Food Safety

Food stays fresh for a certain length of time, eventually it will go off (spoil)

Food spoilage is caused by:

1. **Enzymes:** chemicals natural found in fruit & vegetables which help fruit to ripen (banana)
2. **Micro-organisms:** tiny living organisms (germs) including bacteria, yeasts & moulds
   Bacteria can cause food spoilage and also food poisoning

This happens more quickly if food is:

- Not stored correctly
- Prepared in a dirty kitchen
- Handled by an unhygienic person

Conditions required for growth of Micro-organisms

1. **Warmth**
   - Bacteria grow best at temperatures between 30°C and 40°C
     Fridge temperature (1°C to 4°C) is too cold for them and slows down growth
     Freezer temperature (–18°C to –25°C) is very cold so bacteria are inactivated
   - High temperature kills bacteria.
   - Bacteria grow best at temperatures between 5°C and 63°C – known as the **Danger Zone**

2. **Moisture**
   - All micro-organisms require moisture for growth
   - Micro-organisms grow best in kitchens (steam)
   - Bacteria like moist foods (liquids, raw meat, fruit etc)
   - Bacteria do not grow in dried foods

3. **Food**
   - All micro-organisms need food.
   - They feed on dirt, dust and food.
   - They grow best in liquid protein foods eg raw eggs, milk, yoghurt etc

4. **Oxygen**
   - Most micro-organisms need air in order to grow and multiply.
   - Wrap food tightly to exclude air.
   - Some micro-organisms can survive without air and can still grow and multiply in canned and bottled food.
   - Vacuum packing removes all oxygen from food

5. **Time**
   - Micro-organisms multiply quickly, so use food when it is still fresh.

Carriers of bacteria:

- Unhygienic or careless food handlers
- Dirty food preparation area
- Dirty equipment and cloths
- Flies
- Vermin
- Cats and dogs

Food Poisoning

- Food poisoning is an illness caused by eating food that is contaminated with harmful bacteria.
- It can lead to serious illness and even death.
- Large numbers of bacteria must be present in the food to cause food poisoning in an adult.
- Fewer bacteria will cause food poisoning in children and elderly people.

People who most are at risk of food poisoning:

- Children
- Elderly people
- Pregnant women

} as they may have a lower immune system

Symptoms of Food Poisoning

- Nausea
- Vomiting
- Abdominal pain and cramps
- Fever
- Diarrhoea

Types of Food Poisoning Bacteria (pathogenic bacteria)

1. **Salmonella**
   - Sources/Causes:
     - Salmonella bacteria are found everywhere, especially in the intestines of humans, birds and animals
     - Poultry, eggs and raw meat (esp pork) are possible sources of salmonella food poisoning

2. **Staphylococci**
   - Sources/Causes:
     - Staphylococci bacteria are found on the human body – in the nose, mouth, throat and in cuts
     - Can easily be passed to food by poor hygiene practices (ie not washing hands etc)

3. **Listeria**
   - Sources/Causes:
     - Listeria bacteria are found in soil – can be found in unwashed fruit & vegetables, salads
     - Other sources: raw meat, unpasteurised milk & soft cheese

4. **Campylobacter**
   - Sources/Causes:
     - Campylobacter bacteria are found in animal intestines & is the most common cause of food poisoning in Ireland
     - Food sources: undercooked meat & contaminated water

Food preservation

Food preservation aims to:

- Kill or inactivate micro-organisms esp bacteria
- Prevent any new micro-organisms (eg bacteria) from getting into food
- Prevent/slow down enzyme activity (which causes food to go off)
- Keep the original qualities of the food – taste, texture, nutritive value etc

Advantages of food preservation:

- Prevents food waste & saves money
- Seasonal foods (eg strawberries) are available out of season (during winter)
- Nan add variety to the diet
- Saves time and energy as preserved foods usually require very little preparation

How does food preservation work?

It removes (permanently or temporarily) one or more of the conditions for growth of micro-organisms:

Warmth – store in fridge/freezer

Moisture – drying (dehydration), freeezing

Oxygen – canning, bottling, vacuum packing

pH – add an acid eg vinegar

Methods of Food Preservation:

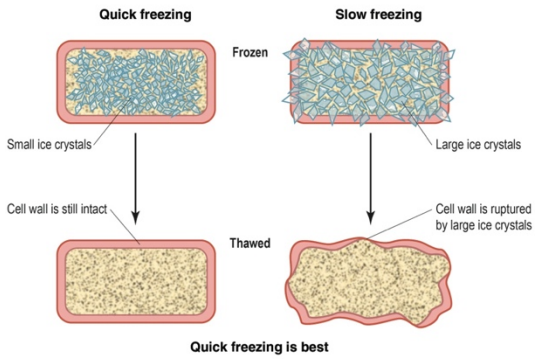
Method	How it preserves food
a) Freezing	Food is wrapped/sealed (no additional bacteria can get in) Low temperatures (bacteria go to sleep) Water turns to ice (moisture temporarily unavailable)
b) Canning & Bottling	Food is sealed in airtight, sterile cans/bottles (no additional bacteria can get in) High temperatures (harmful bacteria are killed)
c) Drying	Food is sealed in airtight packaging (no additional bacteria & oxygen can get in) High temperatures (harmful bacteria are killed) Water evaporated (moisture permanently removed)
d) Freeze Drying	Food is frozen (see above) then moisture is removed

	Food is sealed in airtight packaging (no additional bacteria & oxygen can get in)
e) Jam Making	Food is sealed in airtight, sterile jars (no additional bacteria can get in) High temperatures (harmful bacteria are killed) High sugar content (alters pH)
f) Pasteurisation	Milk is heated to 72°C for 15 secs and then cooled to 4°C High temperatures (harmful bacteria are killed) Milk is sealed in sterile cartons (no additional bacteria can get in)
g) Preservatives (additives)	Chemicals such as vinegar, salt, sugar or smoke are used
h) Irradiation	Energy waves are passed through the food to kill bacteria

a) Home Freezing:

(i) Rules for freezing food at home:

- Freeze only good-quality fresh foods.
- Cool food before freezing it.
- Only freeze one-tenth of the freezer's capacity at any one time.
- Place food in the fast freeze section until frozen, then transfer to the storage area.
- Keep a record and use food in rotation.
- Blanch vegetables before freezing to inactivate enzymes: prepare the vegetables, place in boiling water for 1–4 minutes, then plunge into cold water (this stops them from continuing to cook).



Fast Freezing:

Home freezing is carried out at –25°C.
Food is then stored at –18°C

Commercial freezing is carried out at –30°C

(ii) Suitable packaging for freezing:

- Polythene bags and boxes
- Tin foil
- Foil containers
- Waxed cartons

(iii) Rules for packaging food for freezing:

- Use moisture-proof containers.
- Pack food in small quantities.
- Seal containers well.
- Sharp bones may be overwrapped.

- Allow extra room for liquid to expand.
- Include a label.
- Include the date.

(iv) Using frozen food:

- Remove large pieces of food from the freezer and thaw in the fridge.
- Many convenience foods can be cooked from frozen – read instructions for cooking on label
- Frozen vegetables are cooked in boiling water.
- Use up thawed food quickly and never refreeze it.

e) Jam making:

Jam is a way of preserving fruit

(i) Pectin:

- Pectin is a type of carbohydrate found in fruit – it helps jam to set
- It is also available in powder and liquid form
- It is added to granulated sugar to make "jam sugar"
- Fruit with a high pectin content can be added to fruit with a low content when making jam to ensure it sets

High Pectin Content	Medium Pectin Content	Low Pectin Content
Apples Blackcurrants Gooseberries	Blackberries Raspberries	Strawberries Rhubarb

(ii) Test jam to make sure it is set:

1. **Wrinkle test**
   When you think jam is ready, place a spoonful on a cold plate & push with finger
   If it wrinkles, it is ready (not runny)

2. **Flake test**
   Lift out some jam with a clean, dry wooden spoon - turn the spoon and allow to run off
   If it runs off like a liquid – not ready
   If it flakes off in lumps - ready

3. **Thermometer test**
   Use a sugar thermometer when making jam
   When it reaches 105°C the jam is ready