



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

GB 5009.43-2016

**National Food Safety Standard -- Determination of sodium
glutamate in monosodium glutamate**

**食品安全国家标准 味精中麸氨酸钠（谷氨酸钠）的测定
(English Translation)**

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1 Scope

This Standard specifies the determination method for sodium glutamate in monosodium glutamate.

This Standard is applicable to the determination of sodium glutamate in monosodium glutamate.

First method - Titration method of perchloric acid non- aqueous solution

2 Principle

In the presence of acetic acid, use perchloric acid standard solution to titrate the sodium glutamate in sample; treat the sudden jump of electric potential as the basis to determine

the titration's endpoint OR treat alpha-Naphthol phenylmethanol as the indicator to titrate the sample solution until it turns to green - that is the endpoint.

3 Reagents and Materials

Unless otherwise stated, the used reagents in this method shall all be analytical purity; the water shall be the Grade-2 water which is specified in GB/T 6682.

3.1 Reagents

3.1.1

Formic acid (CH_2O_2).

3.1.2

Acetic acid ($\text{C}_2\text{H}_4\text{O}_2$).

3.1.3

alpha-Naphthol phenylmethanol ($\text{C}_{27}\text{H}_{18}\text{O}_2$).

3.2 Preparation for reagent

alpha-naphthol phenylmethanol-acetic acid indicator solution (2g/L). weigh and take 0.1g of alpha-naphthol phenylmethanol; use acetic acid (3.1.2) to dissolve it; dilute it to 50mL.

3.3 Standard products

Perchloric acid (HClO_4).

3.4 Preparation for standard solution

Perchloric acid standard titration solution [$c(\text{HClO}_4) = 0.1\text{mol/L}$]. according to GB/T 601, prepare and calibrate it.

4 Instruments and Apparatus

4.1

Automatic potentiometric titrator (the accuracy shall be $\pm 0.2\text{mV}$) - with dynamic titration mode or equal titration mode. Minimum volume of liquid added shall be 0.01mL.

The burette has anti-proliferation head.

4.2 Non-aqueous pH electrode regards Ag/AgCl as internal reference electrode; the

internal reference electrolyte shall be 2mol/L lithium chloride ethanol solution OR

0.4mol/L tetraethylammonium bromide ethylene glycol solution.

4.3 Magnetic stirrer.

4.4 Analytical balance. the sensitivity is 0.1mg.

4.5 Ultrasonic cleaner.

5.1 Preparation for samples

Weigh and take 0.15g (accurate to 0.0001g) of the sample which has been ground into fine particles; place it into a 100mL beaker; add 3mL of formic acid (3.1.1); sonicate it until it is completely dissolved; then, add 40 mL of acetic acid (3.1.2); shake it evenly.

5.2.1 Determination by potentiometric titration method

5.2.1.1

Reference conditions for the determination of sample.

- a) The determination of sample adopts dynamic titration mode OR equal titration mode;
- b) Blank determination of reagents. adopt equivalent titration mode. Minimum are obtained under repeatability conditions shall not exceed 0.5g/100g.

Second Method - Optical Rotation Method

8 Principle

Molecular structure of sodium glutamate contains an asymmetric carbon atom, which has optical activity and can rotate the polarized surface to certain angle. Therefore, polarimeter can be used to determine the optical rotation. The content of sodium glutamate can be converted according to the optical rotation.

9 Reagents

Unless otherwise stated, the used reagents in this method shall all be analytical purity; the water shall be the Grade-2 water which is specified in GB/T 6682.

Hydrochloric acid (HCl).

10 Instruments and Apparatus

10.1

Polarimeter (the accuracy shall be $\pm 0.010^\circ$) shall be equipped with sodium lamp (sodium spectrum's D-line shall be 589.3 nm).

10.2

Analytical balance. the sensitivity is 0.1mg.

11.1 Preparation for samples

Weigh and take 10g of the sample (accurate to 0.0001g); add small amount of water to dissolve it; transfer it to a 100mL volumetric flask; add 20mL of hydrochloric acid;

mix it AND cool it to 20 °C; set it to constant volume; shake it evenly.

11.2 Determination of sample solution

At 20°C, use the standard optical rotation angle to calibrate the instrument; place the test solution of 11.1 in the optical rotation tube (There shall be no air bubbles); observe its optical rotation; at the same time, record the temperature of the sample solution in optical rotation tube.

17.2 Determination of sample solution

Turn on the magnetic stirrer; use sodium-hydroxide standard solution to titrate until that the acidometer indicates "pH 8.2"; record the milliliters of the consumed sodium- hydroxide standard titration solution; calculate the content of the total acid.

Add 10.0 mL of formaldehyde solution; mix it evenly; use sodium-hydroxide standard solution to titrate until that the acidometer indicates "pH 9.6"; record the milliliters of the consumed sodium-hydroxide standard titration solution.

Meanwhile, take 60mL of water; firstly, use sodium-hydroxide standard solution to adjust it to "pH 8.2"; then, add 10.0mL of formaldehyde solution; use sodium hydroxide standard solution to titrate it until pH 9.6; make reagent's blank test.

18 Expression of Analysis Results

In sample, the content of sodium glutamate (it contains 1 molecule of crystal water) shall be calculated according to formula (4).

X3 - In sample, the content of sodium glutamate (it contains 1 molecule of crystal water). The unit is grams per hundred grams (g/100g);

V1 - For the used sample in measurement, after adding the formaldehyde, the consumed volume of sodium-hydroxide standard solution. The unit is milliliter (mL);

V2 - For reagent blank, after adding the formaldehyde, the consumed volume of sodium-hydroxide standard solution. The unit is milliliter (mL);

c - Concentration of sodium-hydroxide standard titration solution. The unit is mole per liter (mol/L);