GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

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National food safety standard Food additives - Dibasic sodium phosphate

食品安全国家标准

食品添加剂 磷酸氢二钠

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National food safety standard Food additives - Disodium dihydrogen pyrophosphate

1 Scope

This Standard is applicable to the food additive, disodium dihydrogen pyrophosphate, that is produced with sodium carbonate (or sodium hydroxide) and food additive phosphoric acid (including wet-process phosphoric acid) as raw materials.

2 Molecular formula and relative molecular mass

2.1 Molecular formula

$Na_2HPO_4 \cdot nH_2O$ (n=0, 2, 12)

2.2 Relative molecular mass

Na_2HPO_4 141.96 (according to 2018 international relative atomic mass)

$Na_2HPO_4 \cdot 2H_2O$ 177.99 (according to 2018 international relative atomic mass)

Na_2HPO_4 $12H_2O$ 358.14 (according to 2018 international relative atomic mass)

3 Technical requirements

3.1 Sensory requirements

The sensory requirements shall meet the requirements of Table 1.

3.2 Physical and chemical indicators

The physical and chemical indicators shall meet the requirements of Table 2.

Annex A

(informative)

Detection limit of different matrix specimens

WARNING: Some reagents used in this test method are toxic or corrosive, so be careful when operating! When necessary, it shall be carried out in a fume hood. If splashed on the skin or eyes, rinse immediately with plenty of water. Severe cases shall be treated immediately.

A.1 General provisions

The reagents and water used in this Standard refer to analytically-pure reagents and the grade three water specified in GB/T 6682 when other requirements are not indicated. The standard titration solution, standard solution for impurity determination, preparations and products used in the test are all prepared in accordance with the provisions of GB/T 601, GB/T 602, and GB/T 603 when other requirements are not specified. The solution used refers to an aqueous solution when it is not specified which solvent is used for preparation.

A.2 Identification test

A.2.1 Reagents and materials

A.2.1.1 Hydrochloric acid.

A.2.1.2 Nitric acid solution: 1+8.

A.2.1.3 Ammonia solution: 1+1.

A.2.1.4 Silver nitrate solution: 17g/L.

A.2.2 Instruments and equipment

Platinum wire: The platinum wire is fired on one end of the glass rod, and the top of the platinum wire is bent into a small ring.

A.2.3 Identification methods

A.2.3.1 Identification of phosphate ion

Weigh about 1.0g of specimen to dissolve in 20mL of water. Add silver nitrate solution to produce yellow precipitate. This precipitate can be dissolved in ammonia solution or nitric acid solution.

A.2.3.2 Identification of sodium ion

standard titration solution consumed by the titration between these two sudden points (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 specimen solution is calculated according to formula (A.1).

$$V_1 = \frac{40 \times c_1 - V \times c_2}{c_1} \qquad \text{(A.1)}$$

Where,

40 - The volume of added hydrochloric acid standard titration solution, in milliliters (mL);

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

V - The volume of sodium hydroxide standard titration solution is consumed when the specimen solution is titrated to pH≈4.0 when the sudden overshoot occurs, in milliliters (mL);

c_2 - The concentration of sodium hydroxide standard titration solution, in moles per liter (mol/L).

When $V_1 \times c_1 \leq V_2 \times c_2$, the mass fraction w_1 of disodium hydrogen phosphate (Na_2HPO_4) is calculated according to formula (A.2).

$$w_1 = \frac{V_1 \times c_1 \times M}{m_1 \times 1\,000} \times 100\% \qquad \text{(A.2)}$$

When $V_1 \times c_1 > V_2 \times c_2$, the mass fraction w1 of disodium hydrogen phosphate (Na_2HPO_4) is calculated according to formula (A.3).

$$w_1 = \frac{(2 \times V_2 \times c_2 - V_1 \times c_1) \times M}{m_1 \times 1\,000} \times 100\% \qquad \text{(A.3)}$$

Where,

V_1 - The volume of hydrochloric acid standard titration solution consumed when the sample solution is titrated to pH≈4.0 when the sudden jump point occurs, in milliliters (mL);

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

A.5 Determination of water insoluble matter

A.5.1 Instruments and equipment

A.5.1.1 Glass sand crucible: aperture is 5μm~15μm.

A.5.1.2 Electric heating constant temperature drying oven: The temperature control range is 105°C±2°C.

A.5.2 Analysis steps

Weigh about 20g of specimen, to the nearest of 0.01g. Place in a 500mL beaker. Add 250mL of water. Heat to boil. While it is hot, use the glass sand crucible that has been pre-dried to constant mass at 105°C±2°C to filter. Use 200mL of hot water to wash in 10 times. Then put the glass sand crucible together with the water-insoluble matter in an electric heating constant temperature drying box. Dry at 105°C±2°C to constant mass.

A.5.3 Result calculation

The mass fraction w_3 of water-insoluble matter is calculated according to formula (A.5).

$$w_3 = \frac{m_4 - m_5}{m_6} \times 100\% \qquad \text{(A.5)}$$

Where,

m_4 - The mass of glass sand crucible and water insoluble matter after drying, in grams (g);

m_5 - The mass of glass sand crucible, in grams (g);

m_6 - The specimen mass, in grams (g).

The test results are subject to the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results obtained under repeatability conditions is not more than 0.03%.

A.6 Determination of lead (Pb)

Determine according to the method of GB 5009.75 or GB 5009.12. The water used in the test is grade two water specified in GB/T 6682.

A.7 Determination of arsenic (As)

Determine according to the method of GB 5009.76 or GB 5009.11. The water used in the test is grade two water specified in GB/T 6682.

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