

Device and process for steam-pressure cooking using microwave radiation

The present invention relates to a device and a process for steam-pressure cooking food using microwave radiation.

Numerous devices for steam-pressure cooking using microwaves are already known from the prior art. These offer the advantage of heating, cooking, or reheating food in a very short time and are therefore now found in nearly every modern kitchen. Microwave devices are also used in commercial kitchens or on airplanes, where pre-portioned meals for visitors or passengers must be heated quickly.

When heating food using microwaves, the microwaves act on water molecules contained within the food to be heated, causing them to rotate, which generates friction that in turn produces heat. The evaporating water produces steam, which creates an overpressure inside the microwave appliance compared to the external atmosphere. Therefore, microwave devices known from the prior art are equipped with pressure-regulating elements, in particular valves, for pressure relief or equalization.

A device of this type is described, for example, in DE 20 2004 009 000 U1. This discloses a device for pressure-cooking food contained in a cooking vessel using microwave radiation, wherein the device comprises a cooking chamber designed as a pressure-cooking chamber having a pressure-resistant and pressure-tight door, which features a pressure relief valve adjustable to a specific overpressure that forms within the pressure-cooking chamber.

US 5 945 021 A describes a device for heating food using microwaves and steam. The device has several compartments containing water. This water is vaporized by microwave treatment, so that the food is heated on the one hand by microwaves and on the other hand by the resulting steam.

One disadvantage of the aforementioned devices, as well as other devices known from the prior art, is that the steam generated during the heating of food meets a cold interior lining and condenses there. The condensation droplets formed in this way drip onto the dish to be cooked, leading to an undesirable accumulation of liquid on the food

item and the tray on which it is placed, respectively, which is perceived as a sensory disadvantage.

Furthermore, it has been found that after the cooking process is complete and the existing excess pressure is released via the pressure relief valve, a vacuum forms inside the device, making it very difficult or even impossible to open the door to the cooking chamber if it is not opened immediately after the excess pressure is released.

Another major disadvantage of all microwave devices known in the prior art lies in their space requirements, which are essentially due to a cooking chamber surrounded by walls and doors. This is because in many areas where microwave devices are used to heat food, space is very limited; for example, in airplanes, where only a small amount of space is available due to the necessarily compact design, or in commercial kitchens, where the number of portions to be heated in the microwave devices is comparatively high and therefore many microwave devices are required.

CN 201683703 U describes a pressure cooker having a lid that can be heated in a conventional microwave using steam pressure.

DE 60 2005 000 043 T2 describes a conventional microwave oven.

KR 20 0 445 889 Y1 describes a rice cooker that is designed to emit a signal when a cooking state is reached.

DE 10 2007 043 258 A1 describes a cooking appliance comprising a cooking chamber into which a cooking vessel, designed separately from the cooking chamber, can be inserted, which cooking vessel is subjected to a vacuum at least intermittently during the preparation of the food item contained therein.

FR 2 908 969 A1 describes a microwave pressure cooker comprising a metal tank having a lid that can be sealed watertight and into which microwave radiation is introduced through an opening. The cooking process can be carried out exclusively by microwave radiation or additionally by steam, by introducing water into the metal tank, which is heated by microwave radiation together with the food item.

CN 1 751 635 A describes a microwave vessel that can be coupled to a control unit, whereby a temperature control, time control, etc. may be achieved.

Object of the invention

The objective of the present invention is to provide an alternative device and a process for steam-pressure cooking of food using microwaves, which overcome the aforementioned disadvantages known from the prior art and are characterized in particular by the fact that the space requirements of the device are significantly reduced in comparison to previously known devices for steam-pressure cooking of food using microwaves.

Advantageously, the device is also characterized by the fact that condensate formed during the cooking process does not come into contact with the food to be heated.

General Description of the Invention

The invention achieves this object with the features of the claims and, in particular, with a device for steam-pressure cooking of a food item using microwave radiation, wherein the device comprises a means for generating microwave radiation and a first cover having an opening for the introduction of microwave radiation, a second cover arranged at a distance from the first cover and at least partially permeable to microwave radiation, as well as a mounting for a food item support, which food item support is impermeable to microwave radiation, wherein the device, when the food item support is positioned within the mounting, is configured to form a pressure-tight cooking chamber between the second cover and the food item support, as well as optionally a seal arranged between them, wherein the food item support forms part of the cooking chamber and seals it in a pressure-tight manner.

For the purposes of the present invention, “cooking” and “pressure-steam cooking”, respectively, is understood to mean the heating of food by means of microwave

radiation. Therein, it is irrelevant whether the food was already cooked prior to heating by microwave radiation or not. "Cooking" or "steam-pressure cooking" can therefore also refer to the mere heating or reheating of food that has already been fully cooked.

A "food item" can be any foodstuff in any state of cooking that is heated by means of microwave radiation in the device according to the invention.

In one embodiment, the device according to the invention also comprises a food item support; however, in other embodiments, it is merely configured to accommodate a food item support, while the food item support itself is not a component of the device according to the invention.

Regardless of whether the food item support is a component of the device according to the invention or not, it is a container impermeable to microwave radiation, in particular a tray impermeable to microwave radiation, in which the food item to be cooked can be placed. It is particularly advantageous that the food item support forms part of the cooking chamber and seals it pressure-tight, while at the same time it can serve as transport packaging for the food item and as a serving tray or container for the heated food item.

As transport packaging for the food, the food item support with the food arranged therein is preferably sealed with a film, provided with a lid, or closed with another removable cover, wherein the film, the lid, or the other removable cover is preferably removed prior to cooking, and the food item support with the food arranged thereon is placed in the mounting for a food item support of the device according to the invention. As an alternative to removing the film, the lid, or the other removable cover, these may also remain on the food item support during the cooking process and be removed only afterwards.

When the food item support is placed in the mounting for a food item support of the device according to the invention, a pressure-tight cooking chamber is formed between the food item support and the second cover, or between the food item support, the second cover, and a seal arranged between them. After the cooking process is complete, the food item support can be removed from the mounting of the device

according to the invention and used directly as a serving tray or container for the food item arranged therein.

The mounting for the food item support, which is impermeable to microwave radiation, in a device according to the invention may have various geometries and is in any case designed such that it can be detachably engaged with the food item support, whereby the food item support is held in the mounting in a sealed manner. In particular, the mounting is configured to form a form-fitting or force-fitting connection with the food item support. Conversely, the food item support is configured to form, in particular, a form-fitting or force-fitting connection with the mounting by engaging with it.

According to one embodiment, the food item support comprises or consists of metal, in particular steel, e.g., enameled steel or stainless steel. Furthermore, the food item support preferably has a wall thickness of 0.5-2 mm, in particular a wall thickness of 0.7-1.5 mm, and most preferably of approximately 0.9-1.1 mm.

According to an alternative and preferred embodiment, the food item support has metal outer walls and, in addition, an insulating insertion element, in particular made of plastic and/or porcelain, on which the food item is placed. In this embodiment, preferably only the outer side of the food item support facing away from the cooking chamber is made of metal or comprises metal, which has the advantage that the wet steam generated during the cooking process in the cooking chamber does not come into contact with the metal, but only with the insulating insertion element on which the food is placed. This results in thermal insulation of the cooking chamber from the metal outer walls, thereby reducing heat loss due to heat conduction and recondensation.

Because the food item support seals the cooking chamber in a pressure-tight manner according to the invention and can simultaneously serve as transport packaging for the food item as well as a serving tray or container for the heated food item, significant savings in space, cost, and material are achieved, which the use of a device according to the invention offers compared to devices known from the prior art. The space savings result from the fact that the device of the invention does not have a permanently installed cooking chamber, as is the case with conventional microwave ovens, in which the cooking chamber is typically closed by a door through which a food item arranged

on a plate or in a bowl is introduced into the device and removed from it again after the cooking process is complete. In conventional microwave ovens, not only is the space requirement increased by the permanently installed cooking chamber, or by the cooking chamber enclosed by walls and doors, as compared with the device according to the invention, in which the cooking chamber is formed only by arranging the food item support within the mounting, but it should also be noted that there is an additional space requirement caused by the door opening outward. This is completely eliminated in the device of the invention, as it has no doors.

The cost and material savings resulting from the use of the food item support as both transport packaging and a serving tray or container stem from the fact that the same vessel is used both for transport to the location of cooking and consumption and as a serving tray or container. In contrast, foods intended for preparation in microwave ovens are typically packaged in transport packaging in the prior art, removed from it for cooking, and transferred to a microwave-safe food item support, only to be transferred again to a plate or the like after the cooking process is complete and served on it. While the device of the invention requires only one food item support per cooking cycle, the prior art uses two or even three containers, resulting in higher material costs and more waste.

Another advantage of preparing food using the device of the invention is that the food item support is preferably made of metal and can be reused after cleaning, so that, apart from a cover for the food item support containing the food - which must be removed before cooking and is necessary for transport - no waste is produced when preparing food using the device of the invention.

However, the aforementioned advantages also apply in the alternative embodiment, in which the food item support preferably comprises metal and includes an insertion element made of an insulating material such as plastic or porcelain. In this embodiment, only the insertion element serves as transport packaging; to protect the food item, it is preferably sealed with a cover film that must be removed before the start or after the completion of the cooking process. The insertion element must be placed in the metal portion of the food item support before the cooking process begins; the food item support, together with the insertion element and the food item placed on it,

is then positioned in the mounting for the food item support, thereby sealing the cooking chamber in a pressure-tight manner. The insertion element of the food item support can serve as a serving container after the cooking process is complete and, after the food item has been consumed, can optionally be cleaned and reused or recycled.

In every embodiment, the device according to the invention also offers a hygienic advantage over prior-art microwave devices, since the device according to the invention does not have a permanently installed cooking chamber, but rather has a cooking chamber that is formed only by arranging a food item support in the mounting. Since the food item support, which optionally includes the insulating insertion element, is removed from the device after the food item has been cooked anyway, and a new food item support or a new insulating insertion element is used for the next cooking process, no dirt can accumulate in the part of the cooking chamber formed by the food item support, which is newly inserted for each cooking process. The remaining part of the cooking chamber, which is essentially formed by the second cover, is, on the other hand, very easy to clean between individual cooking cycles, as it is freely accessible after the food item support is removed from the mounting.

Another advantage of the device according to the invention lies in its compactness, also with respect to the cooking chamber formed between the second cover, the food item support, and an optional seal. Because the food item support seals the cooking chamber downward in a pressure-tight manner and this chamber has a relatively small volume compared to microwave devices known from the prior art, the use of the device according to the invention allows for a shorter cooking time and/or cooking at a lower power level.

According to one embodiment, it is further provided to reduce the size of the cooking chamber of the device of the invention by means of one or more cooking chamber-reducing elements, thereby easily optimizing it for various applications. For this, the device of the invention comprises one or more cooking chamber-reducing elements, which are to be arranged on the food item support and/or at the second cover. In particular, the cooking chamber may have a standard size without the arrangement of one or more cooking chamber-reducing elements, specifically to accommodate food item supports having Gastronorm dimensions. However, if only a small portion of a

food item is to be heated, it is advantageous to reduce the cooking chamber formed between the second cover and the food item support using cooking chamber-reducing elements, thereby enabling the best possible cooking time depending on the portion size. In other words, the size of the microwave chamber and the size of the pressure chamber (the cooking chamber) can be optimized independently of one another for each new cooking process by selecting suitable cooking chamber-reducing elements or by replacing the cooking chamber-reducing elements used in a previous cooking process with cooking chamber-reducing elements of a different size and, optionally, shape. The cooking chamber-reducing element(s) provided for this purpose by the present invention is/are an element(s) of any shape, preferably made of a material that absorbs little microwave radiation, such as a closed-cell foam, in particular expanded polypropylene.

Optionally, the cooking chamber-reducing element may be the previously described insertion element that is comprised by the food item support. In this way, it not only fulfills the function of reducing the cooking chamber volume but also directly supports the food item to be heated in the microwave.

Furthermore, the cooking chamber-reducing element may optionally fulfill an additional function and may have a depression for collecting condensate.

In the context of the present invention, a “cover” is understood to mean, in particular, a one-sided open and curved, dimensionally stable flat structure that may, for example, have a bell-shaped or dome-shaped form, which may optionally also include one or more steps. The shape of the first cover is independent of the shape of the second cover. The second cover generally has a slightly smaller diameter than the first cover and a less pronounced curvature or height. In particular, the height of the first cover is approximately 1.5 to 2.5 times the height of the first cover, wherein “height” in each case refers to the vertical dimension of the cover when it rests on a surface with its edge bordering the open side. The material from which the first cover and the second cover of the device according to the invention are made is also generally different. While the first cover is made of a material impermeable to microwave radiation, the second cover is made of a material that is at least partially permeable to microwave radiation.

To ensure that the first cover shields the microwave radiation from the outside and reflects it inward, respectively, it is advantageous for it to consist of or comprise a material having high electrical conductivity. Preferably, the first cover therefore comprises or consists of metal, plastic coated with a metal layer, or a ceramic material coated with a metal layer. Particularly preferably, the first cover consists of stainless steel, which, in addition to the required electrical conductivity, also exhibits high strength and corrosion resistance and is easily formable. Alternatively, however, the first cover may also consist of non-stainless steel that has been provided with a corrosion-protective coating (e.g., galvanization, powder coating, enamel). As a further alternative, the first cover may also consist of aluminium or copper alloys, which may offer certain advantages depending on the application environment; in the case of aluminium alloys, in particular, a lower weight.

The second cover is at least partially permeable to microwave radiation and is preferably made of a material selected from the group comprising or consisting of plastics, e.g., polycarbonate, glass, ceramics, and glass-ceramics.

On the side of the first cover opposite the open side, the first cover has an opening through which microwaves can be directed into the space between the first cover and the second cover. The microwaves are generated by the means for generating microwave radiation, typically by a magnetron, and are preferably guided through a waveguide and the opening in the first cover into the cooking chamber formed by the second cover, the food item support, and optionally a seal. Preferably, the frequency of the generated microwaves is 2.45 GHz. Furthermore, it is preferred that a mounting for a shaft stirrer is arranged within the opening in the first cover, which is driven by a motor arranged on the outside of the first cover and is configured to better distribute the microwave radiation introduced into the space between the first and second covers. This ensures homogeneous heating of the food item.

It is known from cooking in conventional microwave ovens that condensation forms during the cooking process, which accumulates particularly on cooler surfaces such as the walls of the microwave oven and may drip onto the food item being heated, resulting in an undesirable sensory impression. The device according to the invention

addresses this problem in a preferred embodiment by comprising a condensate collection ring that is arranged at or in the immediate vicinity of the edge of the second cover and has a depression for collecting condensate formed during the cooking process.

Since the second cover is advantageously designed to be dome-shaped, which reduces stresses induced by internal pressure, condensate droplets forming on the underside of the second cover during cooking flow toward the edge of the second cover and collect there in the condensate collection ring.

Optionally, the condensate collection ring of the device according to the invention is removably arranged at the edge of the second cover, so that it can be removed from the device and emptied after the cooking process is complete. In this embodiment, the condensate collection ring can simultaneously also serve as a cooking chamber-reducing element. Alternatively, however, the condensate collection ring may also be formed as a single piece with the second cover.

According to an advantageous embodiment, the condensate collection ring of the device of the invention has, at the deepest point of the depression in the condensate collection ring, a pipe leading out of the cooking chamber for draining condensate during or after the cooking process, as well as for ventilating and exhausting air from the cooking chamber.

According to a further advantageous embodiment, the device of the invention comprises an electronic pressure sensor configured to measure the pressure in the cooking chamber. The pressure sensor may, for example, be located directly in the cooking chamber, e.g., at the second cover, or in the pipe connected to the condensate collection ring. Alternatively, the pressure sensor may also be arranged at a branch on the pipe connected to the pipe that is in turn connected to the cooking chamber.

The pressure sensor is preferably configured to measure the pressure in the cooking chamber and to transmit the measured pressure to a control unit, which may optionally be integrated into the pressure sensor or be a separate component connected thereto. The control unit is preferably configured to compare the pressure measured by the

pressure sensor in the cooking chamber with a predetermined pressure limit and, if the pressure exceeds or falls below the predetermined pressure limit, to either emit an alarm signal and/or interrupt the cooking process. In this way, the pressure can be monitored during the cooking process, and excessive pressures can be detected and addressed.

Preferably, the device according to the invention has a controllable valve that is arranged in or at the pipe leading out of the device from the condensate collection ring, e.g., a magnetic valve, a pneumatically controlled valve, a hydraulically controlled valve, or a passively pressure-controlled valve, which is configured to interrupt or allow the passage of fluid from one end of the pipe to the other end of the pipe, optionally depending on a pressure determined by the pressure sensor in the cooking chamber. Preferably, the controllable valve is arranged between the pressure sensor and the end of the pipe located outside the device. More preferably, the controllable valve is a 2/2-way valve that is normally open. Consequently, a failure of the power supply automatically leads to venting of the cooking chamber and thus to the establishment of a safe operating state.

In the aforementioned arrangement, the valve fulfills three functions: In a first function, it serves as a “boiling-up valve” at the start of the cooking process. To this end, it is opened for a defined period of time until steam forms in the cooking chamber. The steam displaces the ambient air from the cooking chamber through the pipe to the outside. The valve is then closed to begin building up steam pressure in the cooking chamber. The resulting saturation of the cooking chamber with steam increases the effectiveness of heat transfer from the steam to the food item. In a second function, the valve serves as a pressure relief valve during the cooking process in conjunction with the pressure sensor. If excessive pressure is detected in the cooking chamber, the valve opens and reduces the pressure in a controlled manner. In a third function, after the cooking process is complete, the valve serves to reduce the pressure in the cooking chamber, ensuring safe removal of the food item. At the same time, this pressure reduction also automatically discharges the condensate collected in the condensate collection ring through the pipe, without the need for an additional pump or the like.

According to a preferred embodiment, the device of the invention for steam pressure cooking using microwave radiation comprises not only one cooking chamber, but two or more cooking chambers, each of which is formed by a second cover and a food item support, with an optional seal arranged between them. Optionally, in this embodiment, there is only one means for generating microwave radiation configured to generate microwave radiation for all cooking chambers, or there are multiple means for generating microwave radiation, each of which generates microwave radiation for only one cooking chamber. Regardless of the number of means for generating microwave radiation in the device according to the invention, these are advantageously connected to the control unit. The control unit is configured to control the microwave radiation supplied to each cooking chamber depending on the cooking state of the food item located therein. In particular, the control unit is configured to supply more microwave radiation to a cooking chamber at the beginning of a cooking process taking place therein than during the already advanced cooking state of the food item located therein. The control unit is preferably further configured to start the cooking processes in different cooking chambers at different times, so that, for example, a cooking chamber in which the initial cooking phase is taking place - during which a certain steam pressure must first be established - is supplied with microwave radiation at maximum power, while a cooking chamber in which the initial cooking phase has already ended and the specific steam pressure has already been reached is supplied with microwave radiation at reduced power. In this way, the total power consumption from the supply circuit is kept as low as possible even when multiple cooking processes are taking place in parallel.

Optionally, the device according to the invention for steam-pressure cooking of a food item using microwave radiation may be arranged or installed in a vehicle and operated within the vehicle. This allows for the delivery of a preheated food item and saves the recipient of the delivery the step of heating the food item themselves after receiving the delivery.

The invention further relates to a process for steam-pressure cooking a food item using microwave radiation, comprising the following steps:

- Providing a device for steam-pressure cooking a food item using microwave radiation, comprising a means for generating microwave radiation, a first cover having an opening for introducing microwave radiation, a second cover arranged at a distance from the first cover and permeable to microwave radiation, as well as a mounting for a food item support, the food item support being impermeable to microwave radiation, wherein the device, with the food item support arranged in the mounting, is configured to form a pressure-tight cooking chamber between the second cover and the food item support, as well as optionally a seal arranged between them;
- Arranging the food item support, which is impermeable to microwave radiation and has food arranged thereon, in the mounting, whereby a pressure-tight cooking chamber is formed between the second cover and the food item support, as well as, optionally, a seal arranged between them;
- Generating microwave radiation by means of the means for generating microwave radiation and heating the food item placed on the food item support by means of the generated microwave radiation.

Preferably, the device provided in the process according to the invention is a device according to the invention that may exhibit all of the features of the device according to the invention described above in any combination.

When the food item support is arranged in the mounting, thereby forming a pressure-tight cooking chamber, the food item support is connected to the mounting - which is arranged in particular at the second cover - especially in a form-fitting or force-fitting manner. For example, the mounting may be a recess in the second cover or a rail system arranged thereon into which the food item support is inserted.

In a preferred embodiment of the process according to the invention, condensate formed during the heating of the food item arranged on the food item support accumulates in a depression of a condensate collection ring arranged at or in the immediate vicinity of the edge of the second cover. This is preferably discharged from the cooking chamber via a pipe leading out of the cooking chamber, one end of the pipe being arranged at the lowest point of the condensate collection ring, and at the

other end of the pipe is either collected in a collection vessel or directed into a wastewater connection.

In embodiments in which the device used in the process according to the invention comprises a controllable valve arranged in or on the pipe, which is configured to interrupt or allow the passage of fluid from one end of the pipe to the other end of the pipe, optionally depending on a pressure determined by a pressure sensor in the cooking chamber, the valve preferably interrupts or opens the aforementioned passage when a specific predetermined pressure is exceeded or not reached in the cooking chamber. For example, the valve opens the passage at the start of a cooking process until a predetermined first pressure, as determined by the pressure sensor, has built up in the cooking chamber, and then closes. If, during the cooking process, a predetermined second pressure is determined in the cooking chamber by the pressure sensor, the valve opens again and clears the passage in the pipe.

Additionally or alternatively, the valve may also open or close independently of pressure after a specific duration of the cooking process.

Optionally, the process according to the invention also comprises a step of arranging one or more cooking chamber-reducing elements on the food item support or at the second cover to adapt the size of the cooking chamber to the size of the portion of the food item to be cooked.

Detailed Description of the Invention

The invention is now described in more detail with reference to examples of embodiment and with reference to the figures, which schematically show

- in Figure 1, a sectional view of a device according to the invention,
- in Figure 2, two perspective views of devices according to the invention,
- in Figure 3, a further perspective view of a device according to the invention,
- in Figure 4, a sectional view of a further embodiment of a device according to the invention,

- in Figure 5, a perspective view of a further device according to the invention, and
- in Figure 6, a perspective view of a further device according to the invention.

Figure 1 shows a sectional view of a device **1** according to the invention, in which a food item support **8** is arranged in the mounting **7** (not shown). The device **1** according to the invention comprises a first cover **4** having an opening **5** for the introduction of microwave radiation. A second cover **6**, which is permeable to microwave radiation, is arranged at a distance from the first cover **4**, and the mounting **7** for the food item support (not visible) is arranged at the second cover **6**. As can be seen, both covers **4** and **6** are curved toward the same side, with the first cover **4** being more strongly curved than the second cover **6**. In this way, a cavity is formed between the first cover **4** and the second cover **6**, into which microwave radiation is introduced through the opening **5** in the first cover **4** via a waveguide **15**. A shaft stirrer **17**, driven by a motor **16**, is arranged with its mounting in the opening **5**, through which the microwave radiation generated by a means for generating microwave radiation (not shown) is distributed homogeneously. The cooking chamber **9** is formed by arranging the food item support **8** in the mounting **7** between them and is sealed pressure-tight by the seal **10**.

According to the preferred embodiment, the device **1** has a condensate collection ring **11**, which is arranged at the edge of the second cover **6** and has a depression for collecting condensate formed during the cooking process. An end of a pipe **12** is arranged in this depression, through which condensate can be drained from the device **1** and the cooking chamber **9** can be ventilated and air can be exhausted.

In Figure 2, subfigures a) and b) each show a perspective view of the device **1** of the invention from Figure 1, which also schematically shows the means for generating microwave radiation **3**, which is in particular a magnetron. In subfigure a), the device **1** is shown at a distance from the food item support **8** having food **2** arranged thereon, i.e., in this arrangement there is not yet a defined cooking chamber **9**. In subfigure b), however, the food item support **8** contacts the device **1** according to the invention, and a pressure-tight cooking chamber **9** is defined by the second cover (not shown) and the food item support **8**.

Figure 3 shows a further perspective view of the arrangement shown in Figure 2a of a food item support **8** at a distance to the device **1** according to the invention.

Figure 4 shows a further embodiment of a device **1** according to the invention in a sectional view. In this embodiment, in addition to the components of the device **1** shown in Figure 1, the device **1** further comprises a pressure sensor **13** and a magnetic valve **14** as a controllable valve, each of which is arranged in or connected to the pipe **12**. The pressure sensor **13** is configured to determine the pressure in the cooking chamber **9**, and the magnetic valve **14** is preferably configured to interrupt or allow the passage of fluid from one end of the pipe **12** to the other end of the pipe **12** depending on a pressure determined by the pressure sensor **13** in the cooking chamber **9**. In this way, when the magnetic valve **14** is open, either air from the outside can enter the cooking chamber **9**, or air, steam, and/or condensate can exit the cooking chamber **9** to the outside.

Figure 5 shows another embodiment of a device **1** according to the invention in an exploded view. This differs from the embodiment shown in Figure 3 in that the food item support **8** is multi-part and comprises a serving tray carrying the food item **2**, an insulating insertion element **18**, and a metallic outer wall facing away from the cooking chamber **9**. However, in contrast to the three-part embodiment of the food item support **8** shown, it may also consist of only two parts, wherein the insulating insertion element **18** carries the food item **2** and functions as a serving tray. A corresponding embodiment is shown in Figure 6.

The features of the invention disclosed in the preceding description, in the figures, and in the claims may be essential for the realization of the invention in its various embodiments, either individually or in any combination.

List of reference numerals:

- 1 Device for steam-pressure cooking
- 2 Food item
- 3 Means for generating microwave radiation
- 4 First cover
- 5 Opening in the first cover
- 6 Second cover
- 7 Mounting
- 8 Food item support
- 9 Cooking chamber
- 10 Seal
- 11 Condensate collection ring
- 12 Pipe
- 13 Pressure sensor
- 14 Controllable valve
- 15 Waveguide
- 16 Motor
- 17 Shaft stirrer
- 18 Insertion element
- 19 Cooking chamber-reducing element

Claims

1. Device (1) for steam-pressure cooking a food item (2) using microwave radiation, comprising a means for generating microwave radiation (3), characterized by a first cover (4) having an opening (5) for introducing microwave radiation, a second cover (6) arranged at a distance from the first cover (4) and permeable to microwave radiation, as well as a mounting (7) for a food item support (8) that is impermeable to microwave radiation, wherein the device is configured, when the food item support (8) is arranged in the mounting (7), to form a pressure-tight cooking chamber (9) between the second cover (6) and the food item support (8) and, optionally, a seal (10) arranged between them, wherein the food item support (8) forms part of the cooking chamber (9) and seals it in a pressure-tight manner.
2. Device according to claim 1, characterized by a condensate collection ring (11) arranged at or in the immediate vicinity of the edge of the second cover (6) and having a depression for collecting condensate formed during the cooking process.
3. Device according to claim 2, characterized in that the condensate collection ring (11) is removably arranged on the edge of the second cover (6).
4. Device according to any of the preceding claims, characterized in that the second cover (6) is curved toward the first cover (4) and/or is made of a material selected from the group comprising or consisting of plastics, glass, ceramics, and glass-ceramics.
5. Device according to any one of the preceding claims, characterized in that the condensate collection ring (11) has, at the deepest point of the depression, a pipe (12) leading out of the cooking chamber (9) for draining condensate and for ventilating and exhausting the air from the cooking chamber (9), respectively.

6. Device according to any of the preceding claims, characterized by a pressure sensor (13) configured to measure the pressure in the cooking chamber (9).
7. Device according to any of the preceding claims, characterized by a controllable valve (14) arranged in or on the pipe (12), which is configured to interrupt or allow the passage of fluid from one end of the pipe (12) to the other end of the pipe (12), optionally depending on a pressure determined by the pressure sensor (13) in the cooking chamber (9).
8. Device according to any one of the preceding claims, characterized in that the food item support (8) comprises an outer side made of or containing metal, which faces away from the cooking chamber (9) when positioned in the mounting (7), as well as an insulating insertion element (18) facing the cooking chamber (9).
9. Device according to claim 8, characterized in that the insulating insertion element (18) is made of plastic and/or porcelain.
10. Device according to any one of the preceding claims, characterized by one or more cooking chamber-reducing elements (19) arranged to reduce the size of the cooking chamber (9) by being positioned on the food item support (8) and/or on the second cover (6).
11. Device according to claim 10, characterized in that the insulating insertion element (18) is a cooking chamber-reducing element (19).
12. Process for steam-pressure cooking a food item using microwave radiation, comprising the following steps:
 - Providing a device (1) for steam-pressure cooking a food item (2) using microwave radiation, comprising a means (3) for generating microwave radiation, a first cover (4) having an opening (5) for introducing microwave radiation, a second cover (6) arranged at a distance from the first cover (5) and permeable to microwave radiation, as well as a mounting (7) for a food item

support (8) that is impermeable to microwave radiation, wherein the device is configured, when the food item support (8) is arranged in the mounting (7), to form a pressure-tight cooking chamber (9) between the second cover (6) and the food item support (8), as well as optionally a seal (10) arranged between them;

- Arranging the food item support (8) that is impermeable to microwave radiation having a food item (2) arranged thereon within the mounting (7), whereby a pressure-tight cooking chamber (9) is formed between the second cover (6) and the food item support (8) as well as, optionally, a seal (10) arranged between them;

- Generating microwave radiation by means of the means (3) for generating microwave radiation and heating the food item (2) placed on the food item support (8) by means of the generated microwave radiation.

13. Process according to claim 12, characterized in that condensate formed during the heating of the food item (2) arranged on the food item support (8) collects within a depression of a condensate collection ring (11) that is arranged at or in the immediate vicinity of the edge of the second cover (6).

14. Process according to any one of claims 12 or 13, wherein the provided device (1) has, at the lowest point of the depression of the condensate collection ring (11), a pipe (12) leading out of the cooking chamber (9) for draining condensate and for ventilating and exhausting the air from the cooking chamber (9), and in addition has a controllable valve (14) arranged in or at the pipe (12), wherein the controllable valve (14) interrupts or allows the passage of fluid from one end of the pipe (12) to the other end of the pipe (12) depending on a pressure determined by a pressure sensor (13) in the cooking chamber (9).

15. Process according to any one of claims 12 to 14, wherein the provided device (1) has a control unit, and wherein the control unit controls the intensity of the microwave radiation supplied to the cooking chamber (9) as a function of the

cooking state of the food item (2) and/or as a function of the pressure determined by the pressure sensor (13) in the cooking chamber (9).