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

GB 29925-2013

Food additive -- Starch acetate

食品添加剂 醋酸酯淀粉

(English Translation)

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1 Scope

This standard applies to edible starch or arrowroot starch produced by a starch milk raw material obtained occurred as a raw material and obtained by esterifying agent Food Additives starch acetate, and a combination of enzymatic treatment, acid treatment, alkali treatment, bleaching treatment and pre-gelatinized treatment of one or more parties Food Additives starch acetate method after processing.

2.1.1 Raw materials

Food starch should be consistent with national standards or industry standards-related products.

2.1.2 Accessories

2.1.2.1

should meet the national standards or industry standards or the relevant provisions of the relevant requirements of the product.

2.1.2.2

esterification agent type and amount of one of the following conditions.

- a) of acetic anhydride, not more than 8.0% by mass of dry starch;
- b) vinyl acetate, dry starch is not more than 7.5% mass fraction.

2.2 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 Sensory requirements

Project requires test methods Color white, white or light yellow 50 g sample taken in a clean white porcelain dish, under natural light, observation its color, state, smell the odor state

granular, flaked or without visible impurities odor products have inherent odor, no smell

2.3 Physical indicators

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

Table 2. Physical and chemical indicators

Project requires test methods Loss on drying, w /% Cereal starch ≤ 15.0 GB/T 12087 other monomers starch ≤ 18.0 Potato starch ≤ 21.0 Total arsenic (As)/(mg/kg) ≤ 0.5 GB/T 5009.11 Lead/(mg/kg) ≤ 1.0 GB 5009.12 Sulfur dioxide/(mg/kg) ≤ 30 GB/T 22427.13 Acetyl/(g/100g) ≤ 2.5 Appendix A A.4 Vinyl acetate residue (only vinyl acetate as esterifying agent)/(mg/kg) ≤ 0.1 A.5 in Appendix A Appendix A Testing method A.1 Safety Tips Reagents The standard test methods used for toxic or corrosive, the operation should be careful! As should be immediately splashed on the skin Rinsed with water, severe cases should be treated immediately.

A.2 General Provisions Unless otherwise indicated in the analysis using only recognized as analytical reagents and GB/T 6682 stipulated three water. Test Methods the standard titration solution, impurity measurement standard solution, preparations and products, did not indicate when the other requirements, according to GB/T 601, GB/T 602 and 603 of the regulations prepared GB/T ; the solution when the solvent is not specified, refer to the aqueous solution.

A.3 Identification Test A.3.1 microscopy Without gelatinized starch acetate treatment retention particle structure can be directly observed and verified starch particle shape, size and character through a microscope.

Under polarized light microscope, it can be observed the typical birefringence.

A.3.2 iodine staining A sample of 1 g was added 20mL of water were suspended, several drops of iodine solution, the color should range from deep blue to reddish brown.

A.3.3 copper reduction A.3.3.1 formulated alkaline tartrate copper test solution A.3.3.1.1 Solution A. Copper Sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) 34.66 g, should be no weathering or moisture absorption phenomenon, dissolved in water volume to 500 mL.

The solution was stored in a small sealed container.

A.3.3.1.2 Solution B. take potassium sodium tartrate ($\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$) 173 g sodium hydroxide 50 g, dissolved in water volume to 500 mL. The solution was stored in a small container and alkali corrosion.

A.3.3.1.3 solutions A and B mixed in equal volumes, to obtain an alkaline tartrate copper test solution.

A.3.3.2 analysis step Weigh the sample 2.5 g, placed in a flask, 0.82 mol/L hydrochloric acid solution of 10 mL of water and 70 mL, mixing, boiling water bath back Stream 3 h,

cooled. Take 0.5 mL solution was cooled, added 5 mL hot alkaline copper tartrate solution, a large amount of red precipitate.

A.3.4 acetyl discrimination A.3.4.1 Principle Acetate is released from the saponification of acetylated starch out. After concentrated, with the calcium hydroxide were hot, acetate into acetone, propylene One with o-nitrobenzaldehyde effects appear blue.

A.3.4.2 Identification of About 10 g of sample is dispersed in 25 mL of water, was added 20 mL 0.4 mol/L sodium hydroxide solution. After shaking 1h filtered and the filtrate an oven at 110 °C was evaporated, the residue was dissolved with a little water and transferred to test tubes. In the test tube was heated and calcium hydroxide.

If the sample is starch acetate, acetone will produce steam. Its vapor can by the use of 2 mol/L sodium hydroxide solution now with ortho-nitro Benzaldehyde saturated solution had soaked a piece of paper turns blue. If 1 drop of hydrochloric acid solution 1 mol L/removal of the reagent original yellow, which Blue species will become clearer.

A.4 Determination of acetyl group A.4.1 principle of the method Starch contains acetyl groups under alkaline conditions (pH 8.5 or more) easily saponified so with excess alkali saponified, standards and then dropwise with hydrochloric acid Fixed base titration solution can be determined the rest of acetyl content.

A.4.2 Reagents and materials A.4.2.1 sodium hydroxide.

A.4.2.2 hydrochloric acid.

A.4.2.3 sodium hydroxide solution. $c(\text{NaOH}) = 0.1 \text{ mol/L}$.

A.4.2.4 sodium hydroxide solution. $c(\text{NaOH}) = 0.45 \text{ mol/L}$. Weigh 18 g of sodium hydroxide dissolved in 100 mL of carbon dioxide-free water in, shake, transferred to a 1000 mL volumetric flask, dilute to the mark with carbon dioxide-free water and shake.

A.4.2.5 hydrochloric acid standard titration solution. $c(\text{HCl}) = 0.2 \text{ mol/L}$. Measure 18 mL of hydrochloric acid, into 1000 mL of water, shake well.

A.4.2.6 phenolphthalein indicator solution. 10g/L.

A.4.3 Instruments and Equipment Mechanical oscillator.

A.4.4 Analysis step

Weigh 5g samples, accurate to 0.001 g, placed in 250 mL conical flask, 50 mL of water, 3 drops of phenolphthalein indicator solution, mixed Uniformly with sodium hydroxide solution (A.4.2.3) titrated to reddish, then add 25.0 mL of sodium hydroxide solution (A.4.2.4), mechanical vibration Turbulent 30 min for saponification the oscillator.

Remove the stopper, rinse bottle with iodine bottle stopper and the bottle wall, which has been saponified containing excess alkali solution with hydrochloric acid standard titration solution Titration to the disappearance of the pink is the end, volume V1.

In 25.0 mL of sodium hydroxide solution (A.4.2.4) blank, with the volume of hydrochloric acid standard solution titration is V_0 .

A.4.5 Calculation Results Mass fraction w_0 acetyl group, according to the formula (A.1) Calculated.

$0 \times x$

$xx = m$

$M_c V V_w$ (A.1)

Where.

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

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

C -- exact concentration of hydrochloric acid standard titration solution, expressed in moles per liter (mol/L);

Molar mass M -- acetyl group, units of grams per mole (g/mol) [$M(C_2H_3O) = 43.03$];

Quality m -- sample in grams (g);

1000-- conversion factor.

A.5 Determination of residual vinyl acetate A.5.1 Reagents and materials A.5.1.1 vinyl acetate.

A.5.1.2 starch. samples with the same plant-derived and non-modified starch.

A.5.2 Instruments and Equipment GC. recommended with a flame ionization detector chromatograph.

A.5.3 chromatographic columns and typical operating conditions A.5.3.1 Column. capillary column, 60m x 0.32mm (internal diameter), the filling (50% cyanopropyl) - methyl polysiloxane.

A.5.3.2 oven temperature. programming, 40 °C incubated 5min, to 10 °C/min heating rate to 180 °C, 180 °C incubated 5min.

A.5.3.3 Inlet temperature. 200 °C.

A.5.3.4 detector temperature. 250 °C.

A.5.3.5 nitrogen as carrier gas (1.3mL/min).

Alternatively with equivalent separation columns and corresponding chromatographic conditions.