Knowledge Organiser

Food & Nutrition

Topic: Food Poisoning

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

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

Key temperatures
75°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.

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 (02):	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

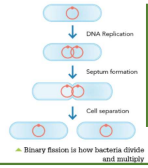
Contamination

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 02 & 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.

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.

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

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)