Institute Of Industrial Electronics Engineering

EFFICIENT PACKAGING AND WASTE REDUCTION

PRESENTED BY MEHAK SATTAR

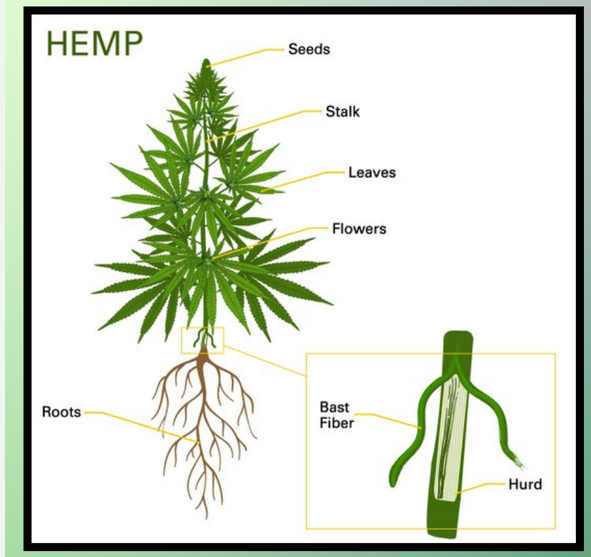
CORNSTARCH PEANUTS FOR PACKAGING SMALL APPLIANCES

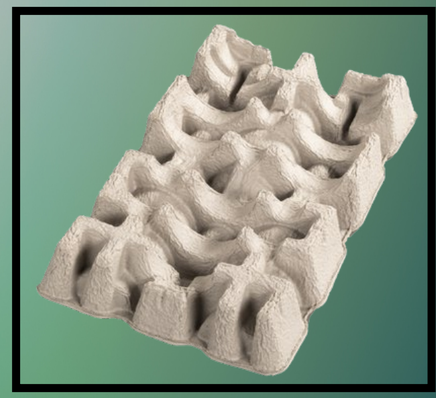
INTRODUCTION: Cornstarch Packaging refers to a biodegradable and environmentally friendly packaging material derived from the natural polymer starch found in corn kernels. It is an alternative to traditional plastics made from petroleum-based polymers.

- **Sustainable Material:**
- **Eco-Friendly:**
- **Protective Cushioning:**
- **Cost-Effective:**
- **Consumer Benefits:**

HEMPCRETE BASES FOR REFRIGERATORS

INTRODUCTION: A lightweight, bio-composite material made from hemp hurds (woody core), lime, and water. Traditionally used in construction, it offers exceptional durability and eco-friendliness for packaging applications.





Sustainability:

Made from renewable hemp plants

Carbon-negative production

Durability & Safety:

Provides a sturdy and shock-resistant base

Eco-Friendly Disposal:

100% biodegradable and recyclable

Custom Moldability:

Easily shaped to snugly fit and support large appliances while minimizing material usage.

REDUCING CARDBOARD WASTE THROUGH CUSTOMER ENGAGEMENT

Problem Statement:

Cardboard waste contributes significantly to environmental pollution, with millions of tons ending up in landfills each year due to improper disposal. Consumer product packaging is a primary source of this waste. A lack of systematic recycling practices amplifies the problem, especially for bulky appliance packaging.

Proposed Solution:

Introduce a Cardboard Return Program, allowing customers to:

- Return Used Cardboard Packaging
- Earn Loyalty Points
- Redeem Points for Appliances

REDUCING CARDBOARD WASTE THROUGH CUSTOMER ENGAGEMENT

Cardboard Return Program Rules:

1. Eligibility Criteria & Time Limit for Returns:
2. Condition of Returns:
3. Loyalty Point Calculation:
    - 1 large cardboard (e.g., refrigerator packaging) = 10 points.
    - 1 medium cardboard (e.g., microwave, juicer, or blender packaging) = 5 points.
    - 1 small cardboard (e.g., iron, toaster packaging) = 3 points.
4. Point Redemption:
5. Return Location:
6. Program Participation:

Mycelium Packaging:

Composition:

- Made of mycelium (fungal roots) and agricultural waste like hemp, sawdust, or corn husks.

Biodegradability:

- Fully biodegradable and decompostable.

Strength:

- Strong, lightweight, and shock-absorbent

Advantages:

- Eco-friendly and reduces plastic waste.
- Uses readily available local resources.
- Provides a sustainable packaging solution for export industries.

Disadvantages:

- Higher initial cost than plastic.
- Limited water and heat resistance.
- Requires investment in infrastructure and training for large-scale adoption.

Implementation in Pakistan:

- Utilize abundant agricultural waste (e.g., wheat straw, rice husks) and local mushroom farms to establish low-cost production units.

Biodegradable Polyurethane Foam

Composition:

- Made from natural, renewable plant-based oils like soybean or castor oil.

Biodegradability:

- Fully biodegradable and decomposes naturally.

Strength:

- Durable and Strong: Protects heavy and fragile appliances.

Performance:

- Moisture-Resistant, Compression Resistance

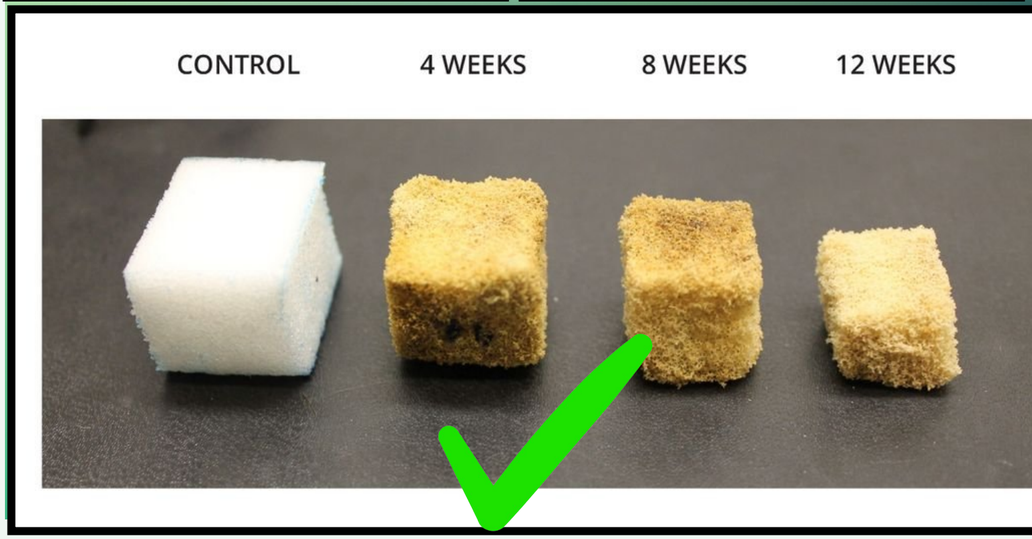
Advantages:

- Environmentally Friendly.
- Improves Brand Reputation.
- Supports Pakistan’s Green Goals and Aligns with national sustainability initiatives.

Disadvantages:

- Higher Initial Costs:
- Limited Local Availability

How Can It Be Implemented in Pakistan? Work with local suppliers, raise awareness, start with small appliances, and collaborate with authorities on waste management.



PLA-Based Air Cushion

Composition:

- Made from Polylactic Acid (PLA), a biodegradable plastic derived from renewable plant-based sources like corn or sugarcane.

Biodegradability:

- Compostable,Faster Decomposition,No Microplastics.

Strength and Performance:

- Lightweight and Shock-Absorbing,Durable,Moisture Resistant

Advantages:

- Eco-Friendly:
- Compostable and Biodegradable:
- Lightweight

Disadvantages:

- Higher Production Costs
- Limited Availability

How Can It Be Implemented in Pakistan? Work with local suppliers, raise awareness, start with small appliances, and collaborate with authorities on waste management.

Geami Wrap (Paper Mesh)

Composition:

- Made from kraft paper, which is transformed into a honeycomb structure that expands into a protective, flexible material.

Strength:

- Moderate:,Geami wrap is strong enough to protect products from impacts and scratches.

Biodegradability:

- Fully biodegradable as it is made from paper, a renewable resource.

Advantages:

- Eco-Friendly:
- Provides cushioning for lightweight products, protects from scratches and impacts.
- Lightweight
- Customizable
- Reusable

Disadvantages:

- Low Water Resistance
- Limited Durability

Smart Food Tracker for Sustainable Refrigeration

An IoT-enabled refrigerator system that uses sensors and machine learning to monitor stored food items. It detects unused food over time and alerts the user, helping reduce food waste and ensuring better food management.

- **Start**
- **Food Identification** (RFID/Barcode Scanner or Camera)
- **Data collection** (weight sensor, gas sensor, temp sensor)
- **Data Processing**
- **Cloud Integration**
- **AI/ML Analysis**
- **User Notifications**
- **User Interaction**
- **Data Logging and Insights**
- **End**

Thank you

Thank you, Dawlance, for providing this amazing opportunity to be part of the Sustainability Hackathon. It has been a great experience to collaborate and contribute to a greener future together. Looking forward to the impact we can make!