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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

GB 1886.334-2021

**National Food Safety Standard -
Food Additives - Dipotassium Hydrogen Phosphate**

食品安全国家标准 食品添加剂 磷酸氢二钾

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National Food Safety Standard - Food Additives - Dipotassium Hydrogen Phosphate

1 Scope

This Standard is applicable to the food additive dipotassium hydrogen phosphate produced with potassium 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

Dipotassium hydrogen phosphate anhydrous: K_2HPO_4

Dipotassium hydrogen phosphate trihydrate: $K_2HPO_4 \cdot 3H_2O$

2.2 Relative Molecular Mass

Dipotassium hydrogen phosphate anhydrous: 174.17 (as per 2018 international atomic mass)

Dipotassium hydrogen phosphate trihydrate: 228.22 (as per 2018 international atomic mass)

3 Technical Requirements

3.1 Sensory requirements

The sensory requirements shall comply with the provisions of Table 1.

Table 1 – Sensory Requirements

3.2 Physicochemical index

Appendix A

Inspection Methods

Caution: Some reagents used in this test method are toxic or corrosive, so please be careful to take appropriate safety and protection measures when operating! If necessary, perform it in a fume hood. If it splashes on the skin, it shall be rinsed with water immediately, and the severe cases shall be treated immediately.

A.1 General provisions

If no other requirements are specified, all the reagents and water used in this Standard refer to the analytical reagents and Class-III water specified in GB/T 6682. If no other requirements are specified, standard solution for determining the impurity, preparation and product used in the test shall be prepared according to the provisions of GB/T 601, GB/T 602, GB/T 603. The solution used in the test refers to the aqueous solution when the solvent is not specified.

A.2 Identification test

A.2.1 Reagents and materials

A.2.1.1 Nitric acid solution: 1+8.

A.2.1.2 Ammonia solution: 2+3.

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

A.2.2 Identification method

A.2.2.1 Identification of phosphate radical

Weigh about 1.0g of specimen; dissolve it in 20mL of water; adjust to neutral with nitric acid solution. Add silver nitrate solution to produce yellow precipitate, which is soluble in ammonia solution or nitric acid solution.

A.2.2.2 Identification of potassium ions

Weigh 1g of specimen; add 20mL of water to dissolve. Dip a platinum wire ring in hydrochloric acid and burn it to colourless on the flame. Dip the test solution and burn it on the flame. The flame shall be purple when viewed with cobalt glass.

A.3 Determination of the content of dipotassium hydrogen phosphate (K_2HPO_4) (on a dry basis)

Where:

40.0 – volume of the added hydrochloric acid standard titration solution, in mL;

c_1 – concentration of hydrochloric acid standard titration solution, in mol/L;

V – volume of sodium hydroxide standard titration solution consumed for titration till a sudden jump point occurs at $\text{pH} \approx 4.0$, in mL;

c_2 – concentration of sodium hydroxide standard titration solution, in mol/L.

When $V_1 \times c_1 \leq V_2 \times c_2$, the mass fraction of dipotassium hydrogen phosphate (by $\text{K}_2\text{HPO}_4 \cdot 3\text{H}_2\text{O}$ or K_2HPO_4) w_1 shall be calculated according to Formula (A.2).

$$w_1 = \frac{V_1 \times c_1 \times M \times 10^{-3}}{m_1} \times 100\% \quad \dots\dots\dots (\text{A.2})$$

When $V_1 \times c_1 > V_2 \times c_2$, the mass fraction of dipotassium hydrogen phosphate (by $\text{K}_2\text{HPO}_4 \cdot 3\text{H}_2\text{O}$ or K_2HPO_4) w_1 shall be calculated according to Formula (A.3).

$$w_1 = \frac{(2 \times V_2 \times c_2 - V_1 \times c_1) \times M \times 10^{-3}}{m_1} \times 100\% \quad \dots\dots\dots (\text{A.3})$$

Where:

V_1 – when titrating till a sudden jump point occurs at $\text{pH} \approx 4.0$, volume of hydrochloric acid standard titration solution consumed by the specimen, in mL;

c_1 – concentration of hydrochloric acid standard titration solution, in mol/L;

M – molar mass of dipotassium hydrogen phosphate (by K_2HPO_4), in g/mol ($M=174.17$);

10^{-3} – conversion factor;

m_1 – mass of specimen, in g;

V_2 – volume of sodium hydroxide standard titration solution consumed for titration at $\text{pH} \approx 4.0$ to $\text{pH} \approx 8.8$, in mL;

c_2 – concentration of sodium hydroxide standard titration solution, in mol/L.

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 no more than 0.2%.

A.4 Determination of loss on drying

mL of water and heat it to a boil. While it is hot, filter by the glass sand crucible pre-baked in an electric heating constant temperature drying oven at $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$. Wash the water-insoluble matter for 10 times by 200mL of hot water. Put the glass sand crucible together with the water-insoluble matter in a $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$ electric heating constant temperature drying box until the mass is constant.

A.5.3 Calculation of results

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

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

Where:

m_4 – mass of water-insoluble matter and glass sand crucible, in g;

m_5 – mass of glass sand crucible, in g;

m_6 – mass of specimen, in g;

w_2 – mass fraction of loss on drying measured according to A.4, in %.

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 no more than 0.002%.

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

A.6.1 Reagents and materials

Carbon dioxide-free water.

A.6.2 Apparatus

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

A.6.3 Analysis procedures

Weigh $1.00\text{g}\pm 0.01\text{g}$ of specimen; place it in a 100mL beaker; dissolve it with carbon dioxide-free water; transfer it into a 100mL volumetric flask. Dilute to the mark with carbon dioxide-free water; and shake it well. Pour into a 100mL dry beaker; and measure the pH of the specimen solution with a calibrated acidity meter.

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 no more than 0.1%.

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Contact: Wayne Zheng, Sales@ChineseStandard.net

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