



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

GB 5009.92-2016

**National food safety standard - Determination of calcium in
foods**

食品安全国家标准 食品中钙的测定

(English Translation)

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Foreword

This Standard replaces the determination method for calcium in GB/T 5009.92-2003 "Determination of calcium 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 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 14610-2008 "Inspection of grain and oils - Determination of

calcium in cereals and cereal products", GB/T 9695.13-2009 "Meat and meat products - Method for Determination of calcium content" and NY 82.19-1988 "Determination of fruit juice - Determination of calcium and magnesium".

Compare this Standard with GB/T 5009.92-2003, the main changes are as follows.

- MODIFY the standard name TO "National food safety standard - Determination of calcium in foods";
- ADD the microwave digestion, pressure tank digestion;
- MODIFY the flame atomic absorption spectrometry and EDTA titration;
- ADD the inductively coupled plasma emission spectrometry;
- ADD the inductively coupled plasma mass spectrometry.

National food safety standard -

Determination of calcium in foods

1 Scope

This Standard specifies the determination of calcium in foods by flame atomic absorption spectrometry, titration, inductively coupled plasma atomic emission spectrometry and inductively coupled plasma mass spectrometry.

This Standard applies to the determination of calcium content in foods.

Method 1 -- Flame atomic absorption spectrometry

2 Principle

After the sample is digested, add lanthanum solution as the releasing agent, atomize by atomic absorption flame, and measure the absorbance value at 422.7 nm, which is proportional to the calcium content in a certain concentration range. Compare with the standard series.

3 Reagents and materials

Unless otherwise specified, the reagents used in this method are excellent reagents, and the water is Grade 2 water as specified in GB/T 6682.

3.2.1 Nitric acid solution (5 + 95). MEASURE 50 mL of nitric acid; ADD 950 mL of water;

MIX well.

3.3 Standard

Calcium carbonate (CaCO_3 , CAS No. 471-34-1). Purity > 99.99 %, or calcium standard solution at a certain concentration certified by the state and awarded the standard substance certificate.

3.4.1 Calcium standard stock solution (1000 mg/L). accurately WEIGH 2.4963 g (to the nearest 0.0001 g) of calcium carbonate; ADD hydrochloric acid solution (1 + 1) to dissolve; TRANSFER to a 1000 mL volumetric flask; ADD water to the mark; MIX well.

4 Instruments and equipment

NOTE: All glassware and polytetrafluoroethylene digestion inner tank must be soaked in nitric acid solution (1 + 5) overnight, washed repeatedly with tap water, and finally rinsed with water.

5.1 Sample preparation

NOTE: Sample contamination shall be avoided during sampling and sample preparation processes.

5.2.1 Wet digestion

Accurately WEIGH 0.2 g ~ 3 g (to the nearest 0.001 g) of solid sample or accurately PIPETTE 0.500 mL ~ 5.00 mL of liquid sample in a graduated digestion tube;

5.2.2 Microwave digestion

Accurately WEIGH 0.2 g ~ 3 g (to the nearest 0.001 g) of solid sample or accurately PIPETTE 0.500 mL ~ 3.00 mL of liquid sample in a microwave digestion tank; ADD 5 mL of nitric acid. DIGEST the sample according to procedure of the microwave digestion, refer to Annex A for digestion conditions. REMOVE the digestion tank after cooling; PLACE it on the electric hot plate to get rid of acid to about 1 mL at 140 °C ~

160 °C. After the digestion tank is cool, TRANSFER the digestion solution to a 25 mL

volumetric flask;

5.3 Instrument reference conditions

See Annex B for reference conditions.

5.4 Plotting of standard curve

The calcium standard series solutions are introduced into the flame atomizer according to the order of the concentration from low to high, the absorbance values are measured. The standard curve is plotted by taking the concentration of calcium in the standard series solutions as the abscissa and the corresponding absorbance values as the ordinate.

6 Expression of analysis results

The content of calcium in the sample is calculated according to equation (1).

7 Precision

The absolute difference between two independent determination results obtained under repeatability conditions shall not exceed 10 % of the arithmetic mean.

8 Others

When weighing 4 g (or 4 mL) of sample, diluting to the constant volume of 25 mL for calculation,

9 Principle

Within the proper pH range, calcium forms metal complex with EDTA (disodium ethylenediaminetetraacetate).

10 Reagents and materials

Unless otherwise specified, the reagents used in this method are analytical reagents, and the water is Grade 3 water as specified in GB/T 6682.