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Compsite materials from Tucuri (Manicaria saccifera Gaertn.) fibrous materials: effect of structural parameters on the tensile properties and applications

Amanda Souza Monteiro
Denise Dantas
Takashi Yojo

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Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A - IPT
Av. Prof. Almeida Prado, 532 | Cidade Universitária ou
Caixa Postal 0141 | CEP 01064-970
São Paulo | SP | Brasil | CEP 05508-901
Tel 11 3767 4374/4000 | Fax 11 3767-4099

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

A.S. Monteiro[1], D. Dantas[1], T. Yojo[2]

[1]University of Sao Paulo, São Paulo, Cid. Universitária, 05508-220, BR.
[2]Institute for Technological Research, São Paulo, Cid. Universitária, 05508-901, BR.

INTRODUCTION

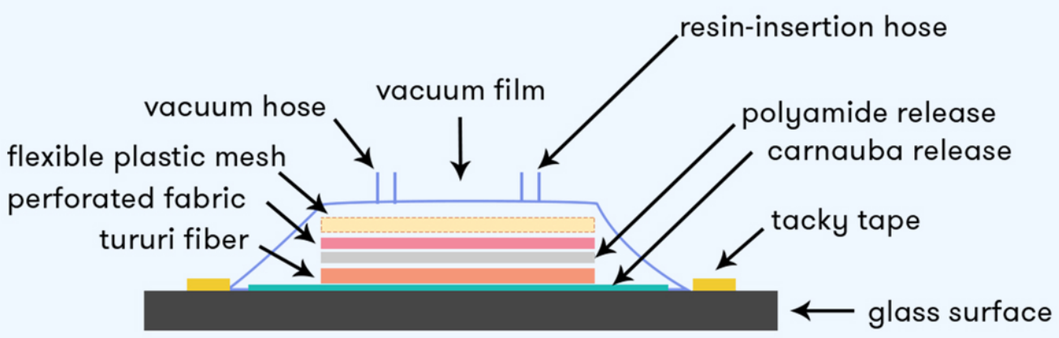
Tururi is a natural fibrous structure that protects the fruits of the Amazon Ubuçu palm tree (*Manicaria saccifera Gaertn.*), traditionally utilized by local communities in the Marajó archipelago - Brazil.

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).

1 

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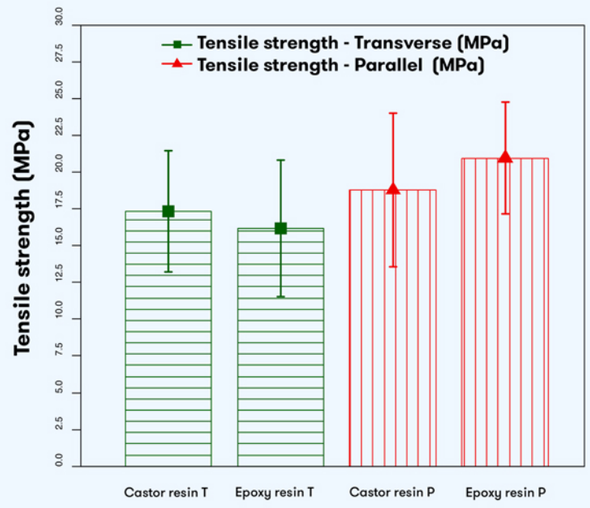
For density measurement, the results were 0.79 ± 0.04 g/cm³ (Material 1) and 0.91 ± 0.20 g/cm³ (Material 2). Lower density values are advantageous for polymer composites as they indicate the potential for lighter materials. The moisture content results were 5.30 ± 0.30% (Material 1) and 4.90 ± 0.60% (Material 2).



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

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