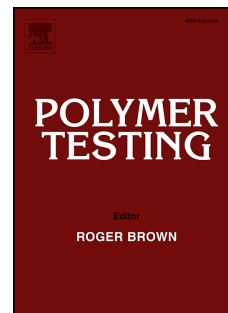


Accepted Manuscript

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PII: S0142-9418(18)30183-1

DOI: [10.1016/j.polymeresting.2018.03.043](https://doi.org/10.1016/j.polymeresting.2018.03.043)

Reference: POTE 5395

To appear in: *Polymer Testing*

Received Date: 30 January 2018

Revised Date: 22 March 2018

Accepted Date: 24 March 2018

Please cite this article as: Jú.Cesar. dos Santos, R.L. Siqueira, L.M.G. Vieira, R.T.S. Freire, V. Mano, Tú.Hallak. Panzera, Effects of sodium carbonate on the performance of epoxy and polyester coir-reinforced composites, *Polymer Testing* (2018), doi: 10.1016/j.polymeresting.2018.03.043.

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EFFECTS OF SODIUM CARBONATE ON THE PERFORMANCE OF EPOXY AND POLYESTER COIR-REINFORCED COMPOSITES

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ABSTRACT: Surface modification induced by sodium carbonate on coir fibres was studied in view of its application as a reinforcing agent in polyester and epoxy polymer fibre-reinforced composites. Coir fibres were treated with a 10 wt% sodium carbonate solution for different periods of time (24, 96 and 168 h) at room temperature. The surface treatment was evaluated by scanning electron microscopy, X-ray diffraction and thermogravimetric analysis. Tensile, flexural and impact properties of treated and untreated coir fibre-reinforced composites were compared. Coir-reinforced epoxy and polyester composites were manufactured by the uniform dispersion of randomly oriented coir fibres within the polymeric matrix. Tensile and flexural modulus of coir-reinforced polyester composites increased nearly 28% and 25%, respectively after 96 h of coir treatment. An analogous increase of 31% and 17% was obtained for coir-reinforced epoxy composites. In addition, coir-polyester composites achieved superior tensile (~17%) and flexural (~5%) modulus and impact strength (~ 193%) compared with coir-epoxy-derived composites. In contrast, coir-epoxy composites led to superior tensile and flexural strength. The experimental results revealed that sodium carbonate solution effectively removes hemicellulosic compounds, promotes swelling and increases superficial roughness of the fibres, improving the mechanical properties (modulus and strength) of the coir-reinforced composites studied.

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