FROM PEEL TO PLASTIC: "A BIODEGRADABLE REVOLUTION"

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Abstract:

- ✓ Plastic is widely used but poses a severe environmental threat due to its non-biodegradable nature.
- ✓ An eco-friendly alternative is *bio plastic*, which can be produced from natural sources such as banana peels or corn starch.
- ✓ This project aims to develop a biodegradable plastic by extracting starch from banana peels or corn and combining it with natural additives.
- ✓ The resulting plastic is expected to be lightweight, flexible, and environmentally safe.

Introduction:

- ✓ Conventional plastic takes hundreds of years to decompose, causing soil, air, and water pollution.
- ✓ Landfills and oceans are increasingly filled with plastic waste, harming wildlife
- ✓ Banana peels and corn starch are cheap, renewable, and rich in starch—making them ideal raw materials for biodegradable plastic.

a. Selection of Problems & Background Information:

- ✓ **Problem Identified:** Pollution caused by non-biodegradable plastics.
- ✓ **Background:**
  - Over **400 million tonnes** of plastic are produced annually worldwide.
  - Plastic waste leads to ocean pollution, microplastics, and health hazards.

- Agricultural byproducts like banana peels and corn starch can be used to create biodegradable plastics that decompose naturally.

b. Research Questions:

- ✓ Can banana peel or corn starch be converted into a useful form of bioplastic?
- ✓ Which source (banana peel vs. corn starch) produces stronger and more durable plastic?
- ✓ How does bioplastic compare with conventional plastic in terms of strength, flexibility, and decomposition?
- ✓ Can bioplastic be produced at a low cost for practical use?

c. Hypothesis:

"If banana peel or corn starch is processed with glycerine, vinegar, and heat, then it can form a biodegradable plastic sheet that can serve as an eco-friendly alternative to conventional plastic."

Objectives:

- ✓ To produce biodegradable plastic using banana peels and corn starch.
- ✓ To compare the quality and durability of plastics obtained from both sources.
- ✓ To reduce the dependency on petroleum-based plastics.
- ✓ To encourage eco-friendly alternatives that are safe for the environment.

Materials Needed:

- ✓ Banana peels (washed and cut)
- ✓ Corn starch
- ✓ Vinegar (acetic acid)
- ✓ Glycerin (acts as a plasticizer)

- ✓ Water
- ✓ Stove or hot plate
- ✓ Saucepan and spoon
- ✓ Measuring cups/spoons
- ✓ Baking sheet / flat tray
- ✓ Oven or sunlight for drying

d. Procedure:

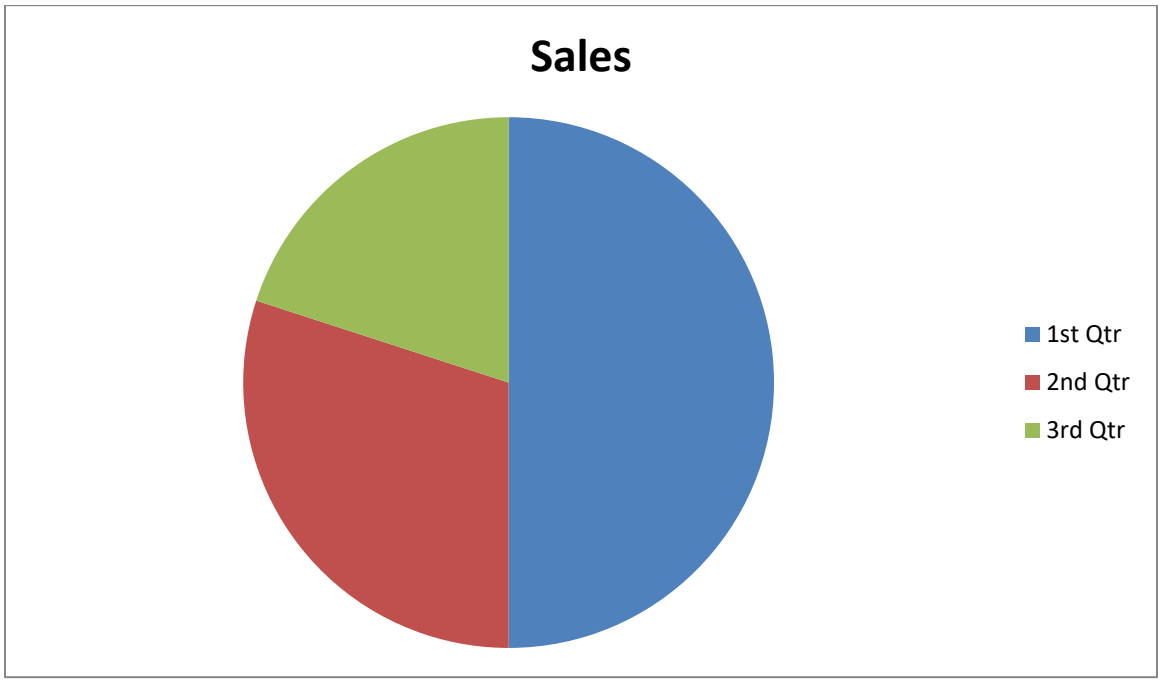
1. **Banana Peel Method:**
    - Collect banana peels, wash, and blend into a paste.
    - Heat paste with water, vinegar, and glycerin while stirring.
    - Pour mixture into a mold/tray and allow it to cool.
    - Dry in oven/sunlight to obtain bio plastic sheet.
2. **Corn Starch Method:**
    - Mix corn starch with water, vinegar, and glycerin.
    - Heat mixture until it thickens and becomes gelatinous.
    - Spread mixture on a tray/mold.
    - Dry thoroughly to obtain corn-starch-based plastic.
3. Compare flexibility, strength, and decomposition rate of both plastics.

Observation:

- ✓ Note drying time.
- ✓ Test flexibility, strength, and smoothness.
- ✓ Check if material bends, breaks, or cracks.

e. Pie Chart – Raw Material Contribution:

- Corn starch – 50%
- Banana peels – 30%
- Glycerin & Vinegar – 20%



f. Table – Comparison of Bio plastic vs. Conventional Plastic:

Property	Bio plastic (Banana Peel/Corn Starch)	Conventional Plastic
Raw Material	Natural (peel/starch)	Petroleum
Cost	Low–Moderate	Moderate
Biodegradability	100% (few months)	100+ years
Strength	Moderate	High
Environmental Impact	Eco-friendly	Hazardous

Risk and Safety:

- ✓ Handle hot mixtures carefully to prevent burns.
- ✓ Wear gloves while using vinegar and glycerin.
- ✓ Ensure proper ventilation during heating to avoid fumes.
- ✓ Avoid ingestion of experimental materials.

Primary Function:

To create an **eco-friendly, biodegradable alternative** to conventional plastic using banana peels or corn starch that can reduce environmental pollution.

Expecting Results:

- ✓ Production of biodegradable plastic sheets from banana peels and corn starch.
- ✓ Bioplastic expected to decompose within months, unlike conventional plastic.
- ✓ Practical applications in packaging, disposable items, and agriculture.
- ✓ A step toward reducing plastic pollution and conserving the environment.

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