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## **Project Title**

**Homemade Biodegradable Napkins (Corn-starch + Natural Fibers)**

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## **Problem Statement**

**Most commercial disposable napkins are made with plastics and synthetic fibers. They are non-biodegradable, pollute soil and water, and harm the environment. A sustainable alternative is needed.**

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## **Hypothesis**

**If corn-starch based bioplastic sheets are combined with natural fibers (banana fiber or cotton), then the resulting napkin will be absorbent, flexible, and biodegradable, making it eco-friendly compared to commercial napkins.**

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## **Aim**

**To prepare biodegradable napkins using corn-starch and natural fibers.**

**To test their absorbency, strength, and biodegradability.**

**To compare them with commercial plastic napkins.**

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## **Materials Required**

**Corn starch**

**Water**

**Glycerin (for flexibility)**

**Vinegar (as binder)**

**Banana fiber (or cotton) – absorbent core**

**Muslin cloth – outer cover**

**Tray / mould**

**Heat source (stove / hot plate)**

**Spatula / spoon**

**Soil sample (for biodegradability test)**

**Commercial napkin (control)**

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## Procedure

### **Step 1: Prepare Bioplastic Sheet**

- 1. Mix 1 tbsp corn starch + 1 cup water.**
- 2. Add 1 tbsp glycerin and ½ tsp vinegar.**
- 3. Heat gently, stirring until it thickens into a paste.**

**4. Spread on tray to form a thin film and dry (sunlight/low oven heat).**

**5. Peel off – this is the biodegradable sheet.**

### **Step 2: Prepare Absorbent Core**

**Clean and dry banana fibers (or cotton).**

**Fluff into soft layers.**

### **Step 3: Assembly**

**1. Place one bioplastic sheet as bottom layer.**

**2. Add absorbent core in the center.**

**3. Cover with muslin cloth / another bioplastic sheet.**

**4. Press and dry to form napkin shape.**

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### **Testing**

**1. Absorbency Test – Drop fixed amount of water (10 ml) and record absorption capacity (ml) & time (seconds).**

**2. Strength Test – Test tearing resistance when dry and wet.**

**3. Biodegradability Test – Bury in soil, observe weight loss/decay after 7, 14, 30 days compared with commercial napkin.**

**4. Comfort Test – Small patch test on skin for irritation check.**

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#### **Observation Table**

<b>Test</b>	<b>Commercial Napkin</b>	<b>Biodegradable Napkin</b>
<b>Absorbency (ml)</b>	<b>High</b>	<b>Moderate–High</b>
<b>Absorption time (s)</b>	<b>10–15</b>	<b>12–18</b>
<b>Strength (wet)</b>	<b>High</b>	<b>Medium</b>
<b>Soil degradation (30 days)</b>	<b>&lt; 5%</b>	<b>60–80%</b>

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#### **Expected Results**

**Biodegradable napkins absorb water reasonably well.**

**They are weaker than plastic napkins but safe to use.**

**They decompose much faster in soil than commercial napkins.**

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#### **Conclusion**

**Homemade biodegradable napkins made from corn starch and natural fibers are an eco-friendly alternative. They reduce plastic waste, decompose naturally, and can be improved further for commercial use.**