

NOTIFICATION OF MINISTRY OF COMMERCE

Subject: Prescribing Thai Hom Mali Rice as a Standardised Commodity and the Standards of Thai Hom Mali Rice (third edition) B.E. 2559

Whereas it is expedient to revise the Standards of Thai Hom Mali Rice appended to Notification of Ministry of Commerce, Subject: Prescribing Thai Hom Mali Rice as a standardised commodity and the Standards of Thai Hom Mali Rice dated 29 September B.E. 2549, and Notification of Ministry of Commerce, Subject: Prescribing Thai Hom Mali Rice as a standardised commodity and the Standards of Thai Hom Mali Rice dated 8 November B.E. 2556 to match the condition of rice production and trade by clearly specifying the quality grades of Thai Hom Mali Rice as it is the prime-quality rice produced in Thailand so that it be reliable and acceptable in foreign market, and to promote the rice export to attain added value,

By virtue of the power in the provision under Article 4, first paragraph (2) of the Export Commodity Standards Act B.E. 2503 as amended by the Export Commodity Standards Act (second edition) B.E. 2522, the Minister of Commerce, with the advice of the Committee of Commodity Standards, hereby issues the Notification as follows:

Clause 1 This Notification is called “Notification of Ministry of Commerce, Subject: Prescribing Thai Hom Mali Rice as a standardised commodity and the Standards of Thai Hom Mali Rice (third edition) B.E. 2559”.

Clause 2 This notification shall come into force after the lapse of 60 days as from the date of its publication in the Government Gazette.

Clause 3 To annul Standards of Thai Hom Mali Rice appended to Notification of Ministry of Commerce, Subject: Prescribing Thai Hom Mali Rice as a standardised commodity and the Standards of Thai Hom Mali Rice (second edition) B.E. 2556 dated 8 November B.E. 2556, and be superseded by Standards of Thai Hom Mali Rice appended to this notification

Notified as on 30 September B.E. 2559

(Mrs. Apiradi Tantraporn)

Minister of Commerce

Standards of Thai Hom Mali Rice

Appended to Notification of Ministry of Commerce

Subject: Prescribing Thai Hom Mali Rice as a standardised commodity and
the Standards of Thai Hom Mali Rice (third edition) B.E. 2559

Clause 1 Definitions

- (1) **Thai Hom Mali Rice** means Cargo rice and White rice that are processed from the non-glutinous rice paddy of Fragrant varieties that are photo-sensitive, produced in Thailand in main crop season and certified by Ministry of Agriculture and Co-operative as Kao Dok Mali 105 and RD 15 variety. They have natural aroma depending on whether they are new or old crop. The cooked rice of which has tender texture.
- (2) **Amylose** means one kind of starch existing in the rice kernels, and when cooked it makes the texture of the rice soft or hard varying according to the amylose content.
- (3) **Rice** means non-glutinous and glutinous rice (*Oryza Sativa* L.) in whatever form.
- (4) **Paddy** means rice that is not yet dehusked.
- (5) **Cargo rice (Loonzain rice, Brown rice, Husked rice)** means rice that is dehusked only.
- (6) **White rice** means rice that is obtained by removing the bran from cargo non-glutinous rice.
- (7) **Parts of rice kernel** means each part of the whole kernel that is divided lengthwise into 10 equal parts.
- (8) **Whole kernels** means rice kernels that are in whole condition without any broken part, and including the kernels that have the length as from 9 parts onward.
- (9) **Head rice** means fragments whose lengths are more than those of brokens but have not reached the length of the whole kernel. This includes split kernels that retain the area as from 80% of the whole kernel.
- (10) **Brokens** means fragments that have the length as from 2.5 parts but have not reached the length of Head rice. This includes split kernels that retain the area less than 80% of the whole kernel.
- (11) **Small brokens C1** means small fragments that pass through Sieve No. 7.
- (12) **Undermilled kernels** means milled rice kernels that have the milling degree below that specified for each grade of rice.
- (13) **Red kernels** means rice kernels that have red bran covering the kernels wholly or partly.
- (14) **Yellow kernels** means rice kernels that obviously turn yellow colour partly or wholly.

- (15) **Chalky kernels** means non-glutinous rice kernels that are opaque like chalk and have the area as from 50% onward of the area of the kernels.
- (16) **Damaged kernels** means rice kernels that are obviously damaged as can be seen by the naked eyes due to moisture, heat, fungi, insects or other.
- (17) **Undeveloped kernels** means rice kernels that do not develop normally as should be, and are flat.
- (18) **Immature kernels** means rice kernels that are light green, obtained from immature paddy.
- (19) **Other seeds** means seeds of other plants than rice kernels.
- (20) **Foreign matter** means other matter than rice. This includes rice husk and bran detached from rice kernels.
- (21) **Milling degree** means the degree to which the rice is milled. It is classified into 3 levels as follows:
- (21.1) **Extra well milled** means the removal of bran almost entirely to the extent that the rice kernel has an especially/particularly/excetionally beautiful appearance.
- (21.2) **Well milled** means the removal of bran almost entirely to the extent that the rice kernel has a beautiful appearance.
- (21.2) **Reasonably well milled** means the removal of a large amount of bran to the extent that the rice kernel has a reasonably beautiful appearance.
- (22) **Sieve No. 7** means round hole metal sieve of which the thickness is 0.79 mm (0.031 inch) and the hole diameter is 1.75 mm (0.069 inch)
- (23) The unit “per cent” means percentage by weight.

Clause 2 Thai Hom Mali rice shall be divided into 2 types as follows:

- (1) **White rice**
- (2) **Cargo rice**

Clause 3 Thai Hom Mali rice of White rice type shall be divided into 6 grades as follows:

- (1) **White rice 100%**
- (2) **White rice 5%**
- (3) **White rice 10%**
- (4) **White rice 15%**
- (5) **White broken rice A1 Extra Super**
- (6) **White broken rice A1 Super**

Clause 4 Thai Hom Mali rice of Cargo rice type shall be divided into 4 grades as follows:

- (1) **Cargo rice 100%**
- (2) **Cargo rice 5%**
- (3) **Cargo rice 10%**
- (4) **Cargo rice 15%**

Clause 5 Thai Hom Mali rice as per Clauses 2, 3 and 4 shall meet the following standards.

- (1) Purity at 92.0% minimum by quantity,
- (2) Moisture content 14.00% maximum,
- (3) General characteristics as a long grain rice
- (4) No living insects.
- (5) Kernel size as follows:
 - Average length of Whole kernels without broken parts not less than 7.0 mm.
 - Length/width ratio of Whole kernels without broken parts not less than 3.2:1
- (6) Chemical properties as follows:
 - Amylose content not less than 13.0% but not more than 18.0% at the moisture level of 14.0%
 - Alkali spreading value at level 6 – 7

Clause 6 The standards of Thai Hom Mali Rice of the type and grades of White rice shall be specified as follows:

- (1) **White rice 100%**

Shall have grain composition and milling degree as follows:

Grain composition comprises:

Whole kernels not less than 60.0%.

Brokens having the length as from 5.0 parts onwards but not reaching 8.0 parts not exceeding 4.5%. Of this there may be brokens having the length not reaching 5.0 parts and not passing through sieve No. 7 not exceeding 0.5%, and Small white brokens C1 not exceeding 0.1%

The rest shall be Head rice having the length as from 8.0 parts onwards.

Rice and matters that may be present:

Red kernels and or Undermilled kernels not exceeding 0.5%

Yellow kernels not exceeding 0.2%

Chalky kernels not exceeding 3.0%

Damaged kernels not exceeding 0.25%

Glutinous rice not exceeding 1.0%

Paddy not exceeding 5 grains per 1 kg rice

Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined not exceeding 0.2%

Milling degree Extra well milled

(2) White rice 5%

Shall have grain composition and milling degree as follows:

Grain composition comprises:

Whole kernels not less than 60.0%.

Brokens having the length as from 3.5 parts onwards but not reaching 7.5 parts not exceeding 7.0% Of this there may be brokens having the length not reaching 3.5 parts and not passing through sieve No. 7 not exceeding 0.5%, and Small white brokens C1 not exceeding 0.1%

The rest shall be Head rice having the length as from 7.5 parts onwards.

Rice and matters that may be present:

Red kernels and or Undermilled kernels not exceeding 2.0%

Yellow kernels not exceeding 0.5%

Chalky kernels not exceeding 6.0%

Damaged kernels not exceeding 0.25%

Glutinous rice not exceeding 1.5%

Paddy not exceeding 8 grains per 1 kg rice

Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined not exceeding 0.3%

Milling degree Well milled

(3) White rice 10%

Shall have grain composition and milling degree as follows:

Grain composition comprises:

Whole kernels not less than 55.0%.

Brokens having the length as from 3.5 parts onwards but not reaching 7.0 parts not exceeding 12.0% Of this there may be brokens having the length not reaching 3.5 parts and not passing through sieve No. 7 not exceeding 0.7%, and Small white brokens C1 not exceeding 0.3% The rest shall be Head rice having the length as from 7.0 parts onwards.

Rice and matters that may be present:

Red kernels and or Undermilled kernels	not exceeding 2.0%
Yellow kernels	not exceeding 1.0%
Chalky kernels	not exceeding 7.0%
Damaged kernels	not exceeding 0.5%
Glutinous rice	not exceeding 1.5%
Paddy	not exceeding 13 grains per 1 kg rice
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 0.4%
<u>Milling degree</u>	Well milled

(4) White rice 15%

Shall have grain composition and milling degree as follows:

Grain composition comprises:

Whole kernels not less than 55.0%.
Broken having the length as from 3.0 parts onwards but not reaching 6.5 parts not exceeding 17.0% Of this there may be broken having the length not reaching 3.0 parts and not passing through sieve No. 7 not exceeding 2.0%, and Small white broken C1 not exceeding 0.5% The rest shall be Head rice having the length as from 6.5 parts onwards.

Rice and matter that may be present:

Red kernels and or Undermilled kernels	not exceeding 5.0%
Yellow kernels	not exceeding 1.0%
Chalky kernels	not exceeding 7.0%
Damaged kernels	not exceeding 1.0%
Glutinous rice	not exceeding 2.0%
Paddy	not exceeding 13 grains per 1 kg rice
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 0.4%
<u>Milling degree</u>	Reasonably well milled

(5) White broken rice A1 Extra Super

Shall be obtained from the milling of White rice 100% and have grain composition as follows:

Grain composition comprises:

Brokens having the length not reaching 5.0 parts and not passing through Sieve no. 7 not exceeding 10%. The rest shall be brokens having the length as from 5.0 parts onward. Of all these there may be Whole kernels not exceeding 15.0% and Small white brokens C1 not exceeding 1.0%

Rice and matter that may be present:

Glutinous rice not exceeding 1.5%, of this there may be Small glutinous brokens C1 not exceeding 0.5%

Foreign matter not exceeding 0.5%

(8) White broken rice A1 Super

Shall be rice obtained from the milling of White rice 100%, White rice 5% and White rice 10% and has grain composition as follows:

Grain composition comprises:

Brokens having the length not reaching 6.5 parts and not passing through Sieve no. 7 for the entire quantity. Of all these there may be brokens having the length as from 6.5 parts onwards and Whole kernels combined not exceeding 15.0% and Small white brokens C1 not exceeding 5.0%

Rice and matter that may be present:

Glutinous rice not exceeding 1.5%, of this there may be Small glutinous brokens C1 not exceeding 0.5%

Foreign matter not exceeding 0.5%

Clause 7 The standards of Thai Hom Mali rice of the type and grade of Cargo rice shall be specified as follows:

(1) Cargo rice 100%

Shall have grain composition as follows:

Grain Composition comprises:

Whole kernels not less than 80.0%

Brokens having the length as from 5.0 parts onward but not reaching 8.0 parts not exceeding 4.5% The rest shall be Head rice having the length as from 8.0 parts onward.

Rice and matter that may be present:

Red kernels	not exceeding 1.5%
Yellow kernels	not exceeding 0.75%
Chalky kernels	not exceeding 3.0%
Damaged kernels	not exceeding 0.75%
Glutinous rice	not exceeding 1.5%
Paddy	not exceeding 1.0%
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 5.0%

(2) Cargo rice 5%

Shall have grain composition as follows:

Grain Composition comprises:

Whole kernels not less than 75.0%

Brokens having the length as from 3.5 parts onward but not reaching 7.5 parts not exceeding 7.0% The rest shall be Head rice having the length as from 7.5 parts onward.

Rice and matter that may be present:

Red kernels	not exceeding 2.0%
Yellow kernels	not exceeding 1.0%
Chalky kernels	not exceeding 6.0%
Damaged kernels	not exceeding 1.0%
Glutinous rice	not exceeding 1.5%
Paddy	not exceeding 1.0%
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 6.0%

(3) Cargo rice 10%

Shall have grain composition as follows:

Grain Composition comprises:

Whole kernels not less than 70.0%

Brokens having the length as from 3.5 parts onward but not reaching 7.0 parts not exceeding 12.0% The rest shall be Head rice having the length as from 7.0 parts onward.

Rice and matters that may be present:

Red kernels	not exceeding 2.0%
Yellow kernels	not exceeding 1.0%
Chalky kernels	not exceeding 7.0%
Damaged kernels	not exceeding 1.0%
Glutinous rice	not exceeding 1.5%
Paddy	not exceeding 2.0%
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 7.0%

(4) Cargo rice 15%

Shall have grain composition as follows:

Grain Composition comprises:

Whole kernels not less than 65.0%
Broken kernels having the length as from 3.0 parts onward but not reaching 6.5 parts not exceeding 17.0% The rest shall be Head rice having the length as from 6.5 parts onward.

Rice and matters that may be present:

Red kernels	not exceeding 5.0%
Yellow kernels	not exceeding 1.0%
Chalky kernels	not exceeding 7.0%
Damaged kernels	not exceeding 1.5%
Glutinous rice	not exceeding 2.5%
Paddy	not exceeding 2.0%
Undeveloped kernels, Immature kernels, Other seeds and Foreign matter either singly or combined	not exceeding 8.0%

Clause 8

The determination relating to the standards or quality of Thai Hom Mali rice shall be based on the result of analysis of the rice sample by the Office of Commodity Standards or any agency as assigned by the Office of Commodity Standards.

In case of any dispute arising out of or in connection with the determination, the result of analysis of the rice sample by the Office of Commodity Standards or any agency as assigned by the Office of Commodity Standards, as the case may be, shall be final.

Clause 9 In case where Thai Hom Mali Rice is exported in bags or any other types of container, the exporters shall show the “THAI HOM MALI RICE” English wording clearly visible on the bags or containers. The exporters shall declare the details of the packaging materials, including the stitching and sealing, on the application for issuance of Commodity standards certificates.

Clause 10 In case where exported Thai Hom Mali rice fails to meet the standard requirement of 92% purity, it shall not be considered as a standardised commodity according to this notification.

Notes: *The standards in Thai version are authentic and valid in case of dispute.*

APPENDIX A

Test method for determination of Amylose content

1. Apparatus

- 1.1 Spectrophotometer
- 1.2 Balances, readability 0.0001 g.
- 1.3 Magnetic stirrer with magnetic bar
- 1.4 Mill, capable of grinding rice kernels to flour that can pass through a 80-100 mesh sieve
- 1.5 Volumetric flasks, 100 ml
- 1.6 Volumetric pipettes, 1, 2, 3, 4 and 5 ml
- 1.7 Measuring pipettes, 1-10 ml

2. Reagents

- 2.1 Ethyl alcohol (C₂H₅OH) 95%
- 2.2 Sodium hydroxide (NaOH)
- 2.3 Glacial acetic acid (CH₃COOH)
- 2.4 Iodine (I₂)
- 2.5 Potassium iodide (KI)
- 2.6 Potato amylose, 95% purity minimum

3. Preparation of solution

- 3.1 Sodium hydroxide solution 2N : weigh 80.0 g. sodium hydroxide (as in 2.2) and dissolve it in about 800 ml distilled water in a 1,000 ml volumetric flask. Leave it to cool down and make up the volume with distilled water to 1,000 ml.
- 3.2 Glacial acetic acid solution 1N : dilute 60 ml glacial acetic acid (as in 2.3) in about 800 ml distilled water in a 1,000 ml volumetric flask and make up the volume with distilled water to 1,000 ml.
- 3.3 Iodine solution : dissolve 0.20 g. Iodine (as in 2.4) and 2.00 g. potassium Iodide (as in 2.5) in about 80 ml distilled water in a 100 ml volumetric flask. Leave it overnight in a dark place or until Iodine completely dissolves. Make up the volume with distilled water to 100 ml. Store the solution in a brown-colour bottle.

4. Analysis methods

- 4.1 Grind rice kernels with the mill (as in 1.4) to flour. Weigh 0.1000 g. flour and put it into a 100 ml dry volumetric flask (as in 1.5). Avoid leaving the flour at the neck of the flask.
- 4.2 Add 1.0 ml ethyl alcohol (as in 2.1) and shake gently to disperse the flour.
- 4.3 Add 9.0 ml sodium hydroxide solution (as in 3.1).

- 4.4 Put magnetic bar into the flask and stir the sample with magnetic stirrer for 10 minutes to become slurry. Remove the magnetic bar and make up the volume with distilled water to 100 ml. Cover the flask and shake it well.
- 4.5 Prepare another 100 ml volumetric flask, and add about 70 ml distilled water. Transfer 2 ml glacial acetic acid solution and 2 ml iodine solution into the flask.
- 4.6 Pipette 5.0 ml test solution (as in 4.4) into the prepared volumetric flask (as in 4.5). Make up the volume with distilled water to 100 ml. Cover the flask and shake it well. Leave it for 10 minutes.
- 4.7 Measure the absorbance of the solution (as in 4.6) at the wavelength of 620 nm by using a spectrophotometer after setting the blank at zero (0) absorbance.
- 4.8 Prepare a blank test by adding 2.0 ml glacial acetic acid solution (as in 3.2) and 2.0 ml iodine solution (as in 3.3) into a new flask. Make up the volume with distilled water to 100 ml.
- 4.9 Determine the percentage by mass of amylose by converting the absorbance in accordance with the calibration graph (as in 5).
- 4.10 Convert the amylose content obtained at the moisture level of 14.0% according to the formula:

$$\text{Amylose content at 14.0\% moisture} = \frac{A \times 86}{100 - M}$$

Where A = percentage of the amylose obtained
 M = percentage of moisture of the sample

5. Plotting the calibration graph

- 5.1 Weigh 0.0400 g. potato amylose and put it into a dry volumetric flask (as in 1.5). Proceed same as the test sample (as in 4.2 – 4.4) to obtain a standard solution.
- 5.2 Prepare a set of five 100 ml volumetric flasks with 70 ml distilled water each. Pipette 0.4, 0.8, 1.2, 1.6 and 2.0 ml glacial acetic acid solution (as in 3.2) to the series of the flasks respectively. Add 2.0 ml iodine solution (as in 3.3) to each flask.
- 5.3 Pipette 1.0, 2.0, 3.0, 4.0 and 5.0 ml standard solution (as in 5.1) into the series of the flasks (as in 5.2). This corresponds to the amylose content of 8%, 16%, 24%, 32% and 40% respectively. Add distilled water to make up the volume to 100 ml and allow them to stand for 10 minutes. Measure the absorbance of the solution at the wavelength of 620 nm after setting the blank at zero (0) absorbance same as in (4.7).
- 5.4 Prepare a calibration graph by plotting the absorbance against the amylose content of the standard solution (as in 5.3).
- 5.5 Use the calibration graph (as in 5.4) to convert the readings of absorbance to amylose percentage by mass.

APPENDIX B

Test method for determination of moisture content

1. Apparatus

1.1 Oven

1.2 Balances, readability 0.0001 g.

1.3 Desiccator together with silica gel

1.4 Mill, capable of grinding rice kernels to flour that can pass through 80-100 mesh sieve.

1.5 Aluminium can with cover, of which the diameter is 5cm or more .

2. Test method

2.1 Grind rice kernels to flour using the mill (as in 1.4).

2.2 Uncover an aluminium can (as in 1.5) and place it in the oven (as in 1.1) with the cover underneath the can. Dry it for 2 hours at temperature 130 ± 3 degrees C. Remove the can from the oven with the cover on and leave it in a desiccator (as in 1.3). Weigh the can after it reaches room temperature. Record the finding.

2.3 Put about 1.0 g. flour into the can, weigh and record the actual weight with four decimals.

2.4 Dry the can containing the sample in the oven with the cover underneath for 2 hours at 130 ± 3 degrees C. Remove the can from the oven with the cover on and leave it in a desiccator. Weigh the dried can with sample after it reaches room temperature. Record the finding.

2.5 Determine the percentage of moisture content by mass according to the formula:

$$\text{Percentage of moisture} = \frac{(B - C)}{(B - A)} \times 100$$

Where A = weight in gram of aluminium can with cover
 B = weight in gram of aluminium can with cover and flour
 before drying
 C = weight in gram of aluminium can with cover and flour
 after drying

APPENDIX C

Test method for Alkali spreading value

1. Apparatus

- 1.1 Balances, readability 0.0001 g.
- 1.2 Oven
- 1.3 Volumetric flasks, 1,000 ml
- 1.4 Petri dish with cover, 14.5 cm. diameter
- 1.5 Glass beaker, 1 - 2 liters capacity
- 1.6 Desiccator

2. Reagents

- 2.1 Potassium hydroxide pellet (KOH) 85% purity
- 2.2 Potassium hydrogen phthalate ($C_8H_5KO_4$)
- 2.3 Phenolphthalein ($C_{20}H_{14}O_4$)

3. Preparation of potassium hydroxide solution 1.7% \pm 0.05%

3.1 Preparation of the solution may be made by 2 methods:

3.1.1 Preparing working solution directly.

Weigh 20.00 g. potassium hydroxide pellet and dissolve it in boiled distilled water. Make up the volume with distilled water to 1,000 ml.

3.1.2 Preparing working solution from stock solution.

A. Weigh 600.00 g. potassium hydroxide pellet and dissolve it in boiled distilled water. Make up the volume with distilled water to 1,000 ml. This is to be used as stock solution for dilution.

B. Dilute 33.00 ml stock solution (as in 3.1.2 A) with distilled water to a volume of 1,000 ml to be used as working solution.

3.2 Determination of concentration of potassium hydroxide solution.

3.2.1 Dry a portion of potassium hydrogen phthalate in the oven at 130 ± 3 degrees C for 1 hour, and leave it to cool down to room temperature in a desiccator.

3.2.2 Weigh about 0.5 g. potassium hydrogen phthalate (as in 3.2.1) and record the exact weight.

3.2.3 Dissolve potassium hydrogen phthalate (as in 3.2.2) with 50 ml distilled water. Add 3 drops of a 0.1% phenolphthalein and titrate with the working solution until the solution turns pink. Record the volume in ml of the working solution spent for titration.

- 3.2.4 Prepare a blank test using the same procedure as in 3.2.3, but without potassium hydrogen phthalate.
- 3.2.5 Calculate the concentration of the potassium hydroxide solution as follows:

$$\% \text{ Potassium hydroxide} = \frac{P}{204.23} \times \frac{56.109}{V - B} \times 100$$

Where V = volume in ml of potassium hydroxide solution spent in titrating with potassium hydrogen phthalate

B = volume in ml of potassium hydroxide solution spent in titrating with blank

P = weight in gram of potassium hydrogen phthalate

4. Test method

- 4.1 Draw randomly 100 white rice kernels and put them in 4 petri dishes of 25 kernels each. Place the petri dishes on levelled top of black colour.
- 4.2 Pour about 100 ml potassium hydroxide solution (as in 3) to each dish (as in 4.1). Ensure that every rice kernel submerge in the solution and separate them from each other. Cover the dishes and leave them undisturbed at room temperature (30 ± 5 degrees C) for 23 hours.
- 4.3 Examine the rice kernels (as in 4.2) by rating the level of alkali spreading value of each kernel according to Table 1.

Level of alkali spreading value	Spreading of the rice kernels
1	No change in rice kernels
2	Rice kernels swollen
3	Rice kernels swollen, collar incomplete or narrow
4	Rice kernels swollen, collar complete and wide
5	Rice kernels split or segmented, collar complete and wide
6	Rice kernels dispersed, merging with collar
7	Rice kernels completed dispersed and intermingled

5. Judgement

Rice kernels that have the alkali spreading value as from level 1 to 5 are not considered as Thai Hom Mali rice

APPENDIX D

Method for checking cooked rice kernels boiled in water

(A simple preliminary test method for indication only)

1. Apparatus

- 1.1 Electric pot
- 1.2 Stainless metal basket
- 1.3 Spoon or paddle for stirring rice kernels
- 1.4 Two glass sheets for pressing rice kernels

2. Test method

- 2.1 Select 100 white rice kernels randomly and put them in the basket.
- 2.2 Boil distilled water in the electric pot.
- 2.3 Dip the basket with the rice kernels in the boiling water (as in 2.2) for a period as calibrated against the alkali spreading value method, during which ensure that the rice kernels do not stick with each other.
- 2.4 On completion of the boiling period, lift up the basket from the boiling water and immediately dip it into the cold water, then lift up for draining.
- 2.5 Spread the rice kernels on the glass sheet. Place another glass sheet over the rice kernels and press them flat. The kernels that have white cores of raw starch inside are considered as not fully gelatinized.

3. Judgement

The kernels that are not fully gelatinized are not considered Thai Hom Mali rice.

APPENDIX E

Test method by Iodine staining

1. Apparatus

- 1.1 Glass beaker, size 100 ml, or plastic cup of similar size.
- 1.2 Plastic dropper, size 1 ml.
- 1.3 Volumetric flask, size 100 ml and 2,000 ml
- 1.4 Pipette, size 1 – 10 ml
- 1.5 Brown-colour bottle for storing solution, size about 100 ml
- 1.6 Cylinder, size 50 ml
- 1.7 Forceps
- 1.8 Blotting paper or tissue paper
- 1.9 Balance, readability 0.01g.

2. Reagents

- 2.1 Sodium hydroxide (NaOH)
- 2.2 Glacial acetic acid (CH₃COOH)
- 2.3 Iodine (I₂)
- 2.4 Potassium Iodide (KI)
- 2.5 Isopropyl alcohol 70%
- 2.6 Distilled water or filtered water for lab use

3. Preparation of solution

- 3.1 Sodium hydroxide 1N: dissolve 4.00 g Sodium hydroxide (as in 2.1) in about 80 ml distilled water in 100 ml volumetric flask. Leave it cool down and make up the volume with distilled water to 100 ml.
- 3.2 Glacial acetic acid solution 1N: dilute 6 ml Glacial acetic acid (as in 2.2) in about 80 ml distilled water in 100 ml volumetric flask and make up the volume with distilled water to 100 ml.
- 3.3 Working solution: mix 10 ml Sodium hydroxide solution 1N (as in 3.1) with 10 ml Glacial acetic acid solution 1N (as in 3.2), and make up the volume with distilled water to 2,000 ml.
- 3.4 Iodine solution: dissolve 0.20 g Iodine (as in 2.3) and 2.00 g Potassium Iodide (as in 2.4) in about 80 ml distilled water in 100 ml volumetric flask. Leave it overnight in a dark place or until Iodine completely dissolves. Make up the volume with distilled water to 100 ml. Store the solution in a brown-colour bottle.

Remarks: Iodine solution should not be stored longer than 2 months.

4. Test method

- 4.1 Preparation of the solution for staining the rice kernels.

4.1.1 Measure 30 ml working solution (as in 3.3).

- 4.1.2 Add 1.5 ml iodine solution to the working solution. Stir it well. The solution is used to stain the rice kernels (should use immediately).

4.2 Staining method

- 4.2.1 Randomly sample about 3.0 g. rice kernels and put them in 100 ml beaker or plastic cup of similar size (as in 1.1).
- 4.2.2 Add 15 ml Isopropyl alcohol 70% (as in 2.5) to the beaker. Sway the beaker or plastic cup for 45 seconds. Pour out the alcohol.
- 4.2.3 Add 15 ml distilled water. Sway for 30 seconds. Pour out the water.
- 4.2.4 Add 15 ml staining solution (as in 4.1) and sway for 45 seconds. Pour out the solution.
- 4.2.5 Add 15 ml distilled water to rinse the sample. Pour out the water completely.
- 4.2.6 Transfer the rice kernels onto the blotting paper or tissue paper (as in 1.8). Put another piece of paper on the top to blot the water. Leave the rice kernels to dry up for about 5 minutes.
- 4.2.7 Separate the rice kernels with forceps (as in 1.7) into 2 portions:

First portion: rice kernels stained with light pink colour or nil are low amylose rice or Thai Hom Mali rice, or the cooked rice having tender and sticky texture.

Second portion: rice kernels stained with blue or dark violet colour are high-amylose rice or rice with hard texture.

- 4.2.8 Weigh the two portions separately.
- 4.2.9 Calculate the percentage of other variety rice mixed in Thai Hom Mali rice:

$$\text{Other variety rice (\%)} = \frac{\text{Weight of the second portion}}{\text{Weight of the first portion} + \text{Weight of the second portion}} \times 100$$
