



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

GB 1886.236-2016

**National Food Safety Standard -- Food Additives -- Propylene
Glycol Fatty Acid Esters**

食品安全国家标准 食品添加剂 丙二醇脂肪酸酯

(English Translation)

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1 Scope

This standard applies to fatty acids or oils and 1,2-propylene glycol produced by the reaction, with or without molecular distillation and other processed food Additive propylene glycol fatty acid ester.

2 Structural formula

Wherein. R1 and R2 represent a fatty acid group and hydrogen (mono ester) when two fatty acid groups (diester).

3.1 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 sensory requirements

The project requires a test method Color transparent or white to yellow and white State liquid or bead, flaky or other shaped solid Take appropriate sample in a clean, dry white porcelain dish Natural light, observe the color and state

3.2 Physical and chemical indicators

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

Table 2 Physical and chemical indicators

Item Index Test Method Total propylene glycol fatty acid ester content, w /% consistent with claims A.3 in Appendix A.

Free propylene glycol, w /% ≤ 1.5 Appendix A, A.3 Acid value (in KOH)/(mg/g) ≤ 4.0 Appendix A A.4 Hydroxyl value/(mg/g) in line with the claimed GB/T 7383 acetic anhydride method Iodine value (g/100g) Conformity claims GB/T 5532 or GB/T 13892

Table 2 (continued)

Item Index Test Method Saponification value/(mg/g) Conformity claims GB/T 5534 Soap (based on potassium stearate), w /% ≤ 7.0 Appendix A, A.5 Burning residue, w /% ≤ 0.5 GB/T 9741 Lead (Pb)/(mg/kg) ≤ 2.0 GB 5009.12

Note 1: Commercial propylene glycol fatty acid ester products should be in line with this standard propylene glycol fatty acid ester as raw material, can be added in line with food additives quality control the requirements of the antioxidants, acidity regulator and as an antioxidant carrier of propylene glycol and emulsifier.

Note 2: Antioxidants include vitamin E, ascorbyl palmitate; acidity regulators include citric acid and its sodium salt, tricalcium phosphate; as antioxidant the carrier emulsifiers include mono-, diglycerin fatty acid esters, diacetyl tartaric acid monoglycerides, and citrate fatty acid glycerides.

Appendix A

Testing method

A.1 General provisions this standard, unless otherwise specified, the purity of the reagents used should be analytical grade, the standard titration solution used, the standard solution for the determination of impurities, the preparation and products should be prepared according to GB/T 601, GB/T 602, GB/T 603, test water should be consistent with GB/T 6682 in the three water regulations set. The solution used in the test refers to the aqueous solution when it is not specified in the formulation of the solvent.

A.2 Identification test the sample is insoluble in water and is soluble in ethanol, ethyl acetate, trichloromethane and other chlorinated hydrocarbons.

A.3 Determination of total propylene glycol fatty acid esters and free propylene glycol A.3.1 Methodological Summary Propylene glycol fatty acid esters or free propylene glycol and silanization reagents to form volatile silanized derivatives, as determined by gas chromatography.

A.3.2 Reagents and materials A.3.2.1 Pyridine.

A.3.2.2 N, N-Bis-trimethylsilyl trifluoroacetamide (BSTFA).

A.3.2.3 Trimethylchlorosilane (TMCS).

A.3.2.4 Heptadecane (internal standard).

A.3.2.5 1,2-Propanediol Standard.

A.3.2.6 Propylene glycol monostearate standard.

Note: different products should be selected corresponding to single propylene glycol fatty acid ester standard test.

A.3.3 Instruments and equipment A.3.3.1 Gas chromatograph with hydrogen flame ionization detector.

A.3.3.2 Balance. 0.01mg.

A.3.4 Reference chromatographic conditions A.3.4.1 Column. 5% phenyl-95% methylpolysiloxane capillary column with a column length of 30 m, an inner diameter of 0.25 mm and a coating thickness of 0.25 μ m.

Or equivalent column.

A.3.4.2 Column temperature. The temperature was raised to 320 °C at a rate of 10 °C/min at a temperature of 50 °C for 1 min.

A.3.4.3 Inlet temperature. 320 °C.

A.3.4.4 Detector temperature. 350 °C.

A.3.4.5 Carrier gas. nitrogen.

A.3.4.6 Carrier gas flow rate. 1 mL/min.

A.3.4.7 Hydrogen. 60 mL/min.

A.3.4.8 Air. 500 mL/min.

A.3.4.9 Split ratio. 1.50.

A.3.4.10 Injection volume. 1 μ L.

A.3.5 Analysis steps A.3.5.1 Preparation of internal standard solutions Weigh 100mg heptadecane (internal standard), accurate to 0.0001g, placed in 100mL volumetric flask, dissolved with pyridine and volume.

A.3.5.2 Preparation of standard solutions Weigh the propylene glycol monostearate standard and propylene glycol standard 100mg, accurate to 0.0001g, placed in 25mL volumetric flask, With the internal standard solution dissolved and volume. Take 0.8 mL of the resulting solution in a 2.5 mL screw cap vial with 0.1 mL of TMCS and 0.3mLBSTFA after the strong shake, placed in 70 °C oven reaction 20min, the standard solution.

A.3.5.3 Preparation of sample solution Weigh 100mg sample, accurate to 0.0001g, placed in 25mL volumetric flask, the internal standard solution to the volume. Take 0.8mL the solution was placed in a 2.5 mL screw cap vial with 0.1 mL of TMCS and 0.3 mL of BSTFA and shaken vigorously and placed at 70 °C for 20 min to give a sample solution.

A.3.5.4 Determination Under standard chromatographic conditions, the standard solution and sample solution were injected for determination. Propylene glycol monostearate and 1,2-propylene glycol standard color the spectrum is shown in Figure B.1.

A.3.6 Calculation of results A.3.6.1 Calculation of Reaction Factor R the reaction factor R is calculated according to formula (A.1) $R = \frac{A_S}{A_d} \times \frac{m_d}{m_S}$ (A.1) where.

AS --- standard material peak area;

Ad - internal standard area;

md - the mass of the internal standard in the standard solution, in milligrams (mg);

mS --- the mass of the standard substance in the standard solution in milligrams (mg).

A.3.6.2 Calculation of the mass fraction of the component to be measured the mass fraction w_i of the total propylene glycol fatty acid ester or free propylene glycol is calculated according to formula (A.2) $w_i = A_i \times m_d / A_d \times m \times R \times 100\%$ (A.2) where.

A_i - the peak area of the component to be tested in the sample solution;

md - the mass of the internal standard in the sample solution, in milligrams (mg);

Ad - the peak area of the internal standard in the sample solution;

m --- the quality of the sample in milligrams (mg);

R --- reaction factor.

The results of the test are based on the arithmetic mean of the parallel measurement results. The absolute difference between the two independent determinations obtained under repeatability conditions the value is not greater than 5% of the arithmetic mean.

A.4 Determination of acid value A.4.1 Reagents and materials A.4.1.1 95% ethanol.

A.4.1.2 sodium hydroxide standard solution. $c(\text{NaOH}) = 0.1\text{mol/L}$.

A.4.1.3 phenolphthalein indicator solution. 10g/L.

A.4.1.4 Neutral hot ethanol. Phenolphthalein indicator solution was added to 95% ethanol after heating (temperature above 70 ° C), treated with sodium hydroxide standard solution Neutral to reddish and keep for 30s without fading.

A.4.2 Analysis steps Weigh the sample 5g, accurate to 0.001g, placed in a 500mL Erlenmeyer flask, add 75mL ~ 100mL neutral hot ethanol, stirring and continue to heat, so that the sample completely dissolved. Add 0.5mL phenolphthalein indicator solution, while shaking, immediately with sodium hydroxide standard solution titration, drop Set to the solution was reddish and maintain 30s does not fade is the end of titration.

A.4.3 Calculation of results the mass fraction w_1 in terms of acid value (in terms of KOH) is calculated as in formula (A.3) in milligrams per gram (mg/g) $w_1 = V \times c \times M$ (A.3) where.

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

c - sodium hydroxide standard solution reagent concentration in moles per liter (mol/L);

M - the molar mass of potassium hydroxide in milligrams per millimole (mg/mmol) [M (KOH) = 56.1];