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National Food Additive Standard - Polydextrose

Report Categories:

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Approved By:
Mark Petry
Prepared By:
Wu Bugang

Report Highlights:
On May 5, 2010, China notified the WTO of "National Food Safety Standard: Food Additives - Polydextrose" as SPS/N/CHN/219. This measure "applies to the technical requirements and testing methods for polydextrose." The date for submission of final comments to the WTO is May 20, 2010. The proposed date of entry is May 30, 2010. This report is an INFORMAL translation of this document.

Executive Summary:
On May 5, 2010, China notified the WTO of "National Food Safety Standard: Food Additives - Polydextrose" as SPS/N/CHN/219. This measure "applies to food additive polydextrose obtained by melting and condensation of the ingredients of glucose, sorbitol and citric acid. It specifies the technical requirements and testing methods for food additive polydextrose." The date for submission of final comments to the WTO is May 20, 2010. The proposed date of entry is May 30, 2010.

Thanks go to the Keller and Heckman LLP Shanghai Representative Office for their assistance in translating this document.

This report contains an UNOFFICIAL translation of National Food Safety Standard: Food Additives - Polydextrose.

General Information:

BEGIN TRANSLATION

GB National Food Safety Standard
GB/T 5009.11—xxxx
To replace GB/T 5009.11—2003

National food safety standard

Food additive Polydextrose

(Draft for soliciting comments)

Issued on XX-XX, 2010 Implemented from XX-XX, 2010

Issued by the Ministry of Health of the People's Republic of China

Preface

This Standard shall not be equivalent to consistency with "Polydextrose" [Monograph 1 of JECFA (2006), and the 51st JECFA (1998)] of Codex Alimentarius Commission (CAC).

The Appendix A of this Standard shall be used as the normative appendix.

National Food Safety Standard

Food Additive - Polydextrose

1.**Scope**

This Standard is applicable to the polydextrose products which are made by the mixture of glucose, sorbitol and citric acid in certain proportion and then refining from polymerization by heating at high temperature.

2. **Normative reference documents**

Reference documents in this Standard are indispensable for the application of this Standard. For the reference documents with indicated dates, only their version with date indicated with shall be applied to this Standard. For the reference documents without indicated dates, the latest version shall be applied to this Standard.

3**. Technical requirements**

3.1 Sensory requirements: Compliance with the regulations in Table 1 below.

Table 1 Sensory requirements

Item	Requirements	Test method
Color and odor	White to yellowish, without foreign smell.	Take proper amount of sample, and place it in the clean and dry white ceramic plate. Then observe its color and state under natural light, and smell its odor.
State	Solid, microparticle or powder.	

3.2 Physical and chemical indexes: Compliance with regulations in Table 2.

Table 2 Physical and chemical indexes

Item		Index	Test method
Content (based on the dry product without ash content), w/%	≥	90.0	A.3 in Appendix A
Loss on drying, w/%	≤	4.0	Direct drying method in GB 5009.3
pH		2.5~7.0	A.4 in Appendix A
Ash content, *w*/%	≤	0.3	GB 5009.4
1,6-anhydro-D-glucose (based on the dry product without ash content), w/%	≤	4.0	A.5 in Appendix A
Glucose and sorbitol (based on the dry product without ash content), w/%	≤	6.0	A.5 in Appendix A
5-hydroxymethyl furfural (HMF) (based on the dry product without ash content), w/%	≤	0.1	A.6 in Appendix A
Lead (Pb)/ (mg/kg)	≤	0.5	GB 5009.12

Appendix A

(Normative appendix)

Test method

A.1 General rules

Unless otherwise specified, only the reagents confirmed as AR and the water specified by the GB/T 6682 standard shall be used during the analysis. The standard titration solutions, the standard solutions, preparations and products for the determination of impurities, shall be prepared according to the regulations in GB/T 601, GB/T 602 and GB/T 603 standards. All the solutions in this test shall be water solution unless specific solvents are indicated for the preparation of solutions.

A.2 Identification test

A.2.1 Reagents and solutions

α. Concentrated sulphuric acid.

β. Acetone.

χ. Phenol solution: 5% (mass fraction).

δ. Copper citrate alkaline solution: weigh 173g sodium citrate ($C_6H_5Na_3O_7 \cdot 2H_2O$) and 117g sodium carbonate ($Na_2CO_3 \cdot H_2O$), dissolve it into about 700mL water under the heating condition, and when necessary, filter it with filter paper. In the other vessel, weigh 17.3g copper sulphate ($CuSO_4 \cdot 5H_2O$), and dissolve it into about 100mL water, then slowly add this solution into the above solution with stable stirring. After cooling down, dissolve it with water to 1,000 ml, and shake it up evenly.

A.2.2 Analysis steps

A.2.2.1 Take 1 drop of 10% (mass fraction) test solution, add 4 drops of 5% (mass fraction) phenol solution, then quickly add 15 drops of concentrated sulphuric acid solution, when there should be the color from deep yellow to orange yellow.

A.2.2.2 Take 1 mL of 10% (mass fraction) test solution, add 1mL acetone under violent stirring, when the solution shall be transparent. Add 2mL acetone into this transparent solution for violent stirring, when the solution shall immediately produce opalescent turbidity.

A.2.2.3 Take 1 mL of 2% (mass fraction) test solution, add 4mL copper citrate alkaline solution and heat it till violent boiling for 2-4 minutes. Then take out the heating source, and let the solution for sedimentation and clarification, when the upper clear layer of the solution shall be blue or bluish green.

A.3 Contents

A.3.1 Reagents and solutions

a. Standard product of α-D-glucose: mass fraction ≥98.0%.

b. Phenol.

c. Sulphuric acid.

d. Phenol solution: 4g/ml; accurately weigh 80g phenol, add 20ml water to let it dissolved and mixed evenly.

A.3.2 Instruments and devices

Spectrophotometer.

A.3.3 Analysis steps

A.3.3.1 Preparation of standard glucose solution

Weigh a certain amount of α-D-glucose standard product, dissolve it with water and prepare it into 0.2 mg/mL basic standard solution, which is used for the preparation of standard solutions with different concentrations, including 50, 40, 30, 20, 10 and 5 μg/mL.

A.3.3.2 Preparation of test solutions

Weigh about 0.25 g test sample (with accuracy to 0.000 1g), dissolve it with water to the constant volume 250ml and shake it up evenly. Then absorb 10.0mL with transfer pipette, and dissolve it with water to the constant volume 250mL. This is the test solution.

A.3.3.3 Plotting of standard curve for glucose and determination of test solution

Absorb 2.0mL standard solution and test solution with transfer pipette with series concentrations, place them into 15mL screw-cap vials without acetone separately, and add 0.12mL phenol solution respectively, then cover the vials and slightly shake them up evenly. Uncover the viol, and quickly add 5.0mL sulphuric acid. Cover the viol again, and shake it up violently and evenly. Pay attention to wearing rubber gloves and other safety protection equipments when adding sulphuric acid.

After the vials are kept under ambient temperature for 45 minutes, the absorbance of the solution in the vials at 490nm will be tested with proper spectrophotometer, and during the determination, the mixing solution of phenol-sulphuric acid will be used as the blank and reference solution. Make this test for three times, to obtain average absorbance of standard solution with series concentrations and average absorbance of test solution. Plot the standard curve with average absorbance of standard solution with series concentrations as longitudinal coordinate, and the concentration of standard solution (μg /mL) as horizontal coordinate.

A.3.4 Result calculation

Content X_1 of polydextrose is calculated in formula (A.1):

$$X_1 = 1.05 \times \frac{100(A-Y)}{S \times c} - P_G - 1.11P_L \quad \text{..... (A.1)}$$

Where,

X1 -- Content of glucose in test sample (based on dry product without ash content), %;

1.05 -- correction factor deducted for the test, because there is certain difference on color value between the same amount of polymer (including small amount of sorbitol) with the same amount glucose monomer;

A--Absorbance of test solution;

Y--Intercept of y axis of standard curve;

S -- Slope of standard curve for absorbance to glucose concentration (μg/mL), about 0.02;

C --Concentration of test solution (based on the conversion of the dry weight loss and ash content of test sample into the concentration calculated by the dry product without ash content), unit: microgram per milliliter (μg/ml);

PG, PL——Contents of glucose and 1, 6-anhydro-D-glucose measured in monomer test, %;

1.11—— Conversion coefficient of 1, 6-anhydro-D-glucose.

A.4 pH

Weigh about 10g sample (with accuracy to 0.00 1g), dissolve it with water to the constant volume of 100ml and shake it up evenly. Then measure it with acidometer.

A.5 1,6-anhydro-D-glucose, glucose and sorbitol

A.5.1 Reagents and solutions

α. Standard product of 1, 6-anhydro-D-glucose: mass fraction ≥98.0%.

β. Standard product of glucose (α-D-glucose): mass fraction ≥98.0%.

χ. Standard product of sorbitol: mass fraction ≥98.0%.

δ. De-ionized water.

ε. Sulphuric acid solution: mass fraction 25%.

A.5.2 Instruments and devices

High performance liquid chromatography, with refractive index detector

A.5.3 Reference chromatographic conditions

α. Chromatographic column: shodex SH1011 H^+, 8mm×300mm, or equivalent

chromatographic column.

β. Mobile phase: 5mL sulphuric acid solution, absorb 1.66mL 25% sulphuric acid solution, dissolve it by adding 1000mL water, filter with 0.45μm filter membrane, and then ultrasonic degas for 15 minutes.

χ. Column temperature: 60 ℃.

δ. Flow rate: 0.5 ml/min.

ε. Sample volume: 20μL.

A.5.4 Analysis steps

A.5.4.1 Preparation of standard solution

Table A.1 Preparation of standard solution

Standard class	Weight of standard sample (g)	Liquid volume (ml)	Concentration of standard sample (g/l)
1	0.03	50	0.6
2	0.02	50	0.4
3	0.01	50	0.2
4	0.005	50	0.1

Prepare the standard samples according to the above standard products of 1,6-anhydro-D-glucose, glucose and sorbitol, that is, weigh 0.03g, 0.02g, 0.01g and 0.005g respectively for every standard product. Then dissolve it with deionized water to the constant volume 50mL. Prepare these three standard products into the standard samples with series concentrations respectively, and pass them with 0.45μm filter membrane for spare use.

A.5.4.2 Preparation of test solution

Weigh about 1g polydextrose sample (with accuracy to 0.000 1g), dissolve it with deionized water to the constant volume 25ml, then pass it with 0.45μm filter membrane for spare use.

A.5.4.3 Determination

Measure the standard samples of 1, 6-anhydro-D-glucose, glucose and sorbitol with series concentrations respectively under the reference chromatographic condition in A 5.3. Repeat this test for two times, to obtain the average peak area value of the standard samples. Plot the standard curves of 1, 6-anhydro-D-glucose, glucose and sorbitol respectively with peak area of the standard sample as longitudinal coordinate and series concentrations as of standard sample (g/L) as horizontal coordinate.

Measure the test solutions under the above chromatographic condition, and make qualitative analysis according to the retention time of the standard products. Repeat this test for two times to obtain the average value of peak area. Obtain the concentrations of 1,6-anhydro-D-glucose, glucose and sorbitol (g/L) in the test solution from the linear relation between peak area and

concentration of standard sample. If the concentrations of 1, 6-anhydro-D-glucose, glucose and sorbitol (g/L) is not within the standard curve, the concentration of standard solution shall be adjusted.

A.5.5 Result calculation

Content X_2 of 1, 6-anhydro-D-glucose is calculated in formula (A.2):

$$X_2 = \frac{c_1}{c_2} \times 100 \quad \text{.....(A.2)}$$

Where,

X2—Content of 1,6-anhydro-D-glucose in test sample (based on dry product without ash content), %;

C1--Concentration of glucose calculated according to the standard curve, unit: gram per liter (g/l)

C2--Concentration of test solution (based on the conversion of the dry weight loss and ash content of test sample into the concentration calculated by the dry product without ash content), unit: gram per liter (g/l);

Calculation for the content of glucose and sorbitol in test sample is the same as that for the content of 1, 6-anhydro-D-glucose in test sample. The content of glucose and sorbitol in test sample is the sum of both contents.

A.5.6 Allowable deviation

Test results shall be based on arithmetic mean value of the results from parallel determination. The absolute deviation between two independent test results under the repeated conditions shall be no more than 5% of the arithmetic mean value.

A.6 5-hydroxymethyl furfural (HMF)

A.6.1 Instruments and devices

Spectrophotometer.

A.6.2 Analysis steps

A.6.2.1 Preparation of test solution

Weigh about 1g polydextrose sample (with accuracy to 0.000 1g), dissolve it with water to the constant volume 100ml and shake it up evenly for spare use.

A.6.2.2 Determination

Choose proper spectrophotometer, get 1cm quartz cuvette, take water as the blank and reference solution, and measure absorbance of the test solution at the 283nm wavelength.

A.6.3 Result calculation

Content X_3 of 5-hydroxymethyl furfural (HMF) is calculated in formula (A.3):

$$X_3 = \frac{0.749 \times A}{c_3} \quad \text{..... (A.3)}$$

Where,

X3--Content of 5- hydroxymethyl furfural (HMF) in test sample (based on dry product without ash content), %;

0.749--Constant of combining proportion, including coefficient of light extinction, molecular weight, and unit and volume conversion.

A--Absorbance of test solution.

C3-- Concentration of test solution (based on the conversion of the dry weight loss and ash content of test sample into the concentration calculated by the dry product without ash content), unit: microgram per milliliter (μg/ml).

END TRANSLATION