

Research Article

**Review And Study On Mechanical Properties Of Tea Dust Powder Reinforced Bio
Polymer Composite**

¹V. Vishnu Vardhan, ²Dr. S. Suresh Kumar

¹Department of Mechanical Engineering, Saveetha School of Engineering, Saveetha Institute of
Medical and Technical Sciences, Chennai-600017

E-mail: vishnu55vardhan11@gmail.com

²Department of Mechanical Engineering, Saveetha School of Engineering, Saveetha Institute of
Medical and Technical Sciences, Chennai-600017

ABSTRACT:

This review article is about the mechanical properties of Tea dust powder which is reinforced with polymer matrix (epoxy resin). Tea dust which represents the bio-waste. That waste of tea dust is remnants from tea shops, restaurant, tea powder seller or from the neighbours, which is an environmental threat with little or no economic value. It can be effectively utilized and can bring immense economic prosperity. They can be used as raw material for many things. Such as in automobile, agriculture, egg supply company etc... As it is suitable for automotive appliance like interior design. In agriculture it is used as a good pesticide for the growth of the crops. As it is also used in the egg supply company as a storage box. As of now we are talking about the mechanical properties we see tensile strength, flexural and impact strength as important parameters which are needed for the automotive sector. Now a days researches in this area are growing very fast and there is a need as well. So therefore for I am continuing and upgrading review on this theme.

Keywords: tea dust, reinforcement, epoxy resin, composite materials.

INTRODUCTION:

Composite materials are made by combination of two or more materials in which materials possess unique characteristics which are completely different from the individual materials. Composite is a two materials in which the one is reinforcing phase. Such as in the form of sheet, fibres or particles. Then the other is matrix phase. In matrix there are metal ceramic or polymer. Unlike metallic alloys, each material added in the composite retains their original chemical, physical and mechanical properties. The composite materials are well known for their superior strength and stiffness together with low density.

In composites they are classified into three first is metal matrix composites, the second one is ceramic matrix composites and the third one is polymer matrix composites. It is also classified based on the reinforcing materials. They are a) fibre reinforced composite material, b) particulate reinforced composite material. As of now snail shell is one of the natural fibres. The natural fibres are of three types 1) plants or vegetables, 2) animals and 3) minerals. We all know that tea is a plant and it is also a natural resource. In this we are going to take natural fibre and mixing with the saw dust which is a particulate reinforced material. Saw dust is used because it gives the external strength to the

composite material. In which the saw dust is a light weight material which is also a renewable material. It is so strong because of its size, its size is Nano, so that it has Nano-structural behaviour and it will improve the adhesion and uniform stress transfer among the reinforcement. The filler surface morphology was evaluated using micrographs obtained from scanning electron microscope.

MATERIAL AND METHODOLOGY:

As we know the materials used in these composite, like tea dust powder, saw dust as reinforcement, epoxy resin LY556, hardener HY951. As we follow the hand layup technique, we should have the specimen plate, releasing agent (silicon spray). As we start the method of preparation of the composite plate is as following. First ensure that the mould is clean and dry. Then apply the releasing agent over the mould and keep it in sunlight for 30 minutes to dry. After that by using brush, pour the epoxy resin over the mould uniformly for the first layer. Then place the reinforcement on the mould and spread uniformly. Then after apply another layer of epoxy resin uniformly over the fibre. By using roller spread the epoxy uniformly. During this process, remove the excess of epoxy, then close the mould plate with some hard material on the top and press the composite material uniformly for 24 hrs for curing.

As the hand layup process is perhaps the simplest processing techniques, the work is become somewhat easier than other. After 24 hrs remove the top mould and see the composite is dried or not, after it get dried take the composite from the bottom mould and see the hardness, we can find some different component. It is so hard to brake, so by using the hacksaw blade cut them in to pieces as required for testing.

See that the process goes smoother and follow the steps carefully. Before getting into the testing make sure the model should be in 300*300*3mm dimensions. Where 300mm length and 300mm breathe and 3mm thickness. It should be done before starting the process.

TESTING:

As we know the application of the composite material where they are going to be used, we know what are all the parameters needed, like tensile, flexural, and impact strengths. As of now there is a separate system for the cutting of the samples for the tests. We should follow the rules and the cutting is to be done. The cutting differs from test to test.

For 1) Tensile test the method of testing is ASTM D638 and the sample should be flat, thickness should be 3mm, width should be 13.5mm, area should be 40.5mm², and gauge length should be 50.00mm. 2) Flexural test themethod of testing is ATSM D790 and the sample should be flat, thickness should be 8.44mm, width should be 51.06mm, area should be 430.95mm² and gauge length should be 50.00mm. 3) Impact test the method of testing ASTM E23 and the sample should be flat, thickness should be 8.70mm, width should be 26.22mm, area should be 228.11mm², and gauge length should be 100.00mm.

RESULT AND DISCUSSION:

As the testing process is done as pre the rules followed in ISO standards, therewill be change in the mixture like percentage of epoxy is 90% and reinforcement is 10%, like that there will be change in percentage of both reinforcement and epoxy, so that at some point the strength is more and reduce gradually, we can find the maximum strength of each test.

As per testing results in tensile test the maximum strength is at 40% reinforcement and 60% epoxy resin. Then after there is a gradual reducing in strength, so note the point where it is maximum. In

flexural test there is raising at the beginning and after 40% of reinforcement and 60% of epoxy resin there is a deflation and leads to the breakage of composite. Same in the impact test after the 40% of reinforcement, it went to braking point.

CONCLUSION:

The composite material is made by the mixture of Tea dust and Saw dust with epoxy resin and been made the sample according to the requirements. By observing the results we can know the right mixture which is suitable for automobile sector, and which can be used in the industrial sector and in our daily life. By these kind of testing we can separate accidently. Their production cost becomes low and we can increase usage of waste materials. We can also control the environmental pollution. Therefore every renewable source can be used for good and for the development of the country. The composites can be used in any aspect like automobile, medicine, agriculture etc... which will develop the surroundings.

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