

## Cooking techniques

### WHY DO WE COOK FOOD?

Cooking is a thermal technique enabling us to refine what we eat. Why do we eat cooked food, when much of our food can be eaten raw?

To reduce biological risk:

The main reason is to reduce biological risk. Cooking destroys germs and toxins that may be present in food. It is therefore less risky to eat cooked food in order to avoid food poisoning.

To help us digest food:

It is also easier to digest cooked food. Consequently, to aid digestion, it is preferable to eat cooked food rather than raw food.

To make food more appetizing:

Finally, cooking makes dishes more appetising. It enables us to create new textures, as well as new flavours and aromas.

### KEY GUIDELINES FOR EFFECTIVE COOKING

In your opinion, what are the key guidelines for good cooking? There are two: First of all, the **temperature distribution** in food, then the **exposure time**. How does cooking work? That all depends on the way heat is transmitted to the food.

If food is submerged in a hot liquid or gas, this is called thermal convection.

**Thermal convection: water (cooking), oil (frying), air (oven), steam (pressure cooker)**

A foodstuff can be submerged in water, oil, air or steam.

If food is in contact with a hot surface, this is thermal conduction.

**Thermal conduction: pan, hot stone, grill, casserole dish**

This is true of a pan, hot stone or grill.

There is also electromagnetic irradiation.

**Electromagnetic irradiation: radio waves (microwave oven), infrared light (infrared oven, embers, barbecue)**

In a microwave oven, these are in the form radio waves. In the case of an infrared oven, embers and the barbecue, they are infrared beams.

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Here are some details of these cooking techniques.

## COOKING IN WATER



There are two different ways of cooking in water. You can put the ingredients into cold water and heat them slowly to dissolve their juices. With this method you can make a good stock or broth, or you can put the food into a ready-flavoured boiling liquid. This is a good method for cooking meat.

## COOKING IN OIL



When we fry food, we submerge it in oil heated to 160°C to 180°C. The surface of the food cooks quickly and encloses the juices inside crispy and tasty food. Fried food is fatty. Too much heat transforms the fat which then burns, takes on a bad taste and develops toxic compounds. Therefore, it is important to use oil that is stable when heated, to filter it and to change it regularly.

## COOKING WITH AIR



Food cooked in an oven bakes in hot air. Many recipes call for baking in an oven. Biscuits, cakes, terrines or gratins are placed on a tray or in tins and dishes. Bread is put directly into the baker's oven. The method of cooking in hot air dates back to Antiquity.

## COOKING WITH STEAM



The doctor Denis Papin was fascinated by steam pistons and invented the safety valve in 1679. He decided to fit it into his famous meat-cooking machine known as the digester. The machine uses steam placed under pressure in a closed container, allowing the boiling point of water to be raised to 140°C. This system means you can save energy, have a shorter cooking time and retain more of the vitamins and minerals.

## COOKING IN CONTACT WITH A HOT SURFACE



In 1912, the biochemist Louis-Camille Maillard discovered that when carbohydrates and proteins are exposed to high heat, they react with each other. This reaction, called the **Maillard reaction**, creates compounds, which give a cooked dish colour and aroma. When a little fat is added to the pan, the heat is better transmitted to the food, and the food sticks less to the pan.

## COOKING IN A CASSEROLE DISH



Cooking in a casserole dish enables you to cook food slowly, evenly and at moderate temperatures. The thickness of the casserole dish also spreads out heat evenly. Because the vessel is lidded, juices remain in the dish, and the loss of steam and flavour is reduced. The dish cooks gently in its own juices, softening vegetable fibres and dissolving **collagen**. Collagen is a family of proteins surrounding muscle fibres, which is responsible for the firm texture of meat.



## 3.1.3 Cooking techniques

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We cook a lot of our food yet, generally speaking, this is unnecessary.

- False
- True

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Which of these parameters is not important to ensure food is cooked thoroughly?

- The brand of the pots and pans
- Heat distribution
- Exposure time

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When we immerse food in hot liquid or hot gas, this is known as thermal convection cooking.

- False
- True

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We talk about thermal conduction when food is in contact with...

- an inert surface
- a smooth surface
- a hot surface

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When we use a frying pan to cook food, we call this...

- electromagnetic irradiation cooking
- thermal convection cooking
- thermal conduction cooking

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How do microwave ovens and infrared ovens cook food?

- By electromagnetic irradiation
- By thermal conduction
- By thermal convection

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Bread is baked in...

- hot air
- hot oil
- hot water

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In 1679, Denis Papin invented...

- the grill
- the deep fat fryer
- the digester

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When water is pressurised in a sealed container, it boils at a temperature of...

- 80°C
- 100°C
- 140°C

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The reaction between carbohydrates and proteins at high temperature is known as the...

- Maillard reaction
- Brillard reaction
- Paillard reaction

## Answers

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**We cook a lot of our food yet, generally speaking, this is unnecessary.**

- False**  
*Well done! Many foodstuffs must be cooked to destroy the microorganisms and toxins they may contain, to make them easier to digest and to make them more appetising.*
- True**  
*Wrong! For several reasons!*

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**Which of these parameters is not important to ensure food is cooked thoroughly?**

- The brand of the pots and pans**  
*Well done! The brand makes little difference.*
- Heat distribution**  
*Wrong! This is an important parameter.*
- Exposure time**  
*Wrong! This is an important parameter.*

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**When we immerse food in hot liquid or hot gas, this is known as thermal convection cooking.**

- False**  
*Wrong! Try again!*
- True**  
*Well done! This is the technique used to cook pasta, for example.*

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**We talk about thermal conduction when food is in contact with...**

- an inert surface**  
*Wrong! Try again!*
- a smooth surface**  
*Wrong! Try again!*
- a hot surface**  
*Well done! A hot surface is required. This is what happens when we heat steak in a frying pan, for example.*

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**When we use a frying pan to cook food, we call this...**

- electromagnetic irradiation cooking**  
*Wrong! Try again!*
- thermal convection cooking**  
*Wrong! Try again!*
- thermal conduction cooking**  
*Well done! The food is in direct contact with a hot surface.*

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**How do microwave ovens and infrared ovens cook food?**

- By electromagnetic irradiation**  
*Well done! Such equipment uses radio waves and infrared light as energy sources.*
- By thermal conduction**  
*Wrong! This is the name for the cooking technique where food is in direct contact with a hot surface.*
- By thermal convection**  
*Wrong! This is the name for the cooking technique where food is immersed in hot liquid or hot gas.*

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**Bread is baked in...**

- hot air**  
*Well done! Bread is baked in a hot oven.*
- hot oil**  
*Wrong! Chips and fritters are cooked in oil.*
- hot water**  
*Wrong! Try again!*

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**In 1679, Denis Papin invented...**

- the grill**  
*Wrong! No, it was not the grill.*
- the deep fat fryer**  
*Wrong! No, it was not the deep fat fryer.*
- the digester**  
*Well done! Denis Papin was fascinated by steam pistons and he invented the safety valve which then became part of the digester.*

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**When water is pressurised in a sealed container, it boils at a temperature of...**

- 80°C**  
*Wrong! It is higher than that.*
- 100°C**  
*Wrong! That is the boiling temperature for water at normal atmospheric pressure.*
- 140°C**  
*Well done! This method of cooking increases the boiling temperature of water. It speeds up cooking time, consumes less energy and preserves the vitamins in food.*

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**The reaction between carbohydrates and proteins at high temperature is known as the...**

- Maillard reaction**  
*Well done! This reaction enhances flavour and gives some cooked food more appealing colours.*
- Brillard reaction**  
*Wrong! Try again!*
- Paillard reaction**  
*Wrong! Try again!*