Food Processing Workshop – Food Packaging

1. Modified Atmosphere Packaging (MAP)

Material:

- Multivac (tray holder and sealer)
- Gas: N2, O2, CO2
- Dried fruits (airdryed and freeze dried)
- : From drying the day before
- Commercially available packaging

Tasks

Produce a variety of modified atmosphere packaging
Discuss the commercially available Packaging

Methods:

Controlled atmospheres in food packaging, also known as Modified Atmosphere Packaging (MAP), is a technology used to extend the shelf life of food products by altering the composition of gases within the packaging. The primary gases involved in MAP are oxygen (O2), carbon dioxide (CO2), and nitrogen (N2) which are put into specific ratios to extend the shelf life
Low Oxygen (LOX): Low oxygen environments are used to slow down the oxidation of food products, which can lead to spoilage and rancidity. It is especially effective for extending the shelf life of fresh meats, poultry, and seafood. Composition: The oxygen content is reduced to a level lower than what is found in ambient air (typically below 2% O2), while nitrogen and carbon dioxide may be adjusted to maintain the package's desired pressure.
High Carbon Dioxide (HICAP): High levels of carbon dioxide can inhibit the growth of spoilage microorganisms and some pathogens. It is commonly used for packaging products like fresh-cut fruits and vegetables. Composition: Elevated levels of CO2 (typically 5-20%) are introduced into the package, often in combination with lowered oxygen levels.
Low Oxygen and High Carbon Dioxide (LOX/HICAP): This combination is used to control both microbial growth and oxidation. It is applied to products like fresh produce, salads, and ready-to-eat meals. Composition: Oxygen is reduced to low levels (typically below 2% O2), while CO2 is increased to inhibit microbial activity.
High Nitrogen (HIN): High nitrogen atmospheres are used to displace oxygen, reducing the risk of oxidative reactions and microbial growth. It is often employed in the packaging of snacks, nuts, and cereals. Composition: The nitrogen content is elevated to push out oxygen, typically maintaining an oxygen level below 2%.

Equilibrium Modified Atmosphere (EMA): EMA is used for products that require a specific gas composition to maintain freshness, such as baked goods. The gas mixture is adjusted to achieve equilibrium with the product's respiration rate. Composition: The gas composition is tailored to the product's requirements, depending on factors like respiration, gas diffusion, and storage temperature.

2. Flexible Films, Boxes, Cups

Material:

- Commercially available packaging
- Flexible Films, Boxes, Cups

Tasks

Discuss the commercially available Packaging

Methods:

Flexible Films: Flexible films are widely used in food packaging due to their ability to provide a protective barrier against moisture, oxygen, UV-rays and contaminants and easy access and handling. Different types of films are designed to provide moisture resistance, oxygen barrier properties, or transparency, depending on the product's requirements.
Boxes: Boxes play a crucial role in the food industry for packaging dry goods, cereals, and various other products. They provide structural support, protect food during shipping, and facilitate easy stacking and storage. Therfore they are used as primary and secondary packaging. Types: In the food industry cardboard boxes for bulk packaging of dry food items, including cereals, grains, and baking ingredients. Corrugated boxes are commonly used to ship perishable goods and protect them from damage during transit.
Bag-in-Box (BIB): Bag-in-box technology is used in the food and beverage industry for efficient dispensing and preservation of liquid products and dry products. Bag-in-box cups consist of a collapsible inner bag housed within a rigid outer cup or box. This combines the functionality of flexible films and the display area and handling advantage of boxes
Cups: Cups are extensively used in food technology for packaging a wide range of products, particularly ready-to-eat foods, desserts, and beverages. Types: Plastic and paper cups are commonly used for various food and beverage items. In food technology, the choice of packaging material is driven by factors such as food safety, preservation, convenience, and marketing. material is crucial to maintain product quality, extend shelf life, and meet regulatory requirements

3. Glasses, Bottles, Cans

Material:

- Commercially available packaging

Tasks

Discuss the commercially available Packaging

Methods:

Glass Packaging: Purpose: Glass packaging is used for various food and beverage products. It's known for preserving the product's quality, flavor, and safety while offering an attractive presentation. Types: Bottles: Used for beverages like wine, beer, juices, and sauces. Jars: Common for jams, pickles, and condiments. Containers: Used for spices, herbs, and baby food. Pros: Excellent barrier properties: Protects against oxygen, moisture, and contaminants. Recyclable and sustainable: Can be recycled repeatedly. Preserves product quality and flavor. Attractive and reusable for storage. Cons: Fragile and heavy: May break during handling or transportation. Higher transportation costs due to weight. Limited design flexibility compared to flexible packaging.
Metal Packaging: Purpose: Metal packaging is used for foods that require durability and protection from light and oxygen. Types: Aluminum Cans: Used for beverages like soda and beer. Steel Cans: Used for canned vegetables, fruits, and pet food. Metal Tins: Common for cookies, candies, and tea. Pros: Excellent barrier properties against oxygen and light. Long shelf life for canned goods. Recyclable and sustainable. Durable and tamper-resistant. Cons: Not suitable for all products (e.g., acidic foods can react with metal). Heavy and costly to transport. Limited design options compared to flexible packaging.