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

GB 31619-2014

National Food Safety Standard -- Food Additives -- Cassia gum

食品安全国家标准 食品添加剂 决明胶

(English Translation)

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1 Scope

This standard applies to Cassia (*Cassia obtusifolia* or *Cassia tora*) endosperm of seeds of plants as raw material, processed and extracted Cassia gum food additives. Containing mainly galactomannans, i.e. a polymer comprising a linear backbone of mannose and galactose side chains.

3.1 Sensory requirements

Shall comply with the requirements in Table 1.

Table 1 Sensory requirements

Project requires test methods Pale yellow to white color Status powder the appropriate amount of sample was placed in a white porcelain plate, its color was observed under natural light and status

3.2 Physical and Chemical Indicators

Shall be in accordance with Table 2.

Table 2. Physical and chemical indicators

Item Index Test Method Galactomannan (w) /% ≥ 75 Appendix A A.3 Loss on drying (w) /% ≤ 12 GB 5009.3 a direct drying method TABLE 2 (cont.) Item Index Test Method Ash (w) /% ≤ 1.2 GB 5009.4 Acid insoluble matter (w) /% ≤ 2.0 A.4 Protein (w) /% ≤ 7 GB 5009.5 Kjeldahl method b Fat (w) /% ≤ 1 GB/T 5009.6 Soxhlet extraction method Starch test by test A.5 Anthraquinone/(mg/kg) ≤ 0.5 A.6 Isopropanol (w) /% ≤ 1.0 A.7 Lead (Pb)/(mg/kg) ≤ 1 GB 5009.12 a drying temperature and time were $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and 5h.
b protein nitrogen conversion factor of 6.25.

3.3 Microbial indicators

Shall be in accordance with Table 3.

Table 3 microbiological indicators

Item Index Test Method CfU/(CFU/g) ≤ 5000 GB 4789.2 Escherichia coli/(MPN/g)
Appendix A Testing method A.1 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 comply with GB/T 6682's.

The test does not indicate when the solution which is formulated with a solvent, refer to the aqueous solution.

A.2 Identification Test A.2.1 solubility test Insoluble in ethanol. Dispersed in cold water to form a colloidal solution.

A.2.2 gel test

A.2.2.1 added a sufficient amount of sodium borate ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$) test solution in the sample solution (20g/L), the pH of solution exceeds 9 dissolved Solution to form a gel.

A.2.2.2 sample weighed 1.5g and 1.5g Xanthan gum, mix well. Under rapid stirring, the mixture was added to 300mL filled with 400mL beaker 80 deg.] C water. The mixture was stirred until dissolved, stirring was continued for 30 min (solution temperature maintained while stirring over 60 °C).

Stirring was stopped and the mixture was allowed to cool for at least 2h at rt. After the temperature dropped below 40 °C, solid form, with a viscoelastic gel. and Separate 10g/L Xanthan gum solution or a control sample was not control the gel formation.

A.2.3 pH

10g/pH L of the sample solution should be 5.5 to 8.0.

A.3 Determination of the milk half mannan Mass fraction w_1 of galactomannan according to formula (A.1) is calculated.

$w_1 = 100\% - w_2 - w_3 - w_4 - w_5 - w_6$ (A.1) where.

--- w_2 of the mass fraction of drying loss,%;

w_3 --- ash content,%;

--- w_4 of the mass fraction of acid-insoluble matter,%;

w_5 --- protein content,%;

w_6 --- fat mass fraction,%.

Determination of acid insoluble A.4 A.4.1 Reagents and materials A.4.1.1 sulfuric acid.

A.4.1.2 filter aid. diatomaceous earth, dried $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, 3h drying treatment.

A.4.2 Instruments and Equipment A.4.2.1 filter crucible (over $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, 3h drying treatment).

A.4.2.2 dryer.

A.4.3 Analysis step

Weigh 2.0g sample was dissolved in a 150mL filled with water and 1.5mL of sulfuric 250mL beaker. The beaker was covered with a watch glass, in Was heated on a steam bath for 6h, added at any time during heating of water evaporation is lost. After completion of heating, said filter aid after the treatment of dried 500mg, was added to the sample solution was filtered through a weighed filter crucible. Residue washed several times with hot water, then filtered off together with the crucible $\pm 2\text{ }^{\circ}\text{C}$ residue dried for 3h at $105\text{ }^{\circ}\text{C}$, weighed after cooling in a desiccator.

A.4.4 calculation results Acid insoluble fraction by mass of w4 by the formula (A.2) is calculated.

$m_1 - m_2 - m_3$

$\times 100\%$ (A.2)

Where.

After drying M1 --- crucible together with the total mass of the residue in grams (G);

m2 --- aid mass, in grams (g);

--- M3 crucible mass in grams (G);

--- M4 sample mass, in grams (g).

Starch test A.5

A.5.1 Reagents and materials Iodine solution. Weigh 14.0 g of iodine, dissolved in an aqueous solution containing 100mL 36.0g of potassium iodide was added 3 drops of hydrochloric acid, diluted with water to 1000mL.

A.5.2 Analysis step

Sample Weigh 1.0g, dispersed in 10mL of water. Iodine solution was added, no blue color appeared, namely by experiment.

Determination of anthraquinone A.6 A.6.1 Method summary Anthraquinone extracted with acetonitrile sample was measured by high performance liquid chromatography.

NOTE: The sample and reference should be stored.

A.6.2 Reagents and materials A.6.2.1 anthraquinone reference. emodin (the EMO) (purity $\geq 90\%$), aloe-emodin (the AEM) (purity $\geq 95\%$) and physcion (A PHY) (purity $\geq 98.0\%$), or 1,8-dihydroxy-3-methoxy-6-methyl - anthraquinone rhein (RHE) (purity $\geq 95\%$) and rhubarb root Acid (CHR) (purity $\geq 98\%$).

A.6.2.2 reference internal standard. 1,8-dihydroxy anthraquinone (purity $\geq 96\%$).

A.6.2.3 Methanol. HPLC grade.

A.6.2.4 Acetonitrile. chromatographically pure.

A.6.2.5 trifluoroacetic acid.

Sodium bicarbonate solution A.6.2.6. 2g/L.

A.6.2.7 acetonitrile/sodium bicarbonate solution. volume ratio of acetonitrile and sodium bicarbonate solution was 60.40.

A.6.2.8 buffer. pH9.0.

A.6.3 Instruments and Equipment High performance liquid chromatography with diode array detector (wavelength 435nm).

A.6.4 Reference chromatographic conditions A.6.4.1 Column. C18 column, 250mm x 4.6mm, particle size 5 μ m. Other equivalent separation or column chromatography condition.

A.6.4.2 mobile phase. AB; A is 0.1% trifluoroacetic acid, B is acetonitrile.

A.6.4.3 running time. 60min.

A.6.4.4 Gradient. Table A.1.

Table A.1 mobile phase concentration ratio

Phase A /% Time/min flow of mobile phase B /% A.6.4.5 flow rate. 1mL/min.

A.6.4.6 injection volume. 50 μ L.

A.6.5 Analysis step

A.6.5.1 Preparation of standard stock solution (100mg/L) of Weigh three kinds of anthraquinone internal standard reference substance and reference substance 1mg $\pm$ 0.01mg, about 5mL methanol respectively were transferred to a reference 10mL volumetric flask, after sonication 15min, diluted with methanol to the mark.

4 parts of this stock standard solution was stored at 4 deg.] C in a brown bottle (this solution is stable for 2 weeks).

A.6.5.2 Preparation of mixed standard solution (10mg/L) of 3 parts of a standard stock solution of anthraquinone suction 1mL, placed in a volumetric flask of 10mL, diluted with