MINISTRY OF AGRICULTURE AND FARMERS WELFARE

NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT

NABARD

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# AGRISURE GREENATHON

## Team Details

- Team Name: Phytopack
- Team Leader Name: Ashok Kumar. M
- Problem Statement: Track 3: Tech Solutions Making Regenerative Agriculture Remunerative

# Brief about the idea

## HYDROCHLOROPHYLL BOTTLES

- Identifying the problem of PET ( Polyethylene terephthalate ) water bottle pollution involves recognizing the environmental impact of PET products, particularly single-use plastics which contribute significantly to pollution in oceans, landfills and ecosystems.
- Our project aims to reduce the increased usage of **PET** (Poly Ethylene Terephthalate) water bottles.
- Hydrochlorophyll bottles are designed to breakdown easily ,acts like a natural fertilizer to enrich the soil nutrient level and reduce the PET bottles impact on the environment.
- The banana fibre is one of the largest bio decomposed cellulosic based wastage producers. It might be reducing the production of PET water bottles.

## Opportunities

- How different is it from any of the other existing ideas?
- How will it be able to solve the problem?
- USP of the proposed solution

- Many researches ongoing related to the replacement of the plastic because it is not easily decomposed or degraded.
- The PLA is a biodegradable thermoplastic derived from natural lactic acid which was found in early 1920s
- Banana fibre (BF) possess low density, high tensile strength and modulus and its use as reinforcement in polymeric composites has the potential to be used in various sectors for non-structural applications. BF has been reported as one of the best natural fibre in context of cellulose content.
- The life cycle environmental performance of PLA drinking water bottles was compared with that of polyethylene terephthalate (PET) bottles for the same functional unit.
- So we would like to include the banana stem waste (Banana fibre) with PLA to making the Hydrochlorophyll bottles to change the increased usage of PET water bottles. The moto of the project is to make the world pure and making aware of the bio products.

# List of features offered by the solution

- ✓ ENVIROMENTAL CONCERNS

  Plastic water bottles are a major contributor to plastic pollution. Hydrochlorophyll water bottles can help reduce plastic waste and negative impact it has on environment.

- ✓ SUSTAINABLE ALTERNATIVE

  They are made from renewable resources, such as plant- based materials and can be easily composed or biodegraded, reducing their impact on the environment.

- ✓ CONVENIENCE

  They are lightweight and can be easily transported , making them a popular choice for on-the-go hydration.

- ✓ CONSUMER DEMAND

  There is growing consumer demand for eco friendly products , including bio-degradable water bottles . People prefer the products that are eco-friendly and support sustainable practice.

Process flow diagram or Use-case diagram

WASTED BANANA STEMS

BANANA FIBRE EXTRACTION

SUN DRYING

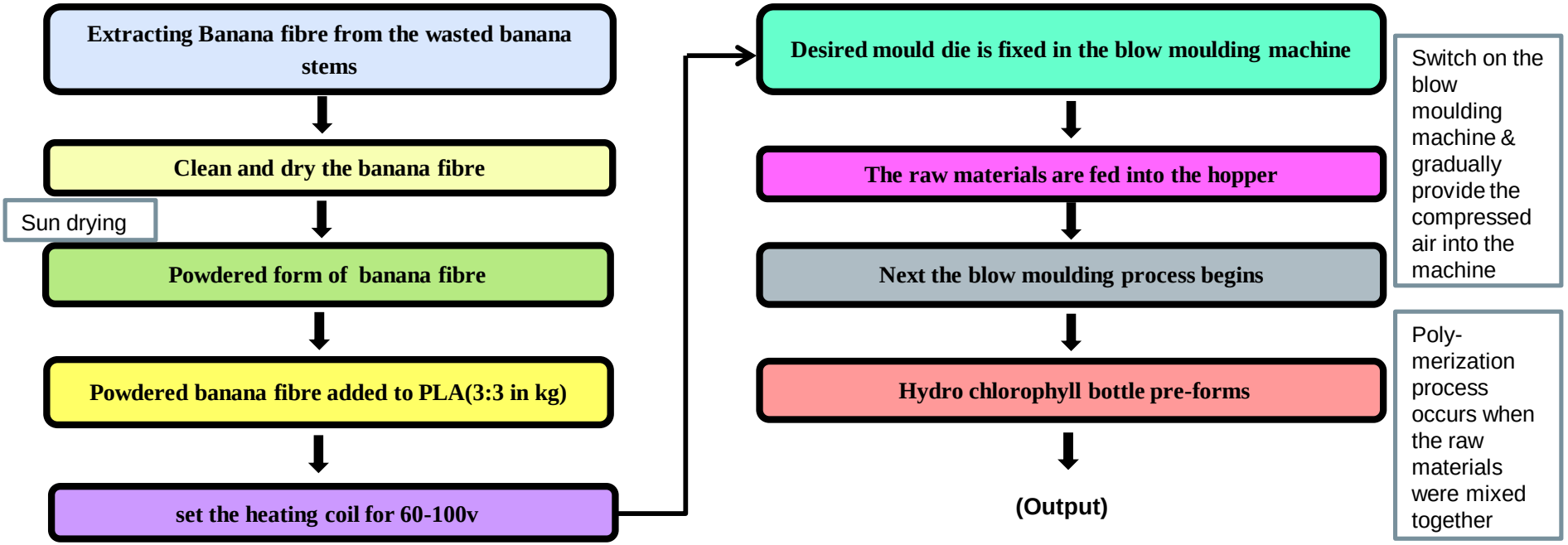
BANANA FIBRE POWDER

+

POLY LACTIC ACID POLYMER

Banana fibre &PLA mixed together (3:3 in kg) to form a raw material of the Hydrochlororpyll bottle pre-forms.

# Architecture diagram of the proposed solution



# Technologies to be used in the solution

- The features and characteristics of the Hydrochlorophyll bottles prove that, these are the best solution for the single usage water bottles.
- Perfect utilization of wasted Banana fibre has been done.
- Assumption of ratio(3:3 in kg) for making Hydrochlorophyll bottle preform has been done.
- Hydrochlorophyll bottles preforms are made by the Blow moulding machine.

# Estimated implementation cost (optional)

| S.NO | **DESCRIPTION / 650ml Hydrochlorophyll bottle** | COST / 650ml BOTTLE |
|---|---|---|
| 1 | Material cost (PLA + Banana fibre) | 32 |
| 2 | Operating cost (Machine cost) | 3 |
| 3 | Labour cost | 1 |
| 4 | labelling cost & Designing cost | 2 |
| 5 | Printing cost | 2 |
| | TOTAL | 40 |

# Snapshots of the prototype


Weighing banana fibre powder and PLA



Blow moulding process and output




Hydro chlorophyll bottle preforms- Final Output

HYDROCHLOROPHYLL

BOTTLE PREFORM WEIGHT : 26g

# Prototype Performance report/benchmarking

- **BIODEGRADABILITY:**

A performance analysis may evaluate the rate of biodegradation and the conditions required for the biodegradable materials to break down properly.

- **DURABILITY:**

While biodegradable water bottles may be designed to break down over time, they still need to be sturdy enough to hold water without breaking or leaking.

- **ENVIRONMENTAL IMPACT:**

A performance analysis may evaluate the environmental impact of biodegradable water bottles, including their carbon footprint, energy consumption during production, and impact on waste management systems.

- **COST-EFFECTIVENESS:**

A performance analysis may compare the cost-effectiveness of biodegradable water bottles to traditional plastic bottles, taking into account factors such as production costs, lifespan, and environmental impact.

# Additional Details/Future Developments

- India is the world's leading banana producer, boasting an annual yield of 30.5 million tons, significantly outpacing other nations. It also holds the title of the largest banana consumer.
- The availability of bananas all over the year and the wastage of banana stem stalks lead to the decision to choose banana fibre.
- There are many other fibres present all over the world such as the sugarcane bagesse fibre production , coconut coir fibre production, palmyra sprouts fibre etc.
- So we can even test it with other fibres in alternative to the banana and find their efficiency .
- The durability and other properties can be improved by continuous evaluation of the same banana fibre and poly lactic acid composition.

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