



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

GB 5009.91-2017

**National food safety standard - Determination of potassium and
sodium in foods**

食品安全国家标准 食品中钾、钠的测定

(English Translation)

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Foreword

This standard replaces the potassium and sodium determination part in GB/T 5009.91-2003 "Determination of potassium and sodium in foods", GB/T 15402-1994 "Fruits, vegetables and derived products - determination of sodium and potassium", NY 82.18-1988 "Determination of potassium and sodium in fruit juice", 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 18932.11-2002 "Method for determination of potassium, phosphorus, iron, calcium, zinc, aluminum, sodium, magnesium, boron, manganese, copper, barium, titanium, vanadium, nickel, cobalt and chromium

in honey - Inductively coupled plasma atomic emission spectrometry (ICP-AES method", GB/T 18932.12-2002 "Method for determination of potassium, sodium, calcium, magnesium, zinc, iron, copper, manganese, chromium, lead and cadmium contents in honey - Atomic absorption spectrometry", AND NY/T 1653-2008 "Determination for mineral elements in vegetables, fruits, and derived products by ICP-AES method".

As compared with the above standards, the main changes are as follows.

- CHANGE the standard name into "National food safety standard - Determination of potassium and sodium in foods";
- MODIFY the flame atomic absorption spectrometry method as the first method, the flame atomic emission spectrometry method as the second method, the inductively coupled plasma emission spectroscopy method as the third method, AND the inductively coupled plasma mass spectrometry as the fourth method;
- MODIFY some part of the sample preparation;
- MODIFY some part of the sample digestion;
- INCREASE the method detection limit and quantitative limit;
- ADD appendix.

National food safety standard

Determination of potassium and sodium in foods

1 Scope

This standard specifies four methods for the determination of potassium and sodium in food. the flame atomic absorption spectrometry, the flame atomic emission spectrometry, the inductively coupled plasma emission spectroscopy, AND the inductively coupled plasma mass spectrometry.

This standard applies to the determination of potassium and sodium in food.

Method I. Flame atomic absorption spectrometry

2 Principle

After digestion, the sample is injected into the atomic absorption spectrometer.

After the flame atomization, the potassium and sodium respectively absorb the

766.5 nm and 589.0 nm resonance line. AND within a concentration range, its

absorption value is proportional to the contents of potassium and sodium, AND

it is quantified through comparison with standard series.

3 Reagents and materials

Unless otherwise specified, the reagents used in this method are excellent

grade pure, AND the water is level II water as specified in GB/T 6682.

3.3.1 Potassium chloride standard substance (KCl). its purity is greater than

99.99%.

3.3.2 Sodium chloride standard substance (NaCl). its purity is greater than

99.99%.

3.4.1 Potassium and sodium standard stock solution (1000 mg/L). PLACE the

potassium chloride or sodium chloride in the oven at 110 °C ~ 120 °C to dry it

for 2 h. Accurately WEIGH 1.9068 g of potassium chloride or 2.5421 g of

sodium chloride;

3.4.2 Potassium and sodium standard working solution (100 mg/L). accurately

PIPETTE 10.0 mL of potassium or sodium standard stock solution in a 100 mL

volumetric flask; USE water to dilute it to the mark; STORE it in a polyethylene

bottle; PRESERVE it at 4 °C.

3.4.3 Potassium and sodium standard series working solution. accurately

PIPETTE 0 mL, 0.1 mL, 0.5 mL, 1.0 mL, 2.0 mL, and 4.0 mL of potassium

standard working solution in 100 mL volumetric flask; ADD 4 mL of cesium

chloride solution; USE water to make its volume reach to the mark;

4.1 Atomic absorption spectrometer, with flame atomizer and potassium, sodium hollow cathode lamp.

4.8 Microwave digestion instrument, with a polytetrafluoroethylene digestion internal tank.

5.1.1.1 Dry sample

As for the beans, cereals, fungi, tea, dried fruit, baked goods and other low water content samples, TAKE the edible part; USE high-speed grinder to crush it uniformly if necessary; AND as for the solid dairy products, protein powder, flour, and other uniform powdery sample, SHAKE it uniformly.

5.1.3 Semi-solid samples

STIR it uniformly.

5.2.1 Microwave digestion method

WEIGH 0.2 g ~ 0.5 g (accurate to 0.001 g) of sample; PLACE it into the microwave digestion tank; as for the samples containing ethanol or carbon dioxide, PLACE it on the heating plate to heat it at low temperature to remove ethanol or carbon dioxide; ADD 5 mL ~ 10 mL of nitric acid; COVER and PLACE it for 1 h or overnight; TIGHTEN the external tank; PLACE it in the microwave digestion device for digestion (the digestion conditions are as shown in Table A.1). After cooling it, TAKE out the internal tank; PLACE it in an adjustable temperature control electric furnace; REMOVE acid at 120 °C ~

5.2.4 Dry digestion method

WEIGH 0.5 g ~ 5 g (accurate to 0.001 g) of sample in the crucible; MAKE it subject to carbonization in the electric furnace at small fire to make it smokeless; PLACE it into the 525 °C ± 25 °C muffle furnace for ashing for 5 h ~