GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

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National food safety standard - Food additives - Metatartaric acid

食品安全国家标准 食品添加剂 偏酒石酸

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Table of Contents

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1 Scope

This Standard applies to the food additive metatartaric acid which is obtained, with tartaric acid as the raw material, by baking at 168 °C ~ 172 °C for 3.5 h, or heating to 180 °C ~ 190 °C, and then naturally cooled.

2 Chemical name, molecular formula, structural formula and relative molecular mass

2.1 Chemical name

Metatartaric acid

2.2 Molecular formula

$C_8H_8O_{10}$

2.3 Structural formula

2.4 Relative molecular mass

264.142 (according to the international relative atomic mass in 2018)

3 Technical requirements

3.1 Sensory requirements

Sensory requirements shall be in accordance with Table 1.

Appendix A

Inspection method

WARNING: Some test procedures which are specified by the test method may lead to dangerous situations. The operator shall take appropriate safety and protective measures.

A.1 General provisions

Unless otherwise stated, only use reagents which are confirmed to be analytical reagents and grade-III water which is specified in GB/T 6682 in the analysis. The solutions, preparations and products, which are used in the test method, shall be prepared in accordance with GB/T 601, GB/T 602 and GB/T 603 when no other requirements are specified.

A.2 Identification test

A.2.1 Reagents and materials

A.2.1.1 Sulfuric acid solution: $c(H_2SO_4)$ = 0.002 5 mol/L.

A.2.1.2 Microporous membrane: 0.22 μm.

A.2.2 Instruments and apparatuses

A.2.2.1 High performance liquid chromatograph, with diode array detector.

A.2.2.2 Analytical balance: The sensitivity is 0.000 1 g.

A.2.2.3 Micro-injector: 10 μL.

A.2.3 Reference chromatographic conditions

A.2.3.1 Chromatographic column: Rezex ROA-Organic Acid, 300 mm × 7.8 mm, 8 μm, or other chromatographic columns that meet the conditions.

A.2.3.2 Column temperature: 40 °C.

A.2.3.3 Mobile phase: 0.002 5 mol/L sulfuric acid solution.

A.2.3.4 Flow velocity: 0.4 mL/min.

A.2.3.5 Injection volume: 10 μL.

A.2.3.6 Detection wavelength: 210 nm.

A.2.4 Analysis steps

Weigh 2.000 g of the sample; add 100 mL of deionized water and heat to dissolve it for later use. Take 50 mL of the newly prepared metatartaric acid solution; put it in a 250 mL conical flask; add 3 drops of bromothymol blue indicator; use 1.0 mol/L sodium hydroxide solution to titrate, until the solution is blue-green and the color is stable for 30 s; record the consumption volume V_1 of sodium hydroxide. Continue to add 20.0 mL of 1.0 mol/L sodium hydroxide solution; cover the bottle stopper; let stand at room temperature for 2 h; then, use the 0.5 mol/L sulfuric acid to titrate the excess sodium hydroxide until the solution is blue-green; record the consumption V_2 of the sulfuric acid.

Before the measurement, the test sample needs to be dried in an oven at 120 °C to a constant weight before weighing.

A.3.3 Result calculation

Each consumption of 1.0 mL of 1.0 mol/L sodium hydroxide solution is equivalent to 0.075 g of tartaric acid in the solution.

Calculate the total acid content (including free and decarboxylated acid) w in the sample according to Formula (A.1).

$$w=[0.075\times(V_1+20.0-V_2)]/m\times100\% \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots(A.1)$$

Where:

w – total acid content, % (retain three significant figures);

0.075 – conversion coefficient;

V_1 – volume of sodium hydroxide used in the first titration, in milliliters (mL) (the reading is accurate to 0.1 mL);

20.0 – addition of sodium hydroxide solution after the first titration, in milliliters (mL) (the reading is accurate to 0.1 mL);

V_2 – volume of sulfuric acid used in the second titration, in milliliters (mL) (the reading is accurate to 0.1 mL);

m – mass of the weighed sample, in grams (g).

Calculate the decarboxylation degree T of the to-be-tested sample according to Formula (A.2).

$$T=(20.0-V_2)/(V_1+20.0-V_2)\times100\% \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots(A.2)$$

Where:

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