Applications of Microwaves in the Food Sterilizatio

Industry

Detail Introduction :

Reference

Hello everyone! Today I'll share some knowledge about microwaves in the food steril
industry.
Microwave sterilization technology utilizes the thermal and non-thermal effects of
microwaves to eliminate or inhibit microorganisms in food, pharmaceuticals, packagi
materials, and other items.

Principle: Microwave sterilization in equipment utilizes the combined effects of
electromagnetic field thermal and biological processes. The thermal effect of microwa
bacteria denatures proteins, depriving bacteria of the conditions for nutrient reproduc
survival, thus achieving food sterilization and preservation. The biological effect of
microwaves on bacteria involves the microwave electric field altering the potential
distribution across the bacterial cell membrane, affecting the concentration of electro
ions around the cell membrane, and changing the cell membrane's permeability. The
bacteria become malnourished and unable to metabolize normally.

Applications:
Generally, mold, yeast, and common bacteria can be killed by heating to 70-80?. Mic
sterilization for just 1 minute can achieve the desired effect. For mold spores, such as
of Penicillium, conventional sterilization at 68-71? for 20 minutes is required to elimin
them, while microwave sterilization at 68-71? for 2 minutes yields satisfactory results
Microwave sterilization has proven effective in sterilizing, preventing mold, and prese
mooncakes, eliminating the need for imported preservatives. It has also proven highly
effective in drying and sterilizing soybean flour, chicken essence, and dried red swee
potatoes.

Advantages:
Wide Applicability: Microwave sterilization technology is suitable for various types of
products, such as dried fruits, condiments, tea, and medicinal herbs. It can effectively
sterilize materials that are difficult to process using traditional methods.
Good Uniformity: Traditional heating methods often transfer heat from the outside in,
microwave heating works simultaneously from the inside out, resulting in a more unifo
temperature distribution within the material and preventing surface scorching while th
interior remains uncooked.

Preservation of Nutrition and Flavor: Due to its short processing time, microwave ster
minimizes nutrient loss and helps retain the food's original color, aroma, and texture.
Easy Control: The microwave sterilization process allows for precise control of tempe
and time by adjusting power levels. It is simple to operate, highly automated, and suit
large-scale industrial production.
Energy Saving and Environmental Protection: Compared to traditional steam or hot w
sterilization methods, microwave sterilization consumes less energy, reducing energy
expenditure and wastewater/exhaust emissions, thus benefiting environmental protec

Contribution to Environmental Protection: Points to note: When sterilizing packaged f
using plastic materials, polyethylene (PE) is not recommended as it softens easily.
Polypropylene (PP), ABS, polycarbonate (PC), polyester (PET), and nylon are all suit
microwave use. If using glass bottles, quartz glass, borosilicate glass, and soda-lime
are preferred. Tempered glass and ordinary glass are not recommended for microwa
as they may shatter. If using paper or wood cellulose materials, short-term heating is
but if the material is dry, the microwave field may be uneven, causing it to burn or cat
Caution should be exercised when using these materials.
Our factory has been in the microwave industry for over twenty years, with hundreds
clients. We have extensive experience in microwave food sterilization applications. W
welcome interested business owners to leave a message to inquire and discuss
cooperation!

Reference

The following are five authoritative foreign literature websites in the field of Industrial machinery:

1. Food Engineering Magazine

Website: https://www.foodengineeringmag.com/

2.Food Processing Magazine

Website: https://www.foodprocessing.com/

3.Journal of Food Engineering

Website:https://www.journals.elsevier.com/journal-of-food-engineering

4. Food Manufacturing Magazine

Website:https://www.foodmanufacturing.com/

5. International Journal of Food Science & Technology

Website:https://onlinelibrary.wiley.com/