Focused Microwave-assisted Extraction of Eleven Elements in Herbal Medicines

The traditional sample digestion technology takes a long time, the steps are tedious, and sometimes there are certain dangers. Since 1975, Abu_Samra et al.

Herbal Ingredients and Tea Microwave Dryer

[1] first proposed the use of household microwave oven to digest biological samples in wet ashing, microwave sample dissolution technology has been greatly developed. Microwave Heating Machinery and Equipment

The emergence of closed microwave digestion technology enables samples to be digested under high temperature and pressure. Compared with the traditional sample pretreatment technology, the closed microwave digestion has the advantages of fast digestion speed, less volatilization loss, simple operation, safe use and good digestion reproducibility [2-6].

However, the closed microwave digestion technology can not be applied to the speciation analysis of elements, because the high temperature and high pressure environment will destroy the speciation of organic compounds in samples, and only the total amount of elements can be obtained.

At present, most Chinese herbal medicines are still taken in the classical Decoction mode. Understanding the effective ingredients in the process of boiling or soaking through a certain way

The utilization efficiency (including trace elements) has certain significance. In this work, the CEM Star II low power Open-Focus microwave extraction system was used to prepare samples of traditional Chinese medicine, hoping to obtain useful information in a short time. This system has two independent cavities, which can control the working mode of one of the cavities without affecting each other. There is a chopper plate between the waveguide tube and the working cavity.

When the chopper plate is opened, microwave enters the cavity and acts on the sample solution. When the chopper plate is closed, microwave does not enter the cavity. The partial opening of the chopper board can also be used to control the proportion of microwave entering. Temperature is controlled in real time by temperature feedback information of the cavity to ensure the repeatability of each extraction.

The system can be used to do some special purpose analysis work, such as selecting the best conditions for non-destructive element morphology analysis. In this work, several traditional Chinese medicines (Cyclocarya paliurus, Gentiana, Qinpi) were selected for experiments. Orthogonal design experiment was used to optimize the conditions of microwave extraction (temperature, time, solid-liquid mass-volume ratio), and the optimum extraction conditions were selected.

The purpose of this work is not only to observe the extraction efficiency, but also to provide preliminary conditions for further elemental speciation analysis.