

CLAIMS

1. Microwave disinfection system (1) configured to
5 destroy or inactivate in real time one or more pathogens by
means of one or more microwave irradiations, wherein said
microwave disinfection system (1) comprises a microwave
disinfection device (10) including:
- a control section (11) including electronic control
10 means (111) and storage means (112); and
- a microwave irradiation section (12) controlled by the
electronic control means (111) and configured to emit
microwave signals;
the microwave disinfection system (1) further comprising
15 human-machine interface means (13) connected to the control
section (11) and configured to allow a user to configure the
control section (11) by setting and storing in the storage
means (112) one or more predefined microwave irradiation
parameters related to one or more predefined microwave
20 disinfection treatments against one or more pathogens;
wherein the electronic control means (111) are
configured to operate the microwave irradiation section (12)
based on the predefined microwave irradiation parameter(s)
stored in the storage means (112) such that said microwave
25 irradiation section (12) performs the predefined microwave
disinfection treatment(s) against said pathogen(s);
and wherein the microwave irradiation section (12) is
configured to, when operated by the electronic control means
(111), perform one or more microwave irradiations based on
30 said predefined microwave irradiation parameter(s).

2. The microwave disinfection system of claim 1,
wherein the human-machine interface means (13) are
configured to allow a user to set and store in the storage
35 means (112), for a specific pathogen, one or more respective
predefined microwave irradiation parameters related to one
or more respective predefined microwave disinfection

treatments against said specific pathogen.

3. The microwave disinfection system according to claim 1 or 2, wherein the human-machine interface means (13) are
5 configured to allow a user to set and store in the storage means (112), for each pathogen of a plurality of given pathogens, one or more respective predefined microwave irradiation parameters related to one or more respective predefined microwave disinfection treatments against said
10 pathogen of said plurality of given pathogens.

4. The microwave disinfection system according to claim 2 or 3, wherein the respective predefined microwave irradiation parameter(s) related to the specific pathogen or
15 to each pathogen of said plurality of given pathogens include(s) one or more of the following parameters related to microwave inactivation of said specific pathogen or of said pathogen of said plurality of given pathogens:

- one or more predefined microwave irradiation
20 waveforms;
- one or more predefined wavelengths or frequencies of microwave irradiation and/or one or more predefined bands of wavelength or frequency of microwave irradiation;
- one or more predefined microwave irradiation timing
25 parameters;
- one or more predefined microwave irradiation powers.

5. The microwave disinfection system according to any claim 2-4, wherein the human-machine interface means (13)
30 are configured to store in the storage means (112), for the specific pathogen or for each pathogen of the plurality of given pathogens, a respective library containing the respective predefined microwave irradiation parameter(s).

35 6. The microwave disinfection system according to any claim 2-5, wherein the microwave disinfection device (10) further comprises one or more pathogen detectors (15)

configured to:

- detect the presence of the specific pathogen or of one or more pathogens from the plurality of given pathogens; and
- signal the presence of the specific pathogen or of one or more pathogens from the plurality of given pathogens to the electronic control means (111);

wherein the electronic control means (111) are configured to operate the microwave irradiation section (12) based on the respective predefined microwave irradiation parameter(s) stored in the storage means (112) for the specific pathogen or the pathogen(s) of the plurality of given pathogens detected by the pathogen detector(s) (15).

7. The microwave disinfection system according to any preceding claim, wherein the microwave disinfection device (10) further comprises one or more presence sensors (14) configured to:

- detect the presence of one or more persons; and
- signal the presence of one or more persons to the electronic control means (111);

wherein the electronic control means (111) are configured to operate the microwave irradiation section (12) when the presence sensor(s) (14) detect(s) the presence of one or more persons.

8. The microwave disinfection system according to any preceding claim, wherein the microwave disinfection device (10) further comprises one or more environmental sensors (16) configured to send respective environmental monitoring data to the electronic control means (111), and wherein said electronic control means (111) are configured to control operation of the microwave irradiation section (12) based also on the environmental monitoring data received from the environmental sensor(s) (16).

9. The microwave disinfection system according to any preceding claim, wherein the human-machine interface means

(13) are:

- external, and wired or wirelessly connected, to the microwave disinfection device (10); or

- are integrated into said microwave disinfection device (10).

10. The microwave disinfection system according to any one preceding claim, wherein the microwave irradiation section (12) includes:

- 10 • signal generating electronic means (121);
- signal amplification electronic means (123); and
- an antenna (125).

11. The microwave disinfection system of claim 10, 15 wherein the microwave irradiation section (12) further includes signal filtering means (124).

12. Microwave disinfection method based on the use of the microwave disinfection system (1) as claimed in any one 20 of the preceding claims, wherein said microwave disinfection method comprises:

- performing microwave irradiation tests of one or more pathogens to determine one or more microwave irradiation parameters related to one or more microwave disinfection treatments against said pathogen(s);

- setting and storing in the storage means (112), by means of the human-machine interface means (13), the determined microwave radiation parameter(s); and

- using the microwave disinfection device (10) to 30 perform the microwave disinfection treatment(s) against the pathogen(s).

13. The microwave disinfection method according of claim 12, comprising:

- 35 • performing microwave irradiation tests of a specific pathogen to determine one or more respective microwave irradiation parameters related to one or more respective

microwave disinfection treatments against said specific pathogen;

• setting and storing in the storage means (112), by means of the human-machine interface means (13), the
5 respective microwave irradiation parameter(s) determined for the specific pathogen; and

• using the microwave disinfection device (10) to perform said microwave disinfection treatment(s) against said specific pathogen.

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14. The microwave disinfection method according to claim 12 or 13, comprising:

• performing microwave irradiation tests of a plurality of given pathogens to determine, for each of the given
15 pathogens, one or more respective microwave irradiation parameters related to one or more respective microwave disinfection treatments against said pathogen of said plurality of given pathogens;

• setting and storing in the storage means (112), by
20 means of the human-machine interface means (13), the microwave irradiation parameters determined for the given pathogens; and

• using the microwave disinfection device (10) to perform microwave disinfection treatments against said given
25 pathogens.

15. The microwave disinfection method according to claim 13 or 14, wherein the respective microwave irradiation parameter(s) determined for the specific pathogen or for
30 each of the given pathogens include(s) one or more of the following parameters related to microwave inactivation of said specific pathogen or said pathogen of the plurality of given pathogens:

• one or more microwave irradiation waveforms;
35 • one or more wavelengths or frequencies of microwave irradiation and/or one or more wavelength or frequency bands of microwave irradiation;

- one or more microwave irradiation timing parameters;
- one or more microwave irradiation powers.