Bacteria

Bacteria

Bacteria are microscopic single-celled organisms that thrive in diverse environments. Bacteria can be found everywhere: in the air, on the ground, in dirt, on people, on animals, on food, and in water. Below are some examples on where to find bacteria.

- **Food**. Raw food, especially red meat, poultry, shellfish, eggs and vegetables, which may be covered in dirt;
- **People**. Bacteria live in and on our bodies, particularly our hands, nose, skin, ears, hair, in any cuts or wounds, and in faeces;
- **Animals**. All animals including rodents and household pets carry harmful bacteria on their bodies and in their droppings;
- **Insects**. Such as cockroaches and flies carry bacteria on their bodies, saliva, and droppings;
- **Equipment**. These can all carry bacteria if not properly cleaned or if chipped;
- **Birds**. Carry harmful bacteria in their droppings;
- **Rubbish**. Contains rotting food and leftovers that can carry bacteria and attract pests;
- **Dust/Dirt**. Contains high amounts of bacteria that may be transferred to food through people from clothes or shoes, vegetables, animals, and pests.

Bacteria are living organisms and require certain conditions in which they grow best:

- Time
- Temperature
- Acidity (pH)
- Moisture
- Food
- Oxygen

Further information on these conditions:

[1] Time. Bacteria are made up of one unit called a cell. This one cell reproduces by splitting in two and so on (called binary fission). Under ideal conditions, one bacterium can reproduce two million bacteria in seven hours. The number of bacteria necessary to cause illness varies with the type of organisms and the health and age of the person consuming the bacteria. Generally, it takes one million bacteria to cause illness.

[2] Temperature. Most bacteria grow rapidly when they are warm (between 20-50°C). Bacteria do not like to be either hot or cold. Placing cold food in the fridge or placing hot food in a food warmer can normally prevent the growth of bacteria.

Bacteria

Given enough food and moisture, most bacteria grow between 5°C and 60°C, which is known as the danger zone. Room temperature is ideal for bacterial growth. It is essential that food be kept out of the danger zone other than for short periods of time. Above 60°C bacteria are killed off. Below 5°C bacteria remain dormant (asleep).

[3] Acidity (pH). Acids are present in sour-tasting foods such as citrus foods, tomato, yoghurt, and pickles. The correct amount of acid in food will stop the growth of bacteria, but not necessarily kill them. Low acid foods such as milk, fish, poultry, and meat are all potentially hazardous.

[4] Moisture. All living organisms require water to survive. Bacteria are made up of 90% water so therefore require water to reproduce. A moist environment will promote bacteria growth. Most bacteria do not survive dry conditions, but some can form spores. Spores are bacteria with an outer coating protecting it from unfavourable conditions. Spores can hatch into bacteria again when in ideal conditions. Spores can be killed when cooking above 120°C.

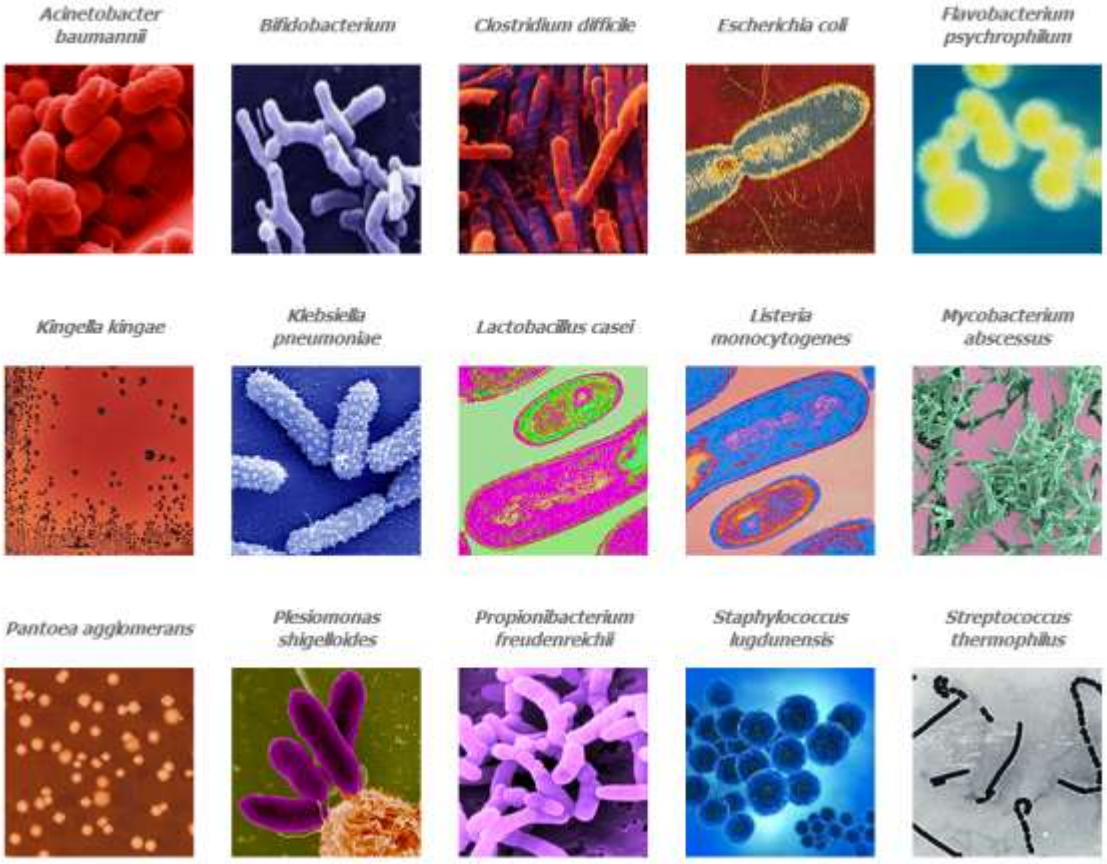
Dry foods such as pasta, rice, flour, and dried fruit contain countless spores. When moisture is added, any spores present may germinate, leading to food poisoning.

[5] Food. All bacteria need nutrients to grow and multiply. They grow more quickly on food with high protein (meat, poultry, dairy, eggs, fish) and carbohydrates (cooked rice and pasta). These foods are considered to be potentially hazardous foods as they contain moisture and are low in acid.

[6] Oxygen. Most food poisoning bacteria need certain levels of oxygen to survive. This is why vacuum or gas packing is an effective form of preservation as it prolongs the shelf life of high-risk foods such as meats.

Bacteria

Some examples of bacteria, there intricate different shapes:



Melbourne Quality Assurance
ABN 46 975 405 936
PO Box 308, FAIRFIELD VIC 3078 AUSTRALIA
janette@melbourneqa.com or www.melbourneqa.com
Mobile 0466 377 371

... Helping you achieve food safety & quality assurance...

Bacteria

Food Poisoning

Most cases of food poisoning are usually mild and last between one and two days. However, some can be more serious and may require hospitalisation.

Symptoms

- Abdominal pains
- Diarrhoea
- Fever
- Headaches
- Nausea
- Vomiting

Poisoned food may look and smell completely normal though if eaten, it will cause sickness and possibly even death.

There are two types of food poisoning:

- Infective food poisoning
- Toxic food poisoning

Infective Food Poisoning

Live bacteria cause infective food poisoning from food invading the body's tissues.

Main bacteria that cause infective food poisoning are:

- **Salmonella**. (intestines of warm-blooded animals, especially poultry and humans)
- **E.coli**. (water, soil, intestines of warm-blooded animals, mostly poultry and humans)
- **Listeria monocytogenes**. (soil, faeces)
- **Campylobacter**. (soil, poultry, unpasteurised milk, non-chlorinated water)

Toxic Food Poisoning

Toxic food poisoning is caused by the action of a toxin or poison released by the bacteria either in the food while it is growing or in the body after the food is ingested. The toxin is resistant to heat so, if present in the food, normal cooking may not destroy it.

Main bacteria that cause toxic food poisoning are:

- **Staphylococcus aureus**. (found on skin, nose, sores, pimples)
- **Clostridium perfringens**. (found in soil and intestines)