



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

GB 31604.38-2016

**National food safety standard - Food contact materials and
articles - Determination of arsenic and migration
(English Translation)**

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Foreword

This standard replaces the determination of arsenic and in the GB/T 5009.68-2003 "Method for analysis of hygienic standard of perchlorovinyl-coating for inner wall of food container", GB/T 5009.72-2003 "Method for analysis of hygienic standard of aluminum-ware for food use", GB/T 5009.78- 2003 "Method for analysis of hygienic standard of papers for food packaging", GB/T 5009.81-2003 "Method for analysis of hygienic standard of stainless steel food containers and table wares", SN/T 2900-2011 "Food contact materials for export - Paper, recycled fiber materials - Determination of arsenic - Atomic fluorescence spectrometry", SN/T 2594-2010 "Food contact materials - Determination of lead, cadmium, chromium, and arsenic in cork stoppers by inductively coupled plasma mass

spectrometry", SN/T 2597-2010 "Determination of lead, cadmium, chromium, arsenic, antimony, germanium migration quantity in polymer for food contact materials - Inductively coupled plasma atomic emission spectrometry method", SN/T 2829-2011 "Food contact materials for export - Metallic materials - Determination of migrant heavy metals in food simulant - Inductively coupled plasma atomic emission spectrometric method".

As compared with GB/T 5009.68-2003, the main changes of this standard are as follows.

- CHANGE the standard name into "National food safety standard - Food contact materials and articles - Determination of arsenic and migration";
- ADD the arsenic determination;
- ADD the inductively coupled plasma mass spectrometry;
- ADD the inductively coupled plasma emission spectroscopy;
- DELETE the silver salt method and the arsenic spot method.

National food safety standard

Food contact materials and articles -

Determination of arsenic and migration

1 Scope

This standard specifies the hydride atomic fluorescence spectrometry, inductively coupled plasma mass spectrometry, and inductively coupled plasma emission spectroscopy for the determination of arsenic migration of the food contact materials and articles after soaked in the food simulants as well as the determination of arsenic in the paper articles and cork stoppers.

This standard applies to determination of the arsenic migration in the food contact materials and articles as well as the determination of arsenic in the paper articles and cork stoppers.

Part 1.Determination of arsenic

Method 1.Hydride atomic fluorescence spectrometry

2 Principles

Paper products and cork stoppers are crushed AND then subjected to dry ash digestion, thiourea is added to the digestion solution to pre-reduce the pentavalent arsenic to trivalent arsenic, which reacts with the reduction hydrogen to produce the arsenic hydride; the arsenic hydride is carried by the argon into the quartz atomizer AND decomposed into atomic arsenic, which generates the atomic fluorescence under the excitation light of the arsenic hollow cathode lamp. The fluorescence intensity is proportional to the arsenic concentration in the measured solution, AND it is quantified through comparison with the standard series.

3 Reagents and materials

Unless otherwise specified, the reagents used in this method are of analytical pure AND the water is the level II water as specified in GB/T 6682.

3.2.1 Potassium hydroxide solution (5 g/L). WEIGH 5 g of potassium hydroxide; USE water to dilute it to 1000 mL; MIX it uniformly.

3.2.2 Potassium borohydride alkaline solution (10 g/L). WEIGH 10 g of potassium borohydride; USE potassium hydroxide solution (5 g/L) to dissolve it;

3.2.3 Pre-reducing agent solution. WEIGH 5.0 g of thiourea; ADD about 80 mL of water to dissolve it; ADD 5.0 g of ascorbic acid; after it is completely dissolved, USE water to dilute it to 100 mL; MIX it uniformly; AND this solution shall be prepared before use.

3.4.1 Arsenic standard stock solution (1000 mg/L). USE the standard solution certified by the state AND awarded with the standard substance certificate, or PREPARE it in accordance with the requirements of GB/T 602.

3.4.2 Arsenic standard intermediate (1.00 mg/L). accurately PIPETTE 10.0 mL

of arsenic standard stock solution into a 100 mL volumetric flask; ADD the hydrochloric acid solution (5 + 95) to the mark;

5.1 Pretreatment of sample

TAKE appropriate amount of sample; CRUSH it and MIX it uniformly. WEIGH 1 g ~ 3 g of sample (accurate to 0.001 g); PLACE it in a crucible with cover; ADD

5.2.1 Instrument test conditions

ADJUST the performance of the instrument to the best condition, AND the instrument reference conditions are as follows. photomultiplier tube voltage.

5.2.3 Sample determination

TAKE 20 mL of the sample digestion solution into a 25 mL colorimetric tube; ADD 5 mL of pre-reducing agent solution; MIX it uniformly; PLACE it for 30 min; MAKE determination on the instrument; QUANTIFY it by comparison with the standard series; and meanwhile MAKE the blank test.

6 Expression of analysis results

The arsenic content in the sample is calculated in accordance with the formula

7 Precision

The absolute difference between the two independent determinations obtained under repeatability shall not exceed 20% of the arithmetic mean.

8 Others

When calculated using the sample amount of 0.5 g and the constant volume of

25 mL, the method detection limit is 0.05 mg/kg AND the limit of quantification

is 0.15 mg/kg.