NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB 5009.6-2025

Replacing GB 5009.6-2016

National food safety standard - Determination of fat in foods

食品安全国家标准 食品中脂肪的测定

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Standardization Administration of the PRC

Table of Contents

1 Scope

GB 5009.6 is the Chinese national food safety method for the determination of fat in foods. Fat content is on the nutrition label of every packaged food sold in China, and a label that overstates or understates it is a compliance failure, so the method behind the number is what an enforcement laboratory uses. The document gives the established routes, Soxhlet extraction, acid hydrolysis, the Rose-Gottlieb method for dairy and the alkaline hydrolysis method, each suited to a different matrix, because the difficulty is not the measurement but freeing the fat from the food before measuring it. For each it covers the principle, the reagents, the apparatus, the preparation of the sample, the analytical procedure, the calculation, the precision and the applicable matrices. The 2025 edition, effective 2 March 2026, replaces GB 5009.6-2016. For a food manufacturer or a testing laboratory working in China, this is the prescribed method behind the nutrition declaration.

This Standard specifies the methods for determining the fat content in foods. Method 1, Soxhlet extraction, is applicable to the determination of free fat in foods. Method 2, acid hydrolysis, is applicable to the determination of fat in foods (excluding milk and dairy products). Method 3, alkaline hydrolysis, is applicable to the determination of fat in milk and dairy products, foods for special dietary purposes, and protein beverages. Method 4, Gerber method, is applicable to the determination of fat in raw milk, sterilized milk and pasteurized milk. Method 1 - Soxhlet Extraction

2 Principle

After the specimen is directly extracted with a solvent, for example, anhydrous diethyl ether or petroleum ether, evaporate to remove the solvent and dry it to obtain the content of free fat.

3 Reagents and Materials

Unless otherwise specified, all reagents used in this Method are analytically pure, and the water is Grade III water as specified in GB/T 6682.

3.1 Reagents

3.1.1 Anhydrous diethyl ether (C4H10O).

3.1.2 Petroleum ether (CnH2n+2). the boiling range of petroleum ether is 30 C ~ 60 C.

3.2 Materials

3.2.1 Quartz sand.

3.2.2 Degreased cotton.

4 Instruments and Equipment

4.1 Homogenizer.

4.2 Tissue pulverizer or grinding machine.

4.3 Soxhlet extractor.

4.4 Constant-temperature water bath.

4.5 Analytical balance. with a division value of

0.001 g and 0.0001 g.

4.6 Electric blast drying oven.

4.7 Desiccator. contains effective desiccant, for example, silica gel.

4.8 Filtration paper cylinder.

4.9 Evaporating dish.

5 Analytical Procedures

5.1 Specimen Preparation For particle-free and homogeneous liquid samples, shake well before use. For liquid samples with particles or non-homogeneous liquid samples, or semi-solid samples, use a homogenizer to homogenize them before use. For solid samples, use a tissue pulverizer or grinding machine to pulverize and homogenize before use. Frozen beverages can be appropriately heated to melt, and then, thoroughly stirred while hot before use. The prepared specimens shall be determined as soon as possible. NOTE. oil samples need to be dried at 105 C 2 C for 1 hour, then pulverized and passed through a

0.425 mm sieve mesh.

5.2.1 Solid specimens. weigh-take 2 g ~ 5 g of homogeneous specimen (accurate to

0.001

g) and transfer it entirely into a filtration paper cylinder.

5.2.2 Liquid or semi-solid specimens. weigh-take 5 g ~ 10 g of homogeneous specimen (accurate to

0.001 g), place it in an evaporating dish, add approximately 20 g of quartz sand, evaporate to dryness in a boiling water bath, and dry in an electric blast drying oven at 100 C 5 C for 30 min. Remove, finely grind, and transfer it entirely into a filtration paper cylinder. Wipe the evaporating dish and the glass rod with the specimen adhering to it clean with degreased cotton soaked in diethyl ether and place the cotton inside the filtration paper cylinder.

5.3 Extraction Place the filtration paper cylinder into the extraction cylinder of a Soxhlet extractor and connect it to a receiving flask that has been dried to a constant weight (accurate to 0.0001 g). Add anhydrous diethyl ether or petroleum ether through the top of the extractor condenser tube, until the flask is two-thirds full. Heat in a 50 C ~ 60 C water bath, continuously reflux and extract the anhydrous diethyl ether or petroleum ether (6 times/h ~ 8 times/h), generally for 6 ~ 10 hours. At the end of extraction, use a ground glass rod to collect one drop of the extracting solution; the absence of oil spots on the ground glass rod indicates that extraction is complete.

5.4 Weighing Remove the receiving flask, recover the anhydrous diethyl ether or petroleum ether, and when 1 mL ~ 2 mL of solvent remains in the receiving flask, evaporate to dryness in a 60 C water bath, then, dry at 100 C 5 C for 1 hour. Cool to room temperature in a desiccator and weigh it (accurate to 0.0001 g). Repeat the above operation, until a constant weight is achieved (until the difference between two weighings does not exceed 2 mg), and take the smallest weighing result.

6 Expression of Analytical Results

The fat content in the specimen is calculated in accordance with Formula (1). Where, X

---the fat content in the specimen, expressed in (g/100 g); m1

---the mass of the receiving flask and fat after reaching a constant weight, expressed in (g); m0

---the mass of the receiving flask, expressed in (g); m2

---the mass of the specimen, expressed in (g); 100

---the conversion factor. The calculation result is expressed to two decimal places. NOTE. the formula for calculating the fat content in oils shall comply with the formulas specified in the relevant standards.

7 Precision

The absolute difference between two independent determination results obtained under repeatability conditions must not exceed 10% of the arithmetic mean; for oil specimens, it shall not exceed 1%. Method 2 - Acid Hydrolysis