

Food Product Packaging (Lecture 6)

Over the last 50 years the way we buy food has changed. In the past, some food items were usually sold 'loose' and taken home in a paper bag. Due to advances in technology, most food items are now sold pre-packed. Food products often have a long journey from the initial manufacturer until finally being eaten by consumers. They must be stored in warehouses before being transported and distributed to retailers. At all these stages the product may be damaged by careless handling or changes in storage conditions such as light, humidity and temperature.

The Purpose of Packaging

The aims of packaging include:

- Prevent physical damage, e.g. from knocking, shaking or crushing
- Prevent contamination from micro-organisms, pollution
- Protect against dehydration or dampness
- Protect the product's nutritional and sensory characteristics
- Keep the product in peak condition
- Help to increase a product's shelf life

Labeling

Packaging is also designed to be visually stimulating and provide information about the product to help the customer. The information supplied must cover:

- The name of the food
- The weight/volume
- The list of ingredients
- How the food should be stored, where appropriate
- The date when the food should be eaten
- Genetically modified ingredients and allergens
- The name and address of manufacturer or distributor
- Nutrition information on the back of pack
- The quality control standards i.e. ISO, HACCP etc.

- The manufacturer may choose to provide extra information, e.g. preparation and cooking instructions, the place the food comes from and a bar code to identify the food.

Packaging Design

When designing packaging it is important to consider the following:

- Is it easy to handle and open?
- Is it a convenient shape, so it is easy to stack?
- Which colors will be used on the packaging?
- What size of print should be used? (Can consumers read it easily?)
- Will it be economical to produce?
- What about environmental considerations? (Will it be recyclable or does it make minimum use of natural resources?)

Types of Packaging

Increased rates of production during the last few decades have made it necessary to use different methods and materials to pack and protect food products. However, other factors also determine the choice of materials used, especially in relation to food hygiene and safety. For example, the material must be suitable for the food, as some chemicals present in the food or packaging may react together.

a. Food Cans

Cans were traditionally made from tin plate sheet, but now more commonly aluminum is used (for drinks). The inside of the can is often sheet coated with lacquers to prevent the cans rusting and reacting with the contents, especially acidic foods.

b. Paper, Board and Foil

Paper, board and foil are commonly used to package foods. Board used for food packaging is often coated with a wax or polythene to prevent interaction with contents. Most paper or board should be discarded before heating, but some products frozen on specially treated board may be cooked in microwave ovens. Foil trays are suitable for both freezing and heating in conventional ovens.

c. Plastics

Food packaging uses a wide range of both rigid and flexible plastic materials including:

- **Polythene** – low density is used as a film wrapping, resistant to water. High density is used for ‘boil-in-the-bag’ products.
- **Polyamide (nylon)** – provides a very good barrier to oxygen, so used for vacuum packaging, especially for foods containing fat (which can be susceptible to oxidation).
- **Polyethylene Terephthalate (PET)** rigid plastic bottles, light-weight, less risk of breakage and keep the fizz in carbonated drinks.
- **Polystyrene** – expanded polythene used for trays and insulated containers to keep food products cold, e.g. ice cream and sorbets or hot, e.g. coffee, soup and burgers.

d. Cellulose Films

Cellulose films are used for different types of food packaging, because they have a range of characteristics such as different degrees of moisture proofing. Some cellulose films are heat sealable.

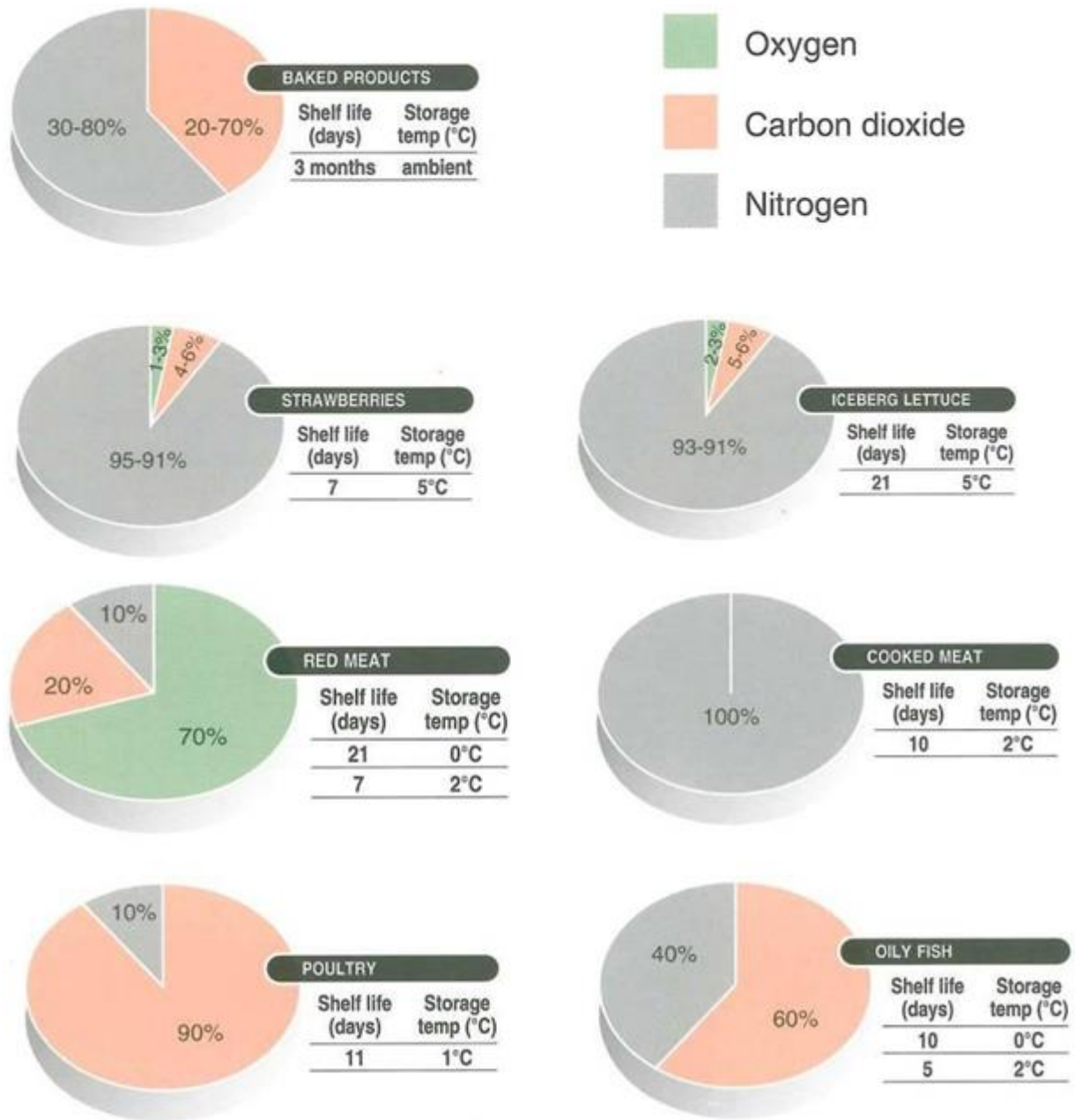
e. Glass

Glass has been used for food packaging for a long time, but tougher, light-weight containers, sometimes protected by a sleeve of expanded polystyrene have been developed more recently. However, glass is still very popular and is used exclusively for many products, e.g. jam.

f. Modified Atmosphere Packaging

Modified atmosphere packaging is the enclosure of a food, in a package in which the atmosphere has been changed by altering the proportions of carbon dioxide, oxygen, nitrogen, water vapors and trace gases. It is used to lengthen the shelf-life of food products of minimally processed or fresh foods. The process limits microbial as well as biochemical activity. This modification is performed by gas flush packaging – air is removed and replaced by a controlled mixture of gases. Meat, fish, fruits and vegetables often use the method during packaging.

Proportion of Gases in Packaging



Thermoplastic Polymers

Nearly all packaging for this process is based on thermoplastic polymers. The reasons for this are that they:

- Have greater flexibility, i.e. can be formed into different shapes
- Are light in weight

- Provide a gas barrier
- Can be sealed easily
- Can be printed on
- Are resistant to physical pressures of manufacturing, distributing and retailing
- Have good aesthetic properties
- Can be multi-layered with other materials to enhance overall properties

Vacuum Packaging

Food is placed within an impermeable package and air is removed. With fruit and vegetables, packaging films of different permeabilities are used to achieve the correct atmosphere to take account of the product's natural respiration.

Ambient Food Products

Ambient foods are those which are stored and sold at room temperature.

- Canned and aseptically packaged foods are examples of ambient products, e.g. ready meals, fruitjuices, UHT milk.
- They are intended to have a long shelf-life, and undergo rigorous heat treatment to destroy potentially harmful microorganisms.
- Pasteurization and sterilization are the two main heat processes used.
- Some ambient foods are not heat treated, e.g. cereals.
- Only harmless micro-organisms can be allowed to survive processing treatment. Canned fruit juice, which may contain spore-forming bacteria, will be safe as long as the pH is low enough to ensure the bacterial growth could not occur.
- Low-acidic foods undergo a rigorous heat treatment known as the 'Botulinum cook'-to reduce the numbers of *Clostridium botulinum* spores to a safe level. This is because these spores are very resistant to heat.
- Ambient foods, such as cereals, rice and pulses must be stored carefully. The moisture content for each need to be kept low to prevent mould and yeast spoilage.