



**THAI AGRICULTURAL STANDARD**

**TAS 6006-2008**

# **RAW GOAT MILK**

**National Bureau of Agricultural Commodity and Food Standards  
Ministry of Agriculture and Cooperatives**

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**Ministry of Agriculture and Cooperatives**

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Raw goat milk is a livestock agricultural commodity which has a good tendency for greater production and higher domestic consumption due to its significant characteristic having small milk fat globules easy for digestion and favourable for using in cosmetic products. At present there is no standard clearly stated on the requirements covering both quality and safety of the raw goat milk for trading reference. Therefore, the Ministry of Agricultural and Cooperatives deemed it necessary to establish the raw goat milk standard for the farmers, entrepreneurs and related agency as a guideline for the production and trade reference and to assure its good quality raw material for further processing.

The establishment of this standard is based mainly on the following documents:

Project report: Study of raising dairy goat and composition of raw goat milk in Thailand National Bureau of Agricultural Commodity and Food Standards with a cooperation of the Center for Research and Development of Animal Products, Suwanvajokkasikit Animal Research and Development Institute (SARDI), Kasetsart University, Kampangsaen Campus.

***Remark:***

The standard title has been revised from “Thai Agricultural Commodity and Food Standard (TACFS)” to “Thai Agricultural Standard (TAS)” in accordance with the enforcement of the Agricultural Standards Act B.E. 2551 (2008).



**NOTIFICATION OF THE NATIONAL COMMITTEE ON  
AGRICULTURAL COMMODITY AND FOOD STANDARDS  
SUBJECT: THAI AGRICULTURAL STANDARD:  
RAW GOAT MILK  
B.E.2551 (2008)**

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The resolution of the 1/2551 session of the National Committee on Agricultural Commodity and Food Standards dated 11 August B.E 2551 (2008) endorsed the Thai Agricultural Commodity and Food Standards entitled Raw Goat Milk. This standard would be of benefits for quality improvement, facilitating trade and protecting consumers.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 5 August B.E 2551 (2008), the Notification on Thai Agricultural Commodity and Food Standard entitled Raw Goat Milk is hereby issued as voluntary standard, the details of which are attached herewith.

Notified on 14 August B.E. 2551 (2008)

Mr.Somsak Prissana-nunthakul

Minister of Agriculture and Cooperatives

Chairman of the National Committee on Agricultural Commodity and Food Standards

# THAI AGRICULTURAL STANDARD

## RAW GOAT MILK

### 1 SCOPE

This Agricultural Standard established the required quality of raw goat milk intended for food processing.

### 2 DEFINITIONS

Definition in this Thai Agricultural Standard is as follows;

Raw goat milk means raw milk obtained from a mother goat (*Capra* spp.) not less than 3 days after giving birth. Milk must be neither decomposed nor added other substances. It must not be treated except cooling. It must exclude any colostrum.

### 3 QAULITY

#### 3.1 General Requirements

Quality of raw goat milk must be as fit for consumption as follows:

- 3.1.1 Normal, clean, and white or cream color.
- 3.1.2 Natural flavor without any foreign matter and adulteration.
- 3.1.3 When examined by alcohol test to observe reaction of raw goat milk with ethyl alcohol, the sediment must be only in a fine or small shape. If found in a medium or large particle, the repeated test must be conducted by method of clot on boiling.
- 3.1.4 pH must be around 6.5 to 6.8.
- 3.1.5 Milk solids not fat must not be less than 8.25%.
- 3.1.6 Freezing point must not be above  $-0.530$  °C.
- 3.1.7 Specific gravity must not be less than 1.028 at 20 °C.
- 3.1.8 Color change of methylene blue must be longer than 4 hours.
- 3.1.9 Color change of resazurin at 1st hour must be at least grade 4.5.

#### 3.2 Quality Grading

Quality grading is categorized based on the total microorganisms, somatic cells from the udders, protein, fat and total solids which will be used as criteria for marketing of raw goat milk according to Table 1.

3.2.1 Premium grade

3.2.2 Good grade

3.2.3 Standard grade

**Table 1. Quality grading of raw goat milk according to its characteristics**

<b>Grading quality</b> <b>Characteristics</b>	<b>Premium</b>	<b>Good</b>	<b>Standard</b>
1. Total count (cfu/ml)	< 5 x 10 <sup>4</sup>	5 x 10 <sup>4</sup> to 10 <sup>5</sup>	> 10 <sup>5</sup> to 2 x 10 <sup>5</sup>
2. Somatic cells (cells/ml)	< 7 x 10 <sup>5</sup>	7 x 10 <sup>5</sup> to 10 <sup>6</sup>	> 10 <sup>6</sup> to 1.5 x 10 <sup>6</sup>
3. Protein (%)	> 3.7	>3.4 to 3.7	3.1 to 3.4
4. Fat (%)	> 4	>3.5 to 4	3.25 to 3.5
5. Total solid (%)	> 13	>12 to 13	11.7 to 12

#### **4 FOOD ADDITIVES**

Food additives are not allowed.

#### **5 PESTICIDE RESIDUES**

In compliance with the provisions of the relevant laws and requirements of TAS 9002: Thai Agricultural Standard on Pesticide Residue: Maximum Residue Limits and TAS 9003: Thai Agricultural Standard on Extraneous: Maximum Residue Limits.

#### **6 CONTAMINANTS**

In compliance with the provisions of the relevant laws and requirements under the Thai Agricultural Standard on Contaminants.

#### **7 VETERINARY DRUG RESIDUES**

7.1 Free of contamination of antibiotics.

7.2 In compliance with the provisions of the relevant laws and requirements under the Thai Agricultural Standard on Veterinary Drug Residues: Maximum Residue Limits.

## 8 HYGIENE

8.1 Production, packaging and storage of raw goat milk must be hygienic in order to protect any contaminants that can be hazardous to consumer.

8.2 Container of raw goat milk must be clean and free of musty and rotten smells.. Surface of the container must be smooth without any welding seam and no chemical reaction. The container must be cleaned immediately after use.

8.3 Contamination of microorganisms in raw goat milk shall be conformed to the following requirements:

8.3.1 Total count must not exceed  $2 \times 10^5$ cfu/ml.

8.3.2 Total coliform must not exceed  $10^3$ cfu/ml.

8.3.3 Total heat resistant bacteria must not exceed  $10^3$ cfu/ml.

8.4 Free of microorganisms causing zoonotic diseases i.e. tuberculosis, brucellosis. .

## 9 PACKING AND STORING

9.1 Raw milk collected from milking must be kept in a clean container with a good hygienic practice before and after use.

9.2 Raw milk from milking must be immediately delivered to the collection center. In case of non delivery, it must be stored at 4 °C or below and not longer than 24 hours.<sup>1/</sup>

9.3 Raw milk in the storage tank of the collection center must be kept at 4 °C or below and not longer than 24 hours prior to delivering to processing factory.

9.4 Raw milk not complied with section 3 of this standard must not be mixed with the next batch of milking.

## 10 TRANSPORTATION

10.1 Carriage used for delivering raw goat milk from farm to collection center must be in a clean and safe condition for transportation. In case of non-cooling, the milk must be immediately delivered within 2 hours.

10.2 Carriage or container used for delivery raw goat milk from collection center to processing factory must keep milk temperature properly and prevent contamination during transportation.

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<sup>1/</sup> In case raw milk has to be stored longer than 24 hours, it should be frozen at -18 °C or below. However, the delivery time from farm to the processing factory must be within 15 days.

## **11 METHOD OF ANALYSIS AND SAMPLING**

11.1 In compliance with the provisions of the relevant laws and requirements under the Thai Agricultural Standard on Sampling Method.

11.2 Method of analysis of raw goat milk at collection center and processing factory shall be complied with Annex A or other validated method complied with the international standard.

## ANNEX A

### ANALYSES OF RAW GOAT MILK

**A.1 Organoleptic tests** for attesting the characteristics of raw goat milk by pouring it in a container to observe its smell, color, and external appearances.

**A.2 Specific gravity test** of raw milk by the lactometer should be between 1.028 to 1.034 at 20 °C with the following procedures:

- (1) Take a sample at 20 °C and pour it into 100 ml. cylinder.
- (2) Float the lactometer in the cylinder and assure that while reading the lactometer will not touch with the inner surface of cylinder to avoid any error.
- (3) The lactometer shows only the second and third decimal of the specific gravity but not showing 1.0 for example: a reading of 28 means the specific gravity is equal to 1.028.

#### **A.3 Milk fat test**

- (1) Pour the Gerber with 10 ml. of sulfuric acid: H<sub>2</sub>SO<sub>4</sub>.
- (2) Suck and gently release 11 ml. of raw milk into the Gerber of sulfuric acid so that milk layer is formed above sulfuric acid.
- (3) Add 1 ml. of amyl alcohol into the Gerber.
- (4) Tightly seal the Gerber with a rubber plug and shake well for 2 minutes to digest milk with sulfuric acid.
- (5) Hold and balance the Gerber in the centrifuge and rotate at 1,100 rpm for 5 minutes.
- (6) After rotating for 5 minutes, then immerse the Gerber in the water bath at 57 °C to 60 °C for 5 minutes. Then take the Gerber for reading percentage of milk fat by holding the Gerber in the vertical direction in order that the zero reading is at the lowest level of the fat column or at the nearest. Read the thickness of the fat column from the top layer to the bottom layer to indicate the percentage of milk fat.

#### **A.4 Total solids and solids not fat test**

- (1) By using the ultrasonic milk analyzer or by the infrared spectrometer to analyze the milk composition.
- (2) In case the ultrasonic milk analyzer is not available, milk composition shall be determined by using the specific gravity and percentage of milk fat for calculation.

#### **A.5 Alcohol test**

A.5.1 Take 1 g. of alizarin and mix with 1 liter of 68% ethyl alcohol prepared from 99.96% ethyl alcohol.

A.5.2 Take the solution from A.5.1 and mix with raw milk at a ratio 1:1. Observe the suspension of protein to indicate the level of acidity as follows:

- (1) pH between 6.4 to 6.5 if the color of the suspension is brown-yellowish color.
- (2) pH between 6.6 to 6.8 if the color of the suspension is brownish red color.
- (3) pH above 6.9 if the color of the suspension is purple red color.

A.5.3 If sediment in medium or large particle, it shall be confirmed sediment test by clot on boiling.

#### **A.6 Clot on boiling test**

Take 5 ml. of well mixed raw milk and boil in the water bath for 5 minutes. The heated milk containing acidity at or above 0.2% as lactic acid will show the sediment particle which is not suitable for further products .

#### **A.7 pH test**

Milk pH can be measured by using the pH meter.

#### **A.8 Acidity test**

Milk acidity can be determined by titration method as follows:

Fill 9 ml. of raw milk into the flask and add one drop of 1% phenolphthalein solution and titrate with 0.1 N of sodium hydroxide until milk turn pink color for 30 s. Then read the amount of sodium hydroxide used in titrate for calculation of milk acidity which can be used as a decision for receiving the raw milk and for further products.

#### **A.9 Methylene blue test**

- (1) Take a methylene blue tablet and prepare the solution following the label instruction. Keep the solution in a tint bottle and store in a refrigerator (to be used within seven days after preparation).
- (2) Suck 10 ml. of raw milk by using a clean and sterilized pipette and mix with 1 ml. of the solution in (1) in a dry test tube. Plug the test tube and slowly invert it to mix the solution and raw milk together and incubate in the water bath at 37 °C.
- (3) Observe the growth of bacteria every hour for 6 hours to see color change of the solution from greenish blue to white color. After each observation, invert test tube. If the color change occurs before 4 hours it means the quality of raw milk is poor.

### A.10 Resazulin test <sup>2/</sup>

- (1) Take a resazurin tablet for preparing resazurin solution follows the label instruction. Prepare the solution just enough for each test and keep in a tint bottle.
- (2) Suck 10 ml. of milk by using a clean and sterilized pipette and mix with one ml. of the solution in (1) in a dry test tube. Plug the test tube and slowly invert to mix the solution and milk together and incubate in the water bath at 37 °C.
- (3) After first hour of incubation, observe the growth of bacteria and then slowly invert the test tube . After the second hour the test tube must be slowly inverted again. After the third hour of incubation, take another observation to see the color change of resazurin solution from purple blue to purple red, to pink or white color and then slowly invert the test tube. Compare the color change with the Lovibond comparator to indicate the amount of microorganisms in the milk. .

### A.11 Antibiotic test

A.11.1 In case the antibiotic test kit is unavailable for checking the contamination of antibiotics, then use yogurt for preliminary test as follows:

- (1) Prepare the solution from plain yogurt (use only new yogurt with shelf life more than 10 days) by using one cup of yogurt (150 g) mixed with 150 ml of distilled water (ratio 1:1) and stir well.
- (2) Pour 10 ml. of milk in test tube and put in boiling water for 5 to 10 minutes then cool down in cool water until the temperature of milk is between 35 °C to 37 °C.
- (3) Take 1 ml. of yogurt solution from (1) and mix well with milk in the test tube from (2). Keep the test tube in the water tub at 43 °C for 3 hours.
- (4) If the milk solution form a clot, it means no antibiotic; if the milk solution still remains as liquid, it means contamination of antibiotics.

A.11.2 Antibiotic test kit should be validated.

**A.12 Total count test** shall be complied with the Standard Methods for the Examination of Dairy Products, latest edition of the American Public Health Association or other equivalent methods.

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<sup>2/</sup> Cautions: 1) Level of water in the water bath must be 2.5 cm. above the level of milk in the test tube.  
2) For each test, conduct together with the positive and negative controlled test tubes in order to check the quality of the solution.  
3) Always check the temperature of the water bath.  
4) Set timing when the temperature of the sample reach 37 °C.

**A.13 Coliform test** shall be complied with the Standard Methods for the Examination of Dairy Products, latest edition of the American Public Health Association or other equivalent methods.

**A.14 Heat resistant bacteria test** shall be complied with the Standard Methods for the Examination of Dairy Products, latest edition of the American Public Health Association or other equivalent methods.

**Note:** Analyzes of raw goat milk

1) Sections A.2 to A.10 refer to Methods of Analysis recommended by Associated Prof. Thongyos Anekviang, Manual for Dairy and Dairy Products Laboratory, Kasetsart University, Bangkok, B.E 2529 (1986).

2) Section A.11 refers to Atherton, H.V. and Newlander, J.A. Chemistry and Testing of Dairy Product. 4th Edn. AVI, Westport, CT, 1977.

## Annex B

### UNIT

The units and symbols used in this standard and the units of SI (International System of Units or *Le Système International d'Unités*) recognized to be used are as follows:

<b>Item</b>	<b>Unit</b>	<b>Symbol</b>
Mass	Gram	g
Volume	Liter	l
	Milliliter	ml
Length	Centimeter	cm
Time	Second	s
Temperature	degree Celsius	°C
Bacteria	colony forming unit per millimeter	Cfu/ml
Concentrate of solution	normality	N