

Knowledge Organiser

Food & Nutrition

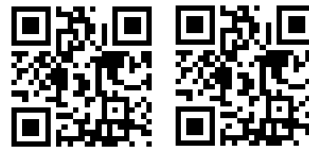
Topic: Food Poisoning

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Useful sites. Type these links into your browser or scan the QR codes:
 Video: tinyurl.com/yd5q4dxq
 GCSEPod: tinyurl.com/y8hosvsf



Food Spoilage

When food deteriorates to the point where it is not edible

Signs of Spoilage:
 Discoloration
 Visible mould
 Changes in texture
 Unpleasant odour
 Changes in flavour

Causes of Food Spoilage

1. Microorganisms - bacteria, yeast, mould, fungi.
2. Chemical reactions - between food, oxygen & moisture.
3. Enzymes - Speed up the process of decay.
4. Environment - Warmth, pH, oxygen & moisture
5. Insects/rodents - Leaves behind bacteria, urine & faeces.
6. Time – this depends on hygiene, correct storage & temperature

Storage



Key temperatures

72°C: kills bacteria. Cook or reheat high risk foods to this temperature
5-63°C: the danger zone - bacteria multiply quickly.
37°C: optimum temperature for bacteria multiplication.
0-5°C: chilling/ fridge: slows bacteria multiplication, extends shelf life
-18°C: freezing - stops bacteria multiplying (until defrosted) and extends shelf life of foods & preserves nutrients.

Remember, bacteria needs warmth & moisture to multiply. Refrigerating removes warmth Freezing removes warmth & moisture

High-Risk Foods – foods which bacteria multiply most in due to high moisture and protein. They have a short shelf life. Meats, fish and poultry; dairy foods; gravy, stocks and sauces; cooked rice

Ambient Foods – can be safely stored at room temperature - Flour; sugar; tinned food; crisps, pasta

'Use By' Date: Unsafe to consume after this date
'Best before' date: Safe to consume after the date but quality not as high. i.e. crisps not as 'crisp'

Cover foods to prevent contamination
 Storing food in the fridge - keep meats at the bottom to prevent juices/blood dripping onto ready to eat foods.

Food Poisoning

Food contaminated with pathogenic bacteria causes severe illness & possibly death. The following are common bacteria responsible for food poisoning:



| Pathogenic Bacteria | Source | Symptoms | Onset time |
|-----------------------|--|---|------------|
| Salmonella | Raw poultry, meat, eggs | Diarrhoea, abdominal pain, vomiting | 12-36 hrs |
| Campylobacter | Raw poultry, meat, eggs, sewage | Diarrhoea, abdominal pain, fever | 46-60 hrs |
| Staphylococcus Aureus | Humans – skin, hair, nose, mouth, cuts.(coughing/sneezing) | Abdominal pain, vomiting, chills | 1-6 hrs |
| E.Coli | Sewage, water, raw meat, muddy vegetables | Abdominal pain, fever, diarrhoea, vomiting, kidney damage | 12-24 hrs |

Preservation

Slowing the rate of food spoilage can occur by minimising bacteria activity, i.e. removing moisture or oxygen, reducing the temperature or changing pH levels.

| Method | Explanation | Example |
|---------------------------------|---|--|
| Heat | Heating kills most microorganisms | Pasteurised milk, cooked food, canned food |
| Freezing | Microorganisms cannot multiply without warmth | Frozen meats, fish, ready meals. |
| Drying | Microorganisms need air to reproduce | Noodle pots, coffee, gravy granules |
| Removing air (O ₂): | Most microorganisms need oxygen to reproduce. Food is sealed in cans, MAP & vacuum packaging. | Food in cans and jars, sandwiches, crisps, vacuum packed meats and fish. |
| Chemicals | (salt, sugar, vinegar & smoke) Changing the pH level of the food to create a hostile environment for the microorganism. | Pickles (make too acidic) , salted meats, smoked fish, chutneys, jam |

Contamination

Food contamination - foods that are spoiled because they contain microorganisms, e.g. bacteria, that make them unfit for consumption.

Contamination of foods can be physical, chemical or biological:

Physical: A foreign object has dropped into the food, e.g. hair, jewellery, finger nail, machinery components.

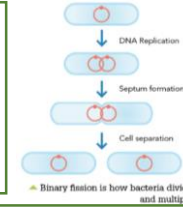
Chemical: Cleaning products & pesticides

Biological: Bacteria (i.e. from unhygienic workers/high risk food) , viruses, moulds & fungi - cause food poisoning

Bacteria need

Moisture (Monday)
Time, (Tuesday)
Warmth, (Wed)
Food (Thursday)
 (& sometimes O₂ & pH)

Bacteria doesn't grow in size, but multiplies into 2 every 20 mins – known as **binary fission**



Mould changes the appearance ('fuzzy'), smell and taste of food. It grows and spreads quickly. Often spoils bread, cheese & fruit



Prevent contamination by the 4 C's: Clean – Cook – Chill - Cover



Cross Contamination Transferring bacteria from one source to another. Bacteria can't move, so need something to move from one surface to another. E.g. cutting raw chicken, then using the same knife, unwashed, to cut lettuce for a salad. The bacteria from the chicken will be destroyed when the chicken is cooked but the salad will not.

Toxins: Waste materials of bacteria, can survive high temperatures. Survive when reheating pre-cooked foods (ie rice)

Spores: Created from bacteria & can survive very high temperatures. Spore-forming bacteria include bacillus cereus

Yeast can grow & spread quickly. Grows on fruit. Spoil fruit by fermenting the sugars

Enzymic browning - chemical process - oxygen & enzymes in food react to cause a cut surface to brown i.e. apple

Desirable changes in food:

| | Use |
|------------------------|---|
| Yeast | Bread making and fermentation of cereals in beer & fruit in wine. |
| Bacteria (lactic acid) | Fermentation of milk to produce yoghurt & cheese. |
| Mould | Added to cheese – adds texture & flavour (sharp and tangy). |
| Probiotics | Yoghurt to aid digestion. |

Key Words

Spoilage - When food deteriorates to the point where it is not edible

Microorganisms - bacteria, yeast, mould, fungi.

Enzyme – Found in foods, speed up the process of decay.

Danger zone – where bacteria multiplies most:- 5 - 63°C:.

High risk - foods which bacteria multiply most in - high moisture & protein. i.e. Meats, fish, dairy, gravy, cooked rice

Ambient – foods can be safely stored at room temperature - Flour; sugar; tinned food; crisps, pasta

Use by - : Unsafe to consume after this date

Best before - Safe to consume after the date but quality not as high. i.e. crisps not as 'crisp'

Contamination - spoiled because they contain microorganisms, e.g. bacteria, that make them unfit for consumption

Cross contamination - Transferring bacteria from one source to another. E.g. cutting raw chicken, then lettuce.

Pathogenic – bacteria which cause disease (unsafe)

Preservation - Slowing the rate of food spoilage can occur by minimising bacteria activity, increasing shelf life.

Vacuum packaging - a method of packaging that removes air from the package to extend shelf life

MAP packaging – (Modified atmosphere packaging) a way of extending shelf life of fresh food. substitutes air with gas



What might be asked in an exam?

Grade 1-3 – state the causes of food poisoning and types of contamination

Grade 4-6 – explain the conditions for bacteria with key temperatures

Grade 7+ - Identify pathogenic bacteria responsible for poisoning, recommend hygienic practises & preservation methods



Summary

Bacteria causes food poisoning when given the conditions moisture, time, warmth and food.

The key temperatures:

72°C (killed), 5-63°C (danger zone), 0-5°C (slows multiplication – fridge) and -18°C (bacteria 'dormant' or asleep – freezer)

The 3 types of contamination are physical, chemical and biological.

Cross contamination is transferring bacteria from one source to another

The 4 Cs to prevent contamination are clean, cook, chill and cover.

Food can be preserved to slow food spoilage by removing the conditions bacteria need (i.e. warmth, moisture, oxygen and pH)

