

Microwave digestion for the determination of metal elements in hair

1. Introduction

The accumulation level of heavy metal inside human body can be determined by analyzing the element's amount inside blood, urine and hair. Compared with blood and urine, hair is a relative stable biological material. It has the merits as easy for collecting, transporting and storage. Since the hair is growing all the time, it can serve as a record for revealing the change of human body in different status. So the analysis of human hair is of vital importance the field of clinical medicine, forensic medicine and environmental ecological study.

2. Instrument and reagents

Instrument:

The digestions were carried out with TOPEX+ microwave digestion system and GT-400 high throughput digestion vessels.



TOPEX+ microwave digestion system



GT-400 rotor



G-400 hot block

Reagent:

HNO₃ (GR)

3. Method

1. Weigh 0.5g hair sample into the sample cup.
2. Add HNO₃ into the sample cup and then seal the vessel.
3. Place the rotor inside cavity to conduct microwave digestion. The digestion program is listed in Table1.

Table 1. Microwave digestion method

Step	Setting temperature(°C)	Ramp time (min)	Temperature holding (min)
1	120	10	2
2	190	8	20

4. Take the vessels out of the cavity when the temperature falls under 60 °C.
5. Dilute the sample with deionized water when the temperature of the sample cools to room temperature.

4. Result and discussion

The final digestion solution is clear and transparent which is qualified for further elemental test. GT-400 as high throughput digestion rotor can perform accurate and precise sample digestion experiment. The vessel is embedded with tool free assemble structure for quick assembly and disassembly which greatly improves the lab efficiency. Up to 40 sample as one batch capacity not only saves the sample preparation time but also derives economic value for commercial lab.

5. Conclusion

Preekem's TOPEX+ microwave digestion system coupled with GT-400 rotor can be applied in the large batch sample preparation process. Thanks to the advanced full vessel IR R-temp and precise pressure control unit, TOPEX+ can ensure the safe and precise sample digestion during the experiment. GT-400 as high throughput digestion rotor can deal with up to 40 sample as one batch experiment greatly improves the lab efficiency and save the lab from hard and tedious work.