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Mycocomposites: looking for a viable alternative to EPS

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Mycocomposites have received special attention from both academic and commercial environments. These materials give a new purpose to agricultural residues, bringing benefits to companies, society and the environment. Currently, they have been studied to replace synthetic materials such as polyester. However, its field of application is still very limited, making it necessary for more research to be carried out. In this work, mycocomposites were produced in two configurations: without jute and with two jute arranged at 1/3 of the thickness in relation to the surfaces perpendicular to loading plains during bending and compression tests. The base substrate used consisted of coconut mesocarp, white wood sawdust and wheat grain pre-myceliated by the fungus *Pycnopurus sanguineus*. Analysis by confocal microscopy showed that the fungus produced a network of mycelial hyphae capable of uniting substrate components and incorporated jute. Composites' mechanical properties were evaluated from three-point bending tests and compression tests. The Shapiro-Wilk tests showed that all determined mechanical properties are normally distributed. The highest compressive resistance (10% deformation) was found in the mycocomposite without jute. The analysis of variance showed that the mean flexural strength of the two configurations analyzed did not present any statistically significant difference; despite this, the composite without jute proved to be more rigid. It was verified that the flexural strength of the produced mycocomposites is located between the values found for the expanded polystyrenes EPS 100 and EPS 150, but that their compressive strength was lower. At first, the materials produced in this work exhibited the necessary properties to be applied in simple pieces such as lampshades, packaging, and plant vases. However, it is still necessary that new studies are carried out to verify the feasibility of its application in the field of engineering, such as in civil construction panels, where EPS are used.

Keyword: ecological materials; flexural strength; compressive strength.

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