



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

GB 31604.48-2016

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

食品安全国家标准 食品接触材料及制品 甲醛迁移量的测定

(English Translation)

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Foreword

This Standard replaces GB/T 5009.178-2003 "Determination of formaldehyde for food packaging material", Clause 8 "Formaldehyde" in GB/T 5009.61-2003 "Method for analysis of hygienic standard of products of tripolycyanamide for food packaging", Clause 7.2 "Free formaldehyde" in GB/T 5009.69-2008 "Method for analysis of hygienic standard of epoxy phenolic coatings for inner wall of food cans" and determination of formaldehyde in water-based simulants in GB/T 23296.26-2009 "Food contact materials - Polymer - Determination of formaldehyde and hexamethylenetetramine in food simulants - Spectrophotometry".

Compared with GB/T 5009.178-2003, the main changes of this Standard are as follows.

- MODIFY the standard name TO "National standard for food safety - Food contact materials and products - Determination of formaldehyde migration";
- DELETE the oscillopolarographic method; ADD acetylacetone spectrophotometric method and chromotropic acid spectrophotometric method.

National standard for food safety -

Food contact materials and products -

Determination of formaldehyde migration

1 Scope

This Standard specifies the spectrophotometric method for the determination of formaldehyde migration in food contact materials and products.

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

Method I Acetylacetone spectrophotometric method

2 Principle

After the food simulant is in contact with the sample, the formaldehyde in the sample migrates to the food simulant. In the presence of ammonium acetate, formaldehyde reacts with acetylacetone and generate yellow 3,5-diacetyl-1,4 ?

dihydrodimethylpyridine; USE a spectrophotometer to measure the absorbance of the test solution at 410 nm; COMPARE it with that of the reference series to obtain the content of formaldehyde in the food simulant, and then obtain the formaldehyde migration in the sample.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are of analytical reagent and water is the tertiary water specified in GB/T 6682.

3.2.1 Water-based food simulants. PREPARE according to the specifications of GB

5009.156.

3.2.2 Acetylacetone solution. WEIGH 15.0 g of anhydrous ammonium acetate and dissolve in the appropriate amount of water; TRANSFER into a 100 mL volumetric flask; ADD 40 µL of acetylacetone and 0.5 mL of glacial acetic acid; DILUTE with water to the scale; MIX well. This solution is prepared when it is in need.

5.1 Migration test

According to the intended use and the use conditions of the sample to be tested, in accordance with the requirements of GB 5009.156 and GB 31604.1, carry out the migration test to the sample. During the migration test to prior to the determination, it shall pay attention to sealing, in order to avoid the loss of formaldehyde volatile. At the same time carry out the blank test.

5.3 Plotting of standard curve

TAKE 7 10 mL colorimetric tubes; according to the type of simulants used in the migration test, add corresponding formaldehyde standard use solution according to Table 1;

5.4 Determination of sample solution and blank solution

PLACE the sample solution and the blank solution after chromogenic reaction into a

10 mm colorimetric cuvette; TAKE the blank solution after chromogenic reaction as the

reference;

6.1 Calculation of formaldehyde concentration in food simulants

The concentration of formaldehyde in food simulants is calculated according to equation (1)

7 Precision

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

8 Others

TAKE the concentration value corresponding to the absorbance of 0.01 higher than the absorbance value of the blank solution AS the detection limit;

9 Principle

After the food simulant is in contact with the sample, the formaldehyde in the sample migrates to the food simulant. In the presence of sulfuric acid, formaldehyde reacts with chromotropic acid and generate purple compounds; USE a spectrophotometer to measure the absorbance of the test solution at 574 nm;

10 Reagents and materials

Unless otherwise stated, the reagents used in this method are of analytical reagent and water is a tertiary water or deionized water specified in GB/T 6682. All reagents in which formaldehyde shall not be detected by this method.

10.2.1 Water-based food simulants. PREPARE according to the specifications of GB

5009.156.

10.2.2 Sulfuric acid solution. MEASURE 100 mL of sulfuric acid, DISSOLVE in 50 mL

of water, STIR slowly, MIX well.

10.3.2 Formaldehyde standard stock solution. PIPETTE 5.0 mL of formaldehyde

solution to a 1000 mL volumetric flask; DILUTE with water to the scale; PRESERVE at

0 °C ~ 4 °C; it is valid for 12 months; CALIBRATE before use (see Annex A); or use

formaldehyde solution standard products to prepare directly.

11.1 Migration test

According to the intended use and the use conditions of the sample to be tested, in accordance with the requirements of GB 5009.156 and GB 31604.1, carry out the