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Characterization of Biodegradable Films from Holocellulose from Natural Polymers via Electrospinning

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INTRODUCTION **Global Plastic Destination of Plastic** Production Worldwide Recycled 22% Landfill tons/year 19% **Waste Generation** Incinerated 49% in Brazil Mismanaged 1 million tons/year **BIOPLASTICS FROM AGROINDUDSTRY** Prevalence of **Packaging** @ 1. PETROLEUM ALTERNATIVE: Replaces fossil-fuel-fuel A 2. ADDS VALUE: Turns 'waste' into a new source of income (a) 3. ACTIVE PACKAGING: Preserves food for longer **GREEN SOLUTION FOR POLLUTION & WASTE** Source: ABIHPEC and WWF, 2024.

OBJECTIVE

The objective of this work is to obtain and characterize polycaprolactone (PCL) and agricultural residue fiber films produced by electrospinning, focusing on their morphology, thermal stability, and fiber treatment process for polymer incorporation.

METHOD Washing and drying Grinding Treatment with 5% Neutralization and NaOH agricultural residue agricultural washing residue Drying of treated Drying of Agricultural Preparation of PCL and agricultural agricultural residue bleaching fiber solutions in organic residue residue acid

Nanofibers films

Electrospinning

RESULTS & DISCUSSION

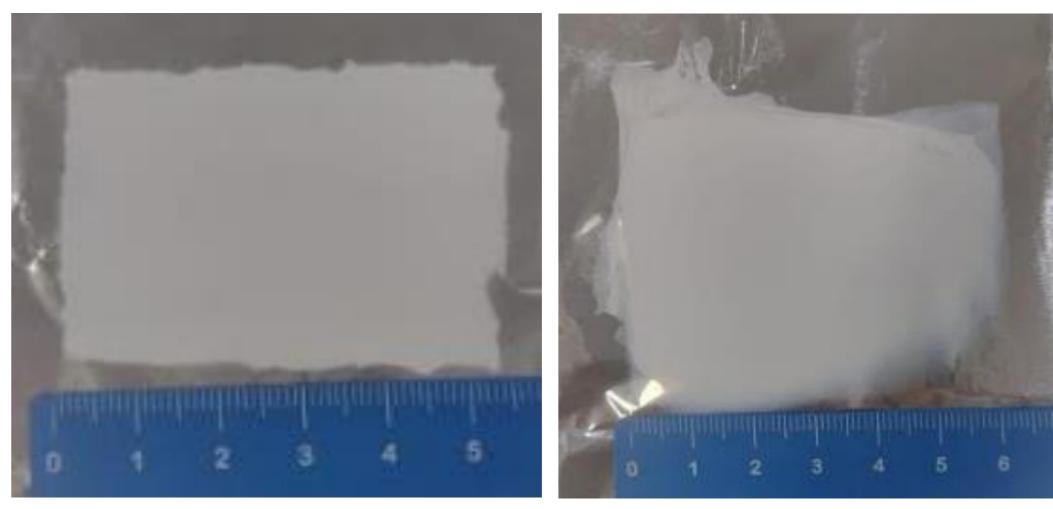


Fig. 1 – Nanofibers films obtained by electrospinning for PCL plain and PCL with 20% m/m agricultural residue samples.

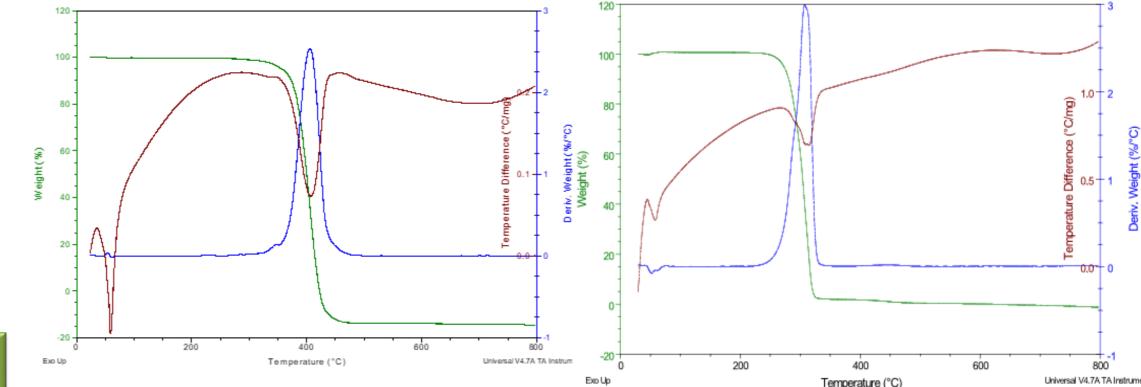
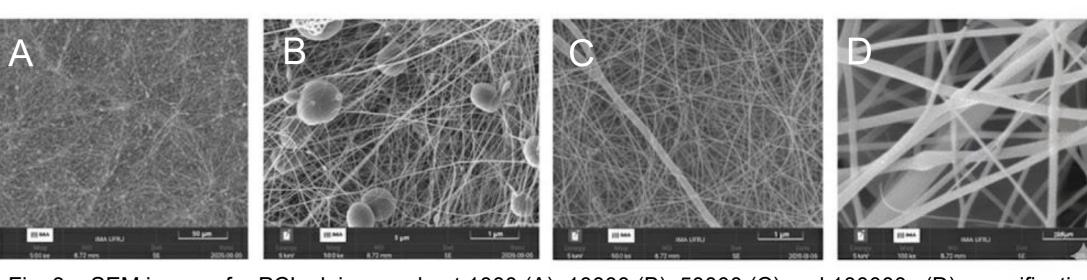


Fig. 2 – TG/DTG and DTA curves of film samples PCL plain and PCL with 20% m/m agricultural residue.



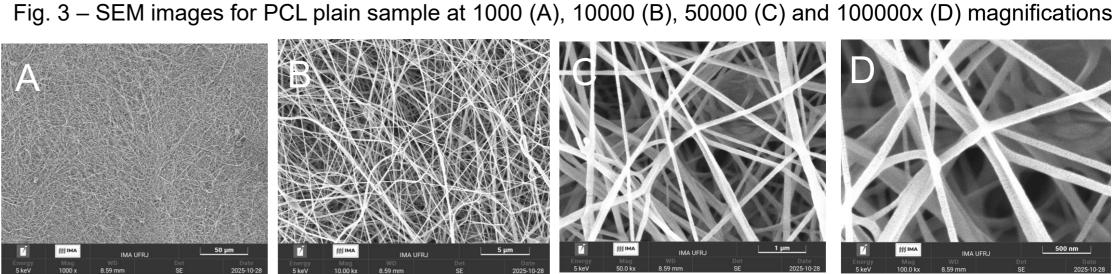


Fig. 4 – SEM images for PCL with 20% m/m agricultural residue sample at 1000 (A), 10000 (B), 50000 (C) and 100000x (D) magnifications

CONCLUSION

Electrospinning proved to be an efficient technique for producing nanometric-scale films. Characterization analyses confirmed successful fiber formation, thermal stability, and complete solvent evaporation during processing, validating the films as a promising alternative for packaging applications.

ACKNOWLEDGMENTS









