SYNTHESIS AND ANALYSIS OF NATURAL FIBERS REINFORCEMENT OF SYNTHETIC RESINS

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INTRODUCTION

In this research kenaaf fiber and polmera fibers are treated with NaOH solution and the fibers are properly reinforced with polypropylene resin and epoxy resin respectively in a matrix form to prepare hybrid composite laminates of 6mm thicknesses thereafter to determine the mechanical[7-8]properties like flexural strength flexural modulus, tensile strength, tensile modulus and compressive strength with suitable specimens with ASTM E - 08 for tensile properties and ASTM D -790 for flexural properties as per standards. By using ANSYS through finite element analysis is done for various load and result factors. The surface is analyzed by SEM test .

MATERIALS & METHODS

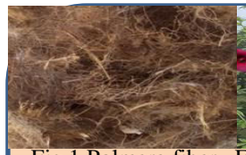

Fig.1 Polmera fiber

Fig.2 Kenaf Plant)

Fig.3 Treatment of Fiber in 2% NaOH solution

Fig.5 Kenaf + Polypropylene laminate
Fig. 6 Polmera + Epoxy laminate

RESULTS

Table: 1 Tensile Test Observations

Specimen Description	Polmera with Epoxy	Kenaf with Polypropelene
Load at Peak (N)	3.345	4.5
Tensile Strength(N/mm^2)	15.529	21.17
Load at Break(N)	3.27	5.8
% of Elongation	3.985	5.22
Tensile modulus(N/mm^2)	528.5	796.2

Table: 2 Flexural test Observations

Specimen Description	Polmera with Epoxy	Kenaf with Polypropelene
Flexural modulus(N/mm^2)	4580	2322
Flexural strength(N/mm^2)	125	88
Deflection(mm)	4	5
Peak load(N)	76	41

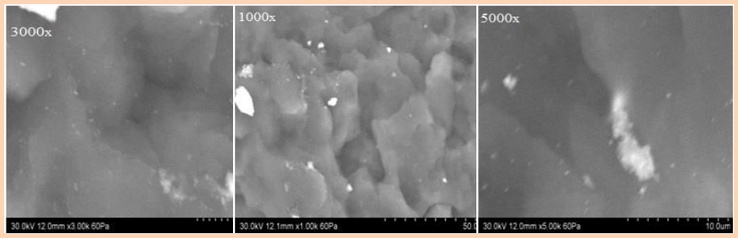

Fig.13 SEM analysis on the surfaces of the polypropylene resin with Kenaaf fiber shows the fine distribution of fiber in resin in matrix with the required resolutions .

CONCLUSION

•For the Tensile properties at the peak load, the tensile strength on polmera fiber with epoxy is 15.529 N/mm^2 which is less than the kenaaf fiber reinforced with the polypropylene is 25.17 N/mm^2 while in compared with Md. Roshnal Hossain[2], the strength is 844 N/mm^2 but as an anisotropic material, jute fiber has a large scatter in tensile properties depending on test specimen span length, test machine slippage and presence of inherent and surface of defects, according to Buenaventurada P. Calabia[12] the tensile strength is 30N/mm^2 cotton reinforced with poly(butylene succinate).

•For the flexural properties at the peak load, the flexural strength is 125N/mm^2 on polmera fiber with epoxy where as in the kenaaf fiber reinforced with the polypropylene is 88 N/mm^2, while according to Byoung-Ho Lee [11] the flexural strength of 31N/mm^2 for the kenaaf and polypropylene composite

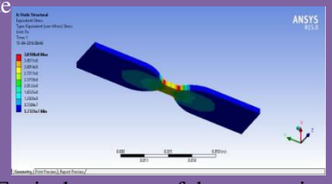

Fig.12 Equivalent stress of the composite specimen

From the analysis it is observed that stress variation in the material shown by the different colors in the above image

The maximum stress is at red color that is
σ max =381.08MPa

The minimum stress is at the green color section that is σ min=57.331MPa

The actual value obtained by the calculations is less than the analysis value so the material Properties are accurate and accepted.

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