

GREEN PLASTIC

An eco friendly alternative to regular, non biodegradable plastic
Can waste become useful without becoming pollution?



TEAM MEMBERS

- 1.Prisha J (team leader)
- 2.Nayna C
- 3.Anbhuti S
- 4.Maria R

Ryan International School, Vasant Kunj
New Delhi, Delhi, India

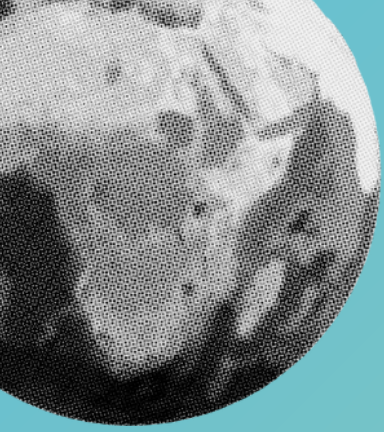
Introduction



- Rising global heat is causing more wildfires, droughts, and health risks.
- Melting glaciers are flooding coastal areas and threatening communities.
- Intense storms and unpredictable rainfall are worsening worldwide—partly driven by pollution, including plastic waste, which traps heat and disrupts ecosystems. This link inspired us to focus on plastic pollution as a major contributor to environmental damage.
- Many animals face extinction due to changing climates—and plastic waste adds to their struggle by polluting habitats.



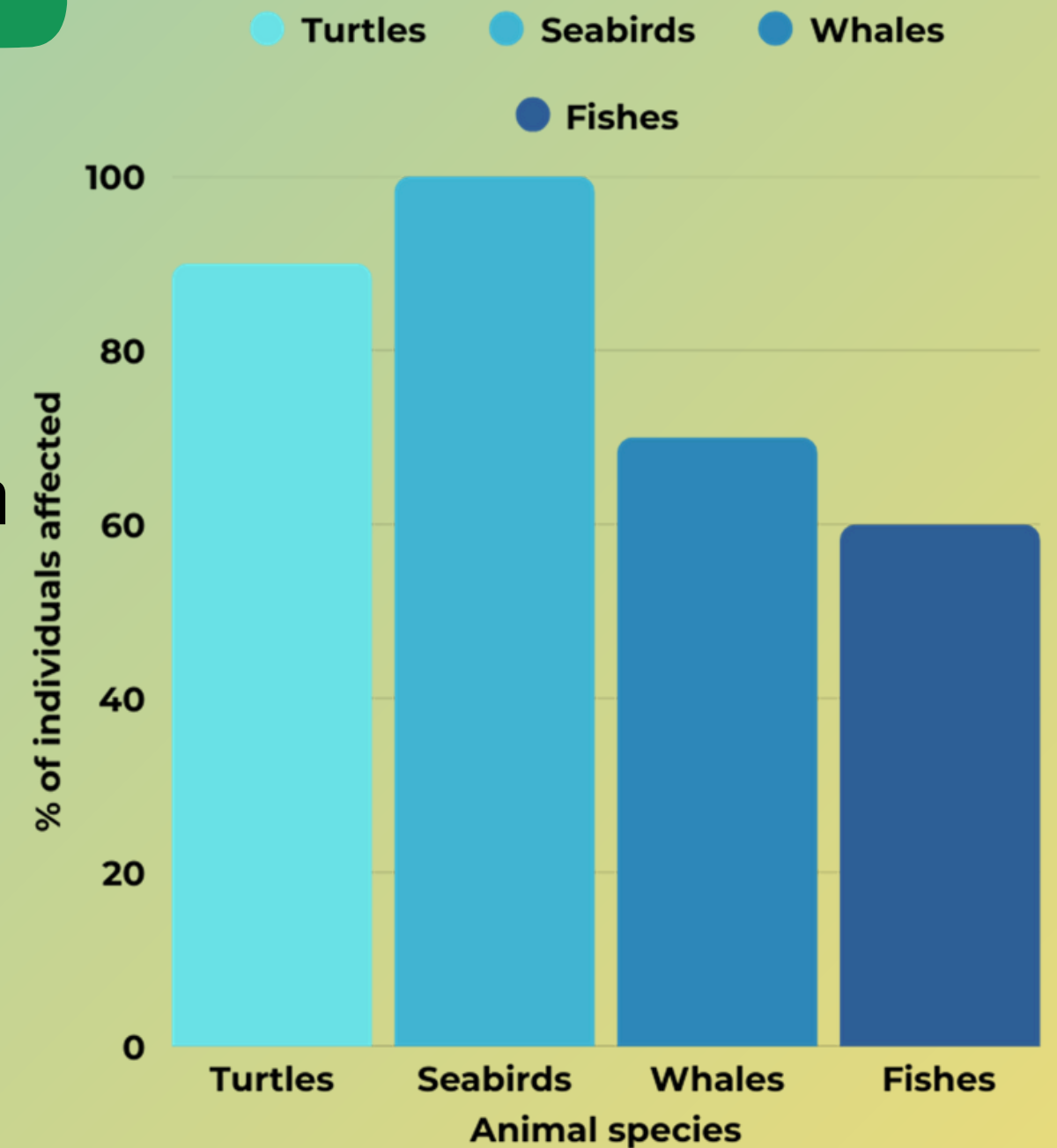
To help address this, our team has developed a bioplastic—a sustainable alternative to traditional plastic that's less harmful to the environment

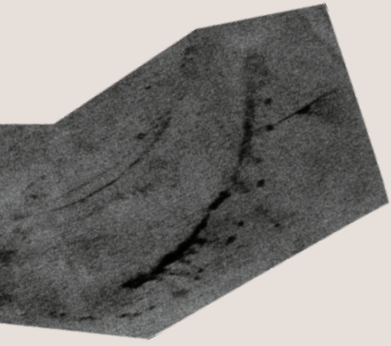


GLOBAL ENVIRONMENTAL CHALLENGES

1. Impact on Humans:
Toxic chemicals from plastic waste can leach into soil and water, eventually entering the food chain and posing serious health risks such as hormone disruption, fertility issues, and even cancer.

2. Impact on Marine Life:
Over 100,000 marine animals die each year from plastic pollution — they often mistake plastic for food, leading to internal injuries, starvation, and death.





Green plastics are materials produced from a renewable biodegradable source using plant-based products.

OUR SOLUTION : GREEN PLASTIC

**BREAK DOWN SAFELY :
NO MICROPLASTIC LEFT BEHIND
Non-toxic to wildlife**



**MADE FROM PLANT BASED PRODUCTS:
MORINGA SEED , CORN GLUTTEN MEAL ,
BANANA PEELS, CORN STARCH, POTATO
PEELS**

**COMPOSTABLE =
HEALTHIER SOIL =
BETTER BIODIVERSITY**

<https://patents.google.com/patent/US20130186303A1/en>

PROCESS OF PROTEIN POLYSACCHARIDE PLASTIC



•Mixed 3 tbsp corn flour, 1 tbsp rice husk powder, 1 tbsp corn gluten meal, 1 tsp vinegar, 1 tsp glycerin, and 120 ml of solution of okra mucilage

•Stirred and heated gently until thickened and gel-like



•Poured onto a flat tray to set and dried for 1-2 days → formed a clear, flexible sheet

PROCESS

LIGNOCELLULOSIC PLASTIC



- Banana , mango and potato peels are washed, boiled, then blended into a smooth pulp.
- Mixed pulp with , rice flour, coconut husk powder ,vinegar, and glycerin , and 1 tbsp corn gluten

- Heated the mixture while stirring until thick



- Pressed into a bowl mold and left to dry for 2-3 days

THE SCIENCE BEHIND IT!

1. POLYMER MATRIX

- Formation Starch molecules swell and gelatinize when heated with water and acid (vinegar).
- This creates the polymer backbone of the bioplastic, similar to synthetic polymers in normal plastics.

2. PROTEIN AS NATURAL BINDER

- Proteins in corn gluten meal (zein, glutenin) or moringa seed powder denature under heat.
- These proteins crosslink with starch chains, acting like a glue that holds the structure together.

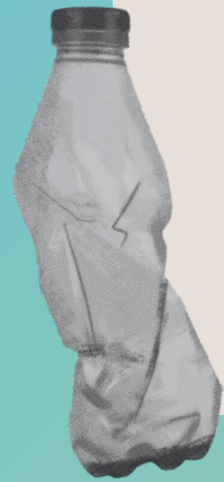
3. PLASTICIZATION

- Glycerin molecules insert themselves between starch and protein chains.
- This reduces brittleness and makes the material flexible instead of cracking.

4. PRESERVATION

- A natural preservative like Boric Acid is added to prevent microbial growth and extend the bioplastic's shelf life

<https://patents.google.com/patent/CN110845830B/en>



OUR VISION



- **Replace single-use plastics with 100% biodegradable bioplastics from food waste.**
- **Keep our solution low-cost, safe, and scalable for daily use.**
- **Empower women by involving them in collection, processing, and production.**
- **Build green jobs and sustainable livelihoods for 500+ women.**
- **In the next 5 years, scale into community enterprises producing plates, cups, and packaging at large**

<https://patents.google.com/patent/US9040597B2/en>

FINANCIAL BREAKDOWN FOR 30 BAGS OF PROTEIN POLYSACCHARIDE PLASTIC

INGREDIENTS	QUANTITY NEEDED	PRICE PER KG	COST (INR)
CORN FLOUR	450g (70%)	₹80/kg	₹24
RICE HUSK POWDER	75g(10%)	₹5/ kg	₹0.45
CORN GLUTTEN MEAL	112g(15%)	₹40/ kg	₹4.48
VINEGAR	15ml(2%)	₹30/l	₹0.36
GLYCERIN	45g(6%)	₹200/kg	₹12.00
OKRA MUCILAGE	300g	₹50/kg	₹24.00
BORIC ACID	1 TSP	₹0.5/g	₹2.5/g
TOTAL	1.05kg	₹405.5	₹68 approx



• ₹68 for 30 plastic bags
₹2.26 for one plastic bag

FINANCIAL BREAKDOWN FOR 30 PLATES OF LIGNOCELLULOSIC PLASTIC



INGREDIENTS	QUANTITY NEEDED	PRICE PER KG	COST (INR)
CORN GLUTTEN MEAL	0.30kg(20%)	₹40/kg.	₹12.0
BANANA AND POTATO PEEL	0.84KG (69%)	-	₹0
RICE FLOUR	0.12KG (5%)	₹60/kg	₹8.5
COCONUT HUSK POWDER	0.12KG (5%)	₹24/kg	₹3
VINEGAR	12ml	₹30/l	₹0.36
GLYCERIN	0.06kg (5%)	₹200/kg	₹12.00
BORIC ACID	1 TSP	₹0.5/g	₹2.5/g
TOTAL	1.2KG	₹354/kg	₹26 approx

- Fossil plastic = ₹120 (for 30 plates) → but external costs (pollution, health) are hidden
- Governments offering subsidies to reduce cost gap
- Bioplastic costs dropping as production scales

THANK YOU



**OUR CHEMISTRY TEACHER
MS. ANU MEHTA**



**FROM RYAN INTERNATIONAL SCHOOL VASANT KUNJ
NEW DELHI, INDIA**