IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

DEVELOPMENT OF COST EFFECTIVE TEXTILE COMPOSITE FOR AUTOMOBILE LINERS

Abhinav Vishnu[1], P. Periyasamy[2], N. Gokarneshan[3] ,Gurunathan[4] , A.Jothimanikandan [5]

[1]*M.Tech Final Year Department of Textile Chemistry SSM College of Engineering Namakkal India*
[2]*Associate Professor Department of Textile Chemistry SSM College of Engineering Namakkal India*
[3]*HOD Department of Textile Chemistry SSM College of Engineering Namakkal India*
[4]*Assistant Professor Department of Textile Technology SSM College of Engineering Namakkal India*
[5]*Assistant Professor Department of Textile Chemistry SSM College of Engineering Namakkal India*

Abstract : **A bio composite is a material formed by a matrix and a reinforcement of natural fibers like Jute, Coir, Sisal, Pineapple, Ramie, Bamboo, Banana and Bagasse, etc. Such natural fibers composites are low-cost fibers with high specific properties, low density and eco-friendly. The development of advanced bio composite materials made is increasing worldwide. It will be an alternative way to develop the bio composites which can be particularly used for daily needs of common people whether it is house hold furniture, house, fencing, decking, flooring, and light weight car components or sports equipment's. This effort to develop bio composite materials with improved performance for global applications is an ongoing process. Thousands of tons' bagasse is produced but most of their wastes do not have any useful utilization. These bagasse wastes can be used to prepare fiber reinforced polymer composites for commercial use. This review paper discusses about recent development of bagasse fibers reinforced polymer composites, types of matrix, processing methods, and any modification of the fiber and its applications.**

***Keywords*: ASTM D3410 or only end-loading such as ASTM D695**

I. INTRODUCTION

INTRODUCTION

Over the last few years, a number of researchers have been involved in investigating the exploitation of natural fibers as load bearing constituents in composite materials. The use of such materials in composites has increased due to their relative cheapness, their ability to recycle and for the fact that they can compete well in terms of strength to weight of material. Natural fibers can be considered as naturally occurring composites consisting mainly of cellulose fibrils embedded in lignin matrix. The cellulose fibrils are aligned along the length of the fiber, which render maximum tensile and flexural strengths, in addition to providing rigidity. The reinforcing efficiency of natural fiber is related to the nature of cellulose and it's crystalline. The main components of natural fibers are cellulose, hemicelluloses, lignin, pectin's, and waxes. Sugarcane bagasse is a rather heterogeneous material, consisting of three main components: fibers (73%), pith (5%) and rind (22%). This lignocellulose material is reported to have about 40 different uses including both short-term and medium-term applications for power generation. One such application is the production of composites, particularly with polymer matrices

II. MATERIALS & METHODS

2.1 MATERIALS

Sugarcane bagasse is a fibrous residue that remains after sugarcane juice extraction. Purchased from erode and polyester fiber purchased from reliance and epoxy resin chemical from online

2.2 METHODS

The manufacturing of the composite automobile liners involves the mixture of different types of natural and synthetic fibers in different composition to get difference in the strength of the composite. Because the different composition of fibers will may vary in the strength and other properties. We are comparing the different composition of composite strengths. We are taking all the two

types of fiber in the equal ratio and varying the total amount ratio. In composite we have used the 30%, 50%, and 70% of fiber composition. It is to achieve the difference in strength.

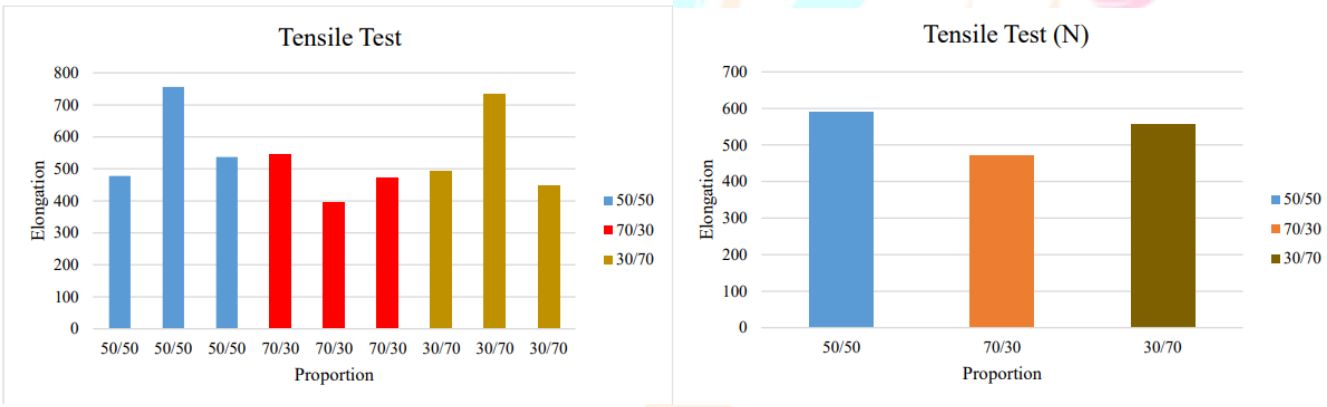
III. RESULT & DISCUSSION

3.1 TENSILE STRENGTH TESTING ASTM D3039

ASTM D3039 tensile testing is used to measure the force required to break a polymer composite specimen and the extent to which the specimen stretches or elongates to that breaking point. Tensile tests produce a stress-strain diagram, which is used to determine tensile modulus. The data is often used to specify a material, to design parts to withstand application force and as a quality control check of materials. Since the physical properties of many materials can vary depending on ambient temperature, it is sometimes appropriate to test materials at temperatures that simulate the intended end use environment

SPECIMEN	SAMPLE PROPORTION	AVERAGE TENSILE STRENGTH TEST (mm)	COMPRESSION STRENGTH TEST(N)
1	50/50	590	442
2	30/70	471	367
3	70/30	558	314

3.2 FIGURES

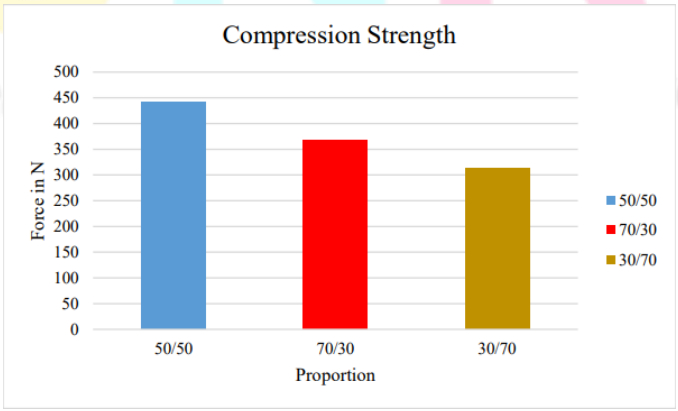


Tensile Strength Test Results with Different Proportion

3.3 COMPRESSION STRENGTH TEST ASTM D695

This test method determines compressive properties of polymer composite materials by applying combined end-loading and shear-loading using a combined loading compression (CLC) fixture. ASTM D6641 is designed for polymer matrix composite laminates which contain at least one 0˚ ply, but other materials can also be tested. The test fixture is designed to provide a combined loading to the unsupported 25 centre 2.5 mm (1 inch) gauge length of the specimen. In comparison, other ASTM test methods outline only shear-loading such as ASTM D3410 or only end-loading such as ASTM D695.Alternatively perform ASTM D6641 modified using the Hydraulic Composites Test Fixture (HCCF) for improved reproducibility.

3.4 COMPRESSION STRENGTH TEST RESULT



In that way the composite which is proportion of 30/70 and 70/30 as well as which has 50/50 ratio of fibres in it gives higher compressive strength when compared with other proportion of composite.

4. CONCLUSION

From the above results, we discovered that for all two types of tests (Compressive strength test, Tensile strength test,) for various proportion. The best results were obtained on a first specimen with a 50/50 proportion of fibers in the composite. The best results obtained for the Compressive strength test indicate the usage of resin and fibers will influence the results of compressive strength. The Tensile strength test indicates the usage of polyester fiber will influences the results of tensile strength. As a result of the above mentioned, we may determine that the usage of fiber in the composite should be moderate. If we change fiber proportion, the composite strength will drop. They are widely used for different applications as Automotive Industry, Aerospace Industry, Building Industry, Furniture Industry, Bio medical Industry etc.,

References

[1] Ashok Pandey, Carlos R. Soccol, Poonam Nigam, Vanete T. Soccol. Biotechnological potential of agro-industrial residues. I: sugarcane bagasse. Bioresource Technology 74 2000, 69 – 80.

[2] Cao Y., Shibata S., Fukumoto I. Mechanical properties of biodegradable composites reinforced with bagasse fibre before and after alkali treatments, Composites: Part A 37 2006, 423–429.

[3] 3. Filho PA, Badr O. Biomass resources for energy in north-eastern brazil. Appl Energy 2004;77(1):51–67.

[4] Hattallia S., Benaboura A., Ham-Pichavant F., Nourmamode A., Castellan A. Adding value to alfa grass (Stipa tenacissima L.) soda lignin as phenolic resins. 1. Lignin characterization. Polymer Degradation and Stability 2002; 76 : 259–64.

[5] Ho K. The potential of bagasse-based cogeneration in the US, MECE 4211.001, Columbia University; 12 January 2006. [accessed 06.06.08].

[6] Joshi S.V., Drzal L.T., Mohanty A.K., Arora S. Are natural fibre composites environmentally superior to glass fibre reinforced composites? Composites: Part A 35 2004, 371 – 376..

[7] Karthikeyan B., Ramanathan S., Ramakrishnan V. Thermo physical property measurement of metal matrix composites, Materials and Design 31 2010, S82 - S86. G. O. Young, "Synthetic structure of industrial plastics," in *Plastics*, 2nd ed., vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.

[8] J Loh Y.R., Sujana D., Rahman M., Dabs C.A. Sugarcane bagasse — The future composite material: A literature review, Resources, Conservation and Recycling 75 2013, 14 – 22

[9] Luz S.M., Goncalves A.R., Del'Arco Jr A.P. Mechanical behaviour and microstructural analysis of sugarcane bagasse fibres reinforced polypropylene composites, Composites: Part A 38 2007, 1455.

[10] Luz SM., Goncalves AR., Del'Arco Jr AP. Mechanical behaviour and microstructural analysis of sugarcane bagasse fibres reinforced polypropylene 31 composites. Composites Part A: Applied Science and Manufacturing 2007; 38: 1455 – 61

[11] Maya Jacob John and Sabu Thomas. Biofibres and bio composites, Carbohydrate Polymers 71 2008, 343–364.

[12] Paturau J.M. By-Products of Sugar Cane Industry, 3rd Edition, Elsevier, Amsterdam 1989.

[13] Ricardo josé brugnago, kestur gundappa satyanarayana, fernando wypych, luiz pereira ramo. The effect of steam explosion on the production of sugarcane bagasse/polyester composites, composites: part A 42, 2011, 364–370.