



GB 31604.58-2023

National Food Safety Standard

Food Contact Materials and Products Determination of Migration Amount of 9 Antioxidants

食品安全国家标准 食品接触材料及制品 9种抗氧化剂
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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National Food Safety Standard

Food Contact Materials and Products

Determination of Migration Amount of 9 Antioxidants

1 Scope

This standard specifies the determination method for the migration of 9 antioxidants in food contact materials and articles.

This standard applies to the determination of the migration amount of antioxidant 2246, antioxidant 264, butylated hydroxyanisole (BHA), 2,4-di-tert-butylphenol, antioxidant 425, antioxidant 300, antioxidant 1010, antioxidant 1076 and antioxidant 168 in food contact materials and products such as plastics, rubber, paints and coatings, adhesives, inks, and paper and paperboard.

Method 1 High Performance Liquid Chromatography

2 Principle

Food contact materials and products are tested by high performance liquid chromatography after migration test in accordance with GB31604.1 and GB5009.156. Among them, water, 4% (volume fraction) acetic acid, 10% (volume fraction) ethanol, 20% (volume fraction) ethanol, 50% (volume fraction) ethanol food simulants and chemical alternative solvent 95% (volume fraction) ethanol soaking solution were directly injected after filtration, and the chemical alternative solvent isooctane was soaked in liquid nitrogen and then dissolved in methanol before injection. Detection was by UV detector or diode array detector and quantification was by peak area external standard method.

3 Reagents and materials

Unless otherwise stated, all reagents were of chromatographic grade. The water is Grade -1 water specified in GB/T6682. During the test, plastic materials should be avoided as much as possible for containers and transfer utensils.

3.1 Reagents

3.1.1 Foods containing ethanol, acidic food simulants and chemical alternative solvents:
The reagents used must meet the requirements of GB5009.156.

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3.1.2 Methanol ($\text{CH}_4 \text{ O}$).

3.1.3 Ethyl acetate ($\text{C}_4 \text{ H}_8 \text{ O}_2$).

3.2 Reagent preparation

Foods containing ethanol, acidic food simulants and chemical alternative solvents: prepared in accordance with the requirements of GB5009.156.

3.3 Standards

9 antioxidant standards (see Table A.1 in Annex A), purity $\geq 98\%$, or standards certified by the state and awarded with standard material certificates.

3.4 Preparation of standard solution

3.4.1 9 kinds of antioxidant standard stock solutions (1000mg/L): Accurately weigh 25mg (accurate to 0.1mg) of each of the 9 antioxidant standards, dissolve them in 1mL of ethyl acetate, transfer them to 9 25mL brown volumetric flasks, dilute to the mark with methanol and shake well. The solution was transferred to a brown glass container and stored in a sealed container at 4°C in the dark. The shelf life is 6 months.

3.4.2 Standard intermediate solution A of 9 antioxidants (solvent is methanol): Accurately transfer 2.50 mL of BHA and Antioxidant 300 standard stock solutions and 5.00 mL of other 7 antioxidant standard stock solutions into the same 50 mL brown volumetric flask, dilute to the scale with methanol to obtain standard intermediate solution A with a mass concentration of 50.0 mg/L for BHA and Antioxidant 300 and a mass concentration of 100 mg/L for other 7 antioxidants. The solution was transferred to a brown glass container and stored in a sealed container at 4°C in the dark. The shelf life is 3 months.

3.4.3 Standard intermediate solution B of 9 antioxidants (solvent is ethyl acetate): Accurately transfer 2.50 mL of BHA and Antioxidant 300 standard stock solutions and 5.00 mL of the other 7 standard stock solutions into the same 50 mL brown volumetric flask, dilute to the scale with ethyl acetate to obtain a standard intermediate solution B with a mass concentration of 50 mg/L for BHA and Antioxidant 300 and a mass concentration of 100 mg/L for the other 7 antioxidants. The solution was transferred to a brown glass container and stored in a sealed container at 4°C in the dark. The shelf life is 3 months.



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