

PRODUCTION AND CHARACTERISATION OF EPOXY MATRIX COMPOSITES REINFORCED WITH KAHILI GINGER STEMS

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Summary: The development of new biodegradable composites reinforced with natural fibres as repalcement for synthetic materials in the transport industry has attracted considerable attention due to the need for more sustainable materials and reduced energy consumption [1,2]. Kahili ginger (KG), scientifically known as *Hedychium gardnerianum*, is native to the Himalayan region and is listed among the 100 most invasive plant species worldwide. This plant invades areas such as New Zealand or the Azores in Portugal. Its proliferation requires control, which can be achieved through the use of herbicides or mechanical thinning, with the latter being a more sustainable method that generates organic residues potentially usable as reinforcement material, thereby adding value to the waste.

This work aims to evaluate the feasibility of using KG particles as filler or reinforcement material in epoxy resin-based composites (KGRE). Composites were produced with fibre contents ranging from 2.5 to 7.5 wt% and using two different particle sizes, 0.5 mm and 12 mm. These composites were then tested for density, hardness, and tensile strength.

The results showed that composite porosity increases with higher fibre content and longer fibre lengths. The addition of fibres to epoxy resin enhances the hardness of the material. The elastic modulus also increases with fibre incorporation; however, mechanical strength and ductility decrease. Furthermore, the materials produced exhibit an appealing aesthetic and can therefore be utilised for decorative purposes, such as furniture or interior components of vehicles, where tensile strength is not a critical selection criterion.

References

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- (2) S. Palanisamy et al, *The prospects of natural fibre composites: A brief review*, International Journal of Lightweight Materials and Manufacture, 7, 2024, 496-506.