



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

GB 5009.229-2025

**National food safety standard - Determination of acid value in
foods**

食品安全国家标准 食品中酸价的测定

Issued on: March 16, 2025

Implemented on: September 16, 2025

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This Standard replaces GB 5009.229-2016 "National food safety standard - Determination of acid value in food". Compared with GB 5009.229-2016, the main changes of this Standard are as follows: - MODIFY the scope of application of the standard; - MODIFY the sample weight; - ADD the forth method -- Spectrophotometry; - DELETE the original Annex B, Annex C, and Annex D. National food safety standard - Determination of acid value in food

1 Scope

GB 5009.229-2025 is the Chinese national food safety standard for determining acid value in food. The acid value measures the free fatty acids in the fat of a food, and it is the single most useful indicator of whether that fat has begun to break down: it rises with hydrolytic rancidity in storage and in frying oil that has been used too long, and it is the parameter on which edible oils, fried snacks and nuts are judged both at production and in market surveillance. The standard gives the determination by cold solvent indicator titration, by hot ethanol indicator titration and by potentiometric titration, each with its principle, reagents and materials, instruments and equipment, analytical steps, expression of results and precision. It takes effect on 16 September 2025.

This Standard specifies the determination methods for acid value in food. The first, second and third methods are applicable to the determination of acid value in food [except non-dairy cream, powdered oils and fats, margarine, compound seasonings (mayonnaise, salad dressing, oil-based chili sauce, nut and seed sauce, hot pot base and other semi-solid seasonings)]. The fourth method is applicable to the determination of acid value in non-dairy cream, powdered oils and fats, margarine, compound seasonings (mayonnaise, salad dressing, oil-based chili sauce, nut and seed sauce, hot pot base and other semi-solid seasonings). First method -- Cold solvent indicator titration method

2 Principle

Based on the principle of acid-base neutralization reaction, potassium hydroxide or sodium hydroxide standard titration solution is used to neutralize the free fatty acids in the sample solution, and the titration end point is determined by the acid-base indicator. The acid value of the sample is calculated based on the consumption of the standard titration solution.

3 Reagents and materials

Unless otherwise specified, the reagents used in this method are analytically pure, and the

water is grade 3 water specified in GB/T 6682.

3.1 Reagents

- 3.1.1 Isopropyl alcohol (C_3H_8O).
- 3.1.2 Anhydrous ether ($C_4H_{10}O$). 3.1.3 95 % ethanol (C_2H_5OH).
- 3.1.4 Phenolphthalein ($C_{20}H_{14}O_4$, CAS No.. 77-09-8).
- 3.1.5 Thymophthalein ($C_{28}H_{30}O_4$, CAS No.. 125-20-2).
- 3.1.6 Alkali blue 6B ($C_{37}H_{29}N_3O_3S$, CAS No.. 1324-76-1).
- 3.1.7 Liquid nitrogen (N_2). purity > 99.99 %.
- 3.1.8 Petroleum ether. the boiling range is 30 °C ~ 60 °C.
- 3.1.9 Anhydrous sodium sulfate (Na_2SO_4).
- 3.1.10 Potassium hydroxide (KOH).
- 3.1.11 Sodium hydroxide (NaOH).

3.2 Preparation of reagents

- 3.2.1 Cold solvent. mix anhydrous ether and isopropyl alcohol (or 95 % ethanol) in a volume ratio of 1.1.
- 3.2.2 Phenolphthalein indicator (10 g/L). weigh 1 g of phenolphthalein, dissolve in 95 % ethanol and dilute to 100 mL.
- 3.2.3 Thymophthalein indicator (20 g/L). weigh 2 g of thymophthalein, dissolve in 95 % ethanol and dilute to 100 mL.
- 3.2.4 Alkali blue 6B indicator (20 g/L). weigh 2 g of alkali blue 6B, dissolve in 95 % ethanol and dilute to 100 mL.

3.3.1 Potassium hydroxide standard titration solution (

0.5 mol/L and

0.1 mol/L). prepared and calibrated according to the requirements of GB/T 5009.1, or purchase a standard titration solution certified by the state and awarded a standard material certificate.

3.3.2 Potassium hydroxide standard titration solution (

0.05 mol/L). before use, obtained by diluting potassium hydroxide standard titration solution (

0.5 mol/L or

0.1 mol/L), or purchase a standard titration solution certified by the state and awarded a standard material certificate.

3.3.3 Standard sodium hydroxide titration solution (

0.5 mol/L and

0.1 mol/L). prepared and calibrated according to the requirements of GB/T 5009.1 or GB/T 601, or purchase a standard titration solution certified by the state and awarded with a standard material certificate.

3.3.4 Standard sodium hydroxide titration solution (

0.05 mol/L). before use, obtained by diluting sodium hydroxide standard titration solution (

0.5 mol/L or

0.1 mol/L), or purchase a standard titration solution certified by the state and awarded with a standard material certificate.

4.1 Burette. capacity of 10 mL, minimum graduation value of

0.05 mL.

4.4 Food grinder or pounder.

4.5 Laboratory oil press. screw press, non-heating type.

4.6 Porcelain mortar.

4.7 Constant temperature water bath.

4.8 Constant temperature blast drying oven.

4.9 Centrifuge. speed ≥ 8000 r/min.

4.10 Rotary evaporator or equivalent equipment.

4.11 Soxhlet extraction device.

5.1 Preparation of samples

5.1.1 Animal and vegetable oils and fats, edible hydrogenated oils, shortening, cocoa butter substitutes At room temperature, liquid samples are fully mixed and then directly sampled for testing. For solid (or semi-solid) samples, take a representative sample and place it in a warm water bath or a constant temperature blast drying oven to heat and melt, mix well and then take the oil and fat for testing. If the oil and fat sample is obviously turbid, emulsified, stratified or precipitated, it shall be treated with impurity removal and dehydration according