

# Composite Materials Composites from Tururi (*Manicaria saccifera* Gaertn.) fibrous material: effect of structural parameters on the tensile properties, and applications.

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## INTRODUCTION

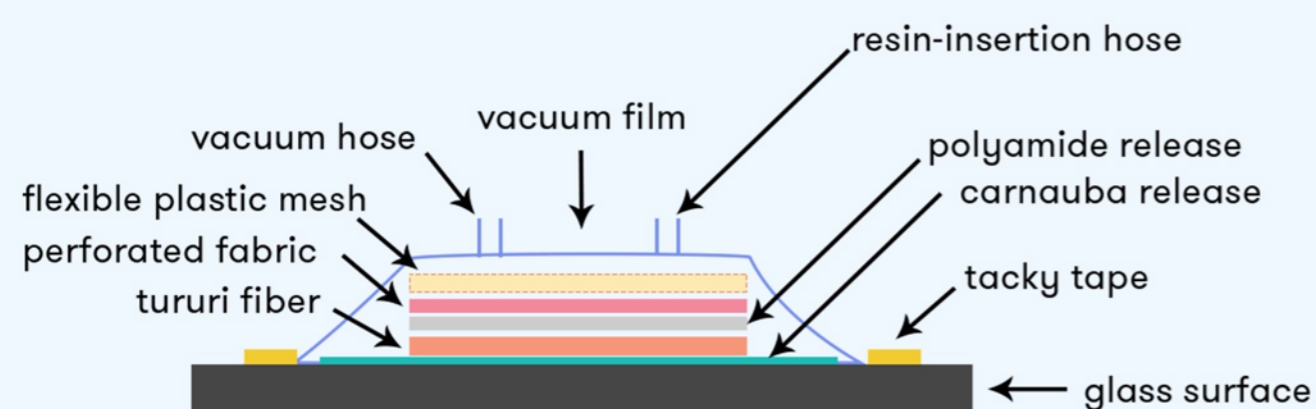
Tururi is a natural fibrous structure that protects the fruits of the Amazon Ubuçu palm tree (*Manicaria saccifera* Gaertn.), traditionally utilized by local communities in the Marajó archipelago - Brazil.

## OBJECTIVE

This research aims to report the development of two different types of multilayer 3D green composites from tururi fibrous material, defining density, and moisture content, characterizing their tensile properties, and identifying applications based on their performance.

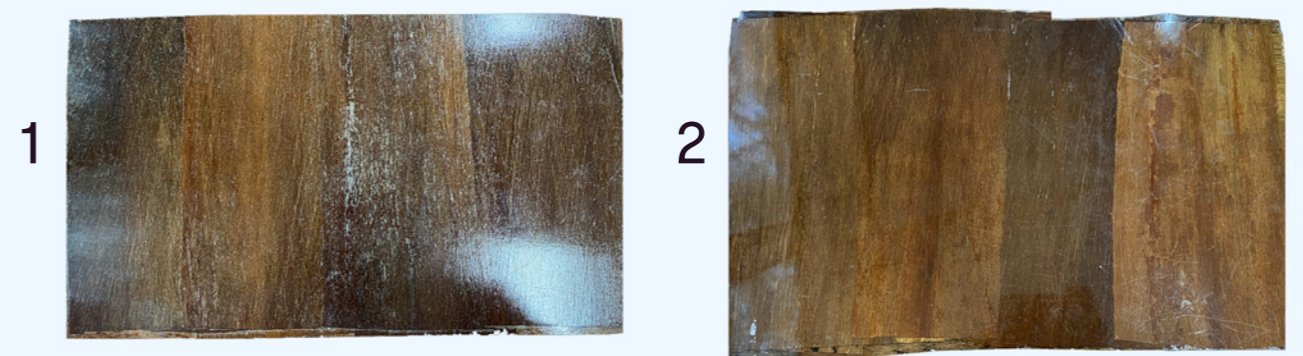
## MATERIALS AND METHODS

A total of six composite samples were fabricated using Vacuum Assisted Resin Transfer Molding Technique (VARTM), with two different types of resin to compare results: castor bean-based polyurethane; and epoxy.

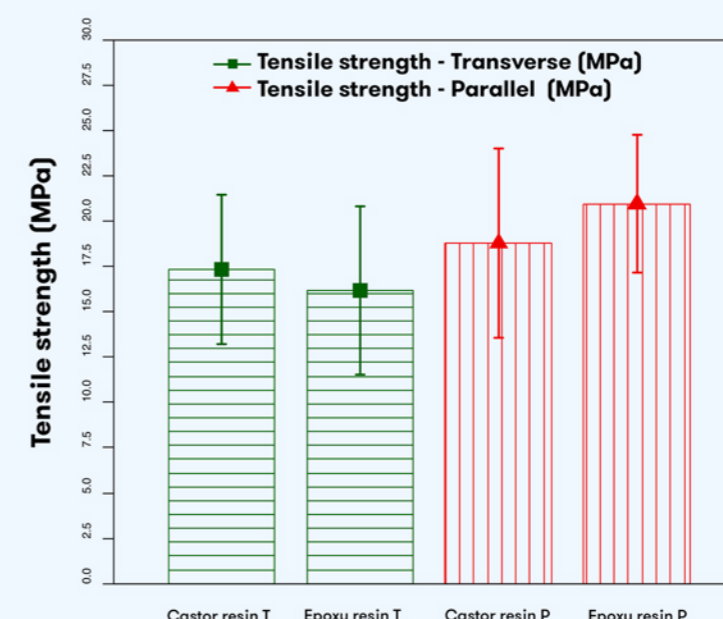


## RESULTS

Material 1 (castor bean matrix with tururi fibers) and Material 2 (epoxy matrix with tururi fibers).



For density measurement, the results were  $0.79 \pm 0.04$  g/cm<sup>3</sup> (Material 1) and  $0.91 \pm 0.20$  g/cm<sup>3</sup> (Material 2). Lower density values are advantageous for polymer composites as they indicate the potential for lighter materials. The moisture content results were  $5.30 \pm 0.30\%$  (Material 1) and  $4.90 \pm 0.60\%$  (Material 2).



The results indicate a close resemblance in tensile strength values between composites with tururi fibers arranged transversely:  $17.33 \pm 4.12$  MPa (Material 1) and  $16.18 \pm 4.65$  MPa (Material 2). Comparable values were observed for composites with tururi fibers arranged in parallel:  $18.78 \pm 5.22$  MPa (Material 1) and  $20.95 \pm 3.80$  MPa (Material 2).

## CONCLUSION

Notably, in Material 2, there was an 8.36% increase in tensile strength when the tururi fibers were aligned in parallel compared to transverse orientation. In general, the results showed similar results for both types of resin and indicate that composites made with tururi fibrous material are suitable for employment in some fields like furniture, internal building elements, fashion, and crafts. The employment of natural fibers, in a sustainable context, brings implications of great importance to society.