**CLAIMS**

1. A method for processing articles, the method comprising:

(a) obtaining an operating profile for heating a type of article using a microwave heating system, the operating profile including a first group of set point values for operating the microwave heating system to heat the type of article according to a first heating process and a second group of set point values for operating the microwave heating system to heat the type of article according to a second heating process different than the first heating process; and

(b) using a control system operatively coupled to the microwave heating system, operating the microwave heating system according to the first group of set point values, the first group of set point values including a target for a control parameter of the microwave heating system, in which operating the microwave heating system includes:

(i) passing a carrier loaded with a plurality of articles of the type of article corresponding to the operating profile through a liquid-filled microwave heating chamber along a convey line such that the plurality of articles are submerged in a liquid medium within the microwave heating chamber, and

(ii) while passing the carrier through the microwave heating chamber, discharging microwave energy into the microwave heating chamber, the microwave energy used to heat the plurality of articles;

in which operating the microwave heating system results in each of the plurality of articles achieving a sterilisation ($F_0$) value that is greater than or equal to a target $F_0$ value.

2. A method according to Claim 1, in which the control parameter is a total net microwave power discharged and the target is greater than 20 kW and less than 300 kW.

3. A method according to Claim 1, in which the control parameter is liquid temperature in the microwave heating chamber and the target is from and including 40°C to and including 105°C.

4. A method according to Claim 1, in which the control parameter is liquid temperature in the microwave heating chamber and the target is from and including 95°C to and including 135°C.

5. A method according to Claim 1, in which:

the discharging is performed using a plurality of microwave launchers configured to emit microwave energy into the microwave heating chamber, the microwave launchers being spaced apart from one another along a direction of travel of the carrier along the convey line, and

the operating of step (b) further comprises:

passing the carrier past a first launcher of the plurality of microwave launchers and into a space between the first launcher and a second launcher of the plurality of microwave launchers adjacent the first launcher; and

holding the carrier in the space for a dwell time during which the articles are not exposed to microwave energy during the dwell time,

the control parameter is total dwell time, and

the target is greater than 10 seconds and less than 10 minutes.

6. A method according to Claim 1, in which:

the operating of step (b) further comprises:

passing the carrier through a liquid-filled preheating section along a convey line prior to passing the carrier through the microwave heating chamber; and

submerging the articles in a warm liquid medium in the preheating section during the passing of the carrier through the preheating section,

the control parameter is liquid temperature in the preheating section, and

the target is greater than 45°C and less than 95°C.

7. A method according to Claim 1, in which:

the operating of step (b) further comprises:

passing the carrier through a liquid-filled holding section along a convey line subsequent to passing the carrier through the microwave heating chamber; and

submerging the articles in a warm liquid medium in the holding section during the passing of the carrier through the holding section,

the control parameter is liquid temperature in the holding section, and

the target is greater than 65°C and less than 140°C.

8. A method according to Claim 1, in which:

the operating of step (b) further comprises:

passing the carrier through a liquid-filled cooling section along a convey line subsequent to passing the carrier through the microwave heating chamber; and

submerging the articles in a cool liquid medium in the cooling section during the passing of the carrier through the cooling section,

the control parameter is liquid temperature in the cooling section, and

the target is from and including 35°C and less than 65°C.

9. A method according to Claim 1, in which the operating of step (b) further comprises:

(i) during at least a portion of the heating, measuring the value of the control parameter to provide a measured value;

(ii) comparing the measured value with the target value for the control parameter to determine a difference;

(iii) comparing the difference with a predetermined allowable difference (PAD); and

(iv) when the difference is greater than the PAD, one or more of:

discarding the articles;

rerunning the articles through the microwave heating system;

changing a total net microwave power discharged into the microwave heating chamber;

changing a liquid flow rate in the microwave heating chamber;

changing a liquid temperature in the microwave heating chamber; and

changing a convey speed of the carrier through the microwave heating chamber.

10. A method according to Claim 1, in which the control parameter is a liquid flow rate in a section of the microwave heating system and the target is greater than 1 gallon per minute and less than 75 gallons per minute.

11. A method according to Claim 1, in which the control parameter is convey speed through a section of the microwave heating system and the target is greater than 0.25 inches per second and less than 6 inches per second.

12. A method for processing articles, comprising:

(a) obtaining an operating profile for heating a type of article using a microwave heating system, the operating profile including a first group of set point values for operating the microwave heating system to heat the type of article according to a first heating process and a second group of set point values for operating the microwave heating system to heat the type of article according to a second heating process different than the first heating process;

(b) selecting the first group of set point values from the operating profile, the first group of set point values including a first target value for a control parameter of the microwave heating system, the first target value used by a control system operatively coupled to the microwave heating system as a first operating set point for the control parameter;

(c) using the control system operatively coupled to the microwave heating system, operating the microwave heating system according to the first group of set point values by:

(i) passing a carrier loaded with a plurality of articles of the type of article through a liquid-filled microwave heating chamber along a convey line, in which the plurality of articles is submerged in a liquid medium during passing through the microwave heating chamber; and

(ii) while passing the carrier through the microwave heating chamber, discharging microwave energy into the microwave heating chamber to heat the plurality of articles;

(d) during the operating of step (c), measuring an actual value of the control parameter to provide a measured value;

(e) in response to determining that a difference between the measured value and the first target value exceeds a predetermined allowable difference, selecting the second group of set point values from the operating profile; and

(f) using the control system, operating the microwave heating system according to the second group of set point values.

13. A method according to Claim 12, in which the control parameter comprises at least one of total net microwave power discharged into the microwave heating chamber, liquid temperature in a section of the microwave heating system, liquid flow rate in a section of the microwave heating system, and convey speed of the carrier through a section of the microwave heating system.

14. A method according to Claim 12, in which each of the first group of set point values and the second group of set point values correspond to different temperature-time profiles for the type of article.

15. A method according to Claim 12, in which the first heating process and the second heating process are for different sterilisation ($F_0$) values for the type of article.

16. A method according to Claim 12, in which the first group of set point values and the second group of set point values correspond to substantially similar temperature-time profiles for the type of article.

17. A method according to Claim 12, in which the first heating process and the second heating process are for substantially similar sterilisation ($F_0$) values for the type of article.

18. A method according to Claim 15, in which the selecting of step (e) is further in response to determining a difference between a second target value for the control parameter of the microwave heating system and the measured value differ by less than the predetermined allowable difference.

19. A method according to Claim 12, in which:

the control parameter is a first control parameter,

the first group of set point values includes a first target value for a second control parameter different from the first control parameter, and

the second group of set point values includes a second target value for the second control parameter.

20. A microwave heating system comprising:

a plurality of liquid-filled processing sections including a microwave heating chamber section, each of the plurality of processing sections comprising a respective convey segment configured to transport a carrier with a plurality of articles through the processing section such that the articles are submerged in a liquid medium during passing through the processing section; and

a control system operatively coupled to each of the plurality of processing sections to control operation of the processing sections, the control system adapted to:

(a) access an operating profile associated with a type of article, the operating profile including each of a first group of set point values and a second group of set point values, each of the first group of set point values and the second group of set point values for achieving a heating target for the type of article, the first group of set point values including a first target value for a control parameter of a processing section of the plurality of processing sections and the second group of set point values including a second target value for the control parameter of the processing section;

(b) operate the processing section in accordance with the first group of set point values including using the first target value as a first operating set point for the control parameter;

(c) pass a carrier loaded with a plurality of articles through each processing section including the microwave heating chamber;

(d) while passing the carrier through the microwave heating chamber, discharge microwave energy into the microwave heating chamber to heat the plurality of articles;

(e) measure an actual value of the control parameter to provide a measured value;

(f) in response to determining that a difference between the measured value and the first target value exceeds a predetermined allowable difference, select the second group of set point values from the operating profile; and

(g) following selecting of the second group of set point values, operate the processing section according to the second group of set point values.

21. A method according to Claim 1, in which the operating of step (b) further comprises:

(i) during at least a portion of the heating, measuring the value of the control parameter to provide a measured value;

(ii) comparing the measured value with the target value for the control parameter to determine a difference;

(iii) comparing the difference with a predetermined allowable difference (PAD); and

(iv) when the difference is greater than the PAD, each of selecting the second group of set point values from the operating profile and operating the microwave system according to the second group of set point values.