



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

GB 5009.14-2017

National food safety standard - Determination of Zinc in Foods

食品安全国家标准 食品中锌的测定

(English Translation)

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Foreword

This Standard replaces GB/T 2009.14-2003 Determination of Zinc in Foods, GB 5413.21-2010 National food safety standard Determination of calcium, iron, zinc, sodium, potassium, magnesium, copper and manganese in foods for infants and young children, milk and milk products, GB/T 23375-2009 Determination of copper, iron, zinc, calcium, magnesium and phosphorus content in vegetables and derived products, GB/T 9695.20-2008 Meat and meat products - Method for determination of zinc, GB/T 14609-2008 Inspection of grain and oils - Determination of copper, iron, manganese, zinc, calcium, magnesium in cereals and derived products by atomic absorption and flame spectrophotometry, GB/T 18932.12-2002 Method for the

determination of potassium, sodium, calcium, magnesium, zinc, iron, copper, manganese, chromium, lead, cadmium contents in honey - Atomic absorption spectrometry, NY/T 1201-2006 Determination of copper iron and zinc content in vegetables and derived products.

Compared with GB/T 2009.14-2003, the main modifications in this Standard are as follows.

- modified the name of the standard to "National Food Safety Standard - Determination of Zinc in Foods";
- in the pretreatment method, maintained the dry ashing method, added the wet digestion, pressure tank digestion and microwave digestion;
- preserved flame atomic absorption spectrometry as Method 1, dithizone colorimetric method as Method 4;
- added inductively coupled plasma emission spectroscopy as Method 2;
- added inductively coupled plasma mass spectrometry as Method 3;
- added microwave digestion procedures and flame atomic absorption spectrometer for instrument reference conditions as appendix.

National Food Safety Standard -
Determination of Zinc in Foods

1 Scope

This Standard specifies the flame atomic absorption spectrometry method, the inductively coupled plasma emission spectroscopy method, the inductively coupled plasma mass spectrometry method and the dithizone colorimetric method in the determination of zinc in foods.

This Standard is applicable to the determination of zinc in foods, irrespective of materials.

Method 1 -- Flame atomic absorption spectrometry

2 Principle

After digestion of the sample, the absorbance shall be measured at 213.9 nm by flame atomization. The absorbance of zinc in a certain concentration range shall be proportional to the zinc content, quantitatively compared with the standard series.

3 Reagents and materials

Unless otherwise noted, the reagents used in this method shall be guaranteed reagents, and water shall be Grade Two water specified in GB/T 6682.

3.3 Standard product

Zinc oxide (ZnO, CAS number. 1314-13-2). zinc standard solution with a purity >99.99%, or certified by the state and given a certain concentration of the standard substance certificate.

4 Apparatus

NOTE All glassware and polytetrafluoroethylene digestion tanks shall be soaked by nitric acid (1+5) overnight, repeatedly rinsed with tap water, and finally washed clean with water.

4.1 Atomic absorption spectrometer. with flame atomizer, with zinc hollow cathode lamp.

4.5 Microwave digestion system. with polytetrafluoroethylene digestion tank.

5.1 Sample preparation

NOTE During the sampling and sample preparation, the sample contamination should be prevented.

5.1.1 Grain, bean samples

Remove the debris from the sample. Crush and store in a plastic bottle.

5.2.1 Wet digestion

Accurately weigh 0.2 g ~ 3 g (nearest to 0.001 g) of solid sample OR accurately remove 0.500 mL ~ 5.00 mL of liquid sample in a digestion tube with scale. Add 10 mL of nitric acid, 0.5 mL of perchloric acid.

5.2.2 Microwave digestion

Accurately weigh 0.2 g ~ 0.8 g (nearest to 0.001 g) of solid sample OR accurately remove 0.500 mL ~ 3.00 mL of liquid sample in the microwave digestion tank. Add 5 mL of nitric acid. Digest the sample according to the procedures of microwave digestion.

5.2.3 Pressure tank digestion

Accurately weigh 0.2 g ~ 1 g (nearest to 0.001 g) of solid sample OR accurately remove 0.500 mL ~ 5.00 mL of liquid sample in the digestion tank. Add 5 mL of nitric acid. Cover the inner cover. Tighten the stainless steel jacket.

5.2.4 Dry ashing

Accurately weigh 0.5 g ~ 5 g (nearest to 0.001 g) of solid sample OR accurately remove 0.500 mL ~ 10.0 mL of liquid sample in the crucible. Heat it with small fire. Carbonize to smokeless. Transfer to the muffle furnace for 3h ~ 4h ashing at 550°C. Cool and take it out.

5.3.1 Instrument reference conditions

Adjust to the best conditions according to the performance of each instrument. Refer to Annex B for the conditions for reference.