3.2.2

Techniques for preserving food

PRESERVATION TECHNIQUES

Food can be preserved while retaining most of its characteristics. Some preservation techniques are physical processes, such as refrigeration and cooking. Others are biological processes, like fermentation. In fact, most of these processes are traditional, having developed over time.

For example, in the past, the Indian method for preparing grains of rice was to steam them in hot water and then dry them so that they kept better. Today, there is a similar method known as 'parboiling'. This process allows the transfer of minerals and vitamins from the husk to the grain of rice. In order to retain the nutritional elements within the grain of rice, it is then hardened and dried.

TEMPERATURE, WATER, OXYGEN, ACIDITY

If you have seen the video on the role played by microorganisms in the natural spoiling of food, you will know that there are several ways of acting on the environment of germs to stop them from developing. These methods use temperature, water, oxygen and the acidity of the surroundings. Particular preservation techniques act on each of these parameters.

TEMPERATURE

Temperature needs to be lowered to stop the development of germs. Techniques using this method are chilling and freezing, for example. However, to destroy microorganisms, the temperature needs to be greatly increased. You know most of the techniques aiming to raise temperature, such as boiling, grilling, baking or even pasteurising. Pasteurisation uses a slightly different process, which involves rapidly heating without boiling, then rapidly chilling. This enables the majority of bacteria to be destroyed.

WATER

Other preservation techniques aim to remove the water contained in food. Methods such as drying, filtering or squeezing reduce the amount of water present, which prevents microorganisms from multiplying. Concentrating by boiling is another example. This technique brings about evaporation of water.

ACIDITY

It is hard to talk about preserving techniques without mentioning fermentation. The purpose of this technique is to increase acidity to stop germs from developing. There are other techniques such as adding citric acid or vinegar, but fermentation is a biological process involving microorganisms. The fermentation particles transform sugar and proteins into alcohol, acid and carbon dioxide. This transformation

modifies the environment and prevents other microorganisms from multiplying. One last thing about fermentation – it is used both for preserving food and to change the taste of food.

PRESERVATIVES

Certain preservation techniques use substances that slow down germ development. These can be chemical preservatives, but there are also well-known techniques such as salting and smoking. When we add salt to something, the water is linked to other molecules, making it less available for microorganisms. Smoking is simply a method of exposing food to smoke. Smoke contains substances which inhibit the growth of moulds and yeasts on the surface of food. Finally, sugar is used to preserve food in syrups and jams.

ULTRA-HIGH PRESSURE AND IRRADIATION

There are two other processes to consider: ultra-high pressure and irradiation.
In ultra-high pressure, food is subjected to 3000 to 10 000 bars of pressure. This pressure enables cold pasteurisation and, avoids the loss of vitamins or changes in flavour.
In irradiation, food is subjected to low intensity beams. These beams block the multiplication of cells. If you are wondering whether these beams can make your food radioactive, the answer is no. The type of beam used and the energy emitted are too low.

3.2.2

Techniques for preserving food

Refrigeration is a...method of preserving food.

- O physical
- O biological
- O chemical

Which nutrients are preserved by steaming rice?

- O Proteins and lipids
- O Carbohydrates and water
- O Vitamins and minerals

Which process preserves food by heating it and then cooling it down quickly?

- O Pasteurisation
- O Sedimentation
- O Irradiation

What evaporates when we boil food to concentrate and preserve it?

- O Alcohol
- O Water
- O Milk

Making yoghurt is a way of preserving milk.

- O True
- O False

Vinegar and citric acid are used to preserve food. What do they modify?

- O The temperature of the food
- O The oxygen content
- O The acidity

Which preserving agent is used when making jam?

- O Water
- O Salt
- O Sugar

Salting food to preserve it modifies...

- O the texture of food
- O the availability of the water in food
- O the acidity of food

Ultra-high pressure is used to preserve...

- O vitamins and flavour
- O microorganisms

Irradiation helps preserve food.

- O False
- O True

Answers

Refrigeration is a...method of preserving food.

- ● **physical**
  Well done! Refrigeration reduces the temperature of food, which inhibits the growth of microorganisms.
- ○ **biological**
  Wrong! Try again!
- ○ **chemical**
  Wrong! Try again!

Which nutrients are preserved by steaming rice?

- ○ **Proteins and lipids**
  Wrong! Those are not the right nutrients.
- ○ **Carbohydrates and water**
  Wrong! Try again!
- ● **Vitamins and minerals**
  Well done! Steaming is used to transfer vitamins and minerals from the rice husk to the grain and to preserve nutrients inside the grain of rice.

Which process preserves food by heating it and then cooling it down quickly?

- ● **Pasteurisation**
  Well done! Pasteurisation involves heating food very quickly, without boiling it, and then cooling it rapidly. This process destroys most microorganisms.
- ○ **Sedimentation**
  Wrong! That's not the correct answer.
- ○ **Irradiation**
  Wrong! That's not the right answer.

What evaporates when we boil food to concentrate and preserve it?

- ○ **Alcohol**
  Wrong! What does most food contain?
- ● **Water**
  Well done! We use concentration by boiling to eliminate water. The food will then keep better.
- ○ **Milk**
  Wrong! That's not the right answer.

Making yoghurt is a way of preserving milk.

- ● **True**
  Well done! Lactic acid bacteria are used to ferment milk to make yoghurt, which is therefore more acidic than milk and can be kept longer.
- ○ **False**
  Wrong!

Vinegar and citric acid are used to preserve food. What do they modify?

- ○ **The temperature of the food**
  Wrong! They have no effect on temperature.
- ○ **The oxygen content**
  Wrong! Try again!
- ● **The acidity**
  Well done! Citric acid and vinegar are acidic and thus prevent the proliferation of microorganisms.

Which preserving agent is used when making jam?

- ○ **Water**
  Wrong! Water encourages microorganisms to develop.
- ○ **Salt**
  Wrong! Salt is not used when making jam.
- ● **Sugar**
  Well done! The high sugar content prevents the proliferation of microorganisms, thus preserving the fruit for longer.

Salting food to preserve it modifies...

- ○ **the texture of food**
  Wrong! That's not the right answer.
- ● **the availability of the water in food**
  Well done! Salt traps water, thus creating unsuitable conditions for the development of microorganisms.
- ○ **the acidity of food**
  Wrong! Salt is not an acidifying agent.

Ultra-high pressure is used to preserve...

- ● **vitamins and flavour**
  Well done! Ultra-high pressure is used to preserve food which cannot withstand high temperatures. This technique is used at room temperature, so flavour and vitamins are better preserved.
- ○ **microorganisms**
  Wrong! Microorganisms are unable to survive ultra-high pressure.

Irradiation helps preserve food.

- ○ **False**
  Wrong! That's not the right answer.
- ● **True**
  Well done! With this method of preservation, food undergoes low-level radiation, which inhibits the multiplication of microorganisms.

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Examples of techniques for preserving food

[11-13 years old and 14-16 years old]

Provide two examples for each technique for preserving food.

Lowering the temperature of food:

_____

Raising the temperature:

_____

Removing the water in food:

_____

Increasing the acidity of food:

_____

Using chemical products:

_____

Answers

Examples of techniques for preserving food

[11-13 years old and 14-16 years old]

Provide two examples for each technique for preserving food.

Lowering the temperature of food:
_ chilling, freezing _____

Raising the temperature:
_ boiling, roasting, grilling, baking, pasteurising _____

Removing the water in food:
_ drying, concentrating by boiling, filtering, pressing _____

Increasing the acidity of food:
_ fermenting, adding citric acid or vinegar _____

Using chemical products:
_ salting, smoking, sweetening, adding chemical preservatives _