GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 31604.40-2016

National Food Safety Standard - Food Contact Materials and Articles - Determination of Migration of Maleic Acid and Its Acid Anhydride

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Foreword

This Standard replaces GB/T 23296.21-2009 “Food contact materials - Polymer - Determination of maleic acid and maleic anhydride in food simulants - High performance liquid chromatography”.

As compared with GB/T 23296.21-2009, the main changes of this Standard are as follows:

- The Standard’s name is “National Food Safety Standard - Food Contact Materials and Articles - Determination of Migration of Maleic Acid and Its Acid Anhydride”;

- MODIFY the conditions for high performance liquid chromatography;

- MODIFY the limit of detection.

National Food Safety Standard - Food Contact Materials and Articles - Determination of Migration of Maleic Acid and Its Acid Anhydride

1 Scope

This Standard specifies the method for determination of migration of maleic acid and its acid anhydride in food contact materials and articles.

This Standard applies to the determination of the total amount of maleic acid in food simulants.

2 Principles

Maleic anhydride, in the presence of water, turns into maleic acid. By determining the content of maleic acid, the migration of maleic acid and its acid anhydride is indirectly obtained. After the sample is soaked, water-based food simulants are injected directly. Oil-based food simulants, after being extracted by sodium bicarbonate solution and purified by C_{18} solid-phase extraction cartridge, are determined by high performance liquid chromatography. ADOPT reversed-phase chromatographic column to separate; ultraviolet detector to detect; external standard method to quantify.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are analytically pure; the water is the Grade I water specified in GB/T 6682. During the test, containers and transfer instruments shall avoid the use of plastic material.

3.1 Reagents

3.1.1 Methanol (CH_4O): chromatographically pure.

3.1.2 Phosphoric acid (H_3PO_4).

3.1.3 Sodium bicarbonate ($NaHCO_3$).

3.1.4 Reagents required for the preparation of water-based, acidic, alcohol-

food simulants is 0.00 mg/kg, 2.00 mg/kg, 4.00 mg/kg, 8.00 mg/kg, 20.0 mg/kg, and 40.0 mg/kg, respectively. ADD 25 mL of 1% sodium bicarbonate solution; SHAKE for 5 min; LET stand for layering; PIPETTE the lower-layer aqueous solution; USE C_{18} solid-phase extraction cartridge to filter; TAKE 1.0 mL of the filtrate, through a 0.45 μm filter membrane, FILTER it in injection bottle; to be determined by the machine.

4 Instruments and equipment

4.1 High performance liquid chromatography: equipped with diode array detector or ultraviolet detector.

4.2 Electrothermal constant-temperature dry box.

4.3 Analytical balance: The sensitivity is 1.0 mg and 0.1 mg.

4.4 Vortex mixer.

4.5 C_{18} solid-phase extraction cartridge: The cartridge stuffing is 500 mg.

5 Analytical procedures

5.1 Preparation of test solution of food simulants

5.1.1 Migration test

According to the requirements of GB 5009.156 and GB 31604.1, CARRY out migration test on the sample; and OBTAIN test solution of food simulants.

5.1.2 Treatment of soaking solution

5.1.2.1 Preparation of test solution of water-based food simulants (including distilled water, 4% of acetic acid, alcohol simulants)

TAKE about 1.5 mL of the water-based food simulants obtained from the migration test; through a 0.45 μm filter membrane, FILTER it for determination. 2 samples are prepared in parallel.

5.1.2.2 Oil-based food simulants

Accurately WEIGH 25 g (accurate to 0.1 g) of soaking solution of oil-based food simulants in separating funnel; ADD 25 mL of 1% sodium bicarbonate solution; SHAKE for 5 min; LET stand for layering; PIPETTE the lower-layer aqueous solution; USE C_{18} solid-phase extraction cartridge to filter; TAKE 1.0 mL of the filtrate, through a 0.45 μm filter membrane, FILTER it in injection bottle; to be

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