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Edible Lard

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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.

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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 o*f Iodine Value

CAC/RM 9-1969 *Determination of Relative Density at 20 Degrees C* (method from British Standards Institution

Codex Stan 28-1981 *Codex Standard for Rendered Lard*

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 1 Sensory characteristics of edible lard

Item		Grading criteria	
		Level 1	Level 2
Property and color	Solidified	White, glossy, smooth and creamy	White or pale yellow, slightly glossy, smooth, creamy
	Melted	Pale yellow, clear and colorless, no settlings	Pale yellow, clear and colorless
Odor and taste	Solidified	Characteristic and free from foreign odors and flavors.	

4.2 Physical and hygienic indexes

4.2. 1 Physical indexes

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

Table 2 Physical indexes of edible lard

Item	Indexes
Refractive index (40°C)/%	1.448~1.460
Relative density (20°C)	0,896~0.904
Melting point /°C	32~45
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 3 Physicochemical indexes of the edible lard

Item	Grading	
	Level 1	Level 2
Moisture / (%)	≤ 0.20	≤ 0.25
Acid value (KOH) / (mg/g)	≤ 1.0	≤ 1.3
Peroxide value / (%)	<0.10	
Saponification value (KOH) / (mg/g)	190~202	
Iodine value/ (%)	45~70	
Malondialdehyde / (mg)	≤ 0.25	
Lead (expressed as Pb) Amg / kg)	≤ 1.0	
Copper (expressed as Cu) / (mg /	≤ 0.4	

kg)	
Arsenic (expressed as As) / (mg / kg)	≤ 0.1
Ether insoluble matter / (%)	≤ 0.5
Note: the iodine and arsenic values are based on these specified in Codex Stan 28-198.	

4.2.2.2 Microbial indexes

The microbial indexes of edible lard are given in Table 4.

Table 4 Microbial indexes of edible lard

Item	Index
Aerobic plate counts / (CFU / g)	≤ 50 000
Coliforms / (MPN / 100g)	≤ 70
Pathogenic bacteria[a]	Not detected
a includes salmonella, shigella, staphylococcus aureu and streptococcus hemolyticus.	

4.2.2. 3 Food additive indexes

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

Table 5 Maximum use level of food additives in edible lard

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

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

5.2.1.1 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

According to CAC/RM 9-1969.

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

(Normative)

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):

$$B=A/10 \quad (A.1)$$

where

A = concentration of lard;

B = malondialdehyde content in mg.

Bibliography

[1] ISO/DIS 3100/1:1984 *Meat and meat products – Sampling – Part 1*

[2] Codex Stan 29-1981 *Codex Standard for Rendered Lard*