


Abstract

Mechanical Characterization of Cement-Based Mortars Reinforced with Green Waste Obtained from Invasive Species—Towards Sustainability in Construction [†]

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The construction industry, along with the material industries that support it, is one of the main global exploiters of natural resources. Nowadays, there is an urgent need to develop and design environmentally friendly materials. Given current technological advancements, one of the many possible alternatives may comprise the development of new environmentally friendly materials using different feedstock, such as green waste.

In this work, an Azorean endogenous plant (*Hedychium gardnerianum*—HC), considered to be an invasive species, was investigated as a possible feedstock of natural fibres to be used as cement-based mortar reinforcement. Thus, HC fibres were evaluated as potential substitutes for commercially available alternatives, such as sisal and polypropylene.

Several formulations were prepared (0.07 to 0.5% fibre content) and characterized with regard to consistency by spreading EN 1015-3; apparent density at 7 and 28 days of curing (EN 1015-10); mechanical resistance at 7 and 28 days of curing (EN 1015-11) and morphology (scanning electronic microscopy).

The results indicate that HC fibres can act in favour of mechanical properties when incorporated at appropriate amounts (0.25–0.5% *v/v*), resembling, in fact, some of the results obtained with similar formulations composed of conventional natural and synthetic fibres (sisal and PP).

The use of alternative building materials with low environmental impact and at a low cost is an important issue, with particular interest at the regional level. Additionally, using HC green waste brings environmental benefits, considering that the invasive behaviour of this species puts local biodiversity at risk.

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