



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

GB 31604.33-2016

**National food safety standard - Food contact materials and
products Determination of nickel migration**

食品安全国家标准 食品接触材料及制品 镍迁移量的测定

(English Translation)

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Foreword

This Standard replaces the determination method for nickel migration in GB/T 5009.81-2003 "Method for analysis of hygienic standard of stainless steel food containers and table wares" and SN/T 2829-2011 "Food contact materials for export - Metal materials - Determination of migrant heavy metals in food simulant - Inductively coupled plasma atomic emission spectrometric method". Compared with the determination method for nickel in GB/T 5009.81-2003, the main changes are as follows.

- MODIFY the standard name TO "National food safety standard - Food contact materials and products - Determination of nickel migration";
- ADD Inductively coupled plasma mass spectrometry and inductively coupled plasma atomic emission spectrometry.

National food safety standard -

Food contact materials and products

Determination of nickel migration

1 Scope

This Standard specifies the graphite furnace atomic absorption spectrometry, inductively coupled plasma mass spectrometry, inductively coupled plasma atomic emission spectrometry and spectrophotometric method using dimethylglyoxime for the determination of nickel migration in food contact materials and products after being soaked in food simulants.

This Standard applies to the determination of nickel migration in food contact materials and products.

Method I -- Graphite furnace atomic absorption spectrometry

2 Principle

Use food simulants to soak parts of food contact materials and products that are expected to come in contact with foods. The soaking solution is atomized in a graphite furnace. The absorbance measured at 232.0 nm is proportional to the nickel content within a certain concentration range, which is compared with the standard series to quantify.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are all guarantee reagents, and the water is grade-2 water specified in GB/T 6682.

3.1.3 Reagents for preparing food simulants. According to specifications of GB 31604.1.

4 Instruments and equipment

NOTE: All glassware must be soaked in nitric acid solution (1 + 5) overnight and rinsed with water for later use.

4.1 Atomic absorption spectrometer. equipped with graphite furnace atomizer, nickel hollow cathode lamp.

5.1 Pretreatment of samples

According to the expected use and the use conditions of the sample to be tested, carry out the migration test in accordance with the migration test methods and test conditions specified in GB 5009.156 and GB 31604.1. After the soaking solution is thoroughly mixed, take part of the soaking solution for analysis. If the soaking solution is neutral or alkaline, add an appropriate amount of nitric acid so that the concentration of nitric acid in the test solution is about 5 % (volume fraction). At the same time carry out the sample blank test.

5.2.1 Instrument test conditions

Instrument reference conditions are shown in Table A.1.

5.2.2 Plotting of standard curves

PIPETTE 10 μL of nickel standard solution and 5 μL of ammonium dihydrogen phosphate solution (20 g/L) (the optimal injection volume may be determined in accordance with the instrument used) in the order of concentration from low to high, INJECT them into the graphite furnace at the same time. After atomization, MEASURE the absorbance value. Take the concentrations of the standard series as the abscissa and take the corresponding absorbance values as the ordinate to plot the standard curve.

5.2.3 Determination of samples

Under the same test conditions as those for the determination of standard solution, PIPETTE 10 μL of sample solution and 5 μL of ammonium dihydrogen phosphate solution (20 g/L) (the optimal injection volume may be determined in accordance with the instrument used), INJECT them into the graphite furnace at the same time. After atomization, MEASURE the absorbance value.
ammonia to decolorize, then reacts with basic dimethylglyoxime to form red

complexes, which are compared with the standard series to quantify.

10 Reagents and materials

Unless otherwise stated, the reagents used in this method are all analytical reagents, the water is the grade-3 water specified in GB/T 6682.

10.1.10 Reagents for preparing food simulants. according to the specifications of GB 31604.1.

10.2.1 Diammonium hydrogen nitrite solution (100 g/L). WEIGH 10 g of diammonium hydrogen nitrite and DISSOLVE in water to 100 mL.

10.2.2 Ethanol solution (95 + 5). ADD 5 mL of water to 95 mL of ethanol, MIX well.

10.2.3 Dimethylglyoxime ethanol solution (10 g/L). DISSOLVE 1 g of dimethylglyoxime and DISSOLVE in 100 mL of ethanol solution (95 + 5), MIX well. If there is any insoluble material, filter and the filtrate is for later use.

10.2.4 Sodium hydroxide solution (0.2 mol/L). DISSOLVE 1.0 g of sodium hydroxide in 125 mL of water.

11 Instruments and equipment

NOTE: All glassware must be soaked in nitric acid solution (1 + 5) overnight and rinsed with water for later use.

12.1 Pretreatment of samples

The same as subclause 5.1.

12.2.1 Plotting of standard curves

Respectively PIPETTE 0 mL, 0.250 mL, 0.500 mL, 1.00 mL, 2.00 mL, 3.00 mL,

4.00 mL, 5.00 mL of nickel standard use solution (10.0 mg/L) to 100-mL volumetric flasks, ADD food simulants to the mark, the corresponding concentration series are 0 µg/L, 25.0 µg/L, 50.0 µg/L, 100 µg/L, 200 µg/L, 300