



## PREPARATION OF BIO-DEGRADABLE SHEET USING BANANA STEM EXTRACT AS AN ALTERNATIVE OF PLASTIC.

### Engineering

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### ABSTRACT

The work is done to set up a bio-degradable sheet from Banana stem separate waste biomass of banana plant is broadly accessible in numerous nations and the fiber extricated from its pseudostem has utility for a differentiated scope of utilizations including the fabricate of good quality handcrafted paper. The enzymatic treatment of green stem and trunk of the banana plant before extricating fiber has come about into an enhancement in the yield just as the nature of fiber acquired. The banana stem remove is amalgamated with glycerol as a plasticizer and sodium metabisulfite as antimicrobial. This examination work is finished in three principle steps, the initial step is the extraction of banana stem separate, the second step is decontaminating the concentrate and after that setting up the sheet with some substance forms with a novel convergence of various synthetics. The third step is to ponder its properties like elasticity, creep, the thickness was considered in this exploration work.

### KEYWORDS

#### II. INTRODUCTION:

There are numerous sorts of nourishments and drink bundling's from plastic for example polyethylene, polypropylene, polystyrene, polyester, polyurethane, polycarbonate, polyvinylchloride are utilized. All in all, kind of bundling that as often as possible utilized our locale is plastic. The utilization of plastic sheet expands the ozone depleting substances like CO, CO<sub>2</sub> which may prompt increment in a dangerous atmospheric deviation Plastic Using by network is produced using oil and flammable gas that subordinate from petrochemical items and non-sustainable normal assets. Crude material of plastic is made and assembled by means of polymerization utilizing monomer crude material. Plastics causing natural contamination on account of having non-biodegradable trademark, adjacent to plastics can debase the bundled nourishment since nearness of specific substances are conceivably cancer-causing than can move into the bundled sustenance phthalates which are utilized for relaxing plastics are viewed as endocrine disturbing synthetic substances, which implies they may meddle with typical regenerative improvement in people.

Aggregation of compound substance in our body are insoluble in water so can't squander with pee and dung. Collection of synthetic substance can make interruption our sound and causing malignancy [1,2]. Biodegradable bundling and biodegradable sheets enjoy considerably less time to relieve down subsequent to being disposed of, in the event that they haven't been reused, obviously. This means it gets retained in the earth, and there will never again be huge amounts of plastic overwhelming our landfills. There. Biomass incorporates trees, plants, grass, and every natural material that decay. Biodegradable plastics are vastly improved for the earth, on the grounds that there is no mischief done to the earth while recuperating petroleum products. Likewise, in this procedure there are not many ozone depleting substance and destructive carbon outflows. Biodegradable plastics require not exactly a large portion of the vitality to deliver than their non-biodegradable partners. This implies it is conceivable to make double the measure of biodegradable sheets utilizing a similar measure of vitality. Biodegradable plastics are made from materials that are completely biodegradable. This implies they can separate a lot quicker and reusing them takes less vitality. Customary plastics are loaded with destructive side-effects and synthetic compounds, which are discharged amid their breakdown procedure. Biodegradable plastics are totally protected and don't have any synthetic concoctions or poisons. This plastic innocuously separates and gets assimilated into the earth. Such favorable circumstances of bio-plastics are of outrageous significance, as the harmful plastic load on the earth is developing. Since most recent couple of years a considerable lot of the organizations have begun their bundling of items in bio plastic materials because of strict laws encircled by government. Indeed, even it sets aside less opportunity to debase and it isn't destructive for earth.

#### III. Materials and methods:

1. Banana stem extract,
2. Glycerol,

3. Gelatin,
4. Starch,
5. HCl (Hydrochloric acid),
6. NaOH (sodium Hydroxide),
7. Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub> (Sodium meta bisulfite),
8. Distilled water.

#### IV. Procedure:

1) Initially, serum acquired by stripping the upper layer of banana stem was gathered at that point remaining concentrate was expelled with the assistance of juicer. At that point it was blended with sodium metabisulfite (0.2M) answer for 45 minutes. It is utilized as cancer prevention agent and additive. This would build the biodegradation time of bio-sheet.

2) A 500ml container was loaded up with refined water and warmed. The banana extricate was blended with refined water in the measuring glass and were bubbled for 20 minutes. At that point include 2 teaspoons of gelatin, and let the blend bubble for 5minutes, ceaselessly mix the blend, when the blend turns out to be thick quit warming and pour it in measuring utensil. This was improved the situation evacuating polluting influences and making a decent reinforced sheet.

3) 30ml of banana separate was put in a 100ml measuring glass. 5ml of HCl was included and the blend was blended utilizing a glass mixing bar. 4ml of propan-1, 2, 3-triol (Glycerol) was included blend with persistent mixing. Further 4ml NaOH was included. Continue mixing the blend.

4) The blend was poured over a dish and put in the broiler at 150°C. It was warmed for 30 mins. It is important to warm for significant measure of time and to keep up appropriate arrangement of glue. Else it might result in mileage of sheet with low quality.

5) The sheet was expelled from dish subsequent to cooling at room temperature. This sheet was given the roundabout shape.

#### V. Properties:

**A. Thickness measurement:** The dial thickness gauge is typically used to measure the thickness, of sheet metal, plastic, paper, and cardboard. The thickness of our bio-bag is 0.1mm.

**B. Creep:** Creep is the tendency of solid material to move slowly or deform permanently under the influence of mechanical stress. Thus the creep is due to stress, which is defined as load per unit area .it was noted that under the load of 2.5 kg creep was developed in the bio-degradable sheet. The change in strain was noted after 12 hours. Thus we can conclude from this that maximum carrying load of this bio-bag is below 2.5 kg.

**C. Tensile strength:** The tensile strength was measured by using standard machine ASTM. It is measured for the sheet in the absence

and presence of starch. It is noted that in the absence of starch the tensile strength is negligible and in the presence of starch its tensile strength increases. This is because the starch acts as fillers and it is strongly bonded with cellulose. The maximum tensile strength of bio-bag in the presence of starch is 5.94 MPa (megapascal).

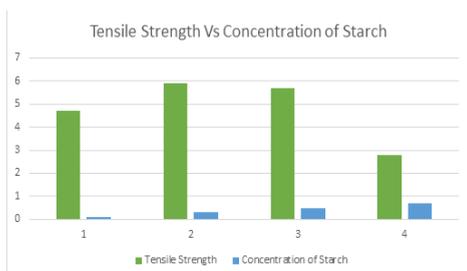
**D. Biodegradation period:** It is noted that the degradation period for bio-bag is due to Sodium meta bisulfite which acts antimicrobial. (An antimicrobial is an agent that kills microorganisms or stops their growth). The addition of glycerol as plasticizer is to increase its flexibility. The biodegradation period was found to be 10-12 months. After 12 months there was degradation of bio-degradable sheet due to fungal growth on its own.

**E. Effect of NaOH and HCL:**

It is well known that the main factors affecting the properties of the sheet are NaOH and HCL so here are some of the composition.

Parameters	RUN 1		RUN 2		RUN 3		RUN 4	
	Molarity of HCl and NaOH Solution used							
	0.1	0.1	0.5	0.5	0.5	0.1	0.1	0.5
Amount of banana peel paste used	30		30		30		30	
Sheet formation	---		ü		ü		ü	
Strength Test	Failed		Failed		Passed		Passed	
Thickness	0.3		0.3		0.1		0.3	
Decay/ Months	<12		<12		<8		<8	

**A. Effect of Concentration of Starch:**



**Decomposition process- picture after 6 months**

**VII. REFERENCES:**

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