



GB 31604.57-2023

# National Food Safety Standard

## Food Contact Materials and Products Determination of the Migration of Benzophenone

食品安全国家标准 食品接触材料及制品 二苯甲酮类物质迁移量的测定

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

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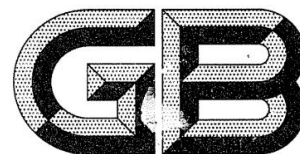
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## National Standard of the People's Republic of China

GB 31604.57-2023

### National Food Safety Standard

### Food Contact Materials and Products

### Determination of the Migration of Benzophenone Substances

食品安全国家标准

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## National Food Safety Standard

### Food Contact Materials and Products

#### Determination of the Migration of Benzophenone Substances

##### 1 Scope

This standard specifies the determination method for the migration of eight benzophenone substances in food contact materials and articles.

The first method liquid chromatography is applicable to the determination of the migration amount of (2-hydroxy-4-methoxyphenyl)(2-hydroxyphenyl)methanone, 2,4-dihydroxybenzophenone, (2-hydroxy-4-methoxyphenyl)phenyl ketone, 4,4'-dihydroxybenzophenone, 2-hydroxy-4-n-octyloxybenzophenone, 2-hydroxy-4-n-hexyloxybenzophenone, benzophenone and 4,4'-difluorobenzophenone in water, 4% (volume fraction) acetic acid, 10% (volume fraction) ethanol, 20% (volume fraction) ethanol, 50% (volume fraction) ethanol food simulants, and chemical alternative solvents 95% (volume fraction) ethanol and isooctane in plastics, paints and coatings, rubber, food contact materials and products using inks.

The second method, liquid chromatography-tandem mass spectrometry, is applicable to the determination of the migration amount of (2-hydroxy-4-methoxyphenyl)(2-hydroxyphenyl)methanone, 2,4-dihydroxybenzophenone, (2-hydroxy-4-methoxyphenyl)phenyl ketone, 4,4'-dihydroxybenzophenone, 2-hydroxy-4-n-octyloxybenzophenone, 2-hydroxy-4-n-hexyloxybenzophenone, benzophenone and 4,4'-difluorobenzophenone in water, 4% (volume fraction) acetic acid, 10% (volume fraction) ethanol, 20% (volume fraction) ethanol, 50% (volume fraction) ethanol, olive oil food simulant, and chemical alternative solvents 95% (volume fraction) ethanol and isooctane in plastics, paints and coatings, rubber, food contact materials and articles using inks.

##### Method 1 Liquid Chromatography

##### 2 Principle

Food contact materials and products are tested by liquid chromatography after migration test according to GB31604.1 and GB5009.156. Water, 4% (volume fraction)

acetic acid, 10% (volume fraction) ethanol, 20% (volume fraction) ethanol, and 50% (volume fraction) ethanol food simulants were directly injected; the chemical alternative solvent 95% (volume fraction) ethanol was diluted with water and then filtered and injected; the chemical alternative solvent isooctane was nitrogen blown and then re-dissolved in methanol-water solution, filtered and injected. Quantification was performed by the peak area 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** Glacial acetic acid ( $\text{CH}_3\text{COOH}$ ).

**3.1.2** Anhydrous ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ).

**3.1.3** Isooctane ( $\text{C}_8\text{H}_{18}$ ).

**3.1.4** Methanol ( $\text{CH}_3\text{OH}$ ): chromatographically pure.

**3.1.5** Dimethyl sulfoxide ( $\text{C}_2\text{H}_6\text{OS}$ ).

#### 3.2 Reagent preparation

**3.2.1** 4% (volume fraction) acetic acid solution, 10% (volume fraction) ethanol solution, 20% (volume fraction) ethanol solution and 50% (volume fraction) ethanol solution shall be prepared in accordance with GB5009.156.

**3.2.2** 95% (volume fraction) ethanol solution: Mix anhydrous ethanol and water in a volume ratio of 95:5.

**3.2.3** Methanol-water solution (7+3): Mix methanol and water in a volume ratio of 7:3.

#### 3.3 Standards

**3.3.1** (2-Hydroxy-4-methoxyphenyl) (2-hydroxyphenyl) ketone ( $\text{C}_{14}\text{H}_{12}\text{O}_4$ , CAS No.: 131-53-3): purity  $\geq 98\%$ , or a standard product certified by the state and awarded a standard substance certificate.



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