INFLUENCE OF MOLYBDIC ACID ON MECHANICAL PERFORMANCE OF CALATROPIS FIBER REINFORCED POLYESTER COMPOSITES

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ABSTRACT

The Major theme of this paper is to observe the impact of Molybdic acid on mechanical properties of (Calatropis gigantea) FRP (fiber reinforced polyester composites). The composites are made by joining 100% biodegradable Calatropis gigantea fiber as support in the reinforced polyester. Mechanical properties of composites without and with molybdic acid are prepared. In this procedure we should discover best composite for different genuine applications.

KEYWORDS: *Calatropis Gigantea, Molybdic Acid, Polyester, Matrix*

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INTRODUCTION

Regular strands are generally accessible everywhere throughout the globe. The pushes to utilize all the accessible regular assets including plants have prompted the creation of polymer composites. Adjacent to those plants that are created with the essential purpose behind using the fiber, some different plants fiber has discretionary or no business interest and is normally viewed as a waste. Plant, for example, banana, plantain which is delivered for its beefy organic products. The left over plantain void organic product group or stem is framed by strands of filaments and is of restricted use, being typically disposed of as trash. So this can be utilized as fiber for making fiber strengthened composites.

Composite materials have a long history of utilization. Their beginnings are obscure, yet completely written history contains references to some type of composite material. For instance, straw was utilized by the Israelites to reinforce mud blocks. Pressed wood was utilized by the old Egyptians when they understood that wood could be revamped to accomplish better quality and obstruction than warm extension just as to expanding inferable from the nearness of dampness. All the more as of late, fiber fortified pitch composites that have high solidarity to-weight and firmness to-weight proportions have gotten significant in weight-touchy applications, for example, airplane and space vehicles. But only limited work has done regarding the effect of the incorporated molybdic acid as a filler into natural fiber reinforced polyester composites on the mechanical and performance of the natural fiber composites. The main goal is to investigate the effects of the addition of molybdic acid as filler on the mechanical properties of different fiber reinforced polyester composites.

MATERIALS AND METHODS

Extraction Fibers

Fibers were acquired from Local vendor (M/s kodali Arjuna Rao &Co., India).

Fabrication

According to the standards given by ASTM fabrication of composites are prepared by using hand layup process. In this process initially a mould should be prepared by using rubber shoe sole of required dimensions depending on the chosen property. Take a tile (mostly ceramic) and clean it by using shellac thinner (which is used for cleaning purpose only) and place the mould (which was prepared earlier) on it by using mansion hygienic wax to eliminate air gaps between mould and tile. Coat the specimen surface with polyvinyl alcohol by using a brush and mould is allowed to cure for 24 hrs. Depending upon the considerations a mixture of polyester resin, coir powder (of prescribed amount) and accelerator +catalyst should be prepared. Addition of molybdic acid was done by using sonicator. Now the prepared mixture will be poured in to the mould and a compression pressure of 0.05MPa will be applied on them and allowed to cure for 24 hrs. After that post curing will done for 2hrs at 80°C.

Mechanical Testing

Based on the standards given by the ASTM for tensile, bending and impact testing, specimens are prepared. Identical specimens of count 5 are prepared for conducting above mentioned tests (for better accuracy).

Table 1

Testing	ASTM code	Dimensions	Equipment
Tensile	ASTMD 638M	160 x 12.5 x 3 mm	Tensometer
Flexural	ASTM D 790M	100 x 25 x 3 mm	Tensometer
Impact	ASTM D 256M	63.5 x 12.7 x 10 mm	Charpy /Izod

RESULTS AND DISCUSSION

Mechanical Properties

The mechanical properties, for example, Tensile, Flexural, and impact quality of polyester composites without and with Molybdic acid are presented.

NORMAL (without Molybdic acid)

Tensile Properties

Table 2

No of Specimen	Pure	With fiber
1	16	20
2	15	18
3	14	19
4	17	22
5	14	21

By taking mean value of all five identical specimens a bar chart is plotted as follows

Figure 1

Flexural Properties

Table 3

No of Specimen	Pure	With fiber
1	32	75
2	35	77
3	35	79
4	37	75
5	34	79

By taking mean value of all five identical specimens a bar chart plotted as follows

Figure 2

Impact Properties

Table 4

No of Specimen	Pure	With fiber
1	16	20
2	18	21
3	16	23
4	14	20
5	18	21

By taking mean value of all five identical specimens a bar chart is plotted as follows.

Figure 3

Table 5: Mechanical Properties of Composites

Mechanical Properties (Without Molybdc Acid)		
Tensile(Mpa)	Flexural(N)	Impact(J/m)
20	75	20
14	77	21
19	79	19

With Molybdc Acid

Similarly five identical specimens are prepared by using molybdc acid of 2% are tested and results are given in below table.

Table 6

Mechanical Properites (With Molybdc Acid)		
Tensile(Mpa)	Flexural(N)	Impact(J/m)
32	102	28
35	90	29
29	92	27

Comparison graphs are drawn between normal and molybdc added composites as shown below

Graph 1: Tensile Strength of Composites.

Graph 2: Flexural Strength of Composite.

Graph 3: Impact Strength of Composites.

It is observed that composites which has molybdic acid shows better strengths in all mechanical proprieties than normal composites.

CONCLUSIONS

From the experimental results obtained, the following conclusions are drawn:

- By including 2 % of Molybdic acid additionally we can enhance the strength and modulus.
- It has been observed that there is an appreciable increment in properties (tensile, flexural, impact) on addition of Molybdic acid

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