

Processing to preserve

WHY DO WE PRESERVE FOOD?

We need to transform most foodstuffs in order to eat them, but also to preserve them. The first question to ask is: Why do humans want to preserve their food?

To prevent shortages:

Certain foodstuffs keep for a long time; consequently, this is a way of preventing food shortages.

To transport food:

Others perish easily and so they need to be preserved, if only to be able to transport them from the producer to the consumer.

Consequently, humans invented **techniques to preserve food**, to slow down the process of food decomposition. In order to understand how these techniques work, first you need to understand what causes the natural decomposition of food. The main cause is the presence of microorganisms.

WHAT ARE MICROORGANISMS?

Microorganisms are living organisms, which come in many shapes and sizes. For example, there are **bacteria**, **yeasts** and even **moulds**. They are invisible to the naked eye, yet they are numerous and can colonise all environments. The question is, are they harmful, or rather are they useful? We can answer, that depends on the microorganism! Most of them are harmless; some can make us ill, whilst others can in fact improve food.

HOW DO MICROORGANISMS MULTIPLY?

The next question is: How do microorganisms multiply? There are several parameters to be taken into account.

First, there is the **temperature**. High temperatures destroy microorganisms, cold generally stops them from growing, whereas moderate temperatures speed up their growth.

The multiplication of microorganisms also depends on **water** being available. Water is the main constituent of living beings and foodstuffs containing lots of water are the most sensitive. It is said that the water present in a foodstuff is available to a greater or lesser extent if it is linked to other molecules or not. The more the water in a foodstuff is available, the more this helps the development of microorganisms.

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Here are some examples: Water is very available in milk and raw meat. On the other hand, there is little water available in spices and dried fruit.

Milk, raw meat: water is very available

Spices, dried fruit: water not very available

There is another parameter concerning the multiplication of microorganisms – the amount of **oxygen** available. Most germs need oxygen to breathe and if the amount of oxygen is reduced, their growth is slowed down. However, you need to watch out for anaerobic germs, which do not need oxygen to grow.

Finally, **the acidity** of the environment has an impact on microorganisms. In an acidic environment, or one where alcohol or preserving agents are present, microorganisms stop multiplying or are destroyed.

SUMMARY

To summarise, **temperature**, **water**, **oxygen** and **acidity** have an important role to play in the development of microorganisms. Different preservation techniques take these parameters into account to destroy germs or at least to prevent them from developing.

Means of prevention:

Nonetheless, remember that there are simple ways of preventing food contamination, like washing your hands before using food or utensils, storing food at the right temperature, or cooking and reheating food at the appropriate temperature.

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Which of the following statements does not explain why it is necessary to preserve food?

- To prevent a shortage
- To preserve perishable food
- Because different foodstuffs comprise different nutrients

Humans invented preserving techniques to ensure food does not...

- dissolve
- proliferate
- decompose

Bacteria, yeasts and moulds are...

- microscopes
- microorganisms
- plants

Microorganisms proliferate at temperatures between 20°C and 40°C.

- True
- False

The higher the water content of food, the more sensitive it is to microorganisms.

- False
- True

Oxygen generally encourages the proliferation of microorganisms.

- True
- False

Acidity promotes the growth of microorganisms.

- True
- False

Which of these foodstuffs is less sensitive to the development of microorganisms?

- Milk
- Ground beef
- Spices

All microorganisms are a health risk.

- True
- False

We wash our hands before touching food to ensure we do not...

- contaminate it
- leave fingerprints
- spoil it

Answers

Which of the following statements does not explain why it is necessary to preserve food?

- To prevent a shortage**
Wrong! We do in fact preserve food so that it can be stored for times of shortage.
- To preserve perishable food**
Wrong! We preserve perishable food so that it can be transported.
- Because different foodstuffs comprise different nutrients**
Well done! The composition of food does not influence the need to preserve it.

Humans invented preserving techniques to ensure food does not...

- dissolve**
Wrong! Try again!
- proliferate**
Wrong! Try again!
- decompose**
Well done! Microorganisms cause food to decay. Various techniques for preserving food slow down this process.

Bacteria, yeasts and moulds are...

- microscopes**
Wrong! Try again!
- microorganisms**
Well done! Microorganisms are microscopic living beings.
- plants**
Wrong! They are much smaller than plants. We need to use a microscope to observe them.

Microorganisms proliferate at temperatures between 20°C and 40°C.

- True**
Well done! Microorganisms develop more slowly at lower temperatures, and are destroyed at higher temperatures.
- False**
Wrong! Try again!

The higher the water content of food, the more sensitive it is to microorganisms.

- False**
Wrong! Try again!
- True**
Well done! The presence of water in food encourages the development of microorganisms.

Oxygen generally encourages the proliferation of microorganisms.

- True**
Well done! Most microorganisms need oxygen to develop. We can slow down their growth by reducing the quantity of oxygen.
- False**
Wrong! Although anaerobic microorganisms do not need oxygen, a large majority of microorganisms do.

Acidity promotes the growth of microorganisms.

- True**
Wrong! Try again!
- False**
Well done! Most microorganisms cannot develop in an acidic environment.

Which of these foodstuffs is less sensitive to the development of microorganisms?

- Milk**
Wrong! Milk is very sensitive to microorganisms.
- Ground beef**
Wrong! Meat is very sensitive to microorganisms.
- Spices**
Well done! As spices do not contain much water, they are not easily affected by microorganisms.

All microorganisms are a health risk.

- True**
Wrong! Think about the yeast used in making bread.
- False**
Well done! We are surrounded by microorganisms and most of them are harmless. Only some are a health risk, so we need to take precautions to ensure these particular microorganisms do not develop.

We wash our hands before touching food to ensure we do not...

- contaminate it**
Well done! Washing your hands will eliminate most microorganisms and therefore ensure they are not transmitted to food.
- leave fingerprints**
Wrong! That's not the right reason.
- spoil it**
Wrong! Try again!

Microorganisms

[14-16 years old]

Select the appropriate terms to complete each phrase.

- Microorganisms are **[living beings/inorganic]**.
- Microorganisms come in **[similar/diverse]** forms.
- Microorganisms can take the form of bacteria, moulds and **[yeasts/viruses]**.
- Microorganisms are generally **[visible/invisible]** to the naked eye.
- Microorganisms are **[plentiful/rare]**.
- Microorganisms colonise **[certain/all]** environments.
- The majority of microorganisms are **[inoffensive/harmful]**; some are useful.
- A break in the cold chain can lead to the **[slowing-down/development]** of microorganisms.

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