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Report Highlights:

On September 25, 2025, China's NHC and SAMR jointly released several food additives standards, including L-Malic Acid, Xanthan Gum, Ammonium Carbonate, and Acorn Shell Brown. The final standards will enter into force on March 2, 2026. This report provides an unofficial translation of the final standards. Stakeholders should conduct their own review of the regulations to assess any market or regulatory effect on their business.

FAS China provides this reporting and analysis as a service to U.S. farmers, ranchers, rural communities, and agribusinesses in support of a worldwide agricultural information system and a level playing field for U.S. agriculture.

Report Summary:

On September 25, 2025, China's National Health Commission (NHC) and the State Administration for Market Regulation (SAMR) jointly released the National Food Safety Standards for the following food additives:

- GB 1886.40-2025: Food Additive L-Malic Acid, it will replace previous standard of GB 1886.40-2015. The draft standard was notified to WTO under G/SPS/N/CHN/1305 on July 11, 2024, please see FAS GAIN Report CH2024-0106 for more detailed information. Please see page 2 for unofficial translation of the final standard.

- GB 1886.41-2025: Food Additive Xanthan Gum, it will replace previous standard of GB 1886.41-2015. China notified the draft of the standard under G/SPS/N/CHN/1338 on August 28, 2025. Please see page 15 for unofficial translation of the final standard.

- GB 1886.386-2025: Food Additive Ammonium Carbonate, this is a new standard. China notified the draft of the standard under G/SPS/N/CHN/1308 on July 11, 2024, please refer to FAS GAIN Report CH2024-0105 for more detailed information. Please see page 25 for unofficial translation of the final standard.

- GB 1886.387-2025: Food Additive Acorn Shell Brown, this is a new standard. China notified the draft standard under G/SPS/N/CHN/1309 on July 11, 2024, please refer to FAS GAIN Report CH2024-0098 for more detailed information. Please see page 34 for unofficial translation of the final standard.

This report provides an unofficial translation of the final standard. Stakeholders should conduct their own review of the regulations to assess any market or regulatory effect on their business.

BEGIN UNOFFICIAL TRANSLATION

National Food Safety Standard

Food Additive L-Malic Acid

Foreword

This standard replaces GB 1886.40-2015 "National Food Safety Standard Food Additives L-Malic Acid."

Compared with GB 1886.40-2015, the main changes in this standard are as follows:

- Modified the scope;
- Added physical and chemical indicators such as moisture and succinic acid;
- Revised the physical and chemical indicators content, description and limits of total arsenic, and removed heavy metals;
- Updated the testing methods for identification, content, clarity, fumaric acid, maleic acid, lead, and total arsenic;
- Added testing method for succinic acid;
- Modified Appendix A and Appendix B, and added Appendix C.

1. Scope of Application

This standard is applicable to L-malic acid, a food additive prepared by enzymatic engineering using fumaric acid or fumarate salts as raw materials, or by fermentation using starch or sugar as raw materials.

2. Chemical Name, Molecular Formula, Structural Formula, and Relative Molecular Mass

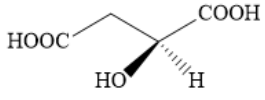
2.1 Chemical name

L-Hydroxysuccinic acid

2.2 Molecular formula

$C_4H_6O_5$

2.3 Structural formula



2.4 Relative molecular mass

134.09 (according to 2022 international relative atomic mass)

3. Technical Requirements

3.1 Sensory requirements

Sensory requirements shall conform to the provisions in Table 1.

Table 1: Sensory Requirements

Items	Requirement	Testing method
Color	White	Take an appropriate amount of the sample and place it on a clean and dry white porcelain plate. Under natural light, observe its color and state, and smell its odor.
State	Crystalline or crystalline powder	
Smell	Special sour taste	

3.2 Physical and chemical indices

It shall conform to the provisions in Table 2.

Table 2: Physical and Chemical Indicators

Items		Indicators	Testing method
Content (calculated as $C_4H_6O_5$), w/%	≥	99.0	A.4 in Appendix A
Specific rotation angle α_m (20℃, D)/ [(°) •dm^2 • kg^{-1}]		-1.6~-2.6	A.5 in Appendix A
Clarity		By experimentation	A.6 in Appendix A
Water content, w/%	≤	1.0	GB 5009.3 Karl Fischer Method
Ignition residue, w/%	≤	0.10	A.7 in Appendix A
Chloride (in Cl^-), w /%	≤	0.004	A.8 in Appendix A
Sulfate (in SO_4^{2-}), w /%	≤	0.02	A.9 in Appendix A
Fumaric acid, w/%	≤	0.5	A.10 in Appendix A
Maleic acid, w/%	≤	0.05	A.10 in Appendix A
Succinic acid, w/%	≤	2.0	A.10 in Appendix A
Lead (Pb)/(mg/kg)	≤	2.0	GB 5009.12 or GB 5009.75
Total arsenic (in As)/(mg/kg)	≤	1.0	GB 5009.11 or GB 5009.76

Appendix A

Testing Methods

A.1 Warnings

Some of the testing procedures specified in the testing method may lead to dangerous situations. The operator should take appropriate safety and health measures.

A.2 General Provisions

The reagents used in this standard refer to analytical grade reagents unless otherwise specified. The standard titration solution, impurity determination standard solution, formulation, and product used in the experiment shall be prepared in accordance with the provisions of GB/T 601, GB/T 602, and GB/T 603 unless otherwise specified. The solution used in the experiment refers to Grade III water as specified in GB/T 6682, unless otherwise specified.

A.3 Determination Test

A.3.1 Reagents and materials

A. 3.1.1 Ammonia solution: ammonia + water = 2+3.

A. 3.1.2 p-Aminobenzenesulfonic acid solution: 10 g/L.

A. 3.1.3 Sodium nitrite solution: 200 g/L.

A. 3.1.4 Sodium hydroxide solution: 40 g/L.

A.3.2 Analysis steps

A. 3.2.1 Color identification of ammonium salts

Weigh 0.5 g of the sample, accurate to 0.01 g, place it in a 50 mL test tube, and add 10 mL of aqueous solution. Neutralize with ammonia solution until neutral, add 1 mL of p-aminobenzenesulfonic acid solution, and heat in boiling water for 5 minutes. Add 5mL of sodium nitrite solution and heat it in boiling water for 3 minutes. Then add 5 mL of sodium hydroxide solution and observe from top to bottom. The sample solution should immediately turn red.

A. 3.2.2 Infrared absorption spectroscopy identification

According to GB/T 6040, the potassium bromide tablet method is used to determine the infrared absorption spectrum. The infrared absorption spectrum of the sample should be basically consistent with Appendix B.

A.4 Determination of Content (calculated as $C_4H_6O_5$)

A.4.1 Method summary

Using phenolphthalein as an indicator, titrate the sample solution with sodium hydroxide standard titration solution, and calculate the total acid concentration in the sample solution (calculated as $C_4H_6O_5$) based on the consumption of sodium hydroxide standard titration solution.

A.4.2 Reagents and materials

A. 4.2.1 Sodium hydroxide standard titration solution: c (NaOH) = 0.5 mol/L.

A. 4.2.2 Phenolphthalein indicator solution: 10 g/L.

A.4.3 Instruments and equipment

Analytical balance: with a sensitivity of 0.000 1 g.

A.4.4 Analysis steps

Weigh about 1.0g of the sample, accurate to 0.000 1g, and dissolve it in 20 mL water that is free of carbon dioxide; add 2 drops of phenolphthalein indicator solution, titrate with sodium hydroxide standard titration solution until it turns slightly red, and when it keeps for 30s without fading, it will take as the endpoint. Perform a blank test using the same measurement steps as the sample.

A.4.5 Calculation of results

The mass fraction ω_1 of the content (calculated as $C_4H_6O_5$) is calculated according to equation (A.1).

$$\omega_1 = \frac{(V_1 - V_0) \times c \times M}{m \times 1\,000} \times 100\% \quad \text{(A.1)}$$

In which:

V_1 - the volume of sodium hydroxide standard titration solution consumed by the sample solution, in milliliters (mL);

V_0 - the volume of sodium hydroxide standard titration solution consumed by the blank solution, in milliliters (mL);

c- the concentration of standard sodium hydroxide titration solution, in mole per liter (mol/L);

M - the molar mass of 1/2 L-malic acid, in grams per mole (g/mol) (M = 67.04);

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

1000 - Conversion factor.

The experimental results are expressed as the arithmetic means of parallel measurement results, and the calculated results are kept to two decimal digits.

A. 4.6 Precision

The absolute difference between two independent measurement results obtained under repetitive conditions shall not exceed 0.2%.

A.5 Determination of Specific Rotation

A.5.1 Instruments and equipment

A. 5.1.1 Polarimeter: Equipped with a sodium lamp (sodium spectrum D line 589.3 nm), with an accuracy of ±0.01°.

A. 5.1.2 Analytical balance: with a sensitivity of 0.01 g.

A.5.2 Analysis steps

Weigh 4.25 g of the sample, accurate to 0.01 g, dissolve it in 20 mL of water and make up to 50 mL, and follow the procedures specified in GB/T 613 for the remaining steps.

A.5.3 Calculation of results

The specific rotation is measured as α_m (20 ℃, D) and expressed as (°) · dm^2 · kg^{-1}, calculated according to equation (A.2).

$$\alpha_m = \frac{\alpha}{l \times \rho} \quad \text{(A.2)}$$

In which:

α - the value of the optical rotation of the sample solution measured at 20 ℃, in degrees (°);

l - the numerical value of the length of the polarizing tube, in decimeters (dm);

ρ - the mass concentration of effective components in the sample in the solution, in grams per milliliter (g/mL).

A. 6 Determination of clarity

A.6.1 Reagents and materials

A. 6.1.1 Nitric acid solution: Nitric acid + water = (1+2).

A. 6.1.2 Silver nitrate solution: 20 g/L.

A. 6.1.3 Dextrin solution: 20 g/L.

A. 6.1.4 Hydrochloric acid standard solution: *c* (HCl)=0.1 mol/L.

A. 6.1.5 Standard working solution (containing 0.01 mg/mL chlorine): Accurately take 14.1 mL of hydrochloric acid standard solution, dilute with water, and make up to 50 mL. Accurately measure 10.0 mL of the solution, dilute with water, and bring to a volume of 1 000 mL.

A. 6.2 Instruments and equipment

A. 6.2.1 Nessler's colorimetric tube.

A. 6.2.2 Analytical balance: with a sensitivity of 0.01 g.

A. 6.3 Analysis steps

A. 6.3.1 Preparation of sample solution

Weigh 1.0 g sample with accuracy to 0.01g, put it in a Nessler colorimetric tube, and add 20 mL water to dissolve and shake well.

A. 6.3.2 Preparation of standard reference solution

Accurately measure 0.20 mL of standard working solution, add water to 20 mL, and add 1 mL of nitric acid solution, 1 mL of silver nitrate solution, and 0.2 mL of dextrin solution; shake well, and place it away from light for 15 minutes.

A. 6.4 Result determination

Observe axially and laterally in the absence of direct sunlight. If the turbidity of the sample solution is not greater than that of the standard control solution, it is considered to have passed the test.

A. 7 Burning residue

Weigh 2.5g of the sample, accurate to 0.0001g, and follow the provisions of GB/T 9741 to conduct rest of the steps. The experimental results shall be based on the arithmetic means of parallel measurement results, and the absolute difference between the two independent measurement results obtained under repeatability conditions shall not exceed 0.02%.

A. 8 Determination of chloride

Weigh 1.0 g of the sample, accurate to 0.01 g, and accurately measure 0.4 mL of chloride

standard solution, the rest of steps follow GB/T 9729. The turbidity of the sample solution should not exceed that of the standard solution, that is, the chloride content should be ≤ 0.004%.

A. 9 Determination of sulfate

A. 9.1 Reagents and materials

A. 9.1.1 Hydrochloric acid solution: hydrochloric acid + water = 1+4.
A. 9.1.2 Barium chloride solution: 250 g/L.

A. 9.1.3 Sulfate standard solution: 0.1 mg/mL.

A. 9.2 Instruments and equipment

A. 9.2.1 Nessler's colorimetric tube: 50 mL.

A. 9.2.2 Analytical balance: with a sensitivity of 0.01 g.

A. 9.3 Analysis steps

A. 9.3.1 Preparation of sample solution

Weigh 1.0 g of the sample, accurate to 0.01 g, and place it in a 50 mL Nessler's colorimetric tube. Dissolve in water to make about 40 mL of solution and shake well.

A. 9.3.2 Preparation of control solution

Accurately measure 2.0 mL of sulfate standard solution and place it in a 50 mL Nessler's colorimetric tube. Dissolve in water to about 40 mL and shake well.

A. 9.3.3 Determination

Add 0.5 mL hydrochloric acid solution and 1 mL barium chloride solution to the sample solution and control solution respectively, dilute with water to 50 mL, shake well, and set aside for 10 min.

A. 9.4 Result determination

Place the sample solution and control solution on the same black background and observe from above the colorimetric tube downwards to compare the turbidity. The turbidity of the sample solution is not greater than that of the control solution, that is, the sulfate content is ≤ 0.02%.

A. 10 Determination of Fumaric Acid, Maleic Acid, and Succinic Acid

A. 10.1 Principle

After processing, the sample is separated using a hydrogen cation exchange chromatography column, detected using an ultraviolet detector or a diode array detector, and quantified using an external standard method.

A.10.2 Reagents and materials

A.10.2.1 Water: GB/T 6682, Grade I water.

A.10.2.2 Sulfuric acid solution: c (1/2 H_2SO_4) = 0.01 mol/L.

A.10.2.3 Fumaric acid standard substance ($C_4H_4O_4$, CAS No.: 110-17-8): purity ≥ 99.0%, or a standard substance certified by the state and granted a standard substance certificate.

A.10.2.4 Maleic acid standard substance ($C_4H_4O_4$, CAS number: https://www.chemsrc.com/baike/340366.html110-16-7): purity ≥ 99.0%, or a standard substance certified by the state and granted a standard substance certificate.

A.10.2.5 Succinic acid standard substance ($C_4H_6O_4$, CAS number: https://www.chemsrc.com/baike/340366.html110-15-6): purity ≥ 99.0%, or a standard substance certified by the state and granted a standard substance certificate.

A.10.2.6 Fumaric acid standard solution (500 μg/mL): Accurately weigh 50 mg of fumaric acid standard, accurate to 0.000 1 g, dissolve in sulfuric acid solution and make up to 100 mL. Store in a refrigerator at 4℃ with a shelf life of 6 months.

A.10.2.7 Maleic acid standard solution (50 μg/mL): Accurately weigh 5 mg of maleic acid standard, accurate to 0.000 1 g, dissolve in sulfuric acid solution and make up to 100 mL. Store in a refrigerator at 4℃ with a shelf life of 6 months.

A.10.2.8 Succinic acid standard solution (5 mg/mL): Accurately weigh 500 mg of succinic acid standard, accurate to 0.000 1g, dissolve in sulfuric acid solution and make up to 100 mL. Store in a refrigerator at 4℃ with a shelf life of 6 months.

A.10.2.9 Microporous membrane: 0.22 μm, aqueous phase.

A.10.3 Instruments and equipment

A.10.3.1 High performance liquid chromatography: equipped with ultraviolet detector or diode array detector.

A.10.3.2 Analytical Balance: with a sensitivity of 0.01 g, and 0.0001 g

A.10.4 Instrument reference conditions

A.10.4.1 Chromatographic column: A hydrogen cation exchanges chromatographic column packed with polystyrene divinylbenzene resin, 300 mm × 7.8 mm, or other chromatographic columns with equivalent analytical performance.

A.10.4.2 Column temperature: 45 ℃.

A.10.4.3 Flow phase: sulfuric acid solution.

A.10.4.4 Flow rate: 0.5 mL/min.

A.10.4.5 Injection volume: 10 μL.

A.10.4.6 Testing wavelength: 214 nm.

A.10.5 Analysis steps

A.10.5.1 Preparation of mixed standard solution

Take five 100 mL volumetric flasks and accurately take 1.00 mL, 2.00 mL, 4.00 mL, 5.00 mL, and 6.00 mL of fumaric acid and maleic acid standard solutions, and 0.40 mL, 1.00 mL, 2.00 mL, 3.00 mL, and 4.00 mL of succinic acid standard solution into the volumetric flasks. Dilute to the mark with sulfuric acid solution. Prepare fumaric acid with concentrations of 5.00 μg/mL, 10.0 μg/mL, 20.0 μg/mL, 25.0 μg/mL, and 30.0 μg/mL, respectively. The concentrations of maleic acid were 0.50 μg/mL, 1.00 μg/mL, 2.00 μg/mL, 2.50 μg/mL, and 3.00 μg/mL, respectively. Mixed standard solutions with succinic acid concentrations of 20.0 μg/mL, 50.0 μg/mL, 100 μg/mL, 150 μg/mL, and 200 μg/mL. Store in a refrigerator at 4℃ with a shelf life of 1 month.

A.10.5.2 Preparation of sample solution

Weigh 0.5 g of the sample, accurate to 0.0001 g, dissolve it in sulfuric acid solution and dilute to 100 mL (The constant volume of the sample solution can be appropriately adjusted to make the mass concentrations of fumaric acid, maleic acid, and succinic acid in the sample solution within the range of the drawn standard curve); shake well, and filter through a microporous membrane.

A.10.6 Determination

A.10.6.1 Drawing of standard curve

Under the conditions of A.10.4, put 5 different concentrations of mixed standard solutions from A.10.5.1 into the liquid chromatograph, measure the corresponding peak areas, and draw the standard curve with the mass concentration of the mixed standard solution as the horizontal axis and the peak area as the vertical axis.

A.10.6.2 Determination of sample solution

Under the conditions of A.10.4, put the sample solution into the liquid chromatograph and determine the peak areas of fumaric acid, maleic acid, and succinic acid by retention time. Calculate the mass concentrations of fumaric acid, maleic acid, and succinic acid in the sample solution based on the standard curve.

A.10.7 Calculation of results

The mass fraction of fumaric acid, maleic acid, and succinic acid content ω_i is calculated according to formula (A.3).

$$\omega_i = \frac{c_i \times V}{m \times 10^6} \times 100\% \quad \text{(A.3)}$$

In which:

C_i - the concentration of the substance to be tested in the sample solution obtained from the standard curve, in micrograms per milliliter (μg/mL);

V - the constant volume of the sample solution, in milliliters (mL);

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

10^6- Conversion factor.

The experimental results are expressed as arithmetic means of parallel determination results, retaining two significant figures.

A.10.8 Precision

The absolute difference between two independent measurement results obtained under repetitive conditions shall not exceed 10% of the arithmetic mean.

A.10.9 Detection limit and quantification limit

The detection limit of fumaric acid is 0.0040%, and the quantification limit is 0.010%; The detection limit of maleic acid is 0.0020%, and the quantification limit is 0.0050%; The detection limit of succinic acid is 0.080%, and the quantification limit is 0.20%.

Appendix B

Infrared Absorption Spectrum of L-Malic Acid Standard Product

The infrared absorption spectrum of L-malic acid standard product is as shown in Figure B.1.

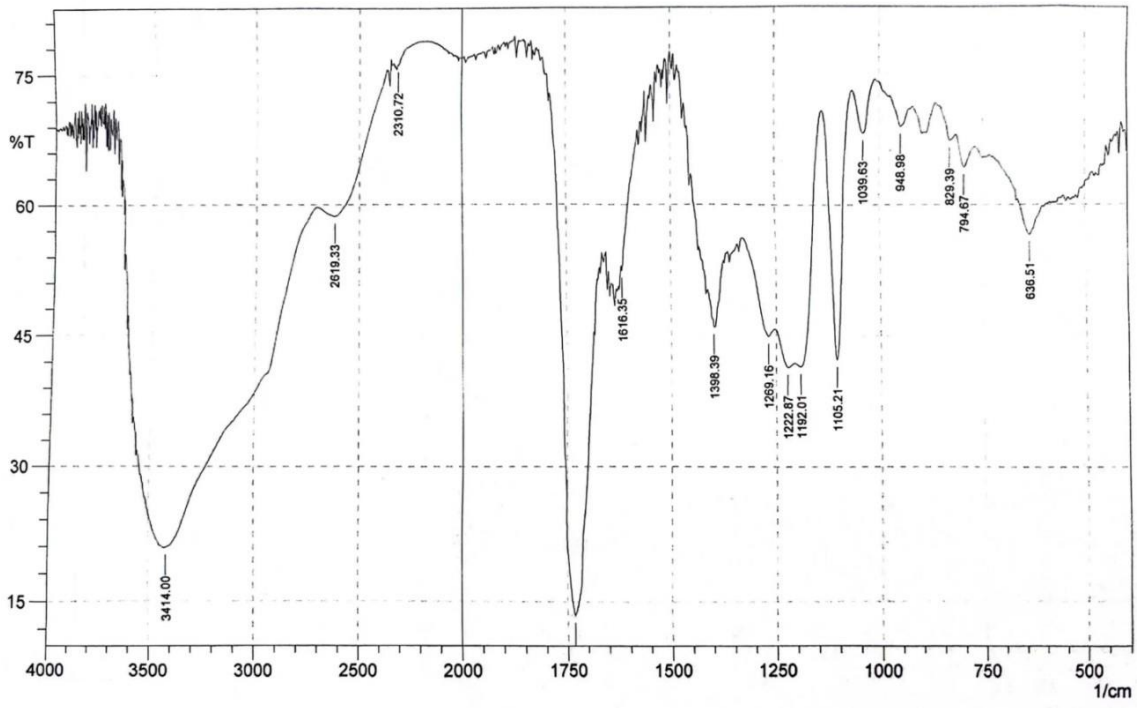


Figure B.1: Infrared absorption spectrum of L-malic acid standard product

Appendix C

Liquid Chromatogram of Standard Solutions of Fumaric Acid, Maleic Acid, and Succinic Acid

The liquid chromatograms of standard substance solutions of fumaric acid, maleic acid, and succinic acid are as shown in Figure C1.

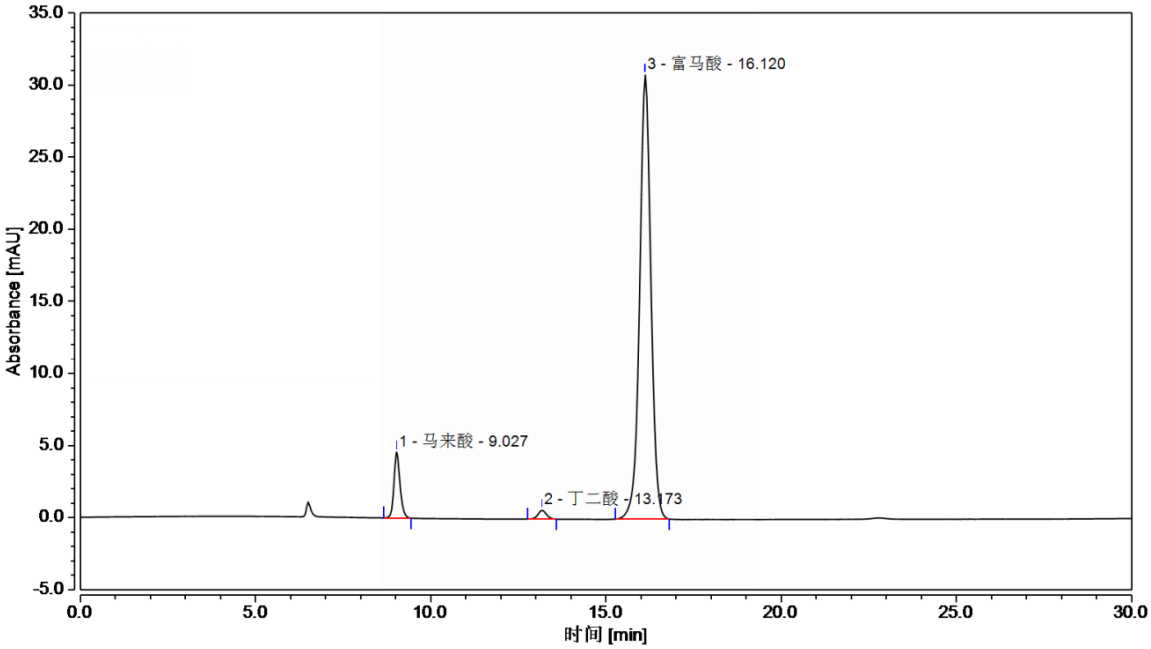


Figure C.1: Liquid chromatogram of standard solutions of fumaric acid (10 µg/mL), maleic acid (1 µg/mL), and succinic acid (50 µg/mL)

National Food Safety Standard

Food Additive Xanthan Gum

Foreword

This standard replaces GB 1886.41-2015 “National Food Safety Standard Food Additive Xanthan Gum.”

Compared with GB 1886.41-2015, the main changes in this standard are as follows:

- Modified the scope;
- Added the content indicator and testing method for xanthan gum;
- Revised the testing method for total nitrogen;
- Added the indicator and testing method for isopropanol;
- Added the indicator and testing method for arsenic;
- Revised the pretreatment method for microbiological testing.

1. Scope of Application

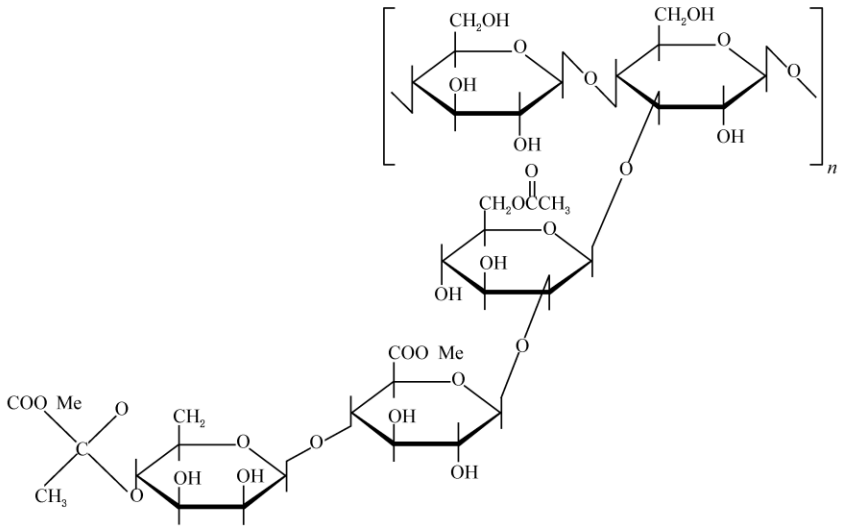
This standard applies to xanthan gum, a food additive prepared from starch-based raw materials through fermentation by *Xanthomonas campestris*, followed by purification with ethanol or isopropanol, and then drying and milling.

2. Molecular Formula and Structural Formula

2.1 Molecular formula:

$(C_{35}H_{49}O_{29})_n$

2.2 Structural formula:



Note: Me represents Na, K, or ½ Ca.

3. Technical Requirements

3.1 Sensory requirements

Sensory requirements shall comply with Table 1.

Table 1: Sensory Requirements

Item	Requirement	Testing Method
Color	White or light beige	Take an appropriate amount of the sample, place it on a clean, dry white porcelain plate, and observe its color and state under natural light.
Status	Granular or powder	

3.2 Physical and Chemical Indicators

Physical and chemical indicators shall comply with Table 2.

Item		Indicator	Testing Method
Content of xanthan gum (dry basis), w/%		72.0~108.0	A.3 in Appendix A
Viscosity/(cP)	≥	600	A.4 in Appendix A
Shear performance value	≥	6.5	A.5 in Appendix A
Loss on drying, w/%	≤	15.0	A.6 in Appendix A
Ash w/%	≤	16.0	Determination of total ash in GB 5009.4. [a]
Total nitrogen w/%	≤	1.5	Kjeldahl method in GB 5009.5. [b]

Pyruvate, w/% ≥	1.5	A.7 in Appendix A
Isopropyl alcohol [c]/(mg/kg) ≤	500	Appendix B in GB 25535-2010.
Lead (Pb)/(mg/kg) ≤	2.0	GB 5009.12 or GB 5009.75.
Arsenic (in As)/(mg/kg) ≤	1.0	GB 5009.11 or GB 5009.76.
[a] The sample was dried at 105℃±1℃ for 4 hours in advance. [b] The calculation formula does not multiply the coefficient *F* used to convert nitrogen to protein. [c] Only products that use isopropyl alcohol as the extraction solvent.		

3.3 Microbiological limits

Microbiological limit shall comply with Table 3.

Table 3: Microbiological Limits

Item	Indicator	Testing Method
Total plate count / (CFU/g) ≤	5 000	GB 4789.2 [a]
Coliforms / (MPN/g) ≤	3.0	GB 4789.3 [a]
Mold and yeast / (CFU/g) ≤	500	GB 4789.15 [a]
Salmonella/25 g	Not detectable	GB 4789.4 [b]
[a] Under sterile conditions, accurately weigh 1.0 g of the sample and dissolve it in 99 mL of sterile phosphate buffer or sterile saline to prepare a 1:100 dilution homogenate as the initial sample solution. Subsequent testing steps should be carried out in accordance with GB4789.2, GB4789.3 [the first dilution uses double lauryl sulfate tryptone broth (LST)], and GB4789.15, respectively.		
[b] Under sterile conditions, accurately weigh 25.0 g of sample and dissolve it in 2475 mL of sterile buffered peptone water (BPW) medium for pre-enrichment. Subsequent testing steps shall be carried out in accordance with GB4789.4.		

Appendix A

Testing Methods

A.1 General Provisions

Unless otherwise specified, the reagents and water used in this standard refer to analytical reagents and Grade III water specified in GB/T 6682. Standard solutions, impurity determination solutions, reagents, and products used in testing shall be prepared according to GB/T 601, GB/T 602, and GB/T 603. The solutions used in the test are aqueous solutions unless the solvent used is specified.

A.2 Identification Tests

A.2.1 Solubility test

Weigh 1g of sample, accurate to 0.01g, and slowly pour it into a beaker filled with 100mL of water. Turn on the stirrer to 200r/min and add the sample while stirring. It should be dissolved after 25 minutes. According to this method, the sample is not dissolved in ethanol, acetone or ether.

A.2.2 Gel test

Add 300 mL of water to a 500 mL beaker and preheat to 80°C. Start the stirrer at 200 r/min and gradually add 1.5 g each of dried sample and locust bean gum (accurate to 0.01 g). After the mixture forms a solution, continue stirring for at least 30 minutes, ensuring that the temperature does not fall below 60°C during stirring. Stop stirring and allow the solution to cool under room temperature for at least 2 hours. When the temperature drops below 40°C, a gel-like substance should be formed. Using the same procedure, prepare a 1% sample solution without locust bean gum, no gel-like substance should be formed.

A.3 Determination of Xanthan Gum Content (Dry Basis)

A.3.1 Principle

The xanthan gum sample is treated with low-concentration potassium hydroxide and hydrochloric acid solutions, precipitated with anhydrous ethanol, washed with anhydrous ethanol to remove impurities, and then filtered. The filter residue is dried and weighed to calculate the xanthan gum content.

A.3.2 Reagents and materials

A.3.2.1 Potassium hydroxide solution (0.04 g/mL): weigh 4 g of potassium hydroxide, dissolve it in water and make up to 100 mL.

A.3.2.2 Dilute hydrochloric acid (1+3, volume ratio): Mix 10 mL of hydrochloric acid with 30 mL of water and shake well.

A.3.2.3 Anhydrous ethanol.

A.3.2.4 Acetone.

A.3.2.5 Diatomaceous earth 545.

A.3.2.6 Silver nitrate test solution (17 g/L): weight 1.7 g of silver nitrate in water and make up to 100 mL.

A.3.3 Instruments and Equipment

A.3.3.1 Centrifuge

A.3.3.2 Vacuum drying oven

A.3.3.3 Glass filter (G3)

A.3.3.4 Dryer

A.3.3.5 Electronic balance (with sensitivity of 0.001 g)

A.3.4 Analytical Procedures

Place about 0.5 cm of diatomaceous earth in a glass filter (G3) and dry in a vacuum oven at temperature of 80°C and condition of 40–53 kPa. Take it out and place it in a dryer to cool, then weigh it. Repeat the above drying and weighing operations until the difference between the two masses does not exceed 2 mg. This is a constant weight, and the mass is recorded as m_1, accurate to 0.001 g.

Accurately weigh 0.5 g of the sample after the drying loss determination, accurate to 0.001 g, and record the mass as m. Add 10 mL of anhydrous ethanol to fully disperse the sample, then add 10 mL of potassium hydroxide solution (0.04 g/mL) to dissolve it and then add 90 mL of water.

Add 15 mL dilute hydrochloric acid (1+3) and 300 mL anhydrous ethanol with vigorous stirring. Place it for 2 hours, centrifuge at 4000 r/min for 10 minutes, and discard the supernatant.

Add an appropriate amount of anhydrous ethanol again and repeat the centrifugation and supernatant removal steps until the supernatant is free of chloride (pour approximately 10 mL of supernatant into a beaker and add 0.5 mL of silver nitrate test solution. If there is no turbidity, the supernatant is free of chloride).

Filter the precipitate through the glass filter after constant weight and wash with anhydrous ethanol. After washing the residue with 30 mL of acetone, place the glass filter containing the

residue in a fume hood for at least 30 minutes. Then, vacuum dry it at temperature of 80°C, under 40 kPa to 53 kPa, for 4 hours. Remove the filter and cool it in the dryer until constant weight is reached. Record the mass as m^2, accurate to 0.001 g.

A.3.5 Calculation

Xanthan gum content w_1 (%) is calculated as in Formula A.1:

$w_1 = (m_2 - m_1) / m \times 100$

$$w_1 = \frac{m_2 - m_1}{m} \quad X \quad 100\% \quad \text{.....(A.1)}$$

where:

m_2 -- mass of glass filter, diatomaceous earth, and dried residue, expressed in gram (g);

m_1 -- mass of glass filter and diatomaceous earth, expressed in gram (g);

m -- mass of sample, expressed in gram (g).

The test results are expressed as the arithmetic mean of two parallel determinations. The results are rounded to one decimal place. The absolute value of two independent determinations obtained under repeatability conditions shall not exceed 3.0% of the arithmetic mean.

A.4 Determination of Viscosity

A.4.1 Instrument and equipment

Rotational viscometer.

A.4.2 Test Conditions

A.4.2.1 Rotor type: No. 3 rotor.

A.4.2.2 Rotation speed: 60 r/min.

A.4.2.3 Test temperature: 24 to 25°C

A.4.3 Analytical Procedures

Accurately weigh 3 g of sample and potassium chloride (accurate to 0.01 g), after mixing, add slowly into a 400 mL beaker containing 294 g of distilled water while turning on the stirrer. Avoid mixture sticking to the stirring blade or the wall of the breaker, stir continuously at 800 r/min for 2 hours at temperature of 24 to 25°C. Stop stirring, take out breaker, and stir the

solution up and down with a stirring rod or other similar object until it is uniform and there are no obvious bubbles.

A.4.3.2 Determination

Use a rotational viscometer to determine the viscosity of the sample solution under the conditions specified in A.4.2.

A.5 Determination of Shear Performance Value

A.5.1 Determination method

According to A.4, measure the viscosity of rotor No. 3 at speeds of 6 r/min and 60 r/min respectively, and calculate the shear performance value according to formula (A.2).

A.5.2 Results calculation

Calculate the shear performance value N as follows:

$N = \eta_1 / \eta_2$ ……..(A.2)

in which:

η_1 — viscosity at 6 r/min (cP);

η_2 — viscosity at 60 r/min (cP).

The calculation result is rounded to one decimal place.

A.6 Determination of Loss on Drying

A.6.1 Method

The sample is dried to constant weight under specified conditions, and the loss in mass is calculated.

A.6.2 Instruments and equipment

A.6.2.1 Glass weighing bottle: inner diameter is 60–70 mm, height is below 35mm.

A.6.2.2 Electric drying oven.

A.6.2.3 Analytical balance: sensitivity is 0.0001 g.

A.6.3 Analysis procedures

Weigh 1.0 g ~ 2.0 g of sample, accurate to 0.0001 g, into a weighing bottle that has been dried to constant weight. Cover the bottle and shake it sideways to evenly distribute the sample. Place the bottle in a drying oven, remove the cap, and leave it in the drying oven. Dry at 105°C ±1°C for 2.5 hours. Immediately cover the bottle containing the sample and place it in a desiccator to cool to room temperature before weighing. Then dry it in the drying oven for another hour. Remove the bottle, cool it to room temperature in a desiccator, and weigh it. Repeat the drying and weighing process until constant weight is achieved. Calculate the loss on drying based on the reduced mass and the sample size.

A.6.4 Calculation results

Loss on drying w_2 (%) is calculated as:

$$w_2 = \frac{m_3 - m_4}{m} \times 100\% \quad \text{.....(A.3)}$$

in which:

m_3 — weigh the mass of the bottle and sample before drying, in grams (g);

m_4 — weigh the mass of the bottle and sample after drying, in grams (g);

m — mass of the sample, in grams (g).

The test result shall be the arithmetic means of parallel determination results, with the result rounded to three significant figures. The absolute difference between the parallel determination results shall not exceed 0.2%.

A.7 Determination of Pyruvic Acid

A.7.1 Method

Xanthan gum releases pyruvic acid after hydrolysis with hydrochloric acid. Pyruvic acid reacts with 2,4-dinitrophenylhydrazine to form pyruvic acid-2,4-dinitrophenylhydrazone, which appears brownish-red in sodium carbonate solution. The pyruvic acid content of the sample is determined by measuring the absorbance of the sample solution and the pyruvic acid standard solution.

A.7.2 Reagents and materials

A.7.2.1 Pyruvic acid

A.7.2.2 2,4-Dinitrophenylhydrazine

A.7.2.3 Ethyl acetate

A.7.2.4 1 mol/L hydrochloric acid solution: Measure 9 mL of hydrochloric acid and dilute to 100 mL with water.
2 mol/L hydrochloric acid: Measure 18 mL of hydrochloric acid and dilute to 100 mL with water.

A.7.2.5 0.1 mol/L sodium carbonate standard solution: Weigh 5.3 g of sodium carbonate, dissolve it in water and dilute to 1 000 mL.

A.7.3 Instruments and equipment

A.7.3.1 Spectrophotometer

A.7.3.2 Analytical balance: sensitivity is 0.0001 g.

A.7.4 Preparation of standard solution

Accurately weigh 45.0 mg of pyruvic acid (accurate to 0.1 mg) into a 500 mL volumetric flask, dilute to the mark with water, and mix thoroughly. Place 10 mL of this solution into a 50 mL stoppered flask. Pipette 20 mL of 1 mol/L hydrochloric acid into the flask, weigh the flask, and reflux for 3 hours. Cool it to room temperature and replace any water lost during reflux. Pipette 1 mL of a 2,4-dinitrophenylhydrazine hydrochloric acid solution (1:200, 2 mol/L hydrochloric acid solution) into a 30 mL separatory funnel and add the refluxed solution from the 2 mL stoppered flask. Mix thoroughly and let stand at room temperature for 5 minutes. Extract with 5 mL of ethyl acetate, discard the aqueous layer, and then extract the hydrazone in the ethyl acetate with 5 mL of standard sodium carbonate solution, repeat three extractions. Collect the extracts and place them in a 50 mL volumetric flask, then dilute to the mark with standard sodium carbonate solution.

A.7.5 Preparation of sample solution

Accurately weigh 600.0 mg of sample (accurate to 0.1 mg) into a 100 mL volumetric flask, dilute to the mark with water, and mix thoroughly. Place 10 mL of this solution into a 50 mL stoppered flask. Pipette 20 mL of 1 mol/L hydrochloric acid into the flask, weigh the flask, and reflux for 3 hours. Cool to room temperature and replace any water lost during reflux. Pipette 1 mL of a 2,4-dinitrophenylhydrazine hydrochloric acid solution (1:200, 2 mol/L hydrochloric acid solution) into a 30 mL separatory funnel and add the refluxed solution from the 2 mL stoppered flask. Mix thoroughly and place it at room temperature for 5 minutes. Extract with 5 mL of ethyl acetate, discard the aqueous layer, and then extract the hydrazone in the ethyl acetate with 5 mL of standard sodium carbonate solution. Repeat three extractions. Collect the extracts and place them in a 50 mL volumetric flask, then dilute to the mark with standard sodium carbonate solution.

A.7.6 Determination

Place the sample into a 1 cm cuvette using a suitable spectrophotometer. Using sodium carbonate standard solution as a blank, measure the absorbance of the sample solution and the standard

solution at 375 nm. If the absorbance of the sample solution is not lower than that of the standard solution, then the pyruvate content of the sample is not less than 1.5%.

National Food Safety Standard

Food Additive Ammonium Carbonate

1. Scope of Application

This standard applies to ammonium carbonate, a food additive made from ammonia, carbon dioxide, and water through process such as absorption, crystallization, separation, drying, and cooling. It is composed of different proportions of ammonium carbamate, ammonium carbonate, and ammonium bicarbonate.

2. Chemical Name, Molecular Formula, Structural Formula, and Relative Molecular Mass

2.1 Chemical name

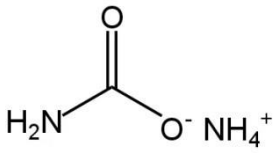
Ammonium carbamate, ammonium carbonate, ammonium bicarbonate

2.2 Molecular formula

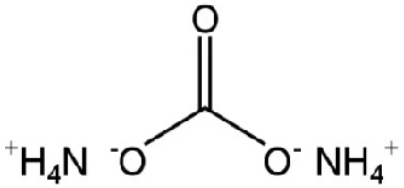
Ammonium carbamate: $H_2NCO_2NH_4$
Ammonium carbonate: $(NH_4)_2CO_3$
Ammonium bicarbonate: NH_4HCO_3

2.3 Structural formula

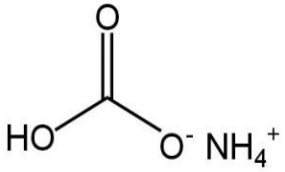
Ammonium carbamate:



Ammonium carbonate:



Ammonium bicarbonate:



2.4 Relative molecular mass

Ammonium carbamate: 78.071 (based on 2022 international relative atomic mass)
Ammonium carbonate: 96.086 (based on 2022 international relative atomic mass)
Ammonium bicarbonate: 79.055 (based on 2022 international relative atomic mass)

3. Technical Requirements

3.1 Sensory requirements

Sensory requirements shall conform to the provisions in Table 1.

Table 1: Sensory Requirements

Items	Requirement	Testing Method
Color	White	Take an appropriate amount of sample and place it in a clean and dry white porcelain plate. Observe its color and condition under natural light. Gently fan with your hands and smell its odor.
State	Powdered or lumpy crystalline	
Odor	Stimulating ammonia odor	

3.2 Physical and Chemical Indicators

Physical and chemical indicators shall conform to the provisions in Table 2.

Table 2: Physical and Chemical Indicators

Items		Indicators	Testing Method
Content (calculated as NH_3), w/%		30.5~34.0	A.4 in Appendix A
Ignition residue, w/%	≤	0.1	GB 5009.4 [a]
Chloride/(calculated as Cl^-)/(mg/kg)	≤	30	A.5 in Appendix A
Sulfate (calculated as SO_4^{2-})/(mg/kg)	≤	50	A.6 in Appendix A
Non-volatile matter /(mg/kg)	≤	100	A.7 in Appendix A
Lead (Pb)/ (mg/kg)	≤	1.0	GB 5009.12 or GB 5009.75
Total arsenic (in As)/(mg/kg)	≤	1.0	GB 5009.11 or GB 5009.76
[a] Sample was prepared according to procedure for "determination of total ash in foods," with a sample weight of 3g.			

Appendix A

Testing Method

A.1 Warning

Some of the testing procedures specified in the testing method may lead to dangerous situations. The operator should take appropriate safety and protective measures.

A.2 General Provisions

Unless otherwise specified, the reagents and water used in this standard refer to analytical grade reagents and third grade water as specified in GB/T 6682. The standard solutions, impurity determination standard solutions, preparations, and products used in the experiment shall be prepared in accordance with the provisions of GB/T 601, GB/T 602, and GB/T 603 unless otherwise specified. When the solvent used in the test is not specified, it refers to aqueous solution.

A.3 Identification Test

A.3.1 Reagents and materials

A.3.1.1 Concentrated hydrochloric acid.

A.3.1.2 Calcium hydroxide.

A.3.1.3 Hydrochloric acid solution (1+1, volume ratio): Measure 50 mL of hydrochloric acid and dilute 100 mL with water.

A.3.1.4 Calcium hydroxide solution (3g/L): Weigh 3g of calcium hydroxide and place it in a reagent bottle. Add 1000mL of water, stopper the bottle, shake vigorously, and let stand for 1 hour. Take the upper clear liquid when using.

A.3.1.5 Red litmus paper.

A.3.1.6 Evaporating dish.

A.3.2 Instruments and equipment

A.3.2.1 Heating plate or electric furnace.

A.3.2.2 Electronic balance: sensitivity of 0.01 g.

A.3.3 Identification method

A.3.3.1 Solubility

Weigh about 1g of the sample, accurate to 0.01 g, place it in a beaker, add about 7mL of water, shake for no less than 30 seconds, and observe the dissolution of the sample within 5 minutes. The sample is easily soluble in water.

A.3.3.2 Identification of carbonates

Weigh about 10g of the sample, accurate to 0.01 g, dissolve it in 10 mL of water, and add hydrochloric acid solution (A.3.1.3) to generate bubbles. When the bubbled gas is introduced into a calcium hydroxide solution (A.3.1.4), it forms a white precipitate first; continue to aerate and the solution should become clear.

A.3.3.3 Thermal test

Weigh about 1 g of the sample, accurate to 0.01 g, place it in a beaker. Heat it on a heating plate or electric furnace, and the sample will decompose when heated. The steam generated can turn wet red litmus paper blue.

A.4 Content Determination (Calculated as NH_3)

A.4.1 Principle

The sample is dissolved in water, and the ammonia content was determined by titration with a standard titration solution of hydrochloric acid using methyl orange as an indicator.

A.4.2 Reagents and materials

A.4.2.1 Standard titration solution of hydrochloric acid: c (HCl)=1 mol/L.

A.4.2.2 Methyl orange indicator solution.

A.4.3 Instruments and equipment

Electronic balance: the sensitivity is 0.0001 g.

A.4.4 Analysis steps

Weigh 1.5 g to 2.0 g of the sample, accurate to 0.0001 g, place it in a 250 mL conical flask. Add 100 mL of water to dissolve it completely. Add 3 drops of methyl orange indicator solution and titrate with standard titration solution of hydrochloric acid until the test solution changes from yellow to orange. Perform a blank test simultaneously.

A.4.5 Calculation results

The mass fraction w_1 of the content (calculated as NH_3) is calculated according to equation (A.1):

$$w_1 = \frac{(V_1 - V_0) \times c_1 \times M}{m_1 \times 1000} \times 100\% \quad \text{(A.1)}$$

In which:

V_1 — the volume of hydrochloric acid standard titration solution consumed by the sample solution, in milliliters (mL);

V_0 — the volume of hydrochloric acid standard titration solution consumed by blank solution, in milliliters (mL);

C_1 — concentration of hydrochloric acid standard titration solution, in moles per liter (mol/L);

M — the molar mass of ammonia, in grams per mole (g/mol) (M=17.03);

m_1 — the mass of the sample, in grams (g);

1 000 — Conversion factor.

The arithmetic mean of parallel measurement results shall be taken as the measurement result, and the absolute difference between two independent measurement results obtained under repeatability conditions shall not exceed 1% of the arithmetic mean.

A.5 Determination of chloride (calculated as Cl^-)

A.5.1 Method principle

Add silver nitrate solution to an acidic medium to produce a white suspension of silver chloride with chloride ions and compare it with a standard turbid solution.

A.5.2 Reagents and materials

A.5.2.1 Nitric acid.

A.5.2.2 Silver nitrate

A.5.2.3 Sodium chloride: Superior grade purity

A.5.2.4 Sodium carbonate

A.5.2.5 Nitric acid solution (10.5%): Measure 105 mL of nitric acid and dilute 1000 mL with water.

A.5.2.6 Silver nitrate solution (17 g/L): Accurately weigh 17.0 g of silver nitrate, dissolve it in water and dilute to 1000 mL.

A.5.2.7 Chloride standard solution (0.01 mg/mL): Weigh 0.165 g of sodium chloride, dissolve it in water and dilute to 100 mL to prepare a chloride standard stock solution (1.0 mg/mL). Pipette 10 mL of chloride standard stock solution into a 1000 mL volumetric flask and dilute it to the mark with water to obtain chloride standard solution (0.01 mg/mL).

A.5.3 Instruments and equipment

A.5.3.1 Electronic balance: with a sensitivity of 0.01 g and 0.0001 g.

A.5.3.2 Nessler's colorimetric tube.

A.5.3.3 Water bath pot

A.5.4 Analysis Steps

A.5.4.1 Preparation of sample solution

Weigh 0.5g of the sample, accurate to 0.0001g, and place it in a 50 mL beaker. Add 10 mL of distilled water to dissolve it. Add 0.005g of sodium carbonate and slowly evaporate on a steam bath until it is dry. Then dissolve the residue in 30mL of distilled water and transfer it to a 50 mL Nessler's colorimetric tube as the sample solution.

A.5.4.2 Preparation of standard solution

Transfer 1.50 mL of chloride standard solution and place it in a 50 mL Nessler's colorimetric tube. Dilute with 25 mL of water as the standard solution.

A.5.4.3 Determination

Add 10 mL of nitric acid solution and 1 mL of silver nitrate solution to the sample solution and standard solution, respectively, and dilute to 50 mL with water. Slowly shake well and place in the dark for 5 minutes.

Place both on a black background and observe from above the colorimetric tube downwards to compare the resulting turbidity. The turbidity of the sample solution is not deeper than that of the standard solution, that is, the chloride content in the sample is not greater than 30 mg/kg.

A.6 Determination of Sulfate (calculated as SO_4^{2-})

A.6.1 Method principle

Add hydrogen peroxide to the sample to convert various sulfur-containing ions into sulfate ions. In an acidic medium, barium ions and sulfate ions produce white barium sulfate suspended particles, which are then compared with a standard turbid solution.

A.6.2 Reagents and materials

A.6.2.1 Hydrogen peroxide: with a mass fraction of 30%.

A.6.2.2 Hydrochloric acid solution: mass fraction of 10%.

A.6.2.3 Sodium carbonate

A.6.2.4 Barium chloride

A.6.2.5 Anhydrous Sodium Sulfate: level of superior grade purity.

A.6.2.6 Barium chloride solution (100 g/L): Accurately weigh 10.00 g of barium chloride, dissolve it in water and dilute it to 100 mL.

A.6.2.7 Sulfate standard solution (0.1 mg/mL): Weigh 0.148 g of anhydrous sodium sulfate, dissolve it in water and dilute to 100 mL, and prepare a sulfate standard reserve solution (1.0 mg/mL). Draw 10 mL of sulfate standard reserve solution into a 100 mL volumetric flask, add water to the mark to obtain the sulfate standard solution (0.1 mg/mL).

A.6.3 Instruments and equipment

A.6.3.1 Electronic balance: with a sensitivity of 0.01g and 0.0001g.

A.6.3.2 Nessler's colorimetric tube

A.6.3.3 Water bath pot.

A.6.4 Analysis steps

A.6.4.1 Preparation of sample solution

Weigh 4 g of the sample, accurate to 0.0001g, and place it in a 50 mL beaker. Add 40 mL of distilled water to dissolve it. Add 0.01 g of sodium carbonate and 1 mL of 30% hydrogen peroxide and slowly evaporate in a steam bath until dry. Then dissolve the residue with 40 mL of distilled water and transfer it to a 50 mL Nessler’s colorimetric tube as the sample solution.

A.6.4.2 Preparation of standard solution

Pipette 2.00 mL of sulfate standard solution, place it in a 50 mL Nessler’s colorimetric tube, and dilute with 20 mL water as the standard solution.

A.6.4.3 Determination

Add 2 mL of hydrochloric acid solution and 3 mL of barium chloride solution to the sample solution and standard solution respectively and dilute it to 50 mL with water. Slowly shake well

and rest for 10 minutes.

Place both on a black background and observe from above the colorimetric tube downwards to compare the resulting turbidity. The turbidity of the sample solution is not deeper than that of the standard solution, that is, the sulfate content in the sample is not greater than 50 mg/kg.

A.7 Determination of non-volatile substances

A.7.1 Method principle

The sample is placed in an evaporating dish, evaporated to dry on a steam bath, and dried to constant weight in an electric constant temperature drying oven, then weigh the non-volatile matter.

A.7.2 Instruments and equipment

A.7.2.1 Electronic balance: with a sensitivity of 0.0001 g.

A.7.2.2 Ceramic evaporating dish: 50 mL.

A.7.2.3 Water bath pot.

A.7.2.4 Electric constant temperature drying oven: the temperature range can be controlled at 105℃ to 110℃.

A.7.3 Analysis steps

Weigh about 4 g of the sample, accurate to 0.0001 g, place it in a porcelain evaporating dish that has been dried to constant weight at 105 ℃ to 110 ℃ in advance, add 10 mL of water. Evaporate in a steam bath until dry. Place in an electric constant temperature drying oven, dry at 105 ℃ to 110 ℃ for 1 hour, then cool in a dryer and weigh it.

A.7.4 Calculation of results

The mass fraction w_2 of non-volatile substances, in milligrams per kilogram (mg/kg), is calculated according to formula (A.2):

$$w_2 = \frac{m_2 - m_3}{m_4} \times 10^6 \quad \text{.....(A.2)}$$

In which:

m_2 — the mass of non-volatile matter and evaporating dish after drying, in grams (g);

m_3 — the mass of the evaporating dish, in grams (g);

m_4 — the mass of the sample, in grams (g);

10^6— Conversion factor.

The experimental results are based on the arithmetic mean of the parallel measurement results. The absolute difference between two independent measurement results obtained under repetitive conditions shall not exceed 10% of the arithmetic mean.

National Food Safety Standard

Food Additive Acorn Shell Brown

1. Scope

This standard is applicable to acorn shell brown, a food additive made from acorn shells through processes such as aqueous extraction, separation, concentration, and drying.

2. Technical Requirements

2.1 Sensory requirements

Sensory requirements shall conform to the provisions in Table 1.

Table 1: Sensory Requirements

Items	Requirements	Testing Method
Color	Brown to dark brown	Take an appropriate amount of sample and place it in a clean and dry white porcelain plate. Observe its color and condition under natural light and smell it.
State	Powder	
Odor	It has a specific odor of acorn shells and no abnormal smell.	

2.2 Physical and Chemical Indicators

It shall conform to the provisions in Table 2.

Table 2: Physical and Chemical Indicators

Items		Indicators	Testing Method
Color value $E_{1cm}^{1\%}$(500 nm)	≥	10	A.3 in Appendix A
Drying loss, w /%	≤	10.0	Direct Drying Method in GB 5009.3
Ash content, w/%	≤	15.0	GB 5009.4
pH		7.0~9.0	A.4 in Appendix A
Lead (Pb)/(mg/kg)	≤	3.0	GB 5009.75 or GB 5009.12
Arsenic (As)/(mg/kg)	≤	2.0	GB 5009.76 or GB 5009.11
Note: Commercialized acorn shell brown products should be made from acorn shell brown that comply with this standard. Food ingredients that comply with relevant standards and/or relevant regulations, and (or) food additives that comply with national food safety standards such as sodium octenyl succinate starch, mono- and diglycerides of fatty acids, polyglycerol fatty acid esters, sucrose fatty acid esters, polyglycerol ricinoleate (PGPR), phospholipids, tween derivatives, span derivatives, glycerin, tea polyphenols, tea polyphenol palmitate, ascorbic acid, sodium ascorbate, calcium ascorbate, ascorbyl palmitate, rosemary extract, vitamin E, D-isoascorbic acid and its sodium salt, and acidity regulators, shall have color value indicators that conform to the claimed values, and may be in powder, liquid, or paste form. Other indicators shall comply with the provisions of this standard.			

Appendix A

Testing Method

A.1 General Provisions

Unless otherwise specified, the reagents and water used in this standard refer to analytical grade reagents and third grade water as specified in GB/T 6682. The standard solutions, impurity determination standard solutions, preparations, and products used in the experiment shall be prepared in accordance with the provisions of GB/T 601, GB/T 602, and GB/T 603. When the solvent used in the test is not specified, it refers to aqueous solution.

A.2 Identification Test

A.2.1 Solubility

Soluble in water or ethanol and insoluble in non-polar solvents.

A.2.2 Color

A.2.2.1 Reagents and solutions

A.2.2.1.1 6 mol/L sodium hydroxide solution: Weigh 240 g of sodium hydroxide, dissolve it in water, dilute and bring the volume to 1000 mL.

A.2.2.1.2 6 mol/L hydrochloric acid solution: Measure 500 mL of concentrated hydrochloric acid and dilute it with 500 mL of water.

A.2.2.2 Analysis steps

Weigh approximately 0.1 g of the sample and add it to 100 mL of 6 mol/L sodium hydroxide solution; the result is a dark brown color.

Weigh approximately 0.1 g of the sample and add it to 100 mL of 6 mol/L hydrochloric acid solution; the result is a yellowish-brown color.

A.2.3 Maximum absorption peak

Take the sample solution from A.3.2 color valence determination and detect it with a UV spectrophotometer. The maximum absorption peak is observed within the wavelength range of 275 nm ± 5 nm.

A.3 Determination of Color Value $E_{1cm}^{1\%}$(500 nm)

A.3.1 Instruments and equipment

UV spectrophotometer.

A.3.2 Analysis steps

Weigh 0.05 g to 0.10 g of the sample, accurate to 0.0001 g, dissolve it in water and make up to 100 mL, shake it well. Use a pipette to absorb 5 mL of the above solution while shaking well and then dilute it to 50 mL to obtain the sample solution. Take this solution and place it in a 1 cm colorimetric dish. Use water as a blank control and measure the absorbance at a wavelength of 500 nm using a UV spectrophotometer. The absorbance should be controlled between 0.3 and 0.7, otherwise the concentration of the sample solution should be adjusted, and the absorbance should be measured again.

A.3.3 Calculation of results

Calculate the color valence $E_{1cm}^{1\%}$ (500 nm) according to equation (A.1):

$$E_{1cm}^{1\%}(500\ nm) = \frac{A \times f}{m} \times \frac{1}{100} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (A.1)$$

In which:

A — absorbance value of the sample solution;

f — dilution factor;

m — mass of sample, measured in grams (g);

100 — concentration conversion factor.

The experimental results shall be based on the arithmetic means of parallel measurement results, accurate to 1 digit. The absolute difference between two independent measurement results obtained under repetitive conditions shall not exceed 2.0% of the arithmetic mean.

A.4 Determination of pH Value

A.4.1 Instruments and equipment

Acidimeter.

A.4.2 Analysis steps

Weigh 0.10 g of the sample, dissolve it in water with a pH of 5.0-7.0 that has been boiled and cooled (excluding carbon dioxide), and transfer it to a 100 mL volumetric flask. Adjust the

volume and measure the pH value of the solution using an acidimeter.

The experimental results are based on the arithmetic means of parallel measurements (rounded to two decimal places). The absolute difference between two independent measurements obtained under repeatability conditions should not exceed 0.1.

END OF UNOFFICIAL TRANSLATION

Attachments:

GB 1886.40-2025 Food Additive L Malic Acid.pdf

GB 1886.41-2025 Food Additive Xanthan Gum.pdf

GB 1886.386-2025 Food Additive Ammonium Carbonate.pdf

GB 1886.387-2025 Food Additive Acorn Shell Brown.pdf