Edible Lard
Preface

This standard is a revision to GB/T 8937-1988 Edible Lard.

This standard differs from the GB/T 8937-1988 primarily in the following ways:

- a physical index, relative density, has been added;
- the physicochemical indexes, including saponification value, iodine value, malondialdehyde (MDA) content, lead, copper, arsenic and ether insoluble matter, have been added;
- the microbial indexes, including aerobic plate count, coliforms and pathogenic bacteria, have been added; and
- the indexes of food additives, including propyl gallate, butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), natural or synthetic tocopherol, citric acid and sodium citrate, have been added.

This standard was prepared with reference to Codex Stan 28-1981 Codex Standard for Rendered Lard of the Codex Alimentarius Commission (CAC).

Annex A of this standard is normative.

This standard was proposed by China General Chamber of Commerce.

This standard is under the jurisdiction of the Meat, Poultry and Egg Products Subcommittee of the National Technical Committee on Food Industry of Standardization Administration of China.

This standard was drafted by Food Science College of Southwest University, and Technology Authentication Center of Slaughtering Industry under Ministry of Commerce of the People’s Republic of China.

The drafters of this standard are Li Hongjun, He Zhifei, Ding Xiaowen, Shang Yongbiao, Wang Guiji, Zhang Xinling, and Liu Hucheng.
Edible Lard

1 Scope
This standard specifies the terms and definitions, quality requirements, physical and hygienic indexes, inspection methods as well as the labeling, storage and transportation requirements of edible lard.
This standard is applicable to edible lard that is rendered with high temperature or centrifugation method for market supply and food processing, rather than refined lard.

2 Normative references
The following normative documents contain provision which, through reference in this text, constitute provisions of this national standard. For dated reference, subsequent revisions of any of these publications (excluding any amendments) do not apply. However, parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. For undated references, the latest edition of the referenced document applies.

GB/T 4789. 2 Microbiological Examination of Food Hygiene - Detection of Coliform Bacteria
GB/T 4789. 3 Microbiological Examination of Food Hygiene - Enumeration of Coliforms
GB/T 4789. 4 Microbiological Examination of Food Hygiene –Examination of Salmonella
GB/T 4789. 5 Microbiological Examination of Food Hygiene - Examination of Shigella
GB/T 4789. 10 Microbiological Examination of Food Hygiene - Examination of Staphylococcus aureus
GB/T 4789. 11 Microbiological Examination of Food Hygiene - Examination of Streptococcus Hemolyticus
GB/T 5009.3 Determination of Moisture in Foods
GB/T 5009.11 Determination of Total Arsenic and Abio-arsenic in Foods
GB/T 5009.12 Determination of Lead in Foods
GB/T 5009.13 Determination of Copper in Foods
GB/T 5009.30 Determination of Butylated Hydroxyanisole (BHA) and Butylated Hydroxytoluene (BHT) in Foods
GB/T 5009.32 Determination of Propyl Gallate (PG) in Oils and Fats
GB/T 5009.37 Method for Analysis of Hygienic Standard of Edible Oils
GB/T 5530 Animal and Vegetable Fats and Oils - Determination of Acid Value and Acidity
GB/T 5534 Animal and Vegetable Fats and Oils - Determination of Saponification Value
GB 7718 General Standard for the Labeling of Prepackaged Foods
GB/T 8935 Lard for Industrial Use
GB/T 12766 Animal Fats and Oils - Determination of Melting Point
ISO 3961:1996 Animal and Vegetable Fats and Oils - Determination of Iodine Value
CAC/RM 9-1969 Determination of Relative Density at 20 Degrees C (method from British Standards Institution

3 Terms and definitions
For the purposes of this national standard, the terms and definitions given in GB/T 8935 and the following apply.

3.1 Edible lard
Edible lard is the fat rendered from fresh, clean and sound fatty tissues from swine in good health at the time of slaughter. The tissues shall not include bones, detached skin, head skin, ears, tails, organs, thyroid, adrenals, lymph nodes, windpipes, large blood vessels, settlings, pressings, and the like, and shall be reasonably free from muscle tissues and blood vessels.
4 Requirements

4.1 Sensory characteristics
The sensory characteristics of edible lard are given in Table 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>Property and color</th>
<th>Odor and taste</th>
<th>Grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solidified</td>
<td>Solidified</td>
<td>Level 1: White, glossy, smooth and creamy</td>
</tr>
<tr>
<td></td>
<td>Melted</td>
<td></td>
<td>Level 2: White or pale yellow, slightly glossy, smooth, creamy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solidified: Pale yellow, clear and colorless, no settlings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Melted: Pale yellow, clear and colorless</td>
</tr>
<tr>
<td>Odor and taste</td>
<td></td>
<td></td>
<td>Characteristic and free from foreign odors and flavors.</td>
</tr>
</tbody>
</table>

4.2 Physical and hygienic indexes

4.2.1 Physical indexes
The physical indexes of edible lard are given in Table 2.

<table>
<thead>
<tr>
<th>Item</th>
<th>Indexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refractive index (40°C)/%</td>
<td>1.448–1.460</td>
</tr>
<tr>
<td>Relative density (20°C)</td>
<td>0.896–0.904</td>
</tr>
<tr>
<td>Melting point /°C</td>
<td>32–45</td>
</tr>
</tbody>
</table>

Note: the refractive index and relative density are based on these specified in Codex Stan 28-198.

4.2.2 Hygienic indexes

4.2.2.1 Physicochemical indexes
The physicochemical indexes of edible lard are given in Table 3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture / (%)</td>
<td>≤ 0.20 ≤ 0.25</td>
</tr>
<tr>
<td>Acid value (KOH) / (mg/g)</td>
<td>≤ 1.0 ≤ 1.3</td>
</tr>
<tr>
<td>Peroxide value / (%)</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>Saponification value (KOH) / (mg/g)</td>
<td>190–202</td>
</tr>
<tr>
<td>Iodine value/ (%)</td>
<td>≥ 45–70</td>
</tr>
<tr>
<td>Malondialdehyde / (mg)</td>
<td>≤ 0.25</td>
</tr>
<tr>
<td>Lead (expressed as Pb) Amg / kg</td>
<td>≤ 1.0</td>
</tr>
<tr>
<td>Copper (expressed as Cu) / (mg)</td>
<td>≤ 0.4</td>
</tr>
</tbody>
</table>
### 4.2.2.3 Food additive indexes

The maximum use level of food additives in edible lard is given in Table 5:

<table>
<thead>
<tr>
<th>Name</th>
<th>Max. Use Level (mg/kg)</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propyl gallate (PG)</td>
<td>100</td>
<td>Singly or in combination</td>
</tr>
<tr>
<td>Butylated hydroxytoluene (BHT)</td>
<td>200</td>
<td>Singly or in combination</td>
</tr>
<tr>
<td>Butylated hydroxyanisole (BHA)</td>
<td>200</td>
<td>Singly or in combination</td>
</tr>
<tr>
<td>PG and BHA / BHT, or combination of PG, BHA and BHT</td>
<td>200</td>
<td>For PG, not exceed 100 mg/kg</td>
</tr>
<tr>
<td>Natural or synthetic tocopherol</td>
<td>Limited by good manufacturing practice</td>
<td>Singly or in combination</td>
</tr>
<tr>
<td>Citric acid</td>
<td>Limited by good manufacturing practice</td>
<td>Singly or in combination</td>
</tr>
<tr>
<td>Sodium citrate</td>
<td>Limited by good manufacturing practice</td>
<td>Singly or in combination</td>
</tr>
</tbody>
</table>

### 5 Test method

#### 5.1 Sampling

Random sampling analysis shall be conducted on each batch at a sampling rate of 10% of the total products. The sampling ratio may vary with the size of the batch. For a large one, the sampling proportion shall be not less than 5%.

#### 5.2 Inspection

##### 5.2.1 Analysis of sensory characteristics
5.2.1 Property and color
Add the melted edible lard in a clean test tube of colorless and transparent glass with a diameter of 1.5 cm to 2 cm, and observe its transparency and color. Stand at melted state for an appropriate period and visually check if there are any settlings. Keep it at an ambient temperature till solidifying and visually check its property and color.

5.2.1.2 Odor and taste
Use a clean glass rod to pick up a small piece of sample and put it in a 50 mL breaker. Heat the breaker to 50°C on a water bath and quickly stir it. Smell and dip a few of sample to taste.

5.2.2 Indexes of physical property

5.2.2.1 Determination of relative density
The result is expressed as the relative density of the lard and water at 20°C.

5.2.2.2 Determination of refractive index
According to GB/T 893.

5.2.2.3 Determination of melting point
According to GB/T 12766.

5.2.3 Physicochemical indexes

5.2.3.1 Determination of moisture
According to GB/T 5009. 3.

5.2.3.2 Determination of malondialdehyde
According to Annex A.

5.2.3.3 Determination of ether insoluble matter
According to GB/T 8935.

5.2.3.4 Determination of acid value
According to GB/T553.

5.2.3.5 Determination of peroxide value
According to GB/T 5009.37.

5.2.3.6 Determination of saponification value
According to GB/T 5534.

5.2.3.7 Determination of iodine value
According to ISO 3961.

5.2.3.8 Determination of lead content
According to GB/T 5009. 12.
5.2.3.9 Determination of copper content
According to GB/T 5009.13.

5.2.3.10 Determination of arsenic content
According to GB/T 5009.11.

5.2.4 Determination of
According to GB/T 5009.32.

5.2.5 Microbial indexes

5.2.5.1 Aerobic plate count
According to GB/T 4789.2.

5.2.5.2 Coliforms
According to GB/T 4789.3.

5.2.5.3 Pathogenic bacteria
According to GB/T 4789.4, GB/T 4789.5, GB/T 4789.10 and GB/T 4789.1.

6 Labeling
In addition to GB 7718, the following provisions shall be followed.

6.1 Name of the food
The product shall be labeled with characters of ‘edible lard’, and any products labeled shall comply with this standard.

6.2 List of ingredients
A complete list of ingredients shall be declared on the label in descending order of proportion. A specific name shall be used for the ingredient in the list.

6.3 Net content
The net content should be clearly indicated with the use of the International System of Units in accordance with the requirements of the consumer or purchaser of the product.

6.4 Marking
The following items shall be marked on the product, including name of the product, grade, net content, name of the manufacturer, retailers, date of product, storage conditions, shelf life, use-by date, country of origin, and the characters of ‘inspected and accepted’.

7 Storage and transport

7.1 Storage
The lard shall be packed into a clean and tightly closed metal bucket or container, and stored at a well-ventilated warehouse at a temperature not greater than 20 °C for a period not longer than 6 months.
7.2 Transport
The product shall be kept in a well-ventilated place away from direct sunlight or rain and in particular from mixed storage with toxic substance. If a particular specification is required, the terms of the contract shall be followed.
Annex A

Determination of malondialdehyde in edible lard

A.1 Principle
Exposure to oxygen in light, heat and air will cause oxidative rancidity of lard and then decompose aldehydes, acids and other compounds. Malondialdehyde, one of the decomposition products, will react with thiobarbituric acid to produce a pink-colored substance, with its absorbance peak at 538 nm. From this, the malondialdehyde content can be measured so that the degree of lard rancidity can be derived.

A.2 Reagents

A.2.1 Aqueous solution of tertiary butanol (TBA): weight 0.288 g TBA accurately and dissolve it in 100 mL (equivalent to 0. 02 mol/L) of water. If TBA is insoluble, heat it to dissolve completely in 100 mL of water after it becomes clear.

A.2.2 Trichloroacetic acid (TCA) mixture: weight 7.5 g trichloroacetic acid (analytical reagent) and 0.1 g ethylene diamine tetraacetic acid (EDTA, analytical reagent) accurately, and dissolve them in 100 mL of water.

A.2.3 Standard stock solution of malondialdehyde: weight 0.315 g of 1, 1, 3, 3-tetrathoxypropane (E. Mesck 97%) accurately, dissolve it in 1000 mL water (containing 100 µg of malondialdehyde per milliliter) and store in a refrigerator.

A.2.4 Standard working solution of malondialdehyde: transfer 10 mL of the stock solution to dissolve in 100 mL water (containing 10 µg of malondialdehyde per milliliter) and store it in the refrigerator.

A.2.5 Trichloromethane (analytical reagent)

A.3 Apparatus
Thermostat water bath, 2000 r/min centrifuge, 72 series spectrophotometer, 100 mL conical flask with cover, 25 mL Nessler tube, test tube, and qualitative filter paper.

A.4 Procedure
Sample treatment: accurately weight 10 g lard after it was melted evenly on a water bath at 70°C and place it in a 100 mL conical flask with cover. Add 50 mL TCA in the flask to shake 30 min (keep the lard in melting state, otherwise heat it on the water bath at 70°C and continue shaking). Remove grease and filtrate with a double filter paper and repeat the process as described above one more time.
Transfer 5 mL of the above filtrate to the 25 mL Nessler tube, add 5 mL TBA in the tube and plug it. Place the tube in a 90 °C water bath for 40 min. Take it out and cool for 1 h. Transfer the mixture into a small test tube and centrifuge for 5 min. Pour the supernatant into the 25 mL Nessler tube and add 5 mL trichloromethane to shake uniformly. After settling and separating, draw the supernatant to conduct colorimetric analysis at a wavelength of 538 nm (a blank test is done at the same time).

A.5 Calculation
Standard curve preparation: separately perform the above procedure with the use of malonic acid at a standard concentration of 1 µg, 2 µg, 3 µg, 4 µg and 5 µg, and then create a standard curve on the basis of the absorbance readings.
Given the absorbance of the sample is measured, the concentration A can be obtained on the basis of its standard curve, and the malondialdehyde content can be calculated according to the following formula (A.1):

\[ B = \frac{A}{10} \]  

(A.1)

where

A = concentration of lard;
B = malondialdehyde content in mg.

Bibliography