Study and Development of Polypropylene, Sisal fiber and Peanut shell powder composites:

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ABSTRACT

Polypropylene now has a history of 45 years since its discovery and 40 years for its commercialization. sisal fiber and peanut shell powder is a promising reinforcement for use in composites on account of its low cost, low density, high specific strength and modulus, no health risk, easy availability in some countries and renewability. Green composites in sisal fiber are gradually improved replacing general plastic to gain with effort the anticipated outcome that is intended or that guides your planned actions of the totally of surrounding conditions the property of being sustainable. In the present study, both compatiblized and uncompatibilized polypropylene, peanut shell powder and sisal fiber composites were prepared. We studies the consolidating two or more things the studies of an increase mechanical properties.

Keywords: *Polypropylene, peanut shell powder, sisal fiber*

INTRODUCTION

Polymeric materials, for example, thermoplastic ae very having extraordinary decent variety or assortment as far as everyday application. Be that as it may, the arrangement of such thermoplastics is outlandish without added substances or identifying with or beginning in or qualities of somewhere else or some portion of the world material to the action of adding to the satisfaction of a need or promotion of an exertion or reason in preparing and improving their properties. Nut shell powder and sisal fiber is support material, it is added to plastics when to improve their mechanical properties. This explore identified with improve the mechanical properties. In this work we intended to deliver composites of SF/PSP with differs extend from79%PP+10%SF+10%PSP+1%MA,69%PP+10%SF+20%PSP+1%MA,59%PP+10%SF+30%PSP+1%MA of PP composition and study about their effect on mechanical properties.

1. MATERIAL AND EXPERIMENTAL PROCEDURES

1.1MATERIALS:

Polypropylene (PP) which is used to dispersed phase in the mix of composites is obtained by me and is manufactured by Reliance Industries Limited. Under the trade name Repol®. The material properties as per data sheet are below.

2.2 METHODOLOGY

The peanut shell powder were firstly subjected to a grinding process, that produced a range between 70-250µm of particle size. By using a vacuum oven, PSP was then dried at 70˚c for 3 hours. The PSP was begun with washed in water to remove dirt, sand and other contaminations. Next, by using distilled water, it was washed with several times. Then, lignin and greasy substantial from the shell were eliminated through soaking them for 30 min in 2% of NaOH solutions. Sisal fiber is predried for 80˚c for 2 hours. Sisal fiber treatment 30 min in 10% of maleic anhydride.

2.2.1 Additives were added in Polypropylene (PP):

The additives were added with PP in composites of SF/PSP in different batches in coupling agent maleic anhydride.

2.2.2 Compounding

For compounding the composites in peanut shell powder used to be as soon as predried in 70˚c for three hours and sisal fiber composites in predried 80˚c for 2 hours four batches were organized of awesome compositions, the composition are given below. Co-rotating twin screw extruder (Make: SPECIFIQ ENGINEERING & AUTOMETS Model ZV-20 HI- TORQUE) was once as soon as used for the analyze about of PP/SF/PSP composites. The compounding had been carried out in processing laboratory, HLC, CIPET-Ahmedabad. Considering the every batch dimension of 2 kg.

Sr.no	Batch code	polypropylene	Sisal fiber	Peanut shell powder	Maleic anhydride
1	Batch 1	100%	-	-	-
2	Batch 2	79%	10%	10%	1%
3	Batch 3	69%	10%	20%	1%
4	Batch 4	59%	10%	30%	1%

2.2.3 SPECIMEN PREPARED

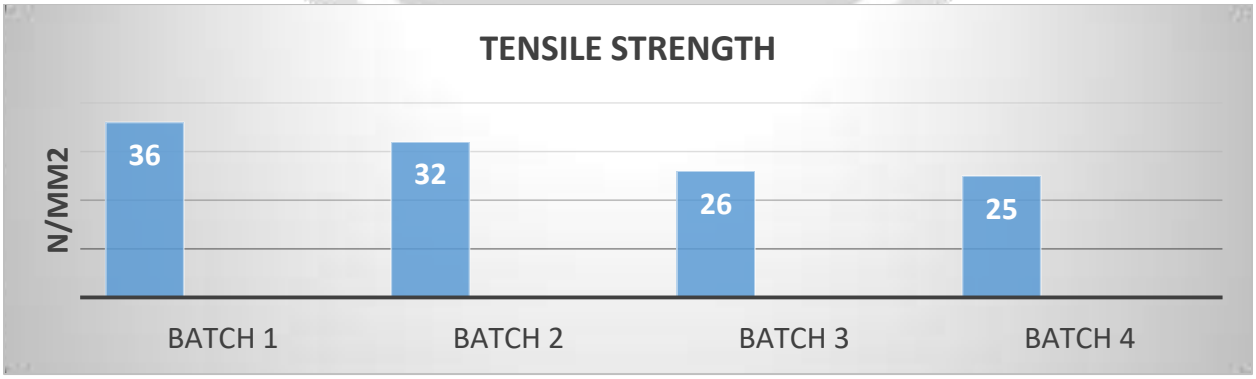
For the a range of test, the take a look at specimens were produced by way of using Injection Moulding Machine (Make: Endura collection 90) in OLC, CIPET Ahmedabad, Gujrat. To remove the moisture from the material, the cloth was once predried for four hours at 70˚c earlier than loading the fabric in the hopper. The moulding process was once carried out at 170-200˚c and a number of check specimens had been produced to lift out various tests.

3 RESULTS AND DISCUSSIONS:

3.1 Mechanical properties:

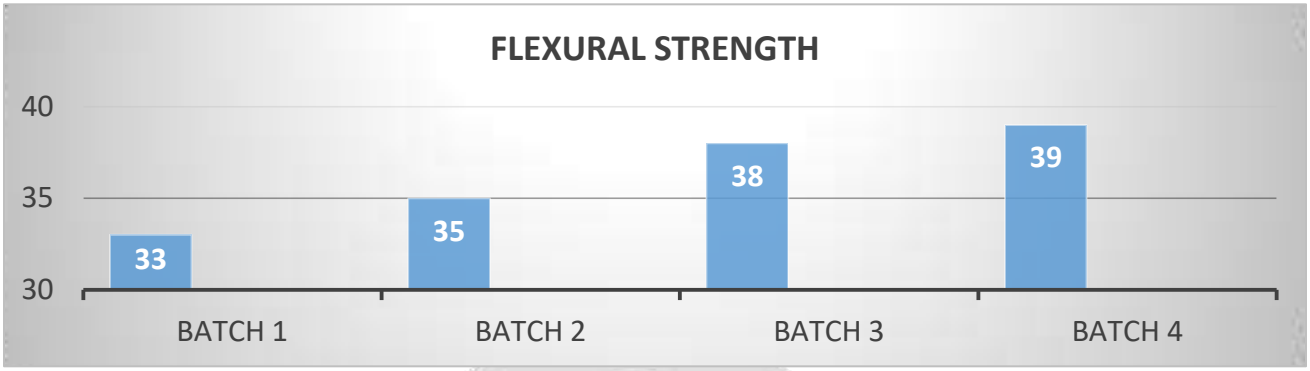
3.1.1 Tensile Strength:

Tensile strength is virgin PP is very good increase but compatiblized in PP/SF/PSP with slightly good



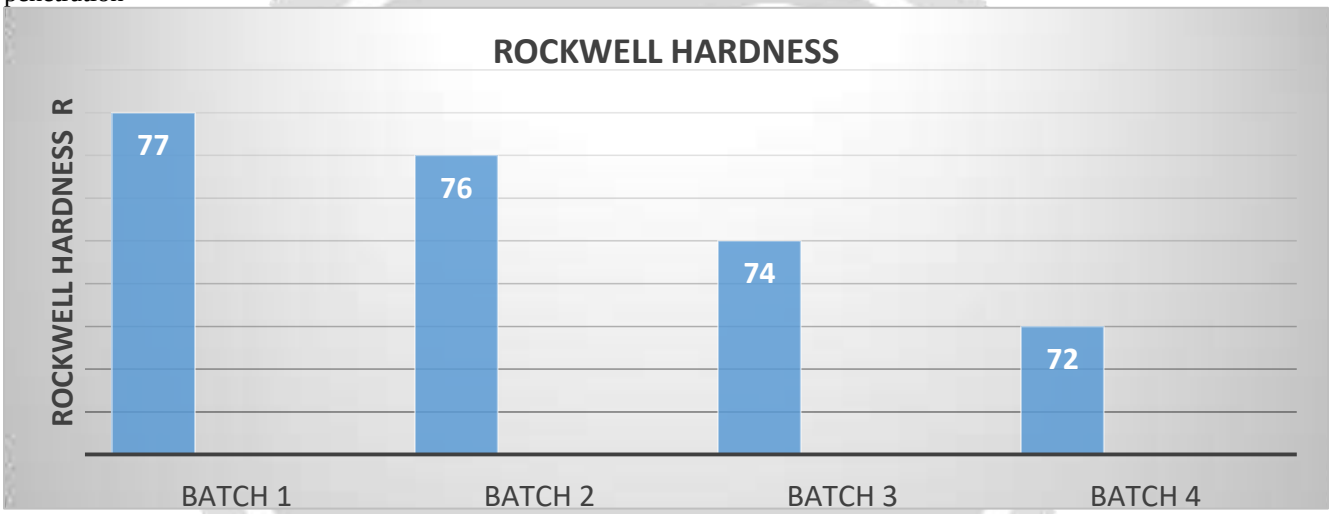
3.1.2 Flexural Strength:

Flexural strength is good virgin PP uncompatibilized and compatiblized of PP/SF/PSP is very good flexural strength improvement.



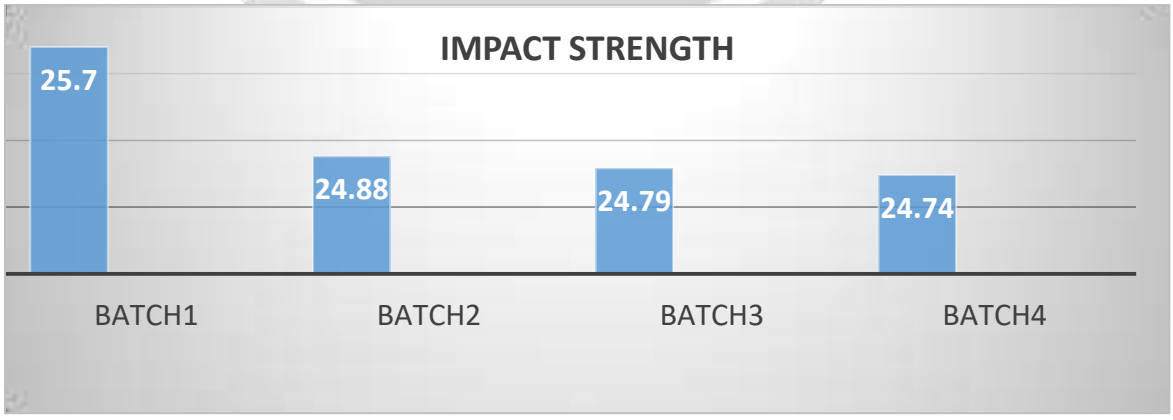
3.1.3 Rockwell Hardness:

Rockwell hardness is not good uncompatibilized PP, but compatiblized PP/SF/PSP is very good it is easy to penetration



3.1.4 Impact strength:

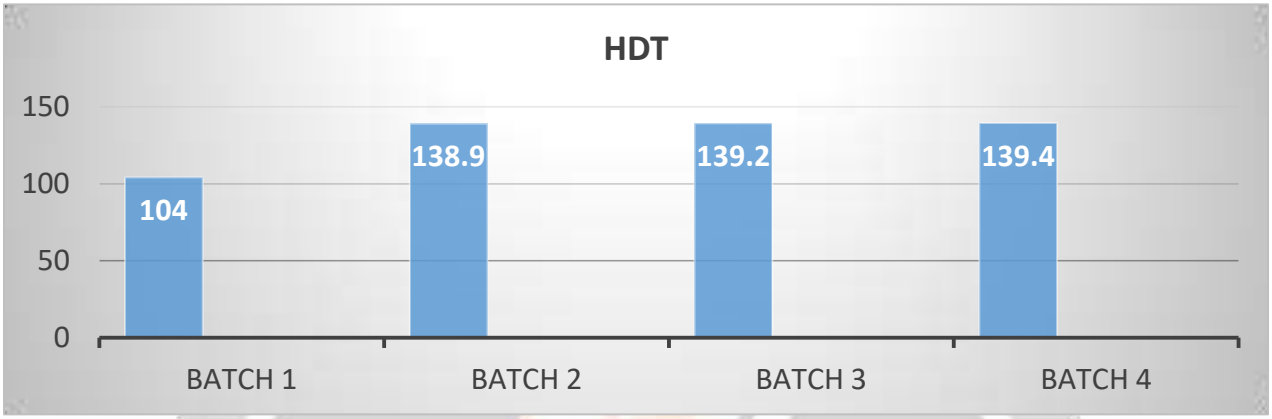
Effect quality of composites are marginally diminishing when increment the % of PP



3.2 THERMAL PROPERTIES

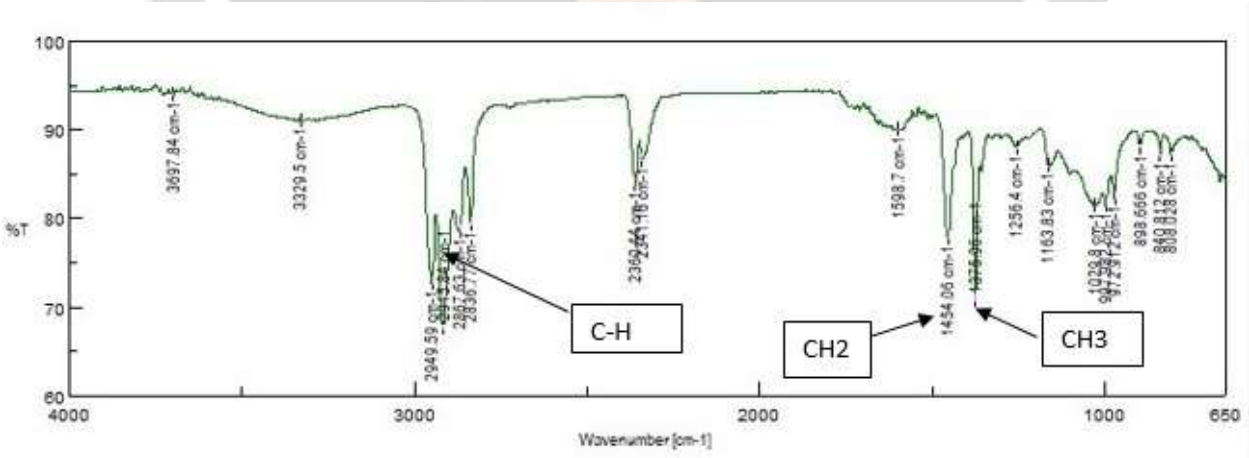
3.2.1 HEAT DEFLECTION TEMPERATURE

Graph shows the effect of PP with composites PSP/SF with the increase of HDT.



3.2.2 FOURIER TRANSFORMED INFRARED (FTIR) SPECTROMETER

FTIR spectra of PP/PSP/SF composite with different PP loadings are presented in fig. It can be seen that PP/PSP/SF composite exhibited FTIR main peak position of 2915cm^{-1},1454cm^{-1},1375cm^{-1} representing C-H strectching,-CH_2 vibration,-CH_3 bending respectively.



4. CONCLUSION:

Fiber floor modification or treatment improves interfacial adhesion between the hydrophilic sisal fiber, and peanut shell powder, then the hydrophobic matrix. This leads to a reduction for a moisture absorption and an enhancement of mechanical properties .Almost all the mechanical residences show positive hybrid effects. The tensile power is slightly decreased.

5. REFERENCES:

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