Poster

[P27-8] P27-8: Assay and monitoring

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[P27-8-4] Determination of iodine element in urine sample by inductively coupled plasma-mass spectrometry

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Background

Iodine is an essential element for life. The long-term insufficient or over intake of iodine harms human health. More than 80 percent of the iodine is discharged by kidney. Today urinary iodine (UI) is recommended as a sensitive indicator of recent changes in iodine nutrition.

Two methods of monitoring UI are provided by 《 WS/T 107-2016 Determination of iodine in urine》: As^{3+}-Ce^{4+} catalytic spectrophotometry and inductively coupled plasma mass spectrometry (ICP-MS) method, respectively. Compared to the former method, ICP-MS can provide higher sensitivity, wide linearity range, high speed and better accuracy. In this paper, the iodine in Reference Materials for Urinary Iodine (GBW 09111) and urine sample was determined by Shimadzu ICPMS-2030.

Methods

We adopt standard addition method to obtain the calibration equation with a matrix urine sample whose concentration of iodine is below 70 μg/L. Matrix urine, mixed with 8 mL diluent (water solution with 0.25% TMAOH and 0.02% Triton X-100) and spiked by 1 mL a series of iodine standard solution, are measured by ICP-MS. Then urine samples mixed with 1 mL ultrapure water and 8 mL diluent are tested by ICPMS-2030 (Shimadzu).

Results

The results were showed in table 1 and table 2.

Table 1. The analysis result of GBW09111
Zoom image

Table 2. The analysis result of urine sample
Zoom image

Conclusions

The proposed method was validated by the Reference Materials for Urinary Iodine (GBW 09111) whose result was consistent with certified value. The precision (RSD, n=3) of the urine sample was less than 2%, and the recoveries were 104.3% and 103.0%, respectively. Low detection limit, high precision and accuracy are achieved, meeting the requirements to analyze a large number of urine samples.