NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB 1886.41-2025

Replacing GB 1886.41-2015

National Food Safety Standard - Food Additive - Xanthan Gum

食品安全国家标准 食品添加剂 黄原胶

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Foreword 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: the scope of xanthan gum has been revised; an index for xanthan gum content and its test method have been added; the test method for total nitrogen has been revised; an index for isopropanol and its test method have been added; an index for arsenic and its test method have been added; the pre-treatment method used in the microbiological tests has been revised.

1 Scope

This standard applies to the food additive xanthan gum obtained from starch-based material as the main raw material by fermentation with Xanthomonas campestris and then purified with ethanol or isopropanol, dried and milled.

2 Molecular formula and structural formula

2.1 Molecular formula. (C35H49O29)n.

2.2 Structural formula. Printed in the standard as a drawing, which the digitised text does not carry. Key to the drawing: Me stands for sodium, potassium or one half calcium.

3 Technical requirements

3.1 Sensory requirements. The sensory requirements shall comply with Table 1. Table 1 fixes the colour as off-white to pale cream and the state as granules or powder. The test method given against both is the same: take a suitable amount of the sample, place it in a clean, dry white porcelain dish, and observe its colour and state under natural light.

3.2 Physical and chemical indexes. The physical and chemical indexes shall comply with

Table 2. Table 2 fixes the following limits, each with the test method shown against it. Xanthan gum content on a dry basis, mass fraction from 72.0 to 108.0 percent, by A.3 of Annex A. Viscosity, not less than 600 centipoise, by A.4 of Annex A. Shear performance value, not less than 6.5, by A.5 of Annex A. Loss on drying, mass fraction not more than 15.0 percent, by A.6 of Annex A. Ash, mass fraction not more than 16.0 percent, by the determination of total ash of GB 5009.4, with the sample dried beforehand at 105 degrees Celsius plus or minus 1 degree Celsius for 4 h. Total nitrogen, mass fraction not more than 1.5 percent, by the Kjeldahl method of GB 5009.5, the calculation not being multiplied by the factor F that converts nitrogen to protein. Pyruvic acid, mass fraction not less than 1.5 percent, by A.7 of Annex A. Isopropanol, not more than 500 mg/kg, by Annex B of GB 25535-2010, this index applying only to products for which isopropanol is used as the extraction solvent. Lead, not more than 2.0 mg/kg, by GB 5009.12 or GB 5009.75. Arsenic, expressed as As, not more than 1.0 mg/kg, by GB 5009.11 or GB 5009.76.

3.3 Microbiological limits. The microbiological limits shall comply with Table 3. Table 3 fixes the following limits, each with the test method shown against it. Aerobic plate count, not more than 5000 CFU/g, by GB 4789.2. Coliforms, not more than 3.0 MPN/g, by GB 4789.3. Moulds and yeasts, not more than 500 CFU/g, by GB 4789.15. Salmonella, not to be detected in 25 g, by GB 4789.4. Two footnotes govern the sample preparation. For the aerobic plate count, coliforms, and moulds and yeasts, accurately weigh 1.0 g of the sample under aseptic conditions and dissolve it in 99 mL of sterile phosphate buffer solution or sterile physiological saline to make a homogenate at a dilution of 1 to 100 as the initial sample homogenate; the subsequent steps follow GB 4789.2, GB 4789.3 (with double strength lauryl sulfate tryptose broth for the first dilution) and GB 4789.15. For Salmonella, accurately weigh 25.0 g of the sample under aseptic conditions and dissolve it in 2475 mL of sterile buffered peptone water medium for pre-enrichment; the subsequent steps follow GB 4789.4.

A.1 General provisions

Unless other requirements are stated, the reagents and the water used in this standard are analytically pure reagents and grade three water as laid down in GB/T 6682.

Unless other requirements are stated, the standard solutions, the standard solutions for the determination of impurities, and the preparations and products used in the tests are prepared as laid down in GB/T 601, GB/T 602 and GB/T 603.

Where the solvent used to prepare a solution is not stated, an aqueous solution is meant.

A.2 Identification test

A.2.1 Solubility test. Weigh 1 g of the sample to the nearest 0.01 g and pour it slowly into a beaker holding 100 mL of water; start the stirrer at 200 r/min and add the sample while

stirring. It shall dissolve after 25 min. When the sample is added to ethanol, acetone or diethyl ether by the same procedure, it does not dissolve.

A.2.2 Gel test. Add 300 mL of water to a 500 mL beaker and pre-heat it to 80 degrees Celsius. Start the stirrer at 200 r/min and, while stirring, add 1.5 g of the dried sample and 1.5 g of locust bean gum, each to the nearest 0.01 g. Once the mixture has formed a solution, continue stirring for more than 30 min, keeping the water temperature at not less than 60 degrees Celsius during stirring. Stop stirring and cool at room temperature for at least 2 h; when the temperature falls below 40 degrees Celsius a gel-like body forms. Prepare a 1 percent sample solution by the same method as a control, without locust bean gum; no such gel-like body appears.

A.3 Determination of xanthan gum content on a dry basis

A.3.1 Outline of the method. The xanthan gum sample is treated with dilute potassium hydroxide and hydrochloric acid solutions, precipitated first with anhydrous ethanol, then washed with anhydrous ethanol to remove impurities and filtered; the filter residue is dried and weighed, and the xanthan gum content is calculated.

A.3.2 Reagents and materials. Potassium hydroxide solution, 0.04 g/mL: weigh 4 g of potassium hydroxide, dissolve it in water and make up to 100 mL. Dilute hydrochloric acid solution, 1 plus 3 by volume: take 10 mL of hydrochloric acid and add 30 mL of water, then mix. Anhydrous ethanol. Acetone. Diatomaceous earth 545. Silver nitrate test solution, 17 g/L: weigh 1.7 g of silver nitrate, dissolve it in water and make up to 100 mL.

A.3.3 Apparatus and equipment. Centrifuge. Vacuum drying oven. Glass filter (G3). Desiccator. Electronic balance, readability 0.001 g.

A.3.4 Procedure. Place diatomaceous earth 545 in the glass filter (G3) to a thickness of about 0.5 cm, put it in the vacuum drying oven and dry it at 80 degrees Celsius under 40 kPa to 53 kPa, take it out, cool it in the desiccator and weigh it; repeat the drying and weighing until the difference between two successive masses does not exceed 2 mg, which is constant mass, recorded as m1 to the nearest 0.001 g. Accurately weigh 0.5 g of the sample left over from the determination of loss on drying, to the nearest 0.001 g, recording its mass as m. Add 10 mL of anhydrous ethanol to disperse the sample thoroughly, then add 10 mL of potassium hydroxide solution (0.04 g/mL) to dissolve it, and add 90 mL of water. To this solution add 15 mL of dilute hydrochloric acid (1 plus 3) and 300 mL of anhydrous ethanol and stir vigorously. Leave it to stand for 2 h, then centrifuge at 4000 r/min for 10 min and remove the supernatant. Add a further suitable amount of anhydrous ethanol and repeat the centrifuging and removal of the supernatant until no chloride remains in the supernatant; to check this, pour about 10 mL of the supernatant into a beaker and add 0.5 mL of silver nitrate test solution, and if no turbidity appears the supernatant is free of chloride. Filter the precipitate through the glass filter previously brought to constant mass, washing with anhydrous ethanol. Wash the final residue with 30

mL of acetone, leave the glass filter carrying the residue in a fume cupboard for more than about 30 min, then dry it under vacuum at 80 degrees Celsius under 40 kPa to 53 kPa for 4 h, take it out, cool it in the desiccator and dry it to constant mass, recorded as m2 to the nearest 0.001 g.

A.3.5 Calculation of the result. The xanthan gum content w1 is calculated by formula (A.1). In the formula: m2 is the mass of the glass filter, the diatomaceous earth and the residue after drying, in grams; m1 is the mass of the glass filter and the diatomaceous earth after drying, in grams; and m is the mass of the sample, in grams. The test result is given as the arithmetic mean of two parallel determinations, kept to one decimal place. The absolute value of the difference between two independent results obtained under repeatability conditions shall not be greater than 3.0 percent of their arithmetic mean.

A.4 Determination of viscosity

A.4.1 Apparatus and equipment. Rotational viscometer.

A.4.2 Conditions of determination. Spindle model: number 3 spindle. Spindle speed: 60 r/min. Temperature of determination: 24 degrees Celsius to 25 degrees Celsius.

A.4.3.1 Preparation of the sample solution. Accurately weigh 3 g of the sample and 3 g of potassium chloride, each to the nearest 0.01 g, mix them and add them slowly, with the stirrer running, to a 400 mL beaker holding 294 g of distilled water. Avoid the mixture sticking to the stirrer blade or to the wall of the beaker, and stir continuously at 800 r/min for 2 h, keeping the temperature at 24 degrees Celsius to 25 degrees Celsius. Stop stirring, take the beaker out, and turn the solution over with a stirring rod or a similar tool until it is uniform and free of visible bubbles.

A.4.3.2 Determination. Measure the viscosity of the sample solution with the rotational viscometer under the conditions laid down in A.4.2.

A.5 Determination of the shear performance value

A.5.1 Method of determination. Following A.4, measure the viscosity with the number 3 spindle at speeds of 6 r/min and 60 r/min, and calculate the shear performance value by formula (A.2).

A.5.2 Calculation of the result. The shear performance value N is calculated by formula (A.2). In the formula: eta one is the viscosity at a speed of 6 r/min, in centipoise; and eta two is the viscosity at a speed of 60 r/min, in centipoise. The calculated result is kept to one decimal place.

A.6 Determination of loss on drying

A.6.1 Outline of the method. The sample is dried to constant mass at a set temperature and