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WS

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

WS/T 107-1999

Replacing WS/T 107-2006

**Determination of iodine in urine - Part 1: As^{3+} - Ce^{4+} catalytic
spectrophotometry
(English Translation)**

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Foreword

WS/T 107 "Determination of urinary iodine" to be released in part, divided into the following two parts.

--- Part 1. arsenic cerium catalytic spectrophotometry;

--- Part 2. Inductively coupled plasma mass spectrometry.

This section is part 1 of WS/T 107.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section replaces WS/T 107-2006 "urinary iodine arsenic cerium catalytic spectrophotometry." this section compared with WS/T 107-2006, the main technical changes are as follows.

--- Modify the use of arsenic acid solution and ceric ammonium sulfate solution concentration, the use of arsenic trioxide reduced to a quarter of the original method;

--- Increased direct sampling digestion determination of 300 μ g/L ~ 1200 μ g/L concentration range of urine iodine method steps;

--- Modify 0 μ g/L ~ 300 μ g/L concentration range of urine iodine determination method of determination of wavelength;

--- Modify, an increase of method characteristics, quality assurance and control points;

--- Added Appendix A, which increased by 300 μ g/L ~ 1200 μ g/L range of urine iodine determination of different temperature response Inter-table.

This section is drafted. Xiamen City, Fujian Province Center for Disease Control and Prevention, Tianjin Medical University Endocrine Institute, China Disease Prevention and Control Center for Nutrition and Health, Anhui Provincial Center for Disease Control and Prevention, Shaanxi Provincial Institute of endemic disease prevention and control.

1 Scope

WS/T 107 provisions of this part of the urinary iodine arsenic cerium catalytic spectrophotometric determination.

This section applies to the determination of urine total iodine concentration.

2 Principle

Using ammonium persulfate solution at 100 °C under the conditions of digestion of urine samples, the use of iodine arsenic redox catalytic reaction.

$\text{H}_3\text{AsO}_3 + 2\text{Ce}^{4+} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{AsO}_4 + 2\text{Ce}^{3+} + 2\text{H}^+$ the reaction of yellow Ce^{4+} is reduced to colorless Ce^{3+} , the higher the iodine content, the faster the reaction, the remaining less Ce^{4+} ; control the reaction temperature and time, the absorbance value of Ce^{4+} remaining in the colorimetric system, using the mass concentration of iodine and the corresponding measured absorbance value the linear relationship of the numerical calculation of iodine content.

3 Instruments

3.1

digestion temperature control heating device. constant temperature digestion instrument (temperature difference between holes ≤ 1 °C).

3.2

digital display spectrophotometer, 1cm cuvette.

3.3

super-heated water bath. temperature control accuracy of ± 0.3 °C.

3.4

glass test tube. 15mm x 150mm.

3.5

stopwatch.

4 Reagent

4.1

Reagents Specifications. Unless otherwise specified, the reagents used are analytical reagents, experimental water should be consistent with GB/T 6682 two water specifications.

4.2

Ammonium persulfate $[(\text{NH}_4)_2\text{S}_2\text{O}_8]$, $M_r = 228.2$].

4.3

sulfuric acid (H_2SO_4 , $\rho_{20\text{ }^\circ\text{C}} = 1.84\text{g/mL}$), excellent grade pure.

4.4

Arsenic trioxide (As_2O_3 , $M_r = 197.8$).

4.5

Sodium chloride (NaCl , $M_r = 58.4$), excellent grade pure.

4.6

Sodium hydroxide (NaOH , $M_r = 40.0$).

4.7

cerium ammonium sulfate $[\text{Ce}(\text{NH}_4)_4(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}]$, $M_r = 632.6$] or cerium ammonium sulfate tetrahydrate $[\text{Ce}(\text{NH}_4)_4(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}]$, $M_r = 668.6$].

4.8

Potassium iodate (KIO_3 , $M_r = 214.0$), reference reagent or standard.

5 Solution preparation

5.1

ammonium persulfate solution $\{c[(\text{NH}_4)_2\text{S}_2\text{O}_8] = 1.0\text{mol/L}\}$. Weigh 114.1g of ammonium persulfate (4.2) was dissolved in about 400mL of pure water