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Inventor(s)	Uchendu; Chizoba Brendan

Heated food processor

Abstract

A food processing system includes a food processing base, an attachment configurable with said food processing base, said attachment including a processing chamber, a heat distribution element for transferring heat to a fluid within said processing chamber, and a controller associated with the system. The controller is programmable to evaluate a plurality of successive changes in temperature of said heat distribution element, and a value of each temperature change between each of said plurality of successive changes in temperature to determine if a fluid temperature in said processing chamber is equal to a target temperature.

Inventors:	**Uchendu; Chizoba Brendan (Boston, MA)**
Applicant:	**SHARKNINJA OPERATING LLC** (Needham, MA)
Family ID:	**1000008750606**
Assignee:	**SharkNinja Operating LLC (Needham, MA)**
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Primary Examiner: Howell; Marc C

Attorney, Agent or Firm: The Webb Law Firm

Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS (1) This is a National Stage Application filed under 35 U.S.C. 371 based on International Patent Application No. PCT/US2020/034664, filed on May 27, 2020, which claims the benefit of U.S. Provisional Application No. 62/853,628, filed on May 28, 2019, the disclosures of both of which are incorporated herein by reference in their entireties.

BACKGROUND

(1) Exemplary embodiments of the present invention relate to a food processor, and more particularly to a container of a food processor configured to receive one or more food items therein.

(2) Food processors are commonly used to process a plurality of different food products, including liquids, solids, semi-solids, gels and the like. It is well-known that food processors are useful devices for blending, cutting, and dicing food products in a wide variety of commercial settings, including home kitchen use, professional restaurant or food services use, and large-scale industrial use. They offer a convenient alternative to chopping or dicing by hand, and often come with a range of operational settings and modes adapted to provide specific types or amounts of food processing, e.g., as catered to particular food products.

(3) Food preparation often requires heating one or more food items in addition to mixing foods together. Integration of a heater into a food processor increases the functionality of the food processor, by providing a single system that may be capable of performing an entire food preparation process.

SUMMARY

(4) According to an embodiment, a food processing system includes a food processing base, an attachment configurable with said food processing base, said attachment including a processing chamber, a heat distribution element for transferring heat to a fluid within said processing chamber, and a controller associated with the system. The controller is programmable to evaluate a plurality of successive changes in temperature of said heat distribution element, and a value of each temperature change between each of said plurality of successive changes in temperature to determine if a fluid temperature in said processing chamber is equal to a target temperature.

(5) In addition to one or more of the features described above, or as an alternative, in further embodiments said controller is programmable to perform a plurality of successive control operations, each of said plurality of successive changes in temperature of said heat distribution element being determined for said plurality of successive control operations.

(6) In addition to one or more of the features described above, or as an alternative, in further embodiments said fluid temperature in said processing chamber is equal to a target temperature when said value of each temperature change between each of said successive changes in temperature is within an allowable tolerance.

(7) In addition to one or more of the features described above, or as an alternative, in further embodiments said allowable tolerance is 1%.

(8) In addition to one or more of the features described above, or as an alternative, in further embodiments said attachment further comprises at least one heating element located remotely from said processing chamber.

(9) In addition to one or more of the features described above, or as an alternative, in further embodiments said attachment further comprises a container body having a first end and a second end defining said processing chamber being; and a processing assembly at least partially arranged within said processing chamber.

(10) In addition to one or more of the features described above, or as an alternative, in further embodiments said heat distribution element seals said second end of said container body.

(11) In addition to one or more of the features described above, or as an alternative, in further embodiments said heat distribution element forms a portion of said container body.

(12) In addition to one or more of the features described above, or as an alternative, in further embodiments said processing assembly is connectable to said second end of said container body and said heat distribution element is a portion of said processing assembly.

(13) In addition to one or more of the features described above, or as an alternative, in further embodiments comprising a sensor for detecting said changes in temperature of said heat distribution element said sensor being operably coupled to said controller.

(14) In addition to one or more of the features described above, or as an alternative, in further embodiments said target temperature is less than or equal to a maximum allowable temperature.
(15) In addition to one or more of the features described above, or as an alternative, in further embodiments said food processing system is operable in a plurality of modes and said maximum allowable temperature is determined in response to a selected mode of said plurality of modes.
(16) According to another embodiment, a method of controlling a temperature in a container of a food processing system includes transferring heat to a processing chamber of the container, evaluating a plurality of successive changes in temperature of a heat distribution element associated with the container, and evaluating a value of each temperature change between each of said plurality of successive changes in temperature to determine if a fluid temperature in said processing chamber is equal to a target temperature.
(17) In addition to one or more of the features described above, or as an alternative, in further embodiments comprising maintaining said fluid temperature of said processing chamber below a maximum temperature.
(18) In addition to one or more of the features described above, or as an alternative, in further embodiments said maximum temperature varies in response to a mode of operation of the food processing system.
(19) In addition to one or more of the features described above, or as an alternative, in further embodiments said maximum temperature is about 100° C.
(20) In addition to one or more of the features described above, or as an alternative, in further embodiments said maximum temperature is about 82° C.
(21) In addition to one or more of the features described above, or as an alternative, in further embodiments said maximum temperature is about 71° C.
(22) In addition to one or more of the features described above, or as an alternative, in further embodiments comprising performing a plurality of successive control operations, each of said plurality of successive changes in temperature of said heat distribution element being determined for said plurality of successive control operations.
(23) In addition to one or more of the features described above, or as an alternative, in further embodiments said change in temperature of said heat distribution element for each of said plurality of successive control operations further comprises heating said heat distribution element to a first temperature, performing at least one processing step, sensing a second temperature of said heat distribution element after said performing at least one processing step, and comparing said first temperature and said second temperature.
(24) In addition to one or more of the features described above, or as an alternative, in further embodiments said fluid temperature of the container is equal to said target temperature when said value of each temperature change between each of said successive changes in temperature is within an allowable tolerance.
(25) In addition to one or more of the features described above, or as an alternative, in further embodiments said allowable tolerance is 1%.
(26) In addition to one or more of the features described above, or as an alternative, in further embodiments said fluid temperature of the container is not at said target temperature when said value of each temperature change between each of said successive changes in temperature exceeds an allowable tolerance.
(27) According to yet another embodiment, a food processing system includes a food processing base an attachment configurable with said food processing base, said attachment including a processing chamber, a heating element operable to heat a fluid in said processing chamber, and a controller associated with the system. The controller is programmable to operate said heating element in a plurality of modes. Each of said plurality of modes is associated with a distinct target temperature of said processing chamber and at least one of said distinct target temperatures being below 100° C.

(28) In addition to one or more of the features described above, or as an alternative, in further embodiments said controller is programmable to operate said heating element in each of said plurality of modes to heat said processing chamber to said target temperature without exceeding said target temperature.
(29) In addition to one or more of the features described above, or as an alternative, in further embodiments said target temperature is below 82° C.
(30) In addition to one or more of the features described above, or as an alternative, in further embodiments said target temperature is below 71° C.
(31) In addition to one or more of the features described above, or as an alternative, in further embodiments said heating element is located remotely from said processing chamber.
(32) In addition to one or more of the features described above, or as an alternative, in further embodiments said attachment further comprises a container body having a first end and a second end defining said processing chamber being; and a processing assembly at least partially arranged within said processing chamber.
(33) In addition to one or more of the features described above, or as an alternative, in further embodiments comprising a heat distribution element in a heat transfer relationship with said heating element and said processing chamber.
(34) In addition to one or more of the features described above, or as an alternative, in further embodiments said heat distribution element seals said second end of said container body.
(35) In addition to one or more of the features described above, or as an alternative, in further embodiments said heat distribution element forms a portion of said container body.
(36) In addition to one or more of the features described above, or as an alternative, in further embodiments said processing assembly is connectable to said second end of said container body and said heat distribution element is a portion of said processing assembly.
(37) In addition to one or more of the features described above, or as an alternative, in further embodiments comprising a sensor for detecting a change in temperature of said heat distribution element said sensor being operably coupled to said controller.

Description

BRIEF DESCRIPTION OF THE FIGURES
(1) The accompanying drawings incorporated in and forming a part of the specification embodies several aspects of the present invention and, together with the description, serves to explain the principles of the invention. In the drawings:
(2) FIG. **1** is a perspective view of an example of an attachment suitable for use with a food processing system;
(3) FIG. **2** is a schematic view of a food processing system according to an embodiment;
(4) FIG. **3** is a cross-sectional view of a portion of a food processing system according to an embodiment;
(5) FIG. **4** is a schematic diagram of a control system of the food processing system according to an embodiment; and
(6) FIG. **5** is a flow diagram of a control sequence of an algorithm according to an embodiment.
(7) The detailed description explains embodiments of the invention, together with advantages and features, by way of example with reference to the drawings.
DETAILED DESCRIPTION
(8) Referring now to FIG. **1**, is an example of a multi-functional food processing system **20** is illustrated. In general, the food processing system **20** can be adapted to perform any food processing or blending operation including as non-limiting examples, dicing, chopping, cutting, slicing, mixing, blending, stirring, crushing, or the like.

(9) The food processing system **20** includes a base **22** having a body or housing **24** within which a motorized unit M (see FIG. **4**) and at least one controller **64** (see FIG. **4**) are located. The base **22** includes at least one rotary component, such as a drive coupler (not shown) for example, driven by the motorized unit located within the housing **24**. The base **22** additionally includes a control panel or user interface **28** having one or more inputs **29** for turning the motorized unit on and off and for selecting various modes of operation, such as pulsing, blending, or continuous food processing. The at least one drive coupler is configured to engage a portion of an attachment **30** coupled to the base **22** for the processing of food products located within an interior of the attachment **30**. This will become more apparent in subsequent FIGS. and discussion.

(10) One or more attachments **30** varying in size and/or functionality may be configured for use with the base **22**. A first attachment illustrated in FIG. **1** includes a jar or container **32** having a rotatable blade assembly **34**. In some embodiments, the container **32** is a pitcher sized to hold approximately 72 fluid ounces. However, embodiments where the container **32** has a larger or smaller capacity are also within the scope of the disclosure. As shown, the container **32** typically includes a first open end **36**, a second closed end **38**, and one or more sidewalls **40** extending between the first end **36** and the second end **38** to define a processing chamber **42** of the container **32**. A rotatable blade assembly **34** may be integrally formed with the second end **38** of the container **32**, or alternatively, may be removably coupled thereto. The attachment **30** may additionally include an accessory, such as a lid **44** configured to couple to the first open end **36** of the container **32** to seal the container **32**. The second closed end **38** of the attachment is configured to mount to the base **22** to perform a food processing operation. Accordingly, the orientation of the container **32** when the attachment **30** is connected to the base **22** and separated from the base **22** remains generally constant. However, it should be understood that other attachments, such as a personal blender container having a first configuration when separated from the base **22** and a second inverted configuration when coupled to the base **22** and a rotatable blade assembly **34** configured to removably couple to the container are also within the scope of the disclosure.

(11) In each of the various attachment configurations, the rotatable blade assembly **34** is configured to couple to the base **22** of the food processing system **20**. A driven coupler (not shown) associated with at least one blade **46** of the rotatable blade assembly **34** is positioned at an exterior of the rotatable blade assembly **34**. The at least one drive coupler is configured to engage the driven coupler to rotate the at least one blade **46** about an axis X (see FIG. **1**) to process the food products located within the processing chamber **42** of the attachment **30**. It should be understood that the attachments **30** illustrated and described herein are intended as an example only, and that other attachments suitable for use with the base **22**, are also contemplated herein.

(12) With reference now to FIGS. **2** and **3**, in an embodiment, the container **32** of the attachment **30**, for example the pitcher container as shown in FIG. **1**, includes a heating element **50** selectively operable to heat the contents of the processing chamber **42**. Although a single heating element **50** is illustrated and described herein, it should be understood that embodiments having multiple heating elements **50** are also within the scope of the disclosure. The heating element **50** may be located at any suitable position about to the container **32**. In the illustrated, non-limiting embodiment, best shown in FIG. **3**, the heating element **50** is arranged adjacent the second end **38** of the container **32**, for example at an underside of the container **32** near the driven coupling.

(13) An upper connector **52** including one or more contactors or prongs is coupled to the heating element **50** adjacent the underside of the second end **38**. When the container **32** is seated on the base **22**, the upper connector **52** mates or contacts a corresponding lower connector **54** mounted on the base **22** (see FIG. **3**), to deliver power from a circuit within the base **22** to the heating element **50**. However, any suitable connection or mechanism for delivering power to the heating element **50** is contemplated herein.

(14) With continued reference to FIG. **3**, a heat distribution element **56** is located upwardly adjacent the heating element **50** at the second end **38** of the container **32**. Accordingly, a shaft **58**

supporting the at least one blade **46** of the rotatable blade assembly **34** extends through the heat distribution element **56** and into the processing chamber **42**. The heat distribution element **56** may have a size and shape generally complementary to the container **32** at its mounted position. In the illustrated, non-limiting embodiment, the heat distribution element **56** seals the second end **38** of the processing chamber **42**. In such embodiments, a gasket **60** is positioned about the outer periphery of the heat distribution element **56** to prevent any contents of the processing chamber **42** from leaking onto the heating element or corresponding electronic components. Further, in embodiments where the heat distribution element **56** seals the second end **38** of container **32**, the heat distribution element **56** may be incorporated into the container **32** directly, or alternatively, may be integrated into a portion of a rotatable blade assembly **34** connectable to the second end **38** of the container **32**.
(15) The heat distribution element **56** may be formed from a metal, or another suitable material having a high coefficient of thermal conductivity. The heat distribution element **56** is heated by operation of the heating element **50**, such as via conduction, radiation, or induction for example. Heat from the heat distribution element **56** is then transferred to the contents of the processing chamber **42**, such as via conduction. However, heat may be transferred from the heat distribution element **56** to the contents of the processing chamber **42** via any suitable heat transfer process, including conduction, convection, and radiation. Although the heat distribution element **56** is illustrated and described herein with respect to an attachment **30** including a pitcher container, any attachment, such as a personal blender attachment including an inverted container for example, may be adapted for use with a heating element **50**.
(16) With continued reference to FIGS. **2** and **3**, and further reference to FIG. **4**, the container **32** may additionally include a sensor **62** operable to monitor a temperature of at least one of the heating elements **50** and the heat distribution element **56**. In an embodiment, the sensor **62** is mounted in contact with a surface of the heat distribution element **56**. The sensor **62** is operatively coupled to a controller **64** located within the base **22** and communicates signals indicating the sensed temperature thereto. The sensor **62** may be wired to the controller **64**, or alternatively, may be able to communicate with the controller **64** wirelessly.
(17) During a heating operation of the food processing system **20**, the sensed temperature of the heat distribution element **56** is provided to the controller **64**. The temperature may be sensed and communication continuously or at predetermined time intervals. In response to the sensed temperature, the controller **64** may vary operation of the heating element **50**. For example, if the sensed temperature of the heat distribution element **56** is below a target temperature, the controller **64** may increase the power provided to the heating element **50**. Similarly, if the sensed temperature is above a target temperature, the controller **64** may decrease the power provided to the heating element **50**, or cease operation of the heating element **50** entirely.
(18) Because the heating element **50** is mounted at a localized region of the container **32**, remote from the processing chamber **42**, the contents of the processing chamber **42** positioned directly adjacent the heat distribution element **56** will heat more quickly than the contents located remotely from the heat distribution element **56**. Because of this resulting temperature gradient, the temperature of the heat distribution element **56** detected by the sensor **62** does not accurately represent the temperature of all of the contents within the processing chamber **42**. Accordingly, during a heating operation, the controller **64** may execute an algorithm **66** to determine the temperature of the processing chamber **42**. The algorithm **66** may be stored within a memory **68** accessible by the controller **64**.
(19) With reference now to FIG. **5**, the algorithm **66** includes a repeatable control sequence **100** for evaluating the fluid temperature within the processing chamber **42**. As shown, in a first step **102**, the heating element **50** is energized to heat the heat distribution element **56** to a target temperature. The sensor **62** may be used to monitor the temperature of the heat distribution element **56** to identify when the heat distribution element **56** has reached the target temperature. The length of

time required to achieve the target temperature will vary based on both the target temperature and the initial temperature of the heat distribution element **56**. Once the heat distribution element **56** reaches the target temperature, the heating element **50** remains energized to maintain the heat distribution element **56** at the target temperature, as shown in step **104**, for a predetermined period of time. The period of time that the heating element **50** remains operational after the heat distribution element **56** has reached the target temperature is also referred to herein as a “dwell” time. The dwell time may be any suitable length of time, including but not limited to at least 30 seconds, at least 60 second, and at least 90 seconds. During the dwell time, heat from the heat distribution element **56** is transferred to the contents of the processing chamber **42**.

(20) In step **106**, the heating element **50** is de-energized, and in step **108**, the rotatable blade assembly **34** is rotated about its axis X (see FIG. **1**) to stir the contents of the processing chamber **42**. The stirring operation performed in step **108** may be a quick 1 second pulse, or alternatively, may be a longer continuous or discontinuous rotation of the at least one blade **46**. Stirring the contents of the processing chamber **42** facilitates a more even distribution of heat across the contents of the processing chamber **42** by moving different portions of the contents into contact with the heat distribution element **56**. In step **110**, after the stirring operation, the food processing system **20** remains inactive or paused for a predetermined period of time, also referred to herein as “soak” time, such as 10 seconds for example. During this soak time, heat from the heat distribution element **56** will continue to transfer to the contents of the processing chamber **42**, even though the heating element **50** is non-operational. Through this heat transfer, heat within the processing chamber **42** is more evenly distributed across the contents located therein and the difference between the temperature of the heat distribution element **56** and the temperature of the contents is reduced. As a result, the temperature of the heat distribution element **56** after the soak time more accurately reflects the temperature of the contents of the processing chamber **42**. After the soak time has elapsed, the temperature of the heat distribution element **56** is sensed, as shown in step **112**. In step **114**, the temperature sensed at the end of the sequence is compared to the target temperature from the beginning of the sequence, and the change in temperature is stored in a database or memory **68**. It should be understood that one or more parameters of the control sequence **100**, such as the dwell time, the soak time, or the time to initially heat the heat distribution element **56** to the target temperature, may vary based on the application.

(21) The change in temperature of the heat distribution element **56** that occurs during a control sequence will vary based on the amount of heat that is transferred to the processing chamber **42** during the control sequence. For example, if the contents of the processing chamber **42** are at a temperature similar to the temperature of the heat distribution element **56**, the amount of heat that is transferred from the heat distribution element **56** to the processing chamber **42** during a control sequence will be limited. Therefore, the change in temperature of the heat distribution element **56** will be relatively small. However, if the contents of the processing chamber **42** are substantially cooler than the heat distribution element **56**, a greater amount of heat will transfer from the heat distribution element **56**. As a result of this increased heat transfer, the change in temperature of the heat distribution element **56** during the control sequence will be larger than when the temperature of the processing chamber **42** is similar to the temperature of the heat distribution element **56**.

(22) In an embodiment, the algorithm **66** uses this change in temperature to evaluate whether the temperature within the processing chamber **42** is stable, as shown in step **116** of FIG. **5**. As used herein, the temperature within the processing chamber **42** is considered “stable” if the temperature is generally constant within an allowable tolerance. In an embodiment, the algorithm **66** does not rely solely on this change in temperature of the heat distribution element **56** that occurs during a control sequence **100** to determine whether the temperature within the processing chamber **42** is stable. Rather, the algorithm **66** will compare the change in temperature to the change in temperature determined for at least the previously performed control sequence **100** to determine the variation in the determined change in temperature between successive control sequences **100**.

(23) If the temperature change determined for two or more successive control sequences is within an allowable tolerance, such as within 1% or alternatively 1° C. for example, the algorithm **66** will determine that the temperature within the processing chamber **42** is stable and at the target temperature. In an embodiment, three sequential changes in temperature must be within the allowable tolerance to determine that the temperature of the processing chamber **42** is at the target temperature. Upon determining that the temperature within the processing chamber **42** is stable, and therefore that the processing chamber **42** is heated to the target temperature, the food processing system **20** may indicate to a user that container **32** has been heated to the target temperature. Alternatively, or in addition, the food processing system **20** may proceed to perform another food processing operation, such as blending for example. If the temperature change associated with successive control sequences **100** is varies by an amount exceed the allowable tolerance, the algorithm **66** will determine that temperature of the processing chamber **42** is not yet stable, and will continue to run additional control sequences until such a determination is made. In an embodiment, even after determining that the temperature within the processing chamber **42** is stable, the algorithm **66** may continue to run continuously during a heating operation to maintain the processing chamber **42** at a desired temperature, such as in the event that cold ingredients are added to the processing chamber **42**.
(24) The algorithm **66** described herein reduces the thermal gradient within the processing chamber **42**, thereby reducing the total length of time required to heat the processing chamber **42** to a target temperature. In addition, inclusion of a controller **64** capable of running the algorithm **66** increases the accuracy of the temperature detection of the processing chamber **42**. This increased accuracy is particularly relevant for applications where one or more of the ingredients provided to the processing chamber **42** are temperature sensitive ingredients. Temperature sensitive ingredients may degrade or evaporate when exposed to high temperatures. For example, alcohol typically boils when heated to a temperature above 82° C. Accordingly, if the food processing system **20** is being used to prepare food that includes alcohol as an ingredient, it is desirable to accurately maintain the temperature of the processing chamber **42** below the boiling temperature of the alcohol to maintain the integrity of the food being prepared.
(25) The food processing system **20** may be operable in one or more modes of operation, each of which is associated with a different maximum temperature of the processing chamber **42**. In an embodiment, the food processing system **20** includes a “High” mode of operation where the temperature of the processing chamber **42** is maintained below 100° C., a “Medium” mode of operation where the temperature of the processing chamber **42** is maintained below 82° C., and a “Low” mode of operation where the temperature of the processing chamber **42** is maintained below 71° C. It should be understood that the maximum temperatures identified herein for each mode are intended as an example only and that any relative low, medium, and high temperatures are within the scope of the disclosure.
(26) All references, including publications, patent applications, and patents cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.
(27) The use of the terms “a” and “an” and “the” and similar referents in the context of describing the invention (especially in the context of the following claims) is to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms “comprising,” “having,” “including,” and “containing” are to be construed as open-ended terms (i.e., meaning “including, but not limited to,”) unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., “such as”)

provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.
(28) Exemplary embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

Claims

1. A food processing system comprising: a food processing base; an attachment configurable with said food processing base, said attachment including a processing chamber; a heat distribution element for transferring heat to a fluid within said processing chamber; and a controller associated with the system, said controller configured to: heat said heat distribution element to a first temperature; perform at least one processing step, said at least one processing step comprising a stirring operation; sense a second temperature of said heat distribution element after said performing at least one processing step; and compare said first temperature and said second temperature to determine if a fluid temperature in said processing chamber is equal to a target temperature.
2. The food processing system of claim 1, wherein said fluid temperature in said processing chamber is equal to said target temperature when a difference between said first temperature and said second temperature is within an allowable tolerance.
3. The food processing system of claim 2, wherein said allowable tolerance is 1%.
4. The food processing system of claim 1, wherein said attachment further comprises at least one heating element located remotely from said processing chamber.
5. The food processing system of claim 1, wherein said attachment further comprises: a container body having a first end and a second end defining said processing chamber; and a processing assembly at least partially arranged within said processing chamber.
6. The food processing system of claim 5, wherein said heat distribution element seals said second end of said container body.
7. The food processing system of claim 6, wherein said heat distribution element forms a portion of said container body.
8. The food processing system of claim 6, wherein said processing assembly is connectable to said second end of said container body and said heat distribution element is a portion of said processing assembly.
9. The food processing system of claim 1, further comprising a sensor for detecting said first and second temperatures, said sensor being operably coupled to said controller.
10. The food processing system of claim 1, wherein said target temperature is less than or equal to a maximum allowable temperature.
11. The food processing system of claim 10, wherein said food processing system is operable in a plurality of modes and said maximum allowable temperature is determined in response to a selected mode of said plurality of modes.
12. The food processing system of claim 1, wherein the controller is configured to continue heating said heat distribution element after reaching said first temperature for a dwell time.
13. The food processing system of claim 12, wherein the dwell time is at least 30 seconds.

14. The food processing system of claim 12, wherein the controller is configured to pause the food processing system for a predetermined soak time after performing said at least one processing step.
15. The food processing system of claim 14, wherein the predetermined soak time is 10 seconds.
16. A method of controlling a temperature in a container of a food processing system, the method comprising: transferring heat to a processing chamber of the container; evaluating a plurality of successive changes in temperature of a heat distribution element associated with the container; evaluating a value of each temperature change between each of said plurality of successive changes in temperature to determine if a fluid temperature in said processing chamber is equal to a target temperature; performing a plurality of successive control operations, each of said plurality of successive changes in temperature of said heat distribution element being determined for said plurality of successive control operations, wherein determining said change in temperature of said heat distribution element for each of said plurality of successive control operations further comprises: heating said heat distribution element to a first temperature; performing at least one processing step, said at least one processing step comprising a stirring operation; sensing a second temperature of said heat distribution element after said performing at least one processing step; and comparing said first temperature and said second temperature.
17. The method of claim 16, further comprising maintaining said fluid temperature of said processing chamber below a maximum temperature.
18. The method of claim 17, wherein said maximum temperature varies in response to a mode of operation of the food processing system.
19. The method of claim 17, wherein said maximum temperature is about 100° C.
20. The method of claim 17, wherein said maximum temperature is about 82° C.
21. The method of claim 17, wherein said maximum temperature is about 71° C.
22. The method of claim 16, wherein said fluid temperature of the container is equal to said target temperature when said value of each temperature change between each of said successive changes in temperature is within an allowable tolerance.
23. The method of claim 22, wherein said allowable tolerance is 1%.
24. The method of claim 16, wherein said fluid temperature of the container is not at said target temperature when said value of each temperature change between each of said successive changes in temperature exceeds an allowable tolerance.
25. The method of claim 16, further comprising: continuing to heat said heat distribution after reaching said first temperature for a dwell time.
26. The method of claim 25, wherein the dwell time is at least 30 seconds.
27. The method of claim 25, further comprising: pausing the food processing system for a predetermined soak time after performing said at least one processing step.
28. The method of claim 27, wherein the predetermined soak time is 10 seconds.