



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

GB 1886.296-2016

**National Food Safety Standard -- Food Additives -- Ammonium
Citrate**

食品安全国家标准 食品添加剂 柠檬酸铁铵

(English Translation)

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1 Scope

This standard applies to citrate, ferrous or ferric sulfate, ammonia as raw materials, food additives, ferric ammonium citrate was prepared by machining.

This standard also applies to food fortifier ferric ammonium citrate.

2 Structural formula, and the formula

Formula 2.1

$(\text{NH}_4)_x\text{Fe}_y(\text{C}_6\text{H}_4\text{O}_7)_z$

2.2 Structure

In $\text{C}_6\text{H}_8\text{FeNO}_7$ an example, the following structural formula.

3.1 Sensory requirements

Sensory requirements shall comply with the requirements in Table 1.

Table 1 Sensory requirements

Project requires test methods Color and smell of green to brown, odorless or slight ammonia smell State scaly, granular or powdered the proper amount of sample was placed on white porcelain plate was observed under natural light its color and state, smell the smell

3.2 Physical and Chemical Indicators

Physical and chemical indicators should be consistent with the provisions of Table 2.

Table 2. Physical and chemical indicators

Item Index Test Method Ferric ammonium citrate content (as Fe), w /% Green brown salt

salt 14.5 ~ 16.0 16.5 ~ 22.5 Appendix A A.4 Ferric citrate experimentally Appendix A A.5 Appendix A oxalate experimentally A.6 Sulfate (in terms of SO₄), w /% ≤ 0.3 Appendix A A.7 Lead (Pb)/(mg/kg) ≤ 2.0 GB 5009.12 Total arsenic (As)/(mg/kg) ≤ 4.0 GB 5009.11 Total mercury (Hg)/(mg/kg) ≤ 1.0 GB 5009.17 Appendix A Testing method A.1 Warning Reagents of this standard test method for use in corrosive or toxic, the operation should take appropriate safety and protective measures.

If necessary, to be carried out in a fume hood. As splashed on the skin should immediately wash with water, severe cases should be treated immediately.

A.2 General Provisions Unless otherwise specified in this standard, it should be analytical reagent purity above, the standard titration solution, impurities determined by standard solution used, Formulations and products, shall GB/T 601, GB/T 602, GB/T 603 provisions prepared test water shall meet the GB/T 6682 in three water Provisions. The test does not indicate when the solution which is formulated with a solvent, refer to the aqueous solution.

A.3 Identification Test A.3.1 Reagents and solutions Hydrochloric acid solution A.3.1.1. 19.

A.3.1.2 ferric chloride solution. 100g/L.

A.3.1.3 potassium permanganate solution. potassium permanganate weighed 0.3161g, dissolved in water volume to 100mL, a concentration of approximately 0.1mol/L.

Mercury sulfate solution A.3.1.4. Take yellow mercuric oxide 5g, mixed with water 40mL, 20mL sulfuric acid was added with stirring, add water 40mL, Stir until completely dissolved.

A.3.1.5 sodium hydroxide solution. 1mol/L.

A.3.2 identification method A.3.2.1 sample soluble in water, insoluble in ethanol.

A.3.2.2 0.5g of sample burning, the resulting residue was dissolved 5mL hydrochloric acid solution, the resulting solution was mixed with ferric chloride solution contrasting color the same.

A.3.2.3 taken 5mL10% sample solution, potassium permanganate solution were added 0.3mL, 4mL mercury sulfate solution, the mixed solution was heated to Boiling, a white precipitate formed.

A.3.2.4 Weigh 0.5g sample was dissolved in 5mL of water, sodium hydroxide solution was added 5mL, red-brown precipitate formed, the mixture was heated, There ammonia release.

A.4 Determination of ferric ammonium citrate content (Fe) of A.4.1 Reagents and solutions

A.4.1.1 hydrochloric acid.

A.4.1.2 KI.

A.4.1.3 sodium thiosulfate standard titration solution. c (Na₂S₂O₃) = 0.1mol/L.

A.4.1.4 starch indicator solution. 5g/L.

A.4.2 Analysis step

Weigh about 1g sample to the nearest 0.1 mg, placed in 250mL iodometric flask, 25mL water was added to dissolve, then add hydrochloric acid and 5mL iodine 4g Potassium, shake, stoppered, allowed to stand in the dark after 15min, add water 100mL, titration with standard sodium thiosulfate titration, is added near the end point 1mL starch indicator solution and continue the titration solution until blue color disappeared, while the blank test.

A.4.3 calculation results the content of ferric ammonium citrate (Fe) mass fraction w_1 , calculated according to formula (A.1).

$$(V-V_0) \times c \times M$$

$$m \times 1000 \times$$

$$100\% \text{ (A.1)}$$

Where.

V --- standard sodium thiosulfate titration of the sample solution volume in milliliters (mL);

--- volume V_0 of the blank test standard sodium thiosulfate titration solution used, in milliliters (mL);

C --- The actual concentration of the solution titrated with sodium thiosulfate standard units of moles per liter (mol/L);

--- M iron molar mass in grams per mole (g/mol) [$M = 55.85$];

--- m sample mass in grams (G);

1000 --- conversion factor.

The arithmetic average of the measurement results parallel the measurement results, the measurement results of two parallel allows absolute difference less than 10%.

Determination of iron citrate A.5 A.5.1 Reagents and solutions Potassium ferrocyanide solution. 100g/L.

A.5.2 Analysis step

Weigh 1.0g sample was dissolved was added 100mL of water, potassium ferrocyanide solution was added 10mL, no blue precipitate formed, that is, by experiment.

A.6 Determination of oxalate A.6.1 Reagents and solutions A.6.1.1 ether.

A.6.1.2 glacial acetic acid.

Hydrochloric acid solution A.6.1.3. 19.

A.6.1.4 calcium acetate solution. Weigh 5.00g calcium acetate dissolved in water, dilute to

100mL.

A.6.2 Analysis step

1.00g sample was taken, dissolved in 10mL of water was added, was placed in a 125mL separatory funnel, then added 2mL of hydrochloric acid solution, washed with 50mL and 20mL of diethyl ether, and the combined extracts were in the 150mL beaker, add water, 10mL, ether evaporated to dryness on a water bath, in an aqueous solution was added dropwise 1 Calcium acetate and 1mL of glacial acetic acid solution, the turbidity not 5min, namely by experiment.

Determination A.7 Sulfate (SO_4 basis) A.7.1 Reagents and solutions Hydrochloric acid solution A.7.1.1. 19.

A.7.1.2 sulfate solution. 0.005mol/L.

Barium chloride solution A.7.1.3. 120g/L.

A.7.2 Analysis step

0.1g sample was weighed to the nearest 0.1 mg, dissolved in water, a 50mL colorimetric tube, was added a solution of hydrochloric acid 1mL, diluted with water to 50mL, this sample solution. Another one cuvette, was added 0.60mL sulfuric acid solution was added hydrochloric acid 1mL, diluted with water to 50mL, this is a control solution. If the solution is not clarified, then the two solutions were filtered under the same conditions. Barium chloride solution were added to 2mL, Placed 10min after mixing. From the comparison both the turbidity of sample solution turbidity of color on a black background above the tube should not exceed a control turbidity, i.e., sulfate content of the sample (in terms of SO_4) not more than 0.3%.