

## Microwave Sterilization Equipment



The process of converting UHF electromagnetic wave into heat energy by direct interaction between microwave and material. Microwave sterilization is the result of microwave thermal effect and biological effect. The potential distribution of microwave on the cross section of bacterial membrane affects the concentration of electrons and ions around the cell membrane, thus changing the permeability of cell membrane. Bacteria are malnourished, unable to metabolize normally, and their growth and development are hindered and died. From a biochemical point of view, nucleic acids (RNA) and deoxyribonucleic acids (DNA) that normally grow and reproduce in bacteria are convoluted macromolecules closely linked by a number of hydrogen bonds. Microwave causes hydrogen bond relaxation, breakage and recombination, which induces genetic or chromosomal aberration, or even breakage. Microwave sterilization is the use of electromagnetic field effect and biological effect to kill microorganisms. Practice has proved that microwave device has obvious advantages in sterilization temperature, sterilization time, product quality maintenance, product shelf life and energy saving.



Food is easily contaminated and deteriorated in the process of production, preservation, transportation and marketing. Usually, high temperature, drying, blanching, pasteurization, freezing and preservatives can be used to achieve food insecticidal sterilization and preservation. But it often affects the original flavor and nutrition of food. Microwave insecticidal sterilization is a kind of microorganism in food. At the same time, it is affected by both microwave thermal effect and non-thermal effect, which causes the variation of protein and physiological active substance in the body, and leads to the delay and death of microorganism growth and development, so as to achieve the purpose of food sterilization and preservation.



Principle of [Microwave Sterilization Equipment](#):

Thermal effect of microwave energy: Under the action of certain intensity microwave field, insects and fungi in food can absorb microwave energy to heat up due to molecular polarization,

thus denaturing their proteins and losing their biological activity. The thermal effect of microwave mainly plays the role of rapid heating and sterilization.

The non-thermal effect of microwave energy: high frequency electric field also changes the membrane potential and polar molecular structure, and changes the protein and physiological active substances in microorganisms, resulting in loss of vitality or death. It plays a special role in sterilization which is not found in conventional physical sterilization, and is also one of the causes of bacterial death. [Microwave Sterilization Equipment](#) and freshness preservation are the results of the combined effects of microwave heating and non-thermal effects. Therefore, the microwave sterilization temperature is lower than the conventional method. Generally, the conventional method sterilization temperature should be 120 – 130 C for about an hour, while the microwave sterilization temperature only needs 70 – 105 C for about 90 – 180 seconds.

The application of microwave heating technology is very wide, and the application of microwave heating technology in food processing is only a small part of it. It can be said that in the process of understanding the characteristics of microwave heating, more and more new devices and instruments are being developed in combination with existing technologies. For example, the combination refrigerator of microwave oven and refrigerator, microwave kettle and microwave curler, microwave drying and washing machine combined with microwave heating and washing machine, microwave water heater, low temperature moisture measuring instrument, etc. The development of microwave heating technology is closely related to people's understanding and mastery, as well as market demand. Among them, the key is to improve microwave heating equipment and processing technology.