

Sterilisation

by Low Energy Electrons and Ions in Microwave Low Pressure Plasma (MW-LPP):

Advantages:

- **product temperature and composition are not changed**,
- **Cost-effective** when other methods do not meet requirements,
- **high efficiency** for flat surfaces of up to 6 logs, **in ca. 3 min**, including fast pumping down to ca. 0.01 -0,001 atm and returning to the atmospheric pressure.
- **safety** - processing powdered products with no air annuls powder explosiveness.

MW LP plasma sterilizes by:

- **eroding spores and bacteria** by impacts of low energy ions and electrons;
- **by UVC light** of this MW plasma;
- **drying and eruption** of bacteria at a low pressure.

Conditions for **effective MW-LPP** sterilization:

Free ions & electrons are formed and accelerated by MW fields in a rarified atmosphere of Argon or Nitrogen gases. Its impacts destroy micro-organisms.

Energies of these electrons and ions ca. 5 to 7 eV and are the same as energies of UV photons for sterilization.

The power deposition to a product is too weak to cause food changes.

System parameters:

- **Gas pressure:** 0.01-0.001 atm,
- **MW power in the gas:** 0.10- 0.01 w/cm³,
- **Gas flows:** 30-100 ml/min for 20l chamber.
- **standard MW frequency** of 2.45 GHz.

Our custom pilot bench-top **SBS-MWLPP-Lab1** meets above conditions.

MW LPP sterilisation vs. Autoclaves:

- #1: It is a batch processing with processing chamber of about the same size,
- #2: it consumes a few times less energy,
- #3: it is faster,
- #4: capital costs can be higher and depend on a type of processed products.

Prior history of the method: it has been used for decades for sterilization or cleaning up flat surfaces. Our goal is to customize MW LPP systems for products in the food industry, including shreds and powders.

Independent scientific articles on MW LPP sterilisation can be downloaded from:

<http://www.springerlink.com/content/g351512213j78303>; <http://iopscience.iop.org/1367-2630/11/11/115017>



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