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GB 5009.34-2022

National food safety standard - Determination of sulfur dioxide in foods

Issued on: June 30, 2022 **Implemented on: December 30, 2022**

Issued by: NHC; SAMR

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Foreword

This document replaces GB 5009.34-2016 "National Food Safety Standard -

Determination of sulfur dioxide in food stuffs".

Compared with GB 5009.34-2016, the main changes in this document are as follows.

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- Modify the original titration method to acid-base titration method.

- Add spectrophotometry, ion chromatography.

National food safety standard - Determination of sulfur dioxide in foods

1 Scope

This document specifies the determination method of sulfur dioxide in foods.

Method One. Acid-base titration method is applicable to the determination of sulfur dioxide in foods. Method Two is Spectrophotometry. Direct extraction method is suitable for the determination of sulfur dioxide in white sugar and white sugar products, starch and starch products and raw wet flour products. Nitrogen-filled steam extraction method is suitable for the determination of sulfur dioxide in wine and brown sugar. Method Three. Ion chromatography is applicable to the determination of sulfur dioxide in foods.

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Method One -- Acid-base titration method

2 Principle

Use nitrogen-filled steaming method to treat the specimen. After the specimen is acidified, under heating conditions, a series of substances such as sulfites release sulfur dioxide. Use hydrogen peroxide solution to absorb the distillate. Sulfur dioxide is dissolved in the absorption liquid and oxidized to form sulfuric acid. Use standard sodium hydroxide solution to titrate. Calculate the content of sulfur dioxide in the specimen according to the consumption of sodium hydroxide standard solution.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are all analytically pure; the water is grade three water specified in GB/T 6682.

3.2.1 Hydrogen peroxide solution (3%). Measure 100mL of hydrogen peroxide of which its mass fraction is 30%. Add water to dilute to 1000mL. Prepare it when it is needed.

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3.2.2 Hydrochloric acid solution (6mol/L). Measure 50mL of hydrochloric acid (rho20=l.19g/mL). Pour slowly into 50mL of water. Stir while pouring.

3.2.3 Methyl red ethanol solution indicator (2.5g/L). Weigh 0.25g of methyl red indicator. Dissolve in 100mL of absolute ethanol.

4.1 Glass nitrogen-filled steamer. 500mL or 1000mL. Equip it with electric heating jacket, nitrogen source and gas flow meter, or equivalent steaming equipment. See Annex A for the schematic diagram of the device.

4.2 Electronic balance. Resolution is 0.01g.

4.3 10mL semi-micro-burettes and 25mL burettes.

5.1.1 Liquid specimen

Take specimens of beer, wine, fruit wine, other fermented wine, prepared wine, and beverages. The sampling volume shall be greater than 1L. For packaging specimens such as bagged specimens and bottled specimens, at least 3 packages (same batch or number) shall be collected. Put all liquids in one container. Mix well. Seal and mark for testing.

5.1.2 Solid specimen

Take specimens of grain processed products, solid condiments, biscuits, potato products, candy products (including chocolate and products), substitute tea, pickled vegetables, dried vegetable products, edible mushroom products, other vegetable products, candied fruit, dried fruit products, roasted seeds and nuts and nut products (baked, fried, other), sugar, dried aquatic products, cooked animal aquatic products, edible starch, starch products, starch sugar, non-fermented soy products, vegetables, fruits, seawater products, raw and dried nuts and seeds.

5.1.3 Semi-fluid specimen

For packaging specimens such as bagged specimens and bottled specimens, at least 3 packages (same lot or number) need to be collected.

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5.2 Specimen determination

Take 20g~100g of solid or semi-fluid specimen (to the nearest of 0.01g; the sampling amount depends on the content). Take 20mL(g)~200mL(g) of liquid specimen. Place the weighed specimen in the round bottom flask A in Figure A.1.Add 200mL~500mL of water. Install the device. Turn on the switch of the reflux condenser to supply water (condensate temperature < 15°C). Place the glass tube connected to the port E at the upper end of the condenser tube at the bottom of the 100mL conical flask. Add 50mL of 3% hydrogen peroxide solution to the conical flask as the absorption solution (the end of the glass tube shall be below the liquid level of the absorption solution). Add 3 drops of 2.5g/L methyl red ethanol solution indicator to the absorption solution.

6 Presentation of analysis results

The content of sulfur dioxide in the specimen is calculated according to formula (1).

7 Precision

The absolute difference between the results of two independent determinations obtained under repeatability conditions shall not exceed 10% of the arithmetic mean.

8 Detection limit and quantification limit

When using 0.01mol/L sodium hydroxide titrant, when the solid or semi-fluid sampling weight is 35g, the detection limit is 1mg/kg, the quantification limit is 10mg/kg.

9 Principle

The sample is directly soaked in methyl acetate buffer absorbent or nitrogen-filling with acid and steamed-released sulfur dioxide is absorbed by the formaldehyde solution. Generate stable hydroxymethanesulfonic acid addition compound.

10 Reagents and materials

Unless otherwise stated, the reagents used in this method are all analytically pure, and the water is grade three water specified in GB/T 6682.

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