GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

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National food safety standard - Food additives - Tripotassium orthophosphate

食品安全国家标准 食品添加剂 磷酸三钾

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State Administration for Market Regulation.

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National Food Safety Standard - Food additives - Tripotassium orthophosphate

1 Scope

This Standard applies to the food additive tripotassium orthophosphate which is produced with potassium hydroxide (or potassium carbonate) and the food additive phosphoric acid (including wet-process phosphoric acid) as raw materials.

2 Molecular formula and relative molecular mass

2.1 Molecular formula

Anhydrate: K_3PO_4

Hydrate: $K_3PO_4 \cdot nH_2O$

2.2 Relative molecular mass

Anhydrate: 212.26 (according to international relative atomic mass in 2018)

3 Technical requirements

3.1 Sensory requirements

Sensory requirements shall be in accordance with Table 1.

3.2 Physical and chemical indicators

Physical and chemical indicators shall be in accordance with Table 2.

Appendix A

Inspection method

WARNING: Some reagents which are used in this test method are toxic or corrosive, so, be careful when operating! If necessary, perform it in a fume hood. If it splashes on the skin or eyes, use water to rinse immediately; if it is serious, seek medical attention immediately.

A.1 General provisions

The reagents and water that are used in this Standard, when no other requirements are specified, refer to analytical reagents and grade-III water which is specified in GB/T 6682. The standard titration solution, the standard solutions, preparations and products for impurity determination, which are used in the test, are all prepared in accordance with the provisions of GB/T 601, GB/T 602, and GB/T 603, when no other requirements are specified. The used solution, if not indicated which solvent is used, refers to aqueous solution.

A.2 Identification test

A.2.1 Reagents and materials

A.2.1.1 Hydrochloric acid.

A.2.1.2 Ethanol

A.2.1.3 Acetic acid solution: 1+1.

A.2.1.4 Ammonia solution: 2+3.

A.2.1.5 Silver nitrate solution: 17 g/L.

A.2.1.6 Sodium hydrogen tartrate solution: 100 g/L.

A.2.1.7 Platinum wire ring.

A.2.2 Identification method

A.2.2.1 Potassium ion identification

Weigh 1 g of the sample; add 20 mL of water to dissolve it; use a platinum wire ring dipped in hydrochloric acid to wet it; burn to colorless on the flame. Then, dip the test solution and burn it on the flame. The flame shall be purple under the cobalt glass.

acid standard titration solution consumed by the sample. To prevent the solution from absorbing carbon dioxide from the air, continue to use the sodium hydroxide standard titration solution to titrate the solution to a pH of about 8.8, where a sudden jump point appears; record the volume V_2 of the sodium hydroxide standard titration solution consumed in this titration (that is, the volume of sodium hydroxide standard titration solution consumed in titration from pH ≈ 4.0 to pH ≈ 8.8).

A.3.5 Result calculation

The volume V_1 of the hydrochloric acid standard titration solution consumed by the sample solution, in milliliter (mL), is calculated according to Formula (A.1).

$$V_1 = \frac{50 \times c_1 - V \times c_2}{c_1} \qquad \text{(A.1)}$$

Where:

50 – volume of the added hydrochloric acid standard titration solution, in milliliters (mL);

c_1 – concentration of the hydrochloric acid standard titration solution, in moles per liter (mol/L);

V – volume of the sodium hydroxide standard titration solution that is consumed when it is titrated with sodium hydroxide standard titration solution to pH ≈ 4.0, after the sample solution is added with 50 mL of hydrochloric acid standard titration solution, in milliliters (mL);

c_2 – concentration of the sodium hydroxide standard titration solution, in moles per liter (mol/L);

When $V_1 \times c_1 \geq 2 \times V_2 \times c_2$, the mass fraction w_1 of tripotassium orthophosphate (calculated on the burning dry basis) is calculated according to Formula (A.2).

$$w_1 = \frac{V_2 \times c_2 \times M \times 10^{-3}}{m} \times 100\% \qquad \text{(A.2)}$$

When $V_1 \times c_1 < 2 \times V_2 \times c_2$, the mass fraction w_1 of tripotassium orthophosphate (calculated on the burning dry basis) is calculated according to Formula (A.3).

$$w_1 = \frac{(V_2 \times c_1 - V_2 \times c_2) \times M \times 10^{-3}}{m} \times 100\% \qquad \text{(A.3)}$$

Where:

V_2 – volume of the sodium hydroxide standard titration solution that is consumed from pH ≈ 4.0 to pH ≈ 8.8, in milliliters (mL);

The test result is based on the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results that are obtained under repeatability conditions is: not more than 0.01% for anhydrous tripotassium orthophosphate; not more than 0.1% for hydrated tripotassium orthophosphate.

A.5 Determination of water insoluble matter

A.5.1 Instruments and apparatuses

A.5.1.1 Sintered-glass filter crucible: The aperture of the filter plate is 5 μm ~ 15 μm.

A.5.1.2 Electrothermal constant-temperature dry box: The temperature control range is 105 °C ± 2 °C.

A.5.2 Analysis steps

Weigh about 20 g of the sample, accurate to 0.01 g; place it in a 400 mL beaker; add 200 mL of water and heat to dissolve; use a sintered-glass filter crucible that has been dried to a constant mass at 105 °C ± 2 °C in advance for suction filtration; use hot water to wash, until the filtrate is neutral. Place the sintered-glass filter crucible in an electrothermal constant-temperature dry box at 105 °C ± 2 °C to dry until the mass is constant.

A.5.3 Result calculation

Calculate the mass fraction w_3 of the water insoluble matter according to Formula (A.5).

$$w_3 = \frac{m_5 - m_4}{m_3} \times 100\% \qquad \text{(A.5)}$$

Where:

m_5 – mass of the water insoluble matter and the sintered-glass filter crucible, in grams (g);

m_4 – mass of the sintered-glass filter crucible, in grams (g);

m_3 – sample mass, in grams (g).

The test result is based on the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results that are obtained under repeatability conditions is not more than 0.02%.

A.6 Determination of pH (10 g/L aqueous solution)

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