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Coimbatore-35
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DEPARTMENT OF FOOD TECHNOLOGY

19FTT305-FRUIT AND VEGETABLE TECHNOLOGY

UNIT 2- POSTHARVEST PROCESSING AND STORAGE



Handling and packaging of fruits and vegetables

Handling and packaging of fruits and vegetables is a crucial aspect of the supply chain, ensuring the products remain fresh, safe, and visually appealing to consumers. Proper handling and packaging can also extend the shelf life of produce, minimize waste, and reduce the risk of contamination. Here's a breakdown of the key elements involved:

1. Harvesting and Handling

- **Timing:** Fruits and vegetables should be harvested at the right stage of ripeness. Overripe produce will deteriorate quickly, while underripe items might not taste good.
- **Gentle Harvesting:** Handling during harvest should be as gentle as possible to avoid bruising or damaging the produce. This includes using clean, sharp tools and ensuring workers are trained on proper techniques.
- **Cooling:** After harvesting, many fruits and vegetables need to be cooled down quickly to preserve freshness. This can be done through **hydrocooling** (cooling with cold water), **forced air cooling**, or **vacuum cooling**.
- **Field Sorting:** Sorting the produce while it's still in the field can help reduce the chances of poor-quality items making it into the packaging process



Cleaning and Preparation

Washing: Some fruits and vegetables require washing to remove dirt, chemicals, and other contaminants. This should be done with clean water, and if necessary, food-safe disinfectants can be used.

Drying: After washing, it's crucial to dry the produce to prevent excess moisture, which can lead to mold or decay during storage or transportation.

Trimming and Peeling: Certain vegetables or fruits, like carrots or potatoes, may need trimming or peeling before packaging



Packaging Materials



Choosing the right materials is essential to both protect the produce and ensure its freshness:

- **Clamshells:** These are commonly used for soft fruits (e.g., berries) and vegetables (e.g., tomatoes). They offer protection from bruising while providing visibility for consumers.
- **Flow-Wrap Films:** Stretchable plastic films that help seal the produce, ensuring it stays fresh longer.
- **Netting:** Often used for fruits like onions or potatoes, allowing air circulation to maintain freshness.
- **Cardboard Boxes:** Popular for bulk or loose items like apples, bananas, and lettuce. The boxes should be sturdy enough to prevent crushing but allow some air circulation to reduce moisture buildup.
- **Modified Atmosphere Packaging (MAP):** Some products, especially leafy greens, benefit from packaging that alters the atmosphere inside the package to reduce oxygen and slow the ripening process.



Proper Packing

- **Layering:** Fruits and vegetables should be packed in layers, with each layer arranged carefully to avoid crushing the produce beneath.
- **Airflow:** Ventilated packaging is crucial for reducing moisture build-up. Packaging should include perforated holes or slits to allow for airflow.
- **Temperature Control:** If the produce needs to be kept cool, cold chain management is key. Refrigerated trucks and storage rooms must maintain consistent temperatures to prevent spoilage.

Labeling

- **Product Information:** Labels should clearly identify the type of produce, the country of origin, and any certifications (e.g., organic, fair trade).
- **Use-by Dates:** A "use-by" or "sell-by" date helps consumers know when the product will be at its freshest.
- **Storage Instructions:** This can include information like "Keep Refrigerated" or "Store in a Cool, Dry Place."



Transportation



- Cold Chain:** For many perishable products, maintaining a cold chain (keeping the produce at the correct temperature from farm to store) is essential.
- Minimizing Transit Time:** Reducing the time the produce spends in transit helps preserve its freshness and quality.
- Handling During Transit:** Packages should be handled with care, ensuring they are not exposed to rough handling that could cause damage or bruising.

Consumer Storage

Once the product reaches the consumer, storage is just as important. Some fruits and vegetables need refrigeration (e.g., leafy greens), while others do better at room temperature (e.g., tomatoes, bananas)



Best Practices for Specific Fruits and Vegetables

Berries: Pack in clamshell containers to avoid crushing. Refrigerate immediately.

Tomatoes: Store at room temperature to avoid flavor loss. Avoid refrigeration until ripened.

Leafy Greens: Use perforated bags to maintain airflow and refrigerate as soon as possible.

Apples and Citrus: Best stored in cool, dark environments. Packaging with air holes prevents moisture buildup and extends shelf life.

Emerging Technologies in Packaging

Edible Films: Some companies are developing edible packaging made from natural ingredients like seaweed or starch. These could potentially reduce waste in the packaging process.

Smart Packaging: Packaging that uses sensors to track temperature or humidity, alerting consumers or distributors if the product is no longer in ideal condition



Thank You