GB

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PEOPLE'S REPUBLIC OF CHINA

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National food safety standard - Food additives - Sodium dihydrogen phosphate

食品安全国家标准 食品添加剂 磷酸二氢钠

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1 Scope

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

2 Molecular formula and relative molecular mass

2.1 Molecular formula

Sodium dihydrogen phosphate anhydrous: NaH_2PO_4

Sodium dihydrogen phosphate monohydrate: $NaH_2PO_4 \cdot H_2O$

Sodium dihydrogen phosphate dihydrate: $NaH_2PO_4 \cdot 2H_2O$

2.2 Relative molecular mass

Sodium dihydrogen phosphate anhydrous: 119.98 (according to 2018 international relative atomic mass)

Sodium dihydrogen phosphate monohydrate: 137.99 (according to 2018 international relative atomic mass)

Sodium dihydrogen phosphate dihydrate: 156.01 (according to 2018 international relative atomic mass)

3 Technical requirements

3.1 Sensory requirements

The sensory requirements shall meet the requirements of Table 1.

Table 1 -- Sensory requirements

Annex A

Inspection methods

WARNING: Some reagents used in this standard test method are toxic or corrosive. Appropriate safety and protection determines should be taken during operation. When necessary, it should be carried out in a fume hood. If it splashes on the skin, it should be rinsed with water immediately, and the severe cases should be treated immediately.

A.1 General

The reagents and water used in this Standard refer to analytically-pure reagents and grade three water specified in GB/T 6682 when other requirements are not indicated. All standard solutions, preparations and products for the determination of impurities used in the test, when no other requirements are specified, are prepared according to GB/T 601, GB/T 602, GB/T 603. 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 Ammonia solution: 2+3.

A.2.1.2 Nitric acid solution: 1+8.

A.2.1.3 Silver nitrate solution: 17g/L.

A.2.2 Identification method

A.2.2.1 Identification of phosphate

Weigh 1g of specimen. Dissolve in 20mLof water. Add silver nitrate solution. Generate yellow precipitate. This precipitate can be dissolved in ammonia solution or nitric acid solution.

A.2.2.2 Identification of sodium ion

Weigh 1g of specimen. Add 20mLof water to dissolve. Dip a platinum wire ring in hydrochloric acid. Burn to colorless on the flame. Dip the test solution and burn on the flame. The flame shall be bright yellow.

A.3 Determination of sodium dihydrogen phosphate (NaH_2PO_4) (on a dry basis) content

Where,

5.0 - The volume of hydrochloric acid standard titration solution added, 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 consumed when titrating to pH≈4.0 when the sudden jump occurs, in milliliters (mL);

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

When $V_1<0$, the mass fraction w_1 of sodium dihydrogen phosphate (NaH_2PO_4) is calculated according to formula (A.2).

$$w_1 = \frac{V_2 \times c_2 \times M \times 10^{-3}}{m_1} \times 100\% \quad \cdots\cdots (A.2)$$

When $V_1 \geq 0$, the mass fraction w_1 of sodium dihydrogen phosphate (NaH_2PO_4) is calculated according to formula (A.3).

$$w_1 = \frac{(V_2 \times c_2 - V_1 \times c_1) \times M \times 10^{-3}}{m_1} \times 100\% \quad \cdots\cdots (A.3)$$

Where,

V_2 - The volume of sodium hydroxide standard titration solution consumed for titration between pH≈4.0 and pH≈8.8, in milliliters (mL);

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

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

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

M - The molar mass of sodium dihydrogen phosphate (nah_2po_4), in grams per mole (g/mol) (M = 119.98);

10^{-3} - The conversion factor;

m_1 - The specimen mass, in grams (g).

Weigh about 10g of specimen, to the nearest of 0.01g. Place in a 400mL beaker. Add 100mL of water and heat to boil. While it is hot, use the glass sand crucible that has been pre-baked at 105°C±2°C electric heating constant temperature drying oven to constant mass for suction-filtration. Wash the water insoluble matter with 200mL of hot water 10 times. Put the glass sand crucible together with the water-insoluble matter in a 105°C±2°C electric heating constant temperature drying box until the mass is constant.

A.5.3 Result calculation

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

$$w_3 = \frac{m_4 - m_5}{m_6 \times (1 - w_2)} \times 100\% \qquad \cdots\cdots (A.5)$$

Where,

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

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

m_6 - The mass of specimen, in grams (g);

w_2 - The mass fraction of loss on drying determined according to A.4, %.

The test results are based on the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results obtained under repeatability conditions is not more than 0.01%.

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

A.6.1 Reagents and materials

Carbon dioxide-free water.

A.6.2 Instruments and equipment

Acidity meter: Resolution is 0.01pH; equipped with glass electrode and saturated calomel electrode (or composite electrode).

A.6.3 Analysis steps

Weigh 1.00g±0.01g of specimen. Place in a 100mL beaker. Use carbon dioxide-free water to dissolve. Transfer to a 100mL volumetric flask. Use carbon dioxide-free water to dilute to the scale mark. Shake well. Pour into a 100mL dry beaker. Use a calibrated acid meter to determine the pH of the test solution.

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