Biodegradable Plastic From Natural Materials

Biodegradable plastic from natural materials

SCIENCE FAIR PROJECT REPORT

LEVEL	MIDDLE
CATEGORY	Environmental science

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GRADE : **VIII**

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PROJECT ID : **NSF-SCH -2025 – 321**

PROJECT TITLE : Biodegradable plastic from natural materials

CITY AND STATE : **Adirampattinam, Tamilnadu**

ACKNOWLEDGEMENT

I wish to experts my deep gratitude and sincere thanks to our Directors , Principal Madam, Vice Principal, Teachers and parents for their encouragement and for all the facilities that they provided for this project work.

I take this opportunity to express my deep sense of gratitude for that invaluable guidance constant encouragement , and constructive comments.

ABSTRACT

Plastics are widely used but cause major environmental problems because they do not decompose easily. This project aims to create biodegradable plastic using natural materials such as cornstarch and agar. The prepared bioplastics were tested for flexibility and biodegradability by burying them in soil and observing changes in mass and appearance. Results showed that bioplastics degrade faster than conventional plastics, making them a potential eco-friendly alternative.

Introduction

Plastic is used everywhere, but it does not rot or break down easily. Because of this, plastic creates a lot of pollution in soil and water. To solve this problem, we can make biodegradable plastic using natural materials like starch or agar. These materials can be broken down by microorganisms, so they do not harm the environment. In this project, I will make biodegradable plastic from natural ingredients and test how well it works.

Statement of the Problem

- When my teacher was teaching about the harmful effects of plastic I started wondering instead of using plastic why cannot be make and use materials from natural sources? this curiosity inspired me to choose the project

Hypothesis

- If plastic is made from natural materials like cornstarch , wheat starch and agar, then it will be biodegradable and decompose in soil faster than regular plastic.
- Among the three materials I selected agar powder for my experiments, which can decomposed and dissolved more quickly than the others.

Design of the Study

Independent variable:

Type of plastic (cornstarch-based, agar-based, and commercial plastic control).

Dependent variables:

Flexibility, strength, and biodegradability

Control variables:

Size and thickness of samples, soil type, moisture, and burial dep

Materials

- Cornstarch - 20g
- Agar powder - 20g
- Water - 100 ml
- Glycerol - 10 ml
- Vinegar - 5 ml
- Saucepan and stirring spoon Molds or flat tray
- Oven or warm drying area
- Soil and small pots (for burial test)
- Ruler
- Digital kitchen scale
- Plastic sheet (polyethylene) for control marker, and notebook

Procedure

- First I mixed a corn flour glycerine and a vinegar together and heater the mixture on the stove.
- Then I poured in into a tray .
- After 2 days I observed that it had formed a thin sheet which looked just like plastic

Similarly, I conducted an experiment, I found that the plastic made using wheat flour and corn flour tore easily, where's the plastic made using only agar powder was much thicker and stronger.


atta
powder
agar
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corn
starch


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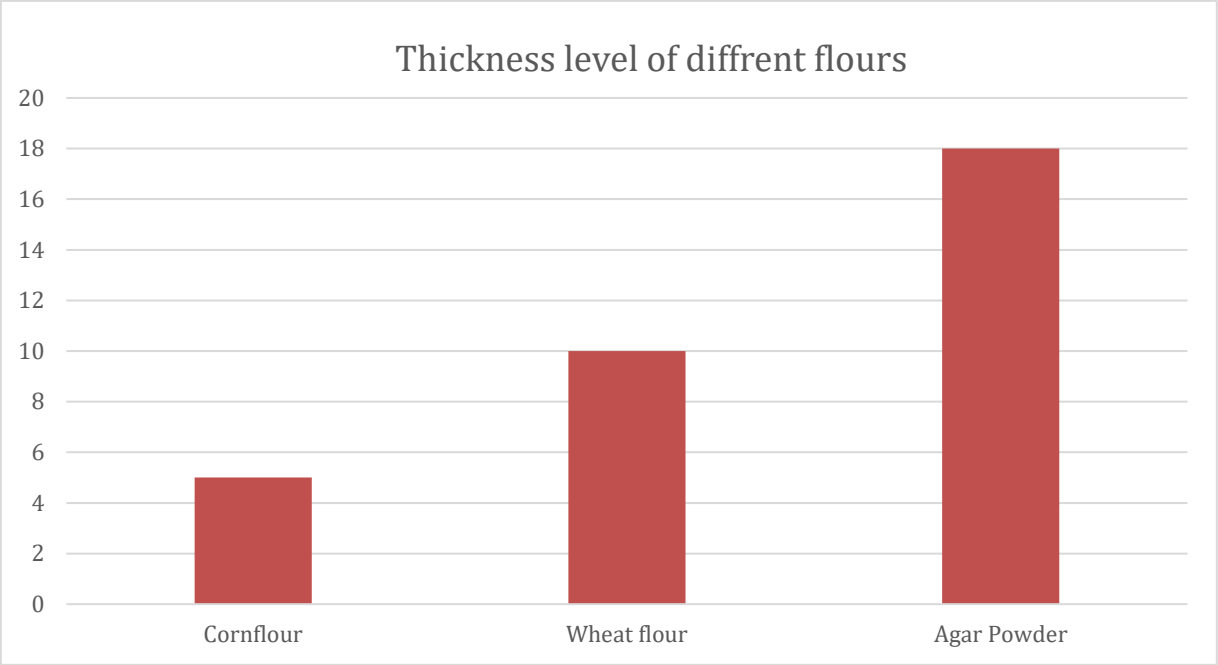
TABULATION

S.No	Material	Thickness (mm)	Flexibility Level	Bending Distance	Observation
1	Cornflour	0.8	Low	5	Hard
2	Wheat flour	0.7	Medium	10	Slightly Flexible
3	Agar Powder	1.0	High	18	Thick and elastic

Graph:


Thickness level of diffrent flours
20
18
16
14
12
10
8
6
4
2
0
Cornflour
Wheat flour
Agar Powder

Result:

Among all the samples the plastic made from agar powder was the thickest and strongest. The plastic made using wheat flour and corn flour were weak and tore easily.

Conclusion:

The experiment proved that plastics made from natural materials such as cornstarch and agar are biodegradable, flexible, and eco-friendly. They decompose much faster than conventional plastics and can help reduce plastic pollution. Therefore, bioplastics are a sustainable alternative for future plastic production.

Real-life Application

- Biodegradable plastics can be used as an eco-friendly alternative to regular plastics for packaging and food containers.
- They can help reduce plastic pollution in soil and oceans.
- These materials can be used for agricultural films, shopping bags, and disposable items that decompose naturally.
- Since they are made from natural, renewable materials (starch, agar, glycerol), they are non-toxic and safe for the environment.