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GB 31604.46-2023

National Food Safety Standard

Food Contact Materials and Products Determination of Free Phenol and Migration Amount

食品安全国家标准 食品接触材料及制品 游离酚的测定和迁移量的测定

National Health Commission of the People's Republic of China
State Administration for Market Regulation

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Translated by ChemLinked

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National Standard of the People's Republic of China

GB 31604.46-2023
In Replacement of GB 31604.46-2016

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游离酚的测定和迁移量的测定

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Foreword

This standard replaces GB 31604.46-2016 "National Food Safety Standard - Determination of free phenol and migration amount in food contact materials and products".

Compared with GB 31604.46-2016, the main changes of this standard are as follows:

——Modified the scope;

——Modified the detection limit and quantitation limit in Part 1;

——Modified the analysis steps and result presentation in Part 2;

——The third part, determination of phenol migration, was added.

National Food Safety Standard

Food Contact Materials and Products

Determination of Free Phenol and Migration Amount

1 Scope

This standard specifies the determination methods for free phenol and migration in food contact materials and products.

The first part of this standard applies to the determination of free phenol in epoxy phenolic resin coatings for food contact; the second part applies to the determination of free phenol migration in food contact materials and products; the third part applies to the determination of phenol migration in food contact materials and products.

Part I Determination of free phenol

2 Principle

The free phenol in the sample reacts with bromine to form bromophenol, and the remaining bromine reacts with potassium iodide. The precipitated iodine is titrated with sodium thiosulfate, and the content of free phenol is calculated based on the consumption of sodium thiosulfate solution.

3 Reagents and Materials

Unless otherwise specified, all reagents used in this method were of analytical grade and the water was Grade-1 water as specified in GB/T6682.

3.1 Reagents

3.1.1 Hydrochloric acid (HCl): mass fraction 36% to 38%.

3.1.2 Chloroform ($CHCl_3$).

3.1.3 Ethanol (C_2H_6O).

3.1.4 Potassium iodide (KI).

3.1.5 Soluble starch [$(C_6H_{10}O_5)$,].

3.1.6 Bromine water (Br_2): content ≥ 3%.

3.1.7 Anhydrous sodium carbonate (Na_2CO_3).

3.1.8 Potassium bromide (KBr).

3.2 Reagent preparation

3.2.1 Potassium iodide solution (100 g/L): Weigh 1.00 g of potassium iodide, dissolve it in water and dilute to 10 mL.

3.2.2 Starch indicator solution (10 g/L): Weigh 1.0 g of soluble starch, add 5 mL of water to make a paste, add the paste to 90 mL of boiling water while stirring, boil for 1 minute to 2 minutes, cool, and dilute to 100 mL. The shelf life is 2 weeks.

3.3 Standards

3.3.1 Sodium thiosulfate pentahydrate ($Na_2S_2O_3 \cdot 5H_2O$, CAS No.: 10102-17-7): working reference reagent, or standard substance certified by the state and awarded with standard substance certificate.

3.3.2 Potassium bromate ($KBrO_3$, CAS No.: 7758-01-2): working reference reagent, or standard substance certified by the state and awarded with standard substance certificate.

3.3.3 Standard solution for bromine volumetric analysis: standard substance certified by the state and awarded with a standard substance certificate.

3.4 Preparation of standard solution

3.4.1 Sodium thiosulfate standard titration solution [$c(Na_2S_2O_3)$=0.1mol/L]

Weigh 26g of sodium thiosulfate ($Na_2S_2O_3 \cdot 5H_2O$), add 0.2g of anhydrous sodium carbonate, dissolve in 1000mL of water, and slowly boil for 10minute. Cool, place in a brown reagent bottle, store away from light for 2 weeks, then filter, and calibrate according to GB/T5009.1 before use. A standard titration solution of sodium thiosulfate of the same concentration may also be used for volumetric analysis.

3.4.2 Bromine standard solution $\left[c\left(\frac{1}{2}Br_2\right)=0.1\ \text{mol/L}\right]$

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