



Microwave extraction

Able to improve an extraction rate of the latest technology developed by microwave. Its principle is in the microwave field, the ability to make differences in absorption of microwave extraction system in certain regions or matrix material certain components are selectively heated so that the material is separated and extracted from the matrix, or the system, go to the referral dielectric constant is small, relatively poor absorption capacity microwave extraction agent; microwave extraction with a simple device, for a wide range of high extraction efficiency, good reproducibility, save time, save reagents, little pollution. At present, except mainly for environmental sample pretreatment, but also for biochemistry, food, industrial analysis and extraction of natural products and other fields. In China, the microwave extraction techniques for herbal extracts reported in this area is still relatively small.

Mechanism of microwave extraction from the following three aspects to analyze:

- ① microwave frequency electromagnetic radiation is penetrating the extraction process medium reaches microtubule bundle and glandular cell system processes the material inside. Due to absorption of microwave energy, the cell internal temperature will increase rapidly, so that the pressure inside the cell walls of the cells can withstand capability than the expansion, results of cell rupture, freely flowing active ingredient therein, and at lower temperatures was dissolved in extraction medium. By further filtration and separation, to obtain the desired extract.
- ② microwave electromagnetic field generated by the acceleration rate can be molecular components extracted from the solid inside the solid-liquid interface diffusion. For example, when using water as solvent, under the influence of the microwave field, the water molecules by the high speed rotation state to the excited state, which is an unstable high-energy state. At this point the vaporization of water molecules to enhance the driving force or the extract component, or release their excess energy to the ground state, the energy released will be passed to other molecular species, in order to accelerate the thermal motion, thus shortening the extract component molecular diffusion to time by solid internal solid-liquid interface, resulting in the extraction rate increased several times, and can reduce the extraction temperature, the maximum guarantee the quality of the extract.
- ③ Since the frequency of the microwave molecular rotational frequencies associated, and therefore the microwave energy is an ionic migration and dipole rotated by a non-ionizing radiation induced molecular motion, when it acts on the molecule, the molecule can promote rotation movement, if the molecule has a certain polarity, can produce under the action of the microwave field instantaneous polarization and 2.45 billion times the speed of / s, for polarity inversion motion, resulting in vibration keys, tear and particle friction and collision between, and quickly generate a lot of heat, promote cell lysis, the cell liquid overflow and spread to the solvent. In a microwave extraction, microwave absorption capacity differences could make certain areas or extraction system matrix material in certain components are selectively heated, so that the extracted material was separated from the matrix or the system proceeds to have a smaller dielectric dielectric constant, microwave absorption capacity is relatively poor extraction solvent.