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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

GB 1886.250-2016

**National Food Safety Standard - Food Additives -
Sodium Phytate**

食品安全国家标准 食品添加剂 植酸钠

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People's Republic of China**

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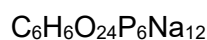
National Food Safety Standard - Food Additives - Sodium Phytate

1 Scope

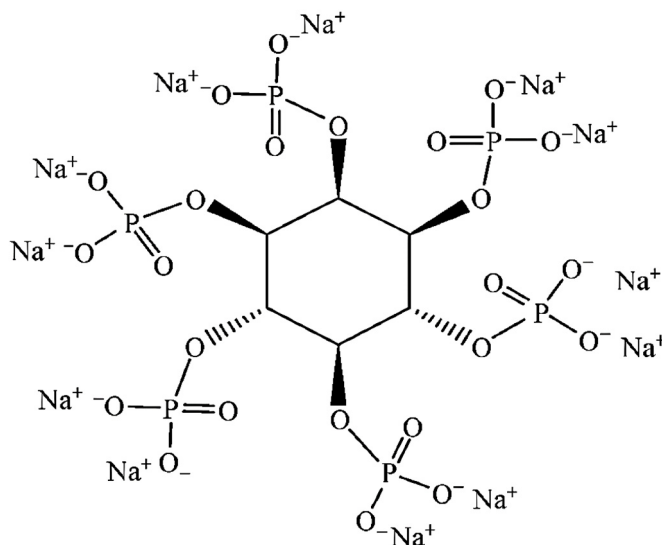
This Standard is applicable to food additive sodium phytate, which is made from rice bran and corn germ as the raw materials, and through extraction, purification, crystallization separation and drying.

2 Molecular Formula, Structural Formula and Relative Molecular Mass

2.1 Molecular Formula



2.2 Structural Formula



2.3 Relative Molecular Mass

923.8012 (in accordance with 2013 international relative atomic mass)

3 Technical Requirements

3.1 Sensory Requirements

Appendix A

Inspection Method

A.1 General Rules

When other requirements are not indicated, the reagents and water used in this Standard refer to analytically pure reagents and Grade-3 water specified in GB/T 6682.

When other requirements are not indicated, the standard solutions, preparations and products used for impurity determination shall be prepared in accordance with the stipulations of GB/T 602 and GB/T 603. When it is not specified which solvent is used for the preparation, the solutions used in the test refer to aqueous solutions.

A.2 Identification Test

A.2.1 Reagents and materials

A.2.1.1 Total arsenic and nitric acid solution: 1 + 3.

A.2.1.2 Sulfuric acid.

A.2.1.3 Hydrogen peroxide.

A.2.1.4 Calcium chloride solution: 75 g/L. Prepare it right before use.

A.2.1.5 Ammonium molybdate solution: 25 g/L.

A.2.2 Identification method

Take a small amount of 1% specimen solution; use nitric acid solution to neutralize it; add a few drops of calcium chloride solution to generate white precipitate.

Take a small amount of 1% specimen solution; add 1 mL of sulfuric acid; heat it up to reach complete carbonization. Then, dropwise add hydrogen peroxide, until it turns light yellow and translucent; add ammonium molybdate solution to develop yellow.

A.3 Determination of Sodium Phytate Content

A.3.1 Method summary

Sodium phytate is digested by perchloric acid and nitric acid to generate sodium phosphate. In nitric acid medium, phosphoric acid reacts with quin molybdenum ketone reagent to generate yellow precipitate of quinoline phosphomolybdate, which is filtered, washed, dried and weighed. Thus, the sodium phytate content in the sample can be calculated.

m_1 ---the mass of the precipitate, expressed in (g);

M_1 ---the molar mass of phosphorus, expressed in (g/mol) [$M(\text{P}) = 30.974$];

M_2 ---the molar mass of quinoline phosphomolybdate, expressed in (g/mol) $\{M[(\text{C}_9\text{H}_7\text{N})\text{H}_3\text{PO}_4 \bullet 12\text{MoO}_3] = 2212.74\}$;

M_3 ---the molar mass of sodium phytate, expressed in (g/mol) [$M(\text{C}_6\text{H}_6\text{O}_{24}\text{P}_6\text{Na}_{12}) = 923.8012$];

6---the number of phosphorus in sodium phytate;

m_2 ---the mass of the specimen, expressed in (g);

20---the volume of the specimen solution being tested, expressed in (mL);

100---the total volume of the specimen solution, expressed in (mL).

The arithmetic mean value of the parallel determination results shall prevail in the test result. The absolute difference between two independent determination results obtained under repeatability conditions is not greater than 0.2%.

A.4 Determination of Inorganic Phosphorus

A.4.1 Method summary

Under acidic conditions, add orthophosphate in the sodium phytate solution of ferric chloride solution to generate yellow phosphorus vanadium molybdate complex with vanadium molybdate. Use a spectrophotometer to measure its absorbance value at 420 nm. In accordance with the standard curve, calculate the inorganic phosphorus content in the sample.

A.4.2 Reagents and materials

A.4.2.1 Ammonium vanadium molybdate solution: weigh-take 40 g of ammonium molybdate $[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \bullet 4\text{H}_2\text{O}]$, dissolve it in 400 mL of water to obtain solution A. Weigh-take 1.0 g of ammonium metavanadate (NH_4VO_3), dissolve it in a mixed solvent of 300 mL of water and 80 mL of concentrated sulfuric acid to obtain solution B. Add solution A to solution B; use reagent water to dilute it to 1 L.

A.4.2.2 Ferric chloride solution: 10 g/L.

A.4.2.3 Phosphate standard stock solution: weigh-take 4.3865 g of potassium dihydrogen phosphate, which is dried at 105 °C for 1 h; dissolve it in 100 mL of water; transfer it into a 1 L volumetric flask. Use reagent water to dilute it to the scale, then, shake it well. The concentration of this solution is 1.0 mg/mL.

A.4.2.4 Phosphate standard working solution: accurately draw 10.0 mL of the standard

Under acidic conditions, the chloride ions in the sodium phytate solution and the silver nitrate solution generate white silver nitrate precipitate. Use the visual inspection method to compare the turbidity with the standard solution.

A.5.2 Reagents and materials

A.5.2.1 Nitric acid solution: 1 + 4.

A.5.2.2 Silver nitrate solution: 0.1 mol/L.

A.5.2.3 Chloride standard solution: 0.1 mg/mL.

A.5.3 Analytical procedures

Weigh-take 1.0 g of the specimen, accurate to 0.01 g. Place it in a 25 mL colorimetric tube; add 15 mL of water, then, use nitric acid solution to neutralize it to pH = 7. Add 1 mL of nitric acid solution to acidify the solution, then, add 1 mL of 0.1 mol/L silver nitrate solution, reach a constant volume of 25 mL; shake it well and place it in the dark for 10 min. Take 1.0 mL of the chloride standard solution to a 25 mL colorimetric tube; add 15 mL of water; the rest of the steps are the same as the treatment of the specimen solution. Observe the turbidity of the sample, which shall not be deeper than the standard solution.

A.6 Determination of Sulfate

A.6.1 Method summary

Under acidic conditions, the sulfate ions in the sodium phytate solution and the barium chloride solution generate barium sulfate precipitate. Use the visual inspection method to compare the turbidity with the standard solution.

A.6.2 Reagents and materials

A.6.2.1 Nitric acid solution: 1 + 3.

A.6.2.2 Sulfate standard solution: 0.1 mg/mL.

A.6.3 Analytical procedures

Weigh-take 1.0 g of the specimen (accurate to 0.01 g); place it in a 25 mL colorimetric tube. Add 20 mL of water, then, use nitric acid solution to neutralize it to pH = 7; the remaining shall be carried out in accordance with the stipulations of GB/T 9728. Take 1.0 mL of sulfate standard solution to a 25 mL colorimetric tube; add 20 mL of water; the rest of the steps are the same as the treatment of the specimen solution. Observe the turbidity of the sample, which shall not be deeper than the standard solution.

A.7 Determination of Calcium Salt

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