

Sustainable Desalination Using Activated Carbon Biofilters from Orange Peels and Banana Stems

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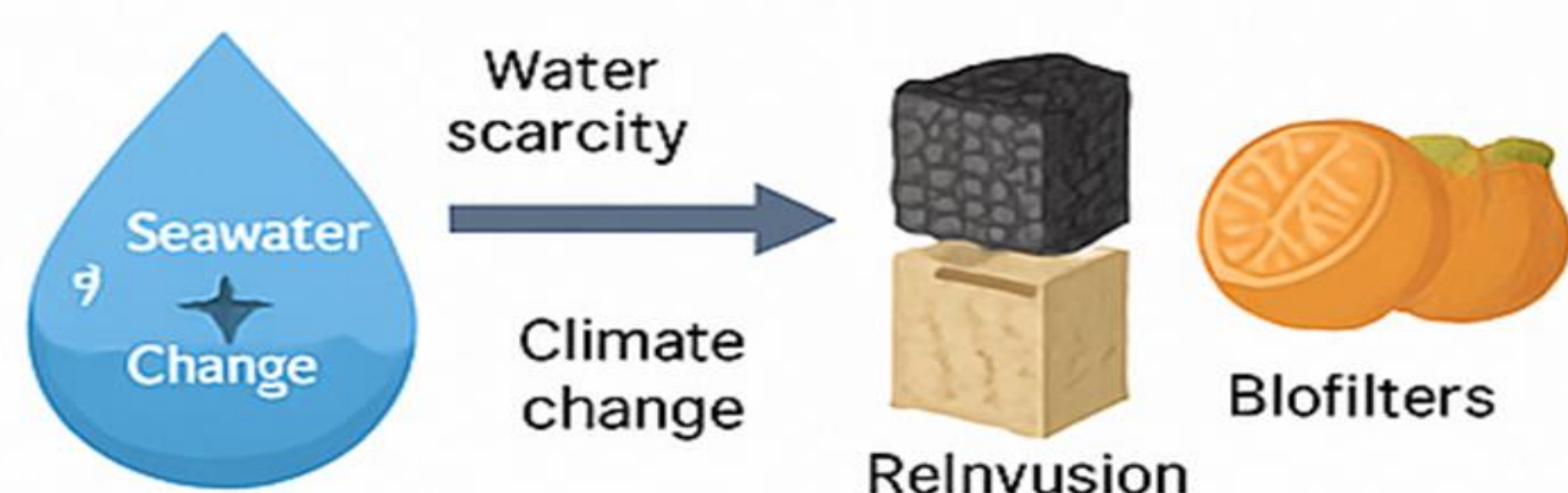
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INTRODUCTION & AIM

Water scarcity, fueled by population growth and climate change, necessitates effective and sustainable seawater desalination technology. In this context, the possibility of seawater desalination by biofilters made from polyurethane foams doped with activated carbon derived from agricultural waste materials: banana stems, and orange peels is explored. The aim is to develop an inexpensive, eco-friendly process for the removal of major seawater ions (Ca^{2+} , Mg^{2+}) through adsorption.

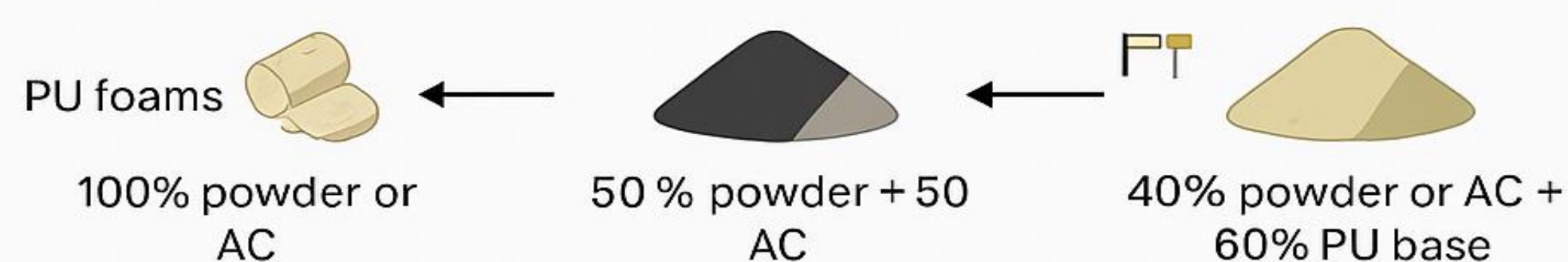


METHOD

Preparation of Activated Carbon (AC)



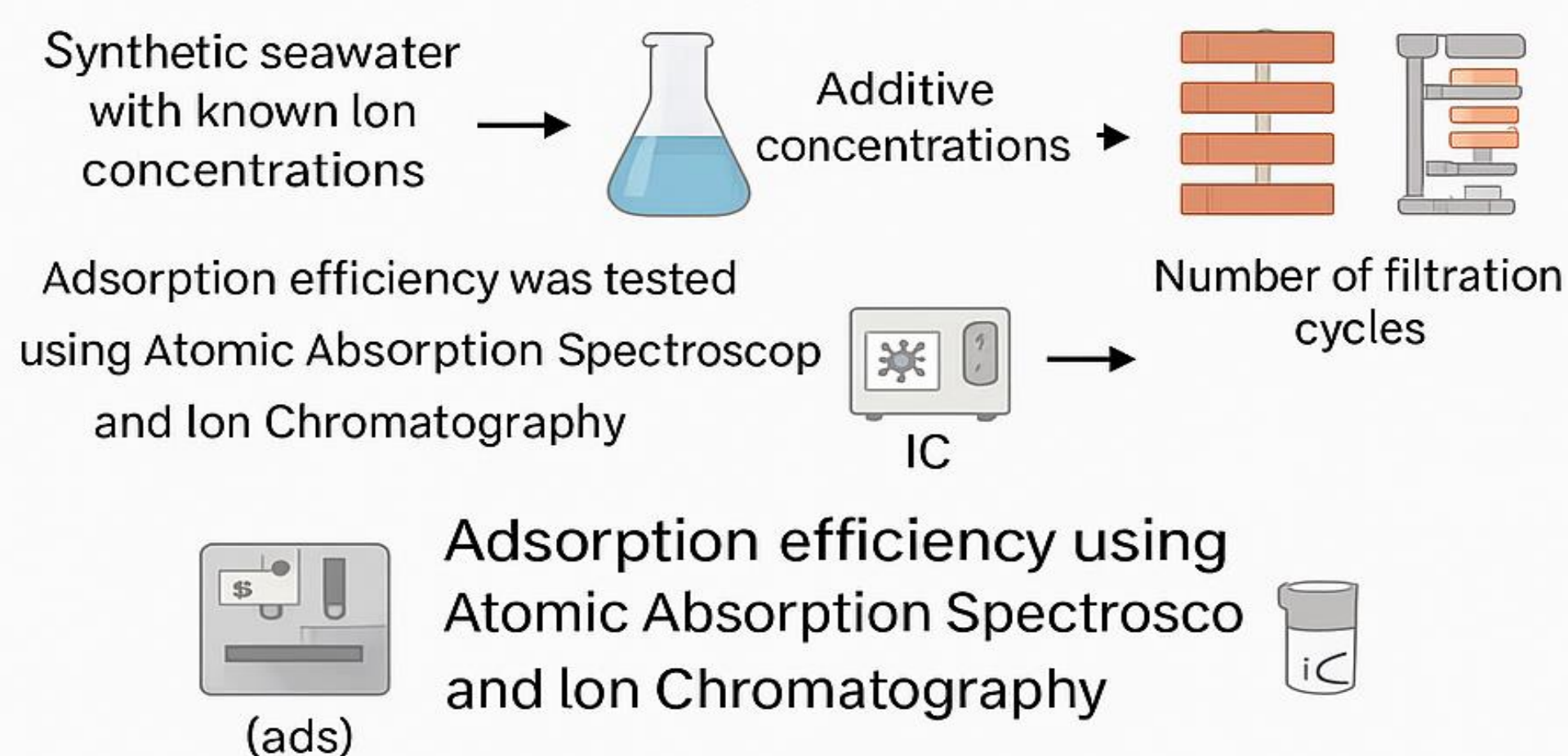
Filter Fabrication



Characterization Techniques

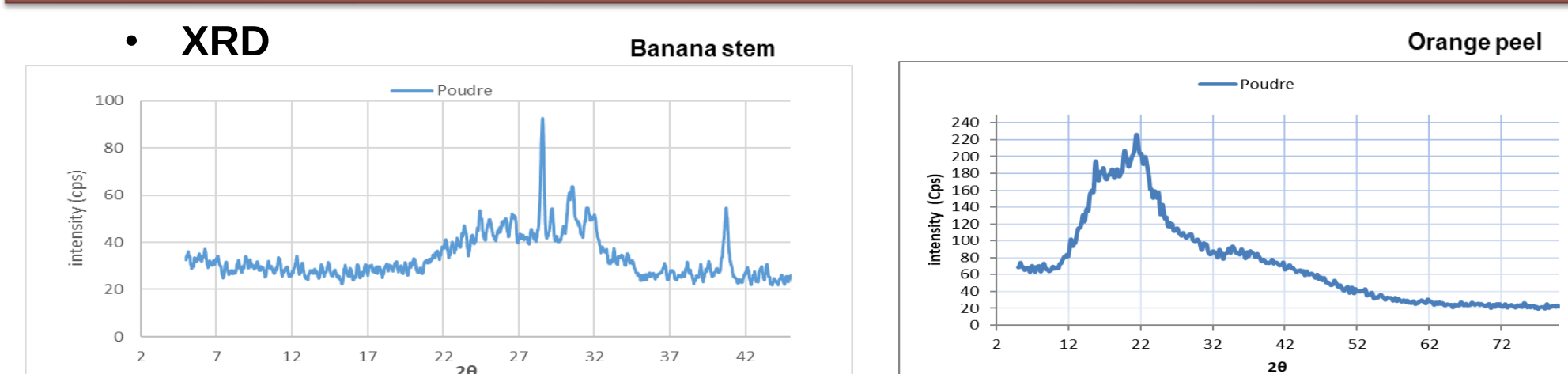


Testing Protocol

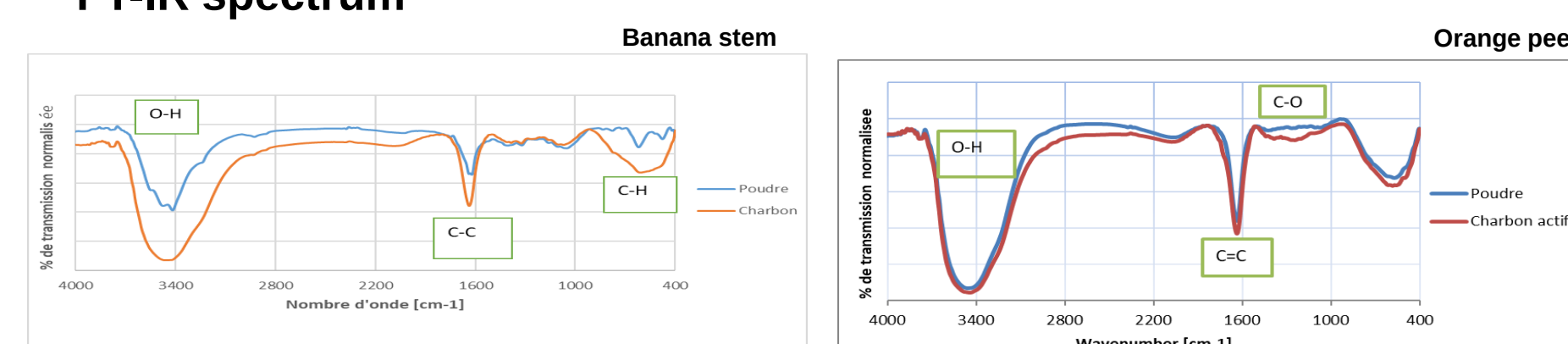


RESULTS & DISCUSSION

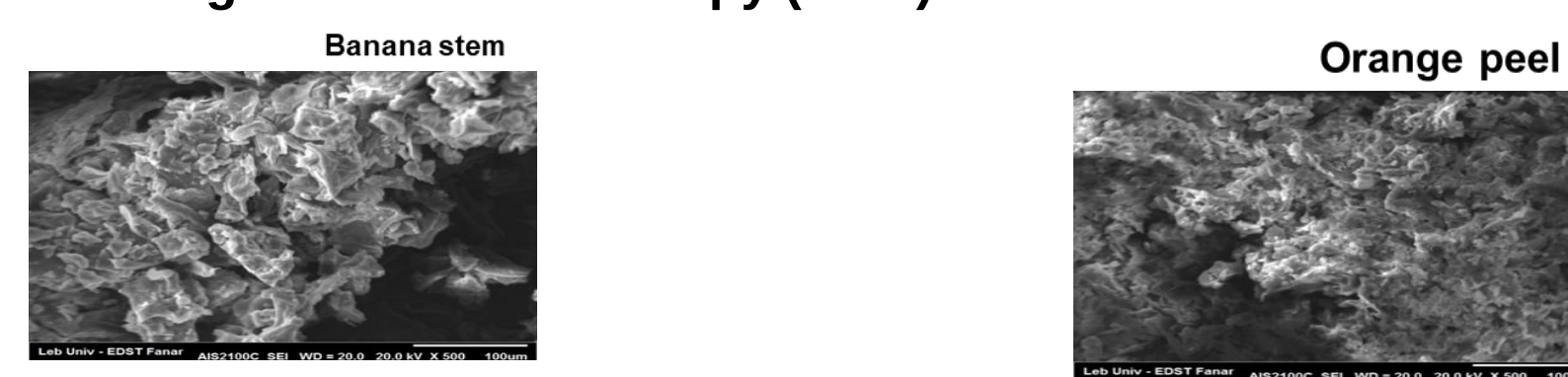
• XRD



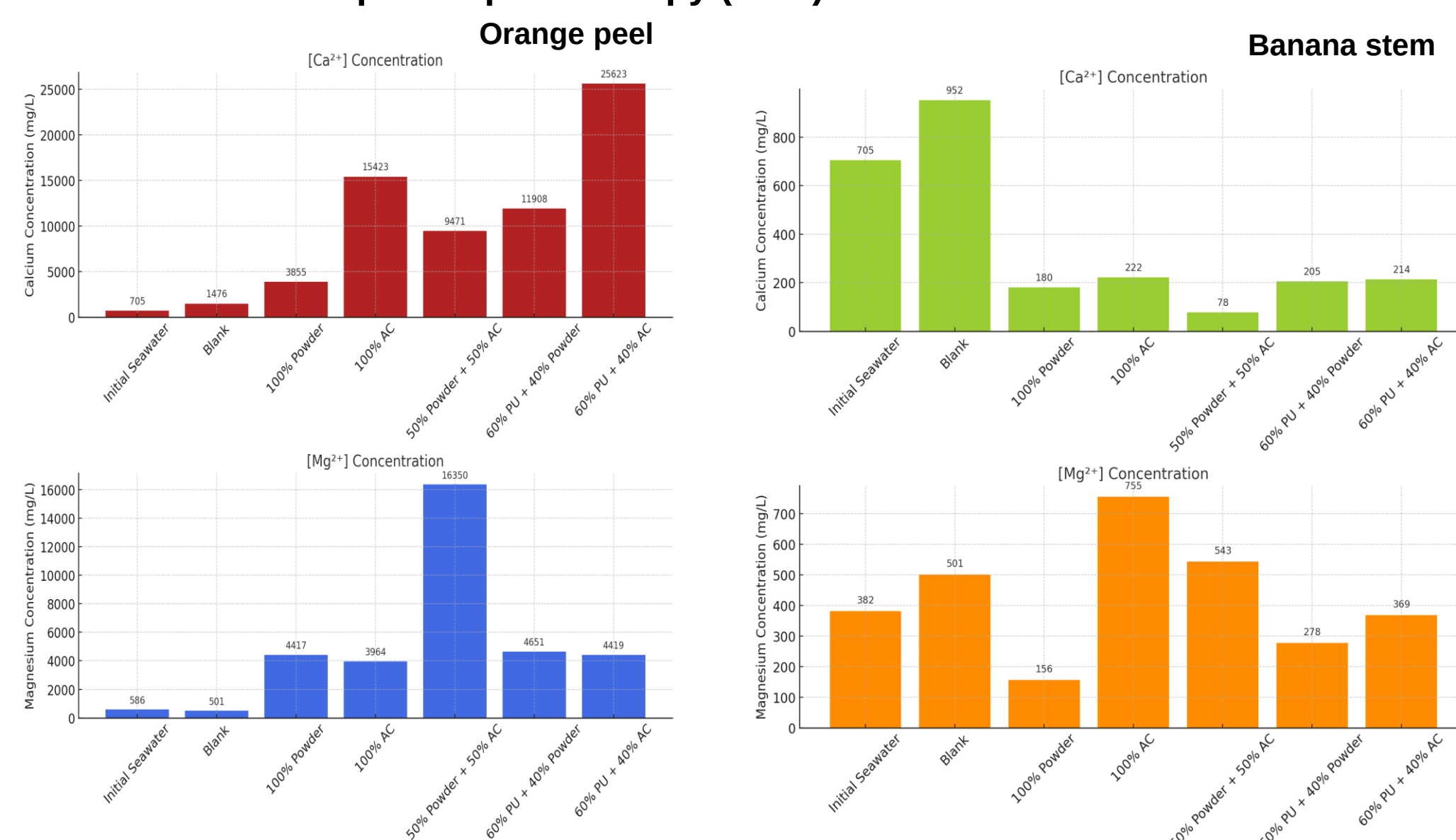
• FT-IR spectrum



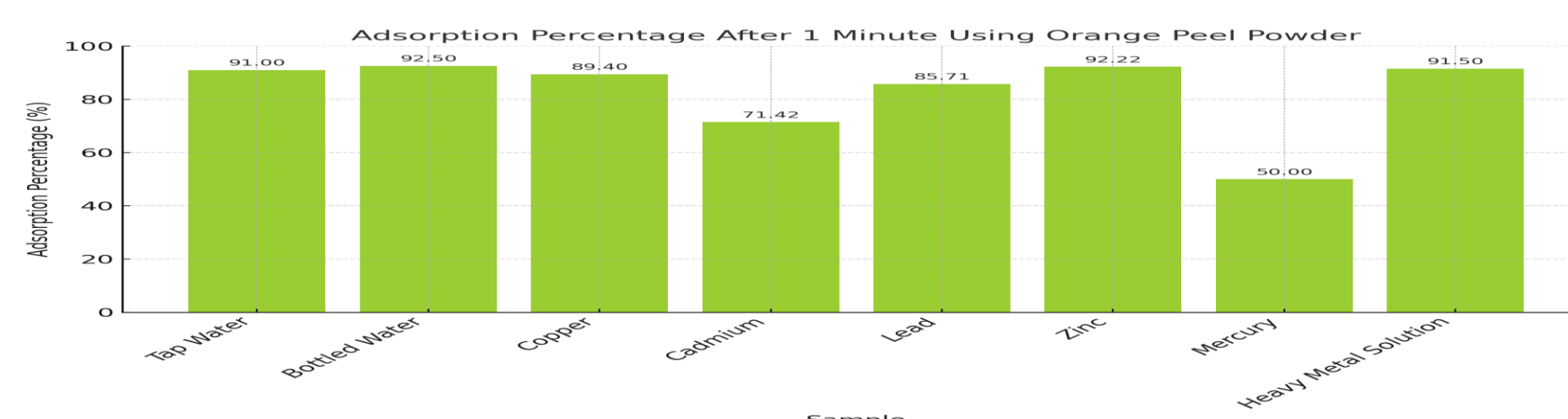
• Scanning Electron Microscopy (SEM)



• Atomic Absorption Spectroscopy (AAS)



• Adsorption percentage of the different tested samples after 1-minute direct contact with orange peel powder.



CONCLUSION

This study demonstrates that activated carbon filters with bio-based materials, such as orange peels and banana stems, can desalinate seawater through adsorption. The process is:

- Green, using agricultural waste,
- Cost-effective and scalable,
- Very efficient to remove numerous salt ions.

FUTURE WORK / REFERENCES

- Optimize filter regeneration methods to improve reusability.
- Field testing under real coastal conditions.
- Explore other agricultural wastes for enhanced performance.