IOCM
2025
Conference

The 4th International Online Conference on Materials



3-6 November 2025 | Online

Study, Production, and Characterization of Nanostructured Nonwoven by Electrospinning from Modified Natural Biopolymers

Fabiane Gomes de Oliveira^{1, 2} and Michelle Gonçalves Mothé¹

¹Laboratory of Natural and Synthetic Polymer Technology, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil. Email: michelle@eq.ufrj.br ² SENAI Institute of Innovation in Biosynthetics and Fibers, Rio de Janeiro, Brazil. Email: fabianegommes1@gmail.com

INTRODUCTION & AIM Produces uniform In 2024, Brazil nanofibers with high produced 15 million tons of chicken meat surface area **Poultry industry residues Electrospinning** Cellulose Nonwoven Fibrous mat with high \ The global production surface area, great of cellulose is porosity, and estimated to be excellent functional between 75 and 100 performance___/ _billion_tons_per_year__,

OBJECTIVE

To study the development and characterization of a nonwoven material composed of nanofibers obtained by electrospinning from a combination of modified natural biopolymers derived from cellulose and poultry industry residues.

METHOD

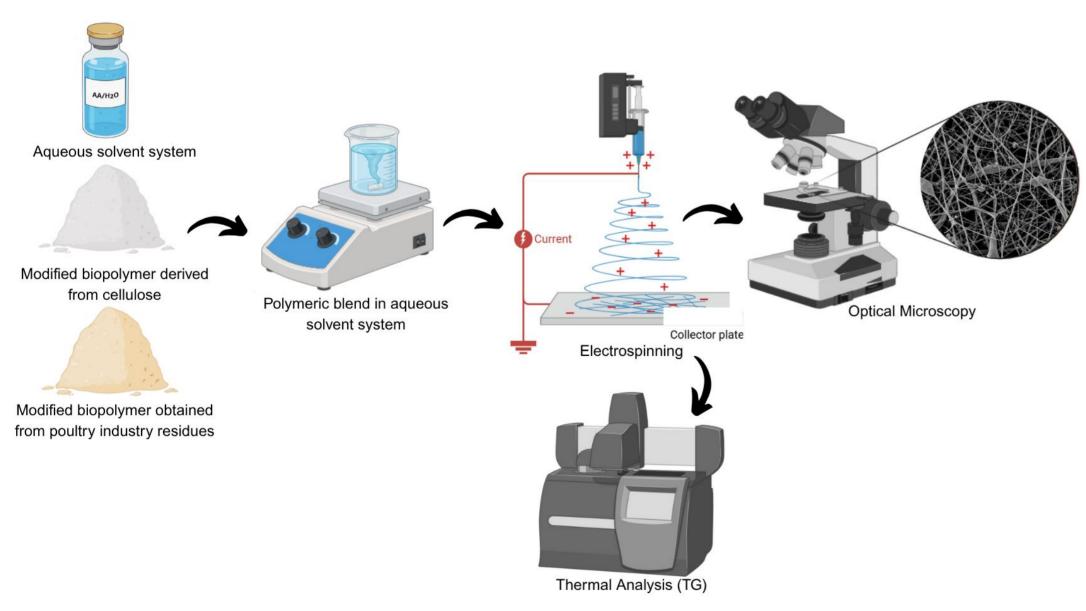


Figure. Schematic representation of the electrospun nonwoven fabrication process from modified natural biopolymers derived from cellulose and poultry industry residues.

Thermal Analysis (TG)

- Equipment: STD Q600, TA Instruments
- Temperature range: 25–600 °C
- Heating rate: 10 °C/min
- Atmosphere: Nitrogen, 100 mL/min flow

Modified biopolymer derived from cellulose



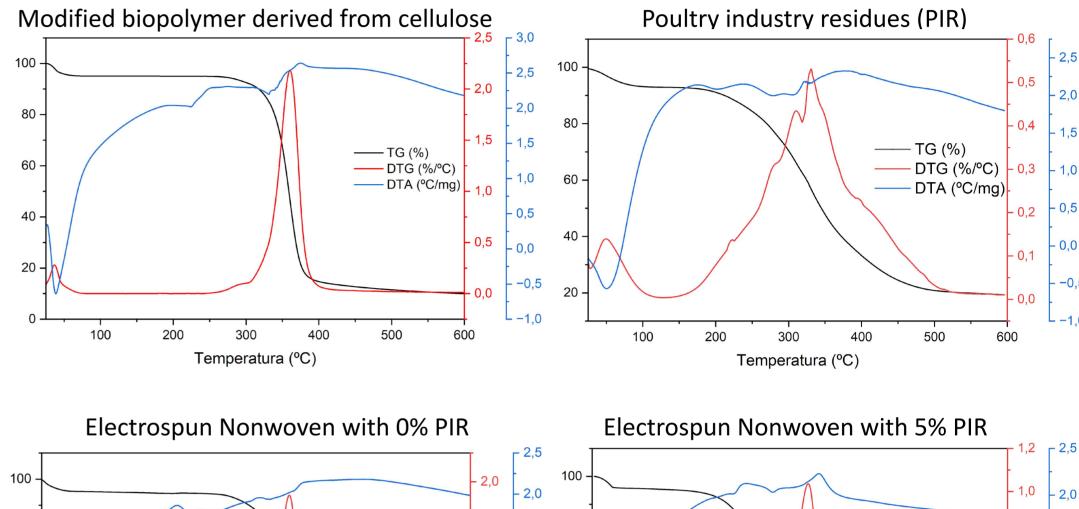


Nonwoven

Scanning Electron Microscopy (SEM)

- Magnification: 10,000×
- Acceleration voltage: 10 kV
- Scan time: 30 μs

RESULTS & DISCUSSION



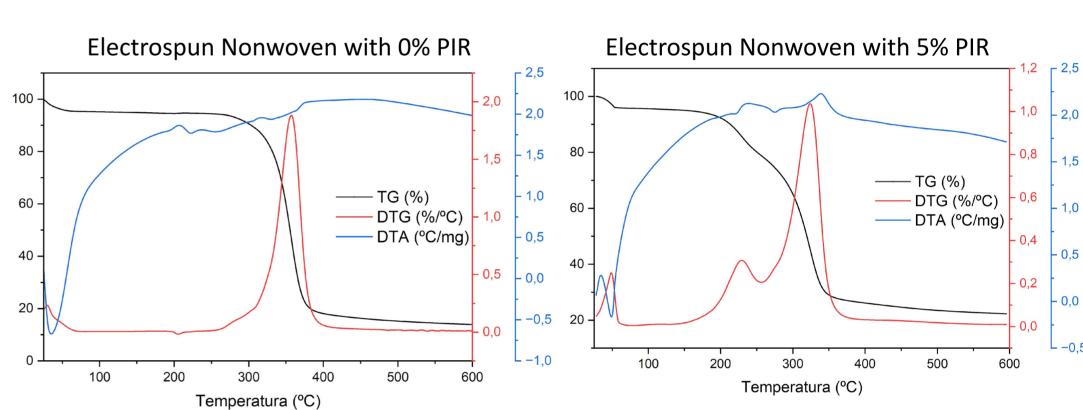


Figure. Comparison of thermogravimetric (TG) curves for modified biopolymer derived from cellulose, modified biopolymer obtained from poultry industry residues (PIR), and electrospun nonwovens without and with 5% PIR.

Figure. Scanning electron micrographs (100,000× magnification) and average fiber diameter distribution of electrospun nonwovens without and with 5% modified biopolymer obtained from poultry industry residues (PIR).

CONCLUSION

The modified biopolymer derived from cellulose and the biopolymer obtained from poultry industry residues (PIR) biocomposite proved to be a promising combination for the production of nanostructured nonwovens, with SEM and thermal analyses confirming its excellent morphology and high stability.

ACKNOWLEDGMENTS









