



How does a pressure cooker work?

To know how a pressure cooker works you must know the physics behind it. The boiling point of water is 100 °C. When boiling water in a pot with no lid, no matter how much you heat it, the temperature will never go over 100 °C because of evaporation. Also the vaporised steam is at the same temperature as the boiling water. So when you cook with a pot of water but this time with a sealed cap, as you increase the temperature, all that will happen is that the vapour will try to escape but, because it is inside a sealed environment, it will not be able to escape resulting in the build up of pressure. The temperature and pressure have a directly proportional relationship, so as one increases so does the other. Steam also has six times the heat potential when it condenses on a cold food product.

In the pressure cooker the pressure develops inside the vessel as time goes on. As pressure increases the boiling point of the water also increases. The food inside is cooked very fast because of the high boiling temperature, which means that the food is not cooked at 100 °C but at a much higher temperature.

Pressure cookers operate above atmospheric pressure. Once the operating pressure is attained, the temperature in the pot stabilises at the boiling point for water at that pressure, which is about 120 °C at 2 atmospheres of pressure. Further temperature increase is prevented since the pressure is stabilized by the venting of steam from the cooking vessel.

If the temperature is raised by only 20 °C above open pot boiling, why is the cooking time so much faster? The answer is that cooking results from chemical reactions in the food, and the rate at which all chemical reactions occur depends on the temperature. The temperature dependence of reactions is variable, but a rough rule of thumb is that the rate will double for every 10 °C increase in temperature. Therefore the reactions that occur during cooking will occur roughly 4 times faster in a pressure cooker at 120 °C, and the food will cook in one quarter of the time.

(Taken from http://wiki.answers.com/Q/How_does_a_pressure_cooker_work)

EXERCISES

1 True or false?

- a. Temperature and pressure are indirectly proportion. T F
- b. Steam has less heat potential when it condenses. T F
- c. Pressure cannot increase the boiling point of water. T F
- d. Water boiling in a pot with no lid will never exceed a temperature of 100 °C. T F

2 Complete.

A cooker is a very cooking instrument, because it makes cook faster. This is possible because of a in the boiling point of water due to higher When you close a and increase the temperature the pressure will, because pressure and temperature are proportional. pressure makes the point of water increase, and the higher temperature makes the reactions in food work faster. For this reason food cooks when you use a pressure cooker.

pressure • food • pot • pressure • faster • increase • change • higher • direct • chemical • useful • boiling

3 Match questions and answers.

QUESTIONS		ANSWERS	
A	How does temperature stabilise inside a pressure cooker?	1	The venting of steam from the cooking vessel prevents the temperature from continuing to increase.
B	What happens inside a pressure cooker when the pressure increases?	2	Because the rate of chemical reactions that cause the cooking of food will double with every 10 °C increase in temperature.
C	Why is the cooking time 4 times faster if the cooking temperature is just 20°C higher than the normal boiling point of water?	3	The boiling point of water also increases, so that food is cooked at a temperature higher than 100 °C.
A		B	
		C	