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Mechanical and interfacial properties of fique fiber for use in composites with polyurethane resin from castor oil

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The use of natural fibers in different matrix composites has been studied by several authors to improve mechanical properties. The specific enhancements will depend on the type of natural fiber used, the matrix material, and the manufacturing process but work is still needed to explore the scope and limitations of these materials. The present study focuses on the characterization of fique fiber through the evaluation of physical and mechanical properties, followed by a statistical analysis to determine general trends in variables such as diameter, length and weight. Physical properties were measured using standard techniques, while tensile strength was evaluated using specific tests, correlating the data obtained with previous measurements of fiber diameter and weight. In addition, a pull-out analysis was carried out to investigate the interfacial interaction between the fique fibers and the vegetable polyurethane matrix, obtained from the curing reaction between castor oil and a copolymer derived from diphenylmethane diisocyanate. The results obtained provide valuable information on the properties and interaction of the fique fibers with the polymeric matrix, which may be relevant for the development of composite materials with potential applications in various industries.