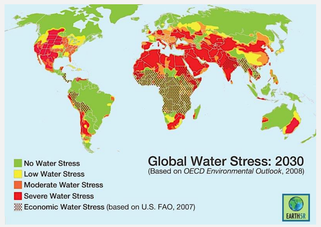
Rong Wu, Muhammad Zubair, Dr. Aman Ullah

Department of Agriculture, Food, and Nutritional Science, University of Alberta

Supported By:

Introduction

- According to UNO, 2.1 billion people have no access to clean water.
- Conventional approaches are very expensive.
- More efficient and low-cost water treatment technology is needed.
- More than 200 million tons of banana peels are produced annually.[1]
- Banana peel/Graphene oxide based biosorbent is a promising candidate for water purification.



Methodology

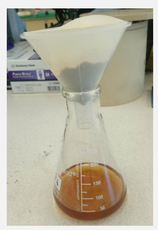
Pre-treatment of banana peel

Dried in oven, 60°C

Grinded and sieved into 75 µm powder.

Carbohydrate extraction[2]

2 times H_2O, 2 times EtOH, 30 min, boiling temperature



Filter with Whatman no.42

Centrifuge at 2000 RPM

Results

Structural Analysis

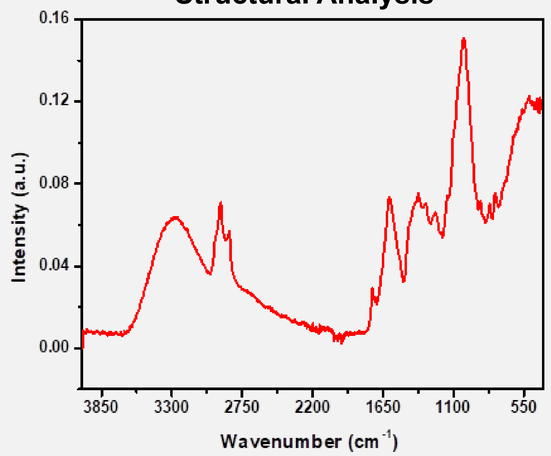


Figure 1: FTIR of banana peel powder

Bands (cm^{-1})	Assignments
3279	O-H stretching
2916 and 2849	C-H stretching of alkane
1728	C-O stretching of carboxylic acids
1592	C–C bond of diene
950–1600	Attributed to ester, polysaccharide or protein
885	N-H deformation of amine

Table 1: FTIR absorption bands of banana peel powder

Thermogravimetric Analysis (TGA)

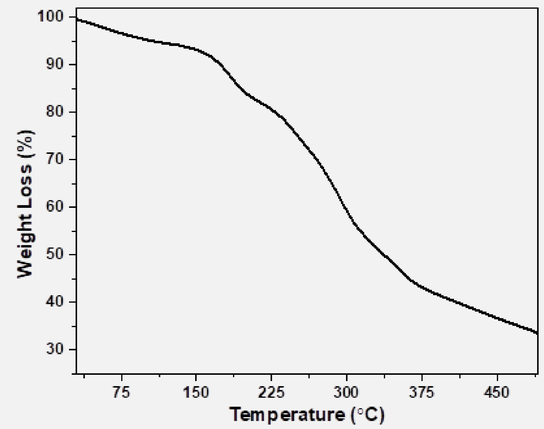
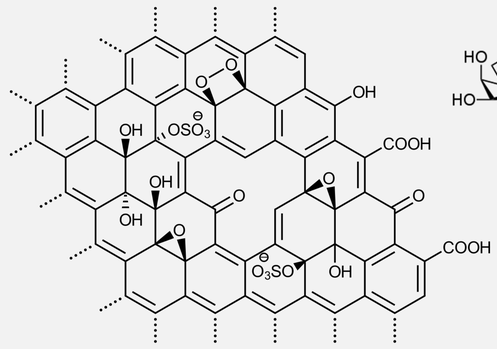
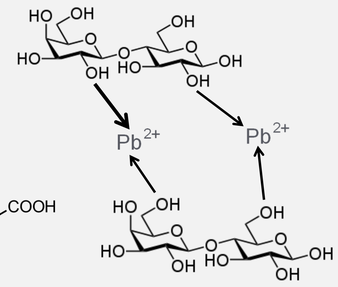


Figure 2: TGA analysis of banana peel powder

Conclusions





Expected Outcomes:

- Low cost adsorbent
- Sustainable and renewable
- Single integrated technology
- Environment friendly

Future Work:

- Development of hybrid adsorbent.
- Characterization of the adsorbent.
- Water purification analysis of the adsorbent.

Acknowledgements

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Lliterature Cited

1. Adisa, V.a., and E.n. Okey. “Carbohydrate and Protein Composition of Banana Pulp and Peel as Influenced by Ripening and Mold Contamination.” *Food Chemistry*, vol. 25, no. 2, 1987, pp. 85–91.

2. Kerepesi, I., et al. “Water-Soluble Carbohydrates in Dried Plant.” *Journal of Agricultural and Food Chemistry*, vol. 44, no. 10, 1996.