



AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority

Food Packaging

Mr Edward O'Neill
Teagasc
Moorepark
Fermoy
Co. Cork



Food Packaging

Fundamentals of Packaging:

Food packaging may be described as an **Economic** means of providing a product with **Protection, Preservation, Information, and Containment** during **Filling, Carriage, Use, Sale** and with Consideration for the **Environment**

Food Packaging

Two thirds of all packaging is used to protect food.

In developing countries where packaging, storage and distribution is inadequate, between 30 and 50% of the food is lost through spoilage.

In developed countries, with proper packaging, storage and distribution systems in place, these losses are in the order of 2-3%.(Source:WHO)

History of Packaging

<u>Date</u>	<u>Development</u>
300ad	Glass Containers
1700	Paperboard
1870	Metal Cans for Preservation Corrugated Board
1892	Mechanised Glass making
1925	Beginning of plastics Era
1935	First beer cans
1959	Aluminium cans
1965	Tin Free Steel cans
1970	MAP, Vac Packs

Branding

First examples of Branding

Yardley's 1770

Schweppes 1792

Perrier 1863

Colgate 1873



Packaging – Why?

- To protect the goods against hazards during transport and sale.
- To enhance the sales appeal of a product.
- To ensure quality of product.

Packaging – Why?

- **To provide information**
- **To provide convenience**
- **To be cost effective**
- **To preserve the contents up to the expected sell by date**

Packaging – Materials

Paper -Tissue, Paperboard, Cardboard, Laminates

Wood -Pallets, Boxes, Balsa

Glass -Jars, Bottles

Plastics -Bottles, Tubs, Trays, Film

Metals -Boxes, Foil



Packaging – Materials

Application

Material

Microwaveable ready meals

PP, C-Pet, Board

Ovenable Ready meals

C-Pet, Smooth and Crinkle Foil, Board

Salads

A-Pet, PVC

Vegetables

PP, Smooth and Crinkle

Deserts

A-Pet, PVC

Puddings

PP, C-Pet



Packaging – Plastics

Polyester (PET)

The most common base material used and is the most heat resistant (235C)
Excellent clarity and can be printed

Nylon (OPA)

Heat resistant to 190C and must be laminated to PE. Can be printed

Polypropylene (OPP)

Heat resistant to 160C must be laminated to PP, will only seal with PP.
Can be printed

Packaging – Plastics

Polypropylene	PP	Microwaveable, Freeze able, suitable for MAP All colours available Can be printed Relatively cheap
Crystallised Polyester Terephthalate	C-PET	Oven able, microwaveable, freeze able Suitable for MAP Available in all colours Can not be surface printed Relatively Expensive



Packaging – Plastics

**Amorphous
Polyester
Terephthalate**

A-PET

**Not suitable for ovens or microwave
Freezable, suitable for MAP
In all colours
Can be printed
More expensive than PVC**

**Polyvinyl
Chloride**

PVC

**Not suitable for ovens or microwave
Suitable for MAP
In all colours
Can be printed
Relatively cheap
Environmentally unpopular**



Packaging – Foil

Foil Smooth



Suitable for oven use and some microwaves

Suitable for freezing

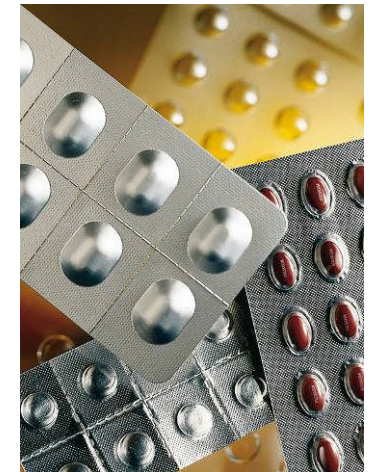
Suitable for MAP

Available in different colours

Difficult to seal

Can not be surface printed

Expensive



Crinkle

Fairly Cheap

Suitable for freezing

Packaging – Know Your Product!

Does it need protection from light

Is moisture loss/ingress a problem

What shelf life is expected

What are the storage conditions

Who are your consumers



Packaging – Food Safety

When Microorganisms get into Food!

Death

-the organism is unable to survive in the environment and dies.

Survival

-the environment is not able to support growth but organisms are able to survive

Growth

-the organism is able to grow in the food product.

Problems may ensue

Food Spoilage

Change in food making it unpleasant to the consumer

Generally organoleptic problems

-smell, flavour, colour, texture

May be due to:

-physical, chemical, enzymatic or microbiological changes

Down to peoples own expectations of what the product should be like

Microbial Spoilage

Bacteria

-Off odours, colour changes, surface slimes, undesirable acid production, gas production (CO₂/ H₂S)

Yeasts

-Fruity or alcoholic taints, gas production(CO₂)
visible surface colonies

Moulds

-Mouldy taints, visible mould growth

Food Poisoning

Usually happens when food appears good to eat

May be caused by:

-Microorganisms

Bacteria and mould and/or their toxins.

Yeasts do not cause food poisoning

-Viruses

-Parasites

-Naturally toxic Foods

-Chemical contamination

Reasons for Preservation

To ensure safe, wholesome foods, that are good to eat

To extend shelf life and permit widespread distribution

To make the purchase and storage of food more convenient

Prevention of Spoilage

Reduction in temperature

**Containment post
heat treatment**

Heat Treatment post containment

Pasteurisation

Reduction in water activity

Drying

Increase in Acid (reduction of pH)

Addition of Preservatives

Atmospheric Changes

Container must be hermetically sealed

Gaseous atmosphere can be altered to exhibit an antimicrobial effect.

May take the form of:

-Modified Atmospheric Packaging (MAP)

-Equilibrium MAP

-Controlled Atmospheric packaging (CAP)

Vacuum Packaging

Packaging – Key Points

Prevent physical damage

Prevent odour and taint pick up

Stop infestation by insects and vermin

Prevent the ingress of micro-organisms

Maintain sterility



Packaging – Key Points

Be Cost Effective

Have sales appeal

Communicate product information

Show evidence of tampering

Open and closes easily



Packaging - Examples



Packaging - Examples



Packaging - Examples



☺ Thank You for Your Attention! ☺

**Mr. Edward O'Neill M.Inst Pkg Dip.
Artisan Food Specialist
Teagasc
Moorepark
Fermoy
Co. Cork
025-42234
087-2893392
eddie.oneill@teagasc.ie**