SYNOPSIS ON

"STUDY ON CHARACTERISTICS OF BIOCOMPOSITE FOR THE POWER TRANSMISSION APPLICATION"

INTRODUCTION:

- composites are materials made by combining two or more distinct substances with different physical or chemical properties. When these substances are combined, they produce a material with enhanced characteristics, such as increased strength, lighter weight, and improved resistance to corrosion.

- **Matrix**: The base material that holds everything together (e.g., polymers, metals, or ceramics).
- **Reinforcement**: The embedded material that provides strength and stiffness (e.g., fibers, particles, or flakes).
- Coconut shell powder is a fine, brownish powder obtained by grinding dried coconut shells.
- It is widely used in various industries due to its hardness, moisture resistance, and biodegradability.
- Coconut shell powder contains high lignin and cellulose content, making it a sustainable alternative to synthetic fillers.
- Tamarind fly ash is an industrial byproduct obtained from burning tamarind seed husks in biomass-based energy production.
- Tamarind fly ash is waste material which could affect the composite.

ABSTRACT:

This study focuses on the development and characterization of a biocomposite material for power transmission applications, utilizing coconut shell powder and tamarind fly ash as sustainable reinforcements. Coconut shell powder offers high lignin and cellulose content, enhancing the composite's strength, hardness, and biodegradability. Tamarind fly ash, an industrial byproduct, is explored for its potential impact—both beneficial and limiting—on composite properties. A polymer matrix is employed to bind these reinforcements, aiming to create an eco-friendly, cost-effective alternative to conventional materials. The study evaluates mechanical properties and performance to assess suitability for power transmission components.

OBJECTIVES:

- The primary objectives of conducting a parametric study on tamarind fly ash in coconut shell powder (CSP) reinforced composites are to systematically investigate the effects of various parameters on the performance and properties of these composites.
- Fabrication of composite using bio-degradable reinforced, such as coconut shell powder and tamarind fly ash.
- Mechanical characteristics of prepared composite.
- Morphological studies of prepared composites (SEM Analysis).
- Preparing of gear from composite purposed for mechanical application.

MATERIALS AND METHODOLOGY

MATERIALS…

- Epoxy Resin.
- Hardener.
- Coconut shell powder & Tamarind seed fly ash
- Mould.

METHODOLOGY…

Collection of Coconut shell powder

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Grinding the Coconut shell powder to get a fine powder form

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Sieving the Coconut powder to obtain different grain size

are 424,300,212,150,106 in microns.

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Fabrication of bio composite material using epoxy resin and hardener

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Preparation of samples from the composite for testing

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Different testing to be carried out

- Tensile test
- hardness test
- Impact test
- drop test

EXPECTED OUTCOME:

- It is believed a composite with improved mechanical property.
- Since we are using waste bio-masses it is expected to reduce the bio waste in environment.
- Expected to have these composites varies structural application (Mechanical Gearing application).

SIGNIFICANCE OF STUDY:

- Promotes the use of eco-friendly, biodegradable materials in engineering applications, reducing environmental impact.
- Utilizes agricultural and industrial waste products like coconut shell powder and tamarind fly ash, contributing to waste valorization.
- Offers a cost-effective alternative to conventional synthetic composites used in power transmission systems.
- Enhances material sustainability without significantly compromising mechanical performance.
- Encourages innovation in green materials for industrial applications, aligning with global sustainability goals.
- Supports the development of lightweight, corrosion-resistant components suitable for harsh operating environments.

CONCLUSION:

The developed biocomposite demonstrates potential as a sustainable and cost-effective material for power transmission applications. Its use of natural and waste-derived reinforcements offers both environmental and functional advantages.