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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 29214-2012

National food safety standards -- Food additives -- Ferrocyanide

食品添加剂 亚铁氰化钠

(English Translation)

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1 Scope

This standard applies to sodium cyanide and ferrous sulfate or with reduced iron powder, sodium hydroxide and hydrogen cyanide as raw materials to produce food additives Sodium ferrocyanide.

2.1 Chemical name

Sodium ferricyanide decahydrate

2.2 Molecular formula

$\text{Na}_4\text{Fe}(\text{CN})_6 \cdot 10\text{H}_2\text{O}$

2.3 Relative molecular mass

484.06 (according to the 2007 International Relative Atomic Quality)

3.1 Sensory requirements

Shall comply with the provisions of Table 1.

Table 1 sensory requirements

The project requires a test method Color pale yellow State granular or powdered crystals
Take appropriate sample in a 50 mL beaker and observe the color and state under natural light

3.2 Physical and chemical indicators

Shall comply with the provisions of Table 2.

Table 2 Physical and chemical indicators

Item Index Test Method Sodium ferrocyanide $[\text{Na}_4\text{Fe}(\text{CN})_6 \cdot 10\text{H}_2\text{O}]$ content, w /% ≥ 99.0 Appendix A A.4 Cyanide through Test Appendix A, A.5 the ferricyanide passes the test in Appendix A, A.6

Table 2 (continued)

Item Index Test Method Chloride (in terms of Cl), w /% ≤ 0.2 Appendix A A.7 Sulfate (in SO_4), w /% ≤ 0.07 Appendix A, A.8 Dry reduction, w /% ≤ 1.0 Appendix A A.9 Water insoluble matter, w /% ≤ 0.03 Appendix A. A.10 Arsenic (As)/(mg/kg) ≤ 3 GB/T 5009.76 Lead (Pb)/(mg/kg) ≤ 5 GB 5009.12 Appendix A Testing method A.1 Warning Some of the reagents used in the test methods of this standard are toxic or corrosive and should be operated with appropriate safety and protective measures.

A.2 General provisions the reagents and water used in this standard, when not specified, refer to the analytical reagent and the tertiary water specified in GB/T 6682-2008.

Standard titration solution used in the test, the standard solution for the determination of impurities, preparations and products, in the absence of other requirements, according to GB/T 601, GB/T 602, GB/T 603. The solution used refers to an aqueous solution when it is not specified with any solvent formulation.

A.3 Identification test A.3.1 Reagents and materials Ferric chloride ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$) solution. 100 g/L.

A.3.2 Identification method Weigh 0.1g sample, dissolved in 10mL water, add 1mL ferric chloride solution, blue-black precipitation generated.

Determination of the content of sodium ferrocyanide $[\text{Na}_4\text{Fe}(\text{CN})_6 \cdot 10\text{H}_2\text{O}]$ A.4.1 Methodological Summary in the acidic medium, cerium sulfate and sodium ferrocyanide redox reaction, according to the standard titration solution of cerium sulfate standard solution Sodium ferricyanide content.

A.4.2 Reagents and materials A.4.2.1 Sulfuric acid.

A.4.2.2 Cerium sulfate standard titration solution. $c[\text{Ce}(\text{SO}_4)_2] = 0.1 \text{ mol/L}$.

A.4.2.3 1,10-phenanthroline-ferrous indicator liquid.

A.4.3 Analysis steps Weigh about 1.5g sample, accurate to 0.0002g, placed in 500mL Erlenmeyer flask, add 225mL water dissolved, along the bottle wall slowly Into 25mL sulfuric acid, while adding 3 drops of 1,10-phenanthroline-ferrous indicator solution, titration solution with cerium sulfate titration to the color by the orange Color becomes pure yellow.

At the same time to do a blank test, in addition to no sample, the other addition of the reagent and the sample solution is exactly the same, and the same sample deal with.

A.4.4 Calculation of results the mass fraction w_1 of sodium ferrocyanide $[\text{Na}_4\text{Fe}(\text{CN})_6 \cdot 10\text{H}_2\text{O}]$ is calculated according to formula (A.1) $w_1 = c(V-V_0)M/1000m \times 100\%$ (A.1) where.

c - the exact value of the standard titration solution of cerium sulfate standard in moles per liter (mol/L);

V - titration sample solution consumed by the standard titration solution of cerium sulfate standard solution in milliliters (mL);

V_0 --- titration blank sample solution consumption of cerium sulfate standard titration solution volume value in milliliters (mL);

m - the mass of the sample, in grams (g);

M - sodium ferrocyanide $[\text{Na}_4\text{Fe}(\text{CN})_6 \cdot 10\text{H}_2\text{O}]$ in grams per mole (g/mol) ($M = 484.06$);

1000 --- conversion factor.

The experimental results are based on the arithmetic mean of the parallel measurement results. The absolute difference between the two independent determinations obtained under repeatability conditions the value is not greater than 0.3%.

Determination of cyanide A.5.1 Reagents and materials A.5.1.1 copper sulfate solution. 1g/L. 0.1 g of copper sulfate was dissolved in 100 mL of aqueous ammonia (15).

A.5.1.2 Filter paper. A filter paper is wetted with a copper sulfate solution and the wet filter paper is placed in a hydrogen sulfide gas to give the filter paper brown.

A.5.2 Analysis steps Approximately 1 g of the sample was weighed and dissolved in 100 mL of water. Drop 1 drop of this solution on the filter paper (A.5.1.2), should be no white ring generated.

A.6 Determination of ferricyanide A.6.1 Reagents and materials A.6.1.1 Lead nitrate solution. 10 g/L.

A.6.1.2 saturated solution of diaminobiphenyl acetic acid (12).

A.6.2 Analysis steps Weigh about 0.1g sample, dissolved in 100mL water, drop 1 drop of the solution on the drip plate, add 1 drop of lead nitrate, add a few drops of two Aminobiphenyl acetic acid (1 2) saturated solution should not be blue precipitated or blue appears.

A.7 Determination of chloride (in terms of Cl) A.7.1 Reagents and materials A.7.1.1 Nitric acid solution. 1 4.

A.7.1.2 Silver nitrate solution. 17 g/L.

A.7.1.3 Chloride-free copper sulfate solution. 50 g/L. Weigh 5g of chloride-free copper sulfate (with the analysis of pure copper sulfate pentahydrate Crystallization twice), dissolved in water, diluted to 100mL.

A.7.1.4 Chloride (Cl) standard solution. 0.01 mg/mL.

A.7.1.5 Blue litmus paper.

A.7.2 Analysis steps Weigh $0.50\text{g} \pm 0.01\text{g}$ sample, add water to dissolve, add 12.5mL of chloride-free copper sulfate solution with stirring, stir well, the solution was transferred to a 100 mL volumetric flask, diluted with water to a graduated volume and shaken. After clarification of the upper solution, dry filter, discard the initial 20mL.

Remove the 5.00 mL filtrate in a 50 mL colorimetric tube, add water to 25 mL, neutralize with nitric acid solution (test with blue litmus paper), add Into 1mL nitric acid solution, 1mL silver nitrate solution, diluted with water to the mark, shake. Avoid light for 10min, the turbidity should not be deeper than the standard Quasi-turbid solution.

Preparation of standard turbidimetric solution. Remove 5.00 mL of chlorine standard solution in 50 mL colorimetric tube, add water to about 25 mL, add no chloride of copper sulfate solution, the color and diluted to 25mL sample solution of the same color, add 1mL nitric acid solution, 1mL silver nitrate solution Liquid, diluted with water to the mark, shake. Avoid light for 10min.

A.8 Sulfate (measured in SO_4) A.8.1 Reagents and materials A.8.1.1 hydrochloric acid solution. 1 3.

A.8.1.2 barium chloride solution. 250 g/L.

A.8.1.3 Sulfate (SO_4) standard solution. 0.05 mg/mL.

A.8.1.4 Blue litmus paper.

A.8.2 Analysis steps Weigh $0.50\text{g} \pm 0.01\text{g}$ sample, placed in 50mL colorimetric tube, add 30mL water dissolved sample, with hydrochloric acid solution to blue Litmus paper turned red, then add 1mL hydrochloric acid solution, 3mL barium chloride solution, diluted with water to the mark, shake. Placed 10min, was cloudy the degree should not be deeper than the standard turbid solution.

Preparation of standard turbid solution. Remove the standard solution of 7.00mL sulfate in 50mL colorimetric tube, add 1mL hydrochloric acid solution, 3mL barium chloride solution, diluted with water to the mark, shake. Placed for 10min.

A.9 Determination of dry reduction A.9.1 Instruments and equipment Electric thermostat oven. temperature can be controlled at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

A.9.2 Analysis steps Weigh about 2g of sample, accurate to 0.0002g. Placed in advance at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ dry to a constant weight of the weighing bottle $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ electric