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

GB 25546-2010

**National food safety standards of food additives fumarate
(English Translation)**

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Foreword

Appendix A, Appendix B and Appendix C of this standard are normative appendices.

National standards for food safety Food additives fumaric acid

1 Scope

This standard is suitable for the use of maleic acid as raw materials by isomerization, crystallization, drying and the preparation of food additives fumaric acid.

2 Normative reference documents

The documents cited in this standard are indispensable for the application of this standard. Any reference to the date of the document, only the date of the edition this applies to this standard. For undated references, the latest edition (including all amendments) applies to this standard.

3.1 Chemical name

Fumaric acid

3.2 Molecular formula

C₄H₄O₄

3.4 Relative molecular mass

116.07 (according to 2007 international relative atomic mass)

4 Technical requirements

4.1

sensory requirements. should be consistent with the provisions of Table 1.

Table 1 sensory requirements

The project requires a test method Color white Smell sour Organizational state Crystalline powder or crystalline particles Take appropriate laboratory samples, placed in clean, dry white porcelain Intraday, in the natural light, visual observation, smell the smell

4.2

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

Table 2 Physical and chemical indicators

Item Index Test Method Fumaric acid (based on $C_4H_4O_4$, dry basis), w /% 99.5 to 100.5
 Appendix A, A.4 Arsenic (As)/(mg/kg) ≤ 2 Appendix A A.5 Lead (Pb)/(mg/kg) ≤ 2
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 Appendix A, A.8 Moisture, w /% ≤ 0.5 Appendix A A.9 Appendix A (Normative appendix)
 Testing method A.1 Warning Some of the test procedures specified in the test method may result in a hazardous situation. Operators should take appropriate safety and protective measures.

A.2 General provisions Unless otherwise stated, only the reagents identified as analytical reagents and the tertiary water specified in GB/T 6682-2008 are used in the analysis.

Standard titration solution used in the test method, standard solution for the determination of impurities, preparations and articles, in the absence of other requirements, GB/T 601, GB/T 602 and GB/T 603.

A.3 Identification test Weigh about 1mg of laboratory samples and 100mg potassium bromide, research into uniform powder, into the former, after pressing into the film with infrared the spectra of the fumaric acid are shown in Figure B.1. The spectra of the fumaric acid are shown in Figure B.1.

A.4 Determination of fumaric acid A.4.1 Methodological Summary the aqueous solution of the sample was titrated with the standard solution of sodium hydroxide with phenolphthalein as the indicator, and the amount of the solution was titrated according to the standard of sodium hydroxide.

The total acid content of $C_4H_4O_4$ dry basis is fumaric acid content.

A.4.2 Reagents and materials A.4.2.1 Sodium hydroxide standard titration solution. c (NaOH) = 0.5 mol/L.

A.4.2.2 phenolphthalein indicator solution. 10g/L.

A.4.3 Analysis steps A.4.3.1 Weigh 1.0g of laboratory samples, accurate to 0.0002g, into the 250mL Erlenmeyer flask, add 100mL of water, dissolved by heating, After cooling, add 3 drops of phenolphthalein indicator solution, titration with sodium hydroxide standard solution to the reddish, keep 30s do not fade for the end.

A.4.3.2 At the same time as the determination, the same amount of reagent solution was used as a blank test in the same procedure as for the measurement.

A.4.4 Calculation of results the mass fraction w_1 of fumaric acid (based on $C_4H_4O_4$, dry basis) is expressed in%, calculated according to formula (A.1) $w_1 = [(V-V_0)/1000] cM (1-w_3) m \times 100\%$ (A.1) where.

V --- sample consumption of sodium hydroxide standard titration solution (A.4.2.1) volume of the value in milliliters (mL);

V_0 --- blank test consumption of sodium hydroxide standard titration solution (A.4.2.1) volume of the value in milliliters (mL);

c - the exact value of sodium hydroxide standard titration solution concentration in moles per liter (mol/L);

m - the mass of the sample, in grams (g);

w_3 --- A.9 measured moisture,%;

M - fumaric acid ($1/2C_4H_4O_4$) in grams per mole (g/mol) ($M = 58.04$).

The arithmetic mean of the results of two parallel measurements is the result of the report. The absolute difference between the two parallel determinations is not more than 0.2%.

A.5 Determination of arsenic A.5.1 Weigh 1.0g of laboratory samples, accurate to 0.01g, sample treatment by GB/T 5009.76 wet digestion. Use absorption Liquid B, the limited test.

A.5.2 Preparation of limited standard solution. Remove (2 ± 0.02) mL of arsenic (As) standard solution (equivalent to 2.0 μg As) with pipettes, at the same time the same treatment.

A.5.3 Other according to GB/T 5009.76 in the diethylamino dithiocarbamate colorimetric method.

A.6 Determination of lead A.6.1 Colorimetric method (arbitration law) According to GB/T 5009.75. The sample treatment was carried out by dry digestion. Before use, 1mg/mL lead (Pb) standard solution dilute Release 5 μg /mL lead (Pb) standard solution. (25 ± 0.02) mL sample solution (equivalent to 2.5 g of laboratory sample) at the time of measurement ($1 \pm$

0.02) mL lead (Pb) standard solution (equivalent to 5µgPb), placed in 125mL separatory funnel, lead standard solution plus 1% Nitric acid solution to 25 mL.

A.6.2 Atomic Absorption Spectrometry Specimen treatment according to GB/T 5009.75 dry digestion. Others are carried out according to GB 5009.12.

A.7 Determination of burning residue Weigh about 2g of laboratory samples, accurate to 0.0001g, burning temperature (800 ± 25) °C. Other according to GB/T 9741.

The arithmetic mean of the results of two parallel measurements is the result of the report. The absolute difference between the two parallel determinations is not more than 0.01%.

A.8 Determination of maleic acid A.8.1 Methodological Summary the components of the sample solution were separated by high performance liquid chromatography under the selected working conditions, and the samples were separated by UV absorption Detection, with external standard method to calculate the sample of maleic acid content.

A.8.2 Reagents and materials A.8.2.1 Maleic acid. mass fraction ≥99.0%.

A.8.2.2 Sodium hydroxide solution. 20 g/L.

A.8.2.3 Phosphoric acid solution. Take phosphoric acid (excellent grade reagent) (1 ± 0.02) mL In 1000mL volumetric flask, add 100mL methanol (HPLC grade reagent) (according to the column to adjust the amount of added), diluted with water to the mark, and then filtered through the 0.45µm filter.

A.8.3 Instruments and equipment A.8.3.1 High Performance Liquid Chromatography System (HPLC) A.8.3.1.1 High pressure pump. no pulse, can keep the flow rate from 0.1mL/min ~ 10.0mL/min.

A.8.3.1.2 Dosing ring. 5 µL.

A.8.3.1.3 UV detector. variable wavelength.

A.8.3.1.4 Data processing systems. Chromatographic workstations or data processors.

A.8.3.2 Filtration system the filter system uses a cellulose ester membrane filter with a pore size of 0.45 µm (for pretreatment of the mobile phase).

A.8.3.3 Filtration systems the filtration system uses a cellulose ester membrane filter with a pore size of 0.45 m (for pretreatment of the sample).

A.8.3.4 injector

Autosampler or microinjector, 50 [µ] L or 100 [µ] L.

A.8.4 Chromatographic analysis conditions Recommended column and typical operating conditions are shown in Table A.1. Maleic Acid Determination Typical High Performance Liquid Chromatogram See Appendix C, the relative retention times for each component are given in Table C.1 in Appendix C. Other columns that can achieve the same degree of