Materials Today: Proceedings 52 (2022) 1108–1112

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Characterization of untreated and alkali treated Areca catechu fibre through eco-friendly composite plates

Uvaraja V.C [a], Sureshkumar K [b], Radha Krishnan B [c,*], Saravanan G [d], Ramakrishnan H [e]

[a] Mechanical Engineering, Bannari Amman Institute of Technology, Sathyamangalam, India
[b] Mechanical Engineering, University of Technology and Applied Sciences-Al Mussanah, Oman
[c] Mechanical Engineering, Nadar Saraswathi College of Engineering and Technology, Theni, India
[d] Mechanical Engineering, PSNA College of Engineering & Technology, Dindigul, India
[e] Mechanical Engineering, K.Ramakrishnan College of Engineering, Trichy, India

ARTICLE INFO

Article history:
Available online 19 November 2021

Keywords:
Bio-reinforced polymer composites
Areca catechu fibre
Surface treatment
Mechanical properties
Composite processing

ABSTRACT

Natural fibre assumes an imperative part in the creation of composite materials. Since Normal Filaments display eco-accommodating properties, it has commanded the notice of the world's academic local area towards regular fibre re-inforced eco-composites. One such natural fibre is Arecacatechu (ACF); the Areca Fibres are inspected both in treated and untreated conditions, the fibres are initially pre-treated with KOH solution. Epoxy Resin with Hardener is used as the matrix in the composite material. Among the pre-treated chemicals, KOH concentration up to 6 % of the solution is used for 1 h, which fits the requirement for making a composite material. The composite plates are prepared in the following ratios 40:60, 50:50, 60:40. Upon which Tensile Test, Impact Test, Hardness Test, Flexural test were conducted. As a result, the composition of 40:60 seems to be one of the best results.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Smart and Sustainable Developments in Materials, Manufacturing and Energy Engineering

1. Introduction

At present generations and trends, the world shifts rapidly towards the green environment, leading to the production n of eco-friendly products. Consumers use products that contain the qualities like lightweight, higher strength, environment-friendly, and cost-effectiveness. As a result, natural fibre reinforced composites are getting considerable attention from world industries because of their lightweight, biodegradability, and renewability [1]. The natural fibre is easily degradable, which also has a good calorific value. It is the best renewable resource that can be easily acquired from nature. The mechanical properties of the fibre are rigid, strong, and eco-friendly. In recent days, automobile and construction industries have used Fibres due to their lightweight quality. Also, Investigated the mechanical properties of banana fibre composite mixed with epoxy resin and suggested high load application. They accessed only the mechanical properties such as tensile strength, flexural strength, and impact strength [2].

The impact of glass fibre rate on glass fibre composite and the mechanical properties like rigidity, twisting strength, and effect strength was explored. Examined and explored the betel nut fibre (Bn)/polypropylene (PP) composites were ready in an alternate proportion from the outcomes, it tends to be induced that Bn60: P40 combination composite (BnPP) showed better execution among the composites arranged [3]. Betel nut fibre was exposed to cleanser wash as an antacid treatment for composite readiness for additional improvement. The crack morphology of the composite, just as the water ingestion limit, has been checked [5]. Examination on the advancement of woven coconut (coir) fibre -built up polyester composites, agent Analyzed the mechanical properties of woven coir composites and assessed results according to ASTM principles. The impact of NaOH treatment on the regular fibre and improvement of mechanical properties of woven coir-polyester composites were examined. The relapse models for foreseeing push power, force, and instrument wear in penetrating woven coir-polyester composites were created, breaking down the impact of boring boundaries [6]. The examination was done on the mechanical properties of betel nut–glass fibre-supported crossover polyethylene composites by shifting the fibre stacking and proportion. By utilizing the hot press strategy with four

* Corresponding author.
E-mail address: radhakrishnancadcam@gmail.com (R.K. B).

https://doi.org/10.1016/j.matpr.2021.11.004
2214-7853/
Selection and peer-review under responsibility of the scientific committee of the International Conference on Smart and Sustainable Developments in Materials, Manufacturing and Energy Engineering