



GB 31604.29-2023

National Food Safety Standard

Food Contact Materials and Products Determination of Migration of Acrylic Acid, Methacrylic Acid and Their Esters

食品安全国家标准 食品接触材料及制品 丙烯酸和甲基丙烯酸及其酯类迁移量的测定

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

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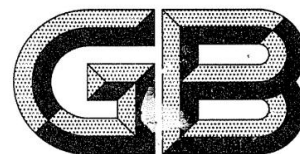
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National Standard of the People's Republic of China

GB 31604.29-2023
In Replacement of GB 31604.29-2016

National Food Safety Standard

Food Contact Materials and Products Determination of Migration of Acrylic Acid, Methacrylic Acid and Their Esters

食品安全国家标准

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Foreword

This standard replaces GB 31604.29-2016 "National Food Safety Standard - Determination of Migration of Methyl Methacrylate in Food Contact Materials and Products".

Compared with GB 31604.29-2016, the main changes of this standard are as follows:

——The name of the standard was changed to "National Food Safety Standard - Food Contact Materials and Products - Determination of Migration of Acrylic Acid, Methacrylic Acid and Their Esters";

——Modified the scope;

——Modified some technical parameters of "Gas chromatography-mass spectrometry";

——Added "Part 2 Liquid Chromatography".

National Food Safety Standard

Food Contact Materials and Products Determination of Migration of Acrylic Acid, Methacrylic Acid and Their Esters

1. Scope

This standard specifies the method for determining the migration of acrylic acid, methacrylic acid and their esters in food contact materials and products.

Part 1 Gas chromatography-mass spectrometry is applicable to the determination of the migration amount of 18 kinds of acrylates and methacrylates in food contact materials and products, including 2-methylpropyl 2-acrylate, ethyl acrylate, n-butyl acrylate, isopropyl acrylate, propyl acrylate, 2-acrylate-1,1-dimethylethyl ester, benzyl acrylate, 2-octyl acrylate, sec-butyl acrylate, ethyl methacrylate, isobutyl methacrylate, butyl methacrylate, 2-methyl-2-acrylate-1,1-dimethylethyl ester, phenyl methacrylate, 2-methyl-2-propyl acrylate, benzyl methacrylate, sec-butyl methacrylate, and isopropyl methacrylate.

The second part of the liquid chromatography method is applicable to the determination of the migration amount of 6 types of acrylic acid and methacrylic acid and their esters in food contact materials and products, including acrylic acid, methacrylic acid, 2-hydroxyethyl acrylate, 2-hydroxyethyl-2-methyl-2-acrylate, methyl acrylate, and methyl methacrylate.

Part I Gas Chromatography-Mass Spectrometry

2. Principle

The water-based food simulants and oily food simulants obtained in the migration test were sampled by headspace injection. 95% (volume fraction) ethanol and isooctane simulants were directly injected after dilution with ethyl acetate. The target substances were separated in a gas chromatography capillary column, detected by mass spectrometry, and quantified by the external standard method.

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 Methanol (CH_3O): chromatographically pure.

3.1.2 Ethyl acetate ($\text{C}_4\text{H}_8\text{O}_2$): chromatographically pure.

3.1.3 Sodium chloride (NaCl).

3.1.4 Anhydrous acetic acid ($\text{C}_2\text{H}_4\text{O}_2$).

3.1.5 Anhydrous ethanol ($\text{C}_2\text{H}_6\text{O}$).

3.1.6 95% ethanol ($\text{C}_2\text{H}_6\text{O}$).

3.1.7 Isooctane (C_8H_{18}).

3.2 Reagent preparation

3.2.1 Food simulants: prepared in accordance with the provisions of GB5009.156.

3.2.2 Isooctane-ethyl acetate solution (1+4): Mix 25 mL of isooctane and 100 mL of ethyl acetate evenly.

3.2.3 95% ethanol-ethyl acetate solution (1+4): Mix 25 mL 95% ethanol and 100 mL ethyl acetate evenly.

3.3 Standards

18 kinds of acrylate and methacrylate standards (see 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 Standard stock solution (1000 mg/L): Accurately weigh 18 standards (accurate to 0.1 mg), and calculate the weighed mass by dividing 25 mg by the conversion factor. The conversion factor is shown in Annex A. Dissolve each standard in ethyl acetate and transfer to a 25 mL volumetric flask. Add ethyl acetate to the mark and mix. The solution was transferred to a brown glass container and stored at 4°C away from light. The shelf life was 6 months.



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