Tentative Translation

JAS 0017

JAPANESE AGRICULTURAL STANDARD

Milled rice

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Ministry of Agriculture, Forestry and Fisheries

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Food and Agricultural Materials Inspection Center, Incorporated Administrative Agency

Contents

Page

Foreword

This Japanese Agricultural Standard has been established by the Minister of Agriculture, Forestry and Fisheries through deliberations at the Council for the Japanese Agricultural Standards as the result of proposal for establishment of Japanese Agricultural Standard submitted by the Japan Rice Millers Association, a general incorporated association, with the original bill being attached, based on the provision of Article 4, paragraph (1) of the Act on Japanese Agricultural Standards.

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JAPANESE AGRICULTURAL STANDARD JAS
(Tentative Translation) 0017 : 2021

Milled rice

1 Scope

This document specifies the quality of the short-grain (of which, on milled rice grain without any broken part, the ratio of length to width is 1.9 or less) of lowland non-glutinous milled rice, or upland non-glutinous milled rice, which is used for boiled rice.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. The latest edition of the referenced document (including any amendments) applies.

JIS Z 8722, *Methods of colour measurement — Reflecting and transmitting objects*

JIS R 3503, *Glass apparatus for chemical analysis*

JIS Z 8801-1, *Test sieves — Part 1: Test sieves of metal wire cloth*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
husked rice
brown rice
rice prepared by removing the husk from paddy

3.2
milled rice
white rice
rice with all or some of the bran layer and germ removed from husked rice

3.3
foreign matter
extraneous matter
matter other than grain, and grain which is smaller than one-quarter of an entire grain

3.4
objectionable seed
grain other than the variety of milled rice

Note 1 to entry: For lowland non-glutinous milled rice, those upland non-glutinous milled rice, glutinous milled rice, husked rice and other grains are objectionable seeds.

3.5
discolored grain
grain with the surface discolored, entirely or partially, to red, yellow, brown, black, etc., by pests, heat, micro-organisms, etc. (excluding those that do not affect the quality of milled rice to a considerable extent)

Note 1 to entry: Examples of discolored grains are given in Figure A.1.

3.6
damaged grain
grain contaminated or damaged by pests, heat, micro-organisms and other impediments (excluding broken grain)

Note 1 to entry: Examples of damaged grains are given in Figure A.2.

3.7
broken grain
grain which is two-thirds to one-quarter of an entire grain in size

Note 1 to entry: Examples of broken grains are given in Figure A.3.

3.8
chalky grain
grain with a chalky or semi-chalky texture

Note 1 to entry: Examples of chalky grains are given in Figure A.4.

3.9
water-soaked crack grain
grain with a crack which is equal to or longer than half of the grain width when soaked in water

4 Quality

The quality of milled rice shall conform to the quality criteria of Table 1.

Table 1 — Quality criteria

Category	Criteria
Whiteness	39 or more when tested by the method specified in 5.3
Moisture content	15.0 % or less when tested by the method specified in 5.4
Objectionable seed and foreign matter	0.0 % or less when tested by the method specified in 5.5
Discolored grain	0.0 % or less when tested by the method specified in 5.6
Damaged grain (including discolored grain)	1 % or less when tested by the method specified in 5.7
Broken grain	3 % or less when tested by the method specified in 5.8
Chalky grain	6 % or less when tested by the method specified in 5.9
Water-soaked crack grain	10 % or less when tested by the method specified in 5.10

5 Test methods

5.1 General

Apparatus used for the testing shall be as follows.

a) **Whiteness meter,** capable of measuring the whiteness of milled rice, under the illumination and viewing geometric conditions specified in JIS Z 8722, with the following capacities.

1) The measurable range of wavelength is 450 nm to 480 nm.

2) The repeatability of the measured value is within ±0.1 % of the measured value. In addition, when measuring the same stable object color under the same condition after a long interval of time, the repeatability does not exceed the value that is three times as much as the aforementioned repeatability.

NOTE As an example of commercially available product, there is Rice Whiteness Tester (Model C-600) from Kett Electric Laboratory Co. Ltd. This information is given for the convenience of users of this document and does not constitute an endorsement.

b) **Constant temperature drying oven,** rotary type (rotary rack style), capable of adjusting the temperature with a precision in temperature adjustment of within ±1 °C, when setting the constant temperature drying oven at 106.5 °C.

c) **Weighing can,** made of aluminum, 50 mm or more in bottom diameter, 25 mm or more in height, with a lid.

d) **Desiccator,** specified in JIS R 3503, containing silica gel as a desiccant.

e) **Sample crusher,** with knurled steel rolls, tempered and coated with chrome. The diameter of roll is 25 mm. The rotation ratio is 2 to 1. The space between the rolls is 0.5 mm. The knurled rolls have 9

graduations per 1 cm. The height of graduations is 0.5 mm.

f) **Electric moisture meter,** with the following specifications.

1) The electric moisture meter is either the direct current resistance type or the high frequency capacity type, and is capable of displaying the measured value to the nearest 0.1 %.

2) The standard deviation between the measured value by electric moisture meter and the measured value of 5.4 a) is within ±0.5 %.

3) The electric moisture meter is capable of measuring from 11.0 % to 18.0 %.

g) **Near-infrared spectrometer,** with the following specifications.

1) The precision of apparatus and the stability of apparatus are ensured as follows.

1.1) Regarding the repeatability upon repeated measurement of the same sample, the standard deviation is within ±0.1 %.

1.2) Regarding the measurement repeatability of an unknown sample, the standard deviation is within ±0.30 %.

1.3) The near-infrared spectrometer is not affected by fluctuations in voltage.

2) Measures against or protective measures for the working environment (temperature, dust, vibration, etc.) have been taken.

3) The measurer can construct the calibration equation and can adjust either the bias or slope.

h) **Test sieve,** specified in JIS Z 8801-1, having an opening of 1.7 mm, made of No. 25 wire.

5.2 Preparation of test sample

Prepare the test sample by dividing the collected sample into pieces of approximately 200 g, by a) or b). The number of times of the sample division shall be the maximum number at which the mass of the divided test sample is not less than 200 g.

a) **Quartering method**

Spread the sample evenly, turn it into a circular shape, divide it into four equal parts by dividing it in half lengthways and half sideways, gather two opposite parts of the sample together, and mix them. By doing this, the sample becomes half. If the sample needs to be divided further, repeat this operation until the mass of the sample becomes approximately 200g.

b) **Method using a sample divider**

Put the sample in an appropriate container, and divide it into halves by pouring it, evenly, on the whole area of the hopper of the sample divider. Choose either of the halves of the divided sample. Always keep the conical part in a horizontal position, and open the shutter after having finished pouring the sample. When equally and continuously dividing the sample, the amount of which is equal to or larger than the capacity of the funnel, keep adding the sample so that the funnel part does not become empty. Do not open or close the shutter while dividing the sample.

5.3 Whiteness

Measure the test sample of 5.2 several times with a whiteness meter, calculate the mean value, and round it off to the nearest integer.

5.4 Moisture content

The measurement of moisture content shall be either of the following.

a) Drying method by heating at ordinary pressure

1) Put the weighing can, with the lid opened, into a constant temperature drying oven, which has been set at 106.5 °C in advance, and heat it for 1 h after confirming that the temperature inside the constant temperature drying oven is 106.5°C by checking the displayed temperature on the constant temperature drying oven. Put the lid on the weighing can inside the constant temperature drying oven, transfer it to a desiccator, and immediately weigh it to the nearest 0.1 mg after allowing it to cool down to room temperature. Determine the mass of the weighing can by measuring the constant weight by repeating this operation until the difference between the preceding weighing and the following weighing becomes 0.5 mg or less.

2) Weigh approximately 5 g of the test sample of 5.2, crushed by the sample crusher, into the weighing can, the constant weight of which was measured in 1), and weigh it to the nearest 0.1 mg.

3) Open the lid of the weighing can, which was weighed in 2), put it into the constant temperature drying oven, which has been set at 106.5 °C in advance, together with the lid, and heat it for 5 h after confirming that the temperature inside the constant temperature drying oven is 106.5°C by checking the displayed temperature on the constant temperature drying oven.

4) Put the lid on the weighing can inside the constant temperature drying oven and transfer it to a desiccator. After allowing it to cool down to room temperature, immediately weigh it to the nearest 0.1 mg, calculate the moisture content by the following formula, and round it off to one decimal place.

$$M = \frac{W_1 - W_2}{W_1 - W_0} \times 100$$

where

M is the moisture content (%);
W_0 is the mass of the weighing can (g);
W_1 is the mass of the test sample and the weighing can, before drying (g);
W_2 is the mass of the test sample and the weighing can, after drying (g).

b) Method using an electric moisture meter

1) Allow an electric moisture meter to adjust to the temperature of the measuring place, so that the difference between the temperature of the main part of the electric moisture meter and the room temperature becomes within 2 °C.

2) Allow the difference between the temperature of the test sample and the temperature of the electric moisture meter in a state adjusted through 1), to become within 3 °C.

3) Measure the test sample of 5.2 several times with the electric moisture meter, calculate the mean value, and round it off to one decimal place.

c) Method using a near-infrared spectrometer

1) Allow the difference between the temperature of the test sample and the room temperature where the near-infrared spectrometer is set to become within 3 °C.

2) Measure the test sample of 5.2 several times with the near-infrared spectrometer, calculate the mean value, and round it off to one decimal place.

5.5 Objectionable seeds and foreign matter

The measurement of the mass proportion of objectionable seeds and foreign matter shall be as follows.

a) Divide the test sample of 5.2 into pieces of approximately 100 g, and put it through a test sieve after weighing it to the nearest 0.1 g. The number of times of the sample division shall be the maximum number at which the mass of the divided test sample is not less than100g.

b) Weigh the test sample, which passed through the test sieve in a), to the nearest 0.1 g.

c) Visually sort out objectionable seeds and foreign matter from the test sample, left on the test sieve after a), and weigh them to the nearest 0.1 g.

d) Calculate the mass proportion of objectionable seeds and foreign matter by the following formula, and round it off to one decimal place.

$$A = \frac{W_1 + W_2}{W_0} \times 100$$

where

A is the mass proportion of objectionable seeds and foreign matter (%);
W_0 is the mass of the test sample, weighed in 5.5 a) (g) ;
W_1 is the mass of objectionable seeds and foreign matter, sorted out in 5.5 c) (g);
W_2 is the mass of the test sample, which passed through the test sieve, weighed in 5.5 b) (g).

5.6 Discolored grains

Visually sort out discolored grains from the test sample of 5.5 c). Weigh them to the nearest 0.1 g, calculate the mass proportion of discolored grains by the following formula, and round it off to one decimal place.

$$B = \frac{W_1}{W_0} \times 100$$

where

B is the mass proportion of discolored grains (%);
W_0 is the mass of the test sample, weighed in 5.5 a) (g);
W_1 is the mass of discolored grains, sorted out in 5.6 (g).

5.7 Damaged grains (including discolored grains)

The measurement of the mass proportion of damaged grains shall be as follows.

a) Divide the test sample of 5.5 c) after carrying out the test of 5.6 into pieces of approximately 20 g, and weigh it to the nearest 0.1 g. The number of times of the sample division shall be the maximum number at which the mass of the divided test sample is not less than 20 g.

b) Visually sort out damaged grains. Weigh them to the nearest 0.1 g, calculate the mass proportion of damaged grains by the following formula, and round it off to the nearest integer.

$$C = \frac{W_1}{W_0} \times 100 + B$$

where

C is the mass proportion of damaged grains (%);
W_0 is the mass of the test sample, weighed in 5.7 a) (g) ;
W_1 is the mass of damaged grains, sorted out in 5.7 b) (g).
B is the mass proportion of discolored grains, measured in 5.6 (%).

5.8 Broken grains

Visually sort out broken grains from the test sample of 5.7 a). Weigh them to the nearest 0.1 g, calculate the mass proportion of broken grains by the following formula, and round it off to the nearest integer.

$$D = \frac{W_1}{W_0} \times 100$$

where

D is the mass proportion of broken grains (%);
W_0 is the mass of the test sample, weighed in 5.7 a) (g) ;
W_1 is the mass of broken grains, sorted out in 5.8 (g).

5.9 Chalky grains

Visually sort out chalky grains from the test sample of 5.7 a). Weigh them to the nearest 0.1g, calculate the mass proportion of chalky grains by the following formula, and round it off to the nearest integer.

$$E = \frac{W_1}{W_0} \times 100$$

where

E is the mass proportion of chalky grains (%);
W_0 is the mass of the test sample, weighed in 5.7 a) (g) ;
W_1 is the mass of chalky grains, sorted out in 5.9 (g).

5.10 Water-soaked crack grains

The measurement of the proportion of water-soaked crack grains in number shall be as follows.

a) Pick out 100 grains from the test sample of 5.7 a) after carrying out the tests from 5.7 to 5.9, and soak them in water at ordinary temperature (15 °C to 25 °C) for 20 min.

b) Visually sort out grains with a crack which is equal to or longer than half of the grain width, and calculate the proportion of water-soaked crack grains in number by the following formula.

$$F = \frac{N}{100} \times 100$$

where

F is the proportion of water-soaked crack grains in number (%);
N is the number of water-soaked crack grains.

5.11 Testing procedure

The flowchart of testing from 5.2 to 5.10 is given in Figure 1

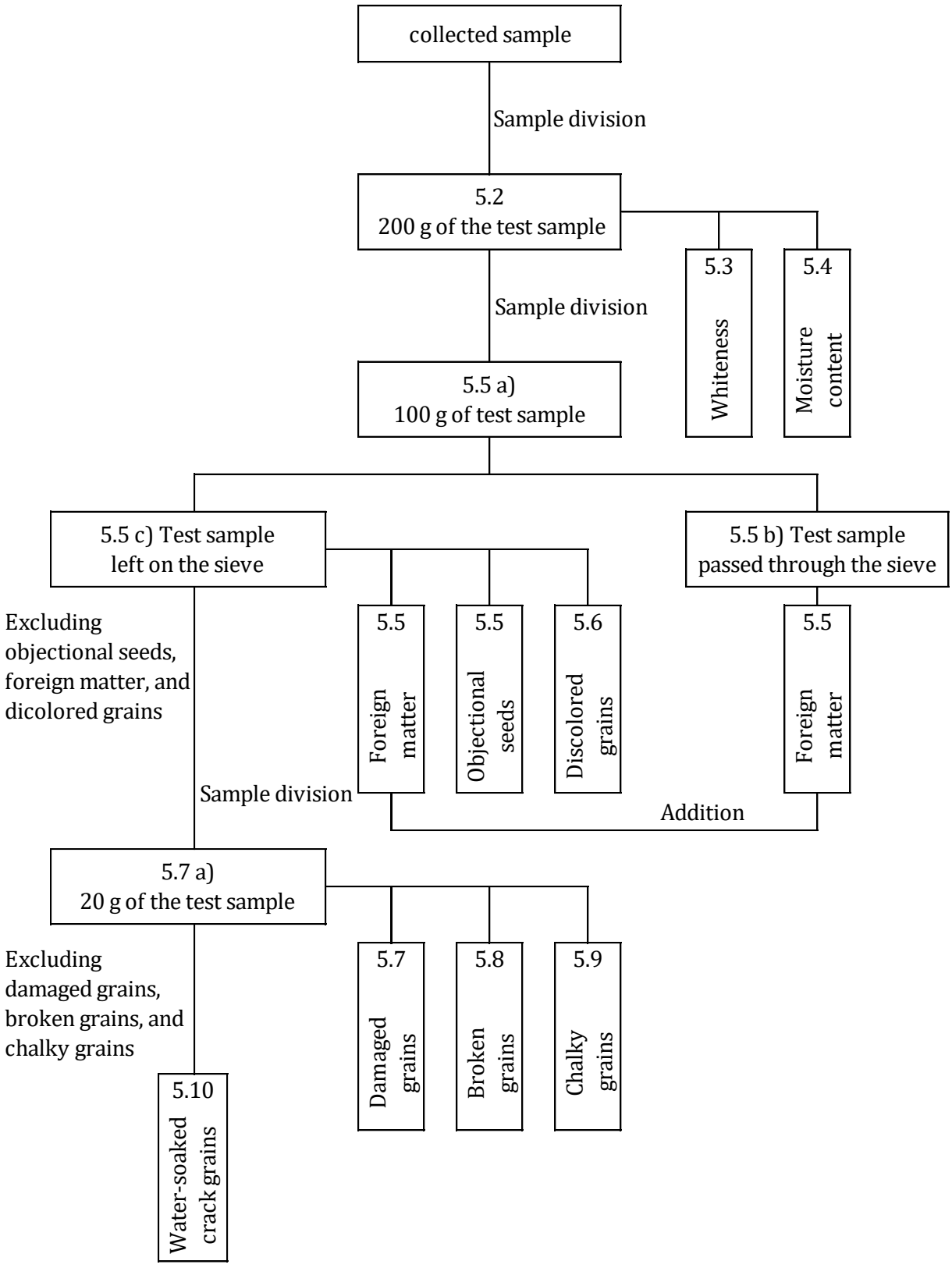

Figure 1 — Flowchart of testing

Annex A
(informative)

Examples of discolored grains, damaged grains, broken grains and chalky grains

Examples of discolored grains, damaged grains, broken grains and chalky grains are given in Figure A.1 to Figure A.4, respectively.

Figure A.1 — Examples of discolored grains

Figure A.2 — Examples of damaged grains

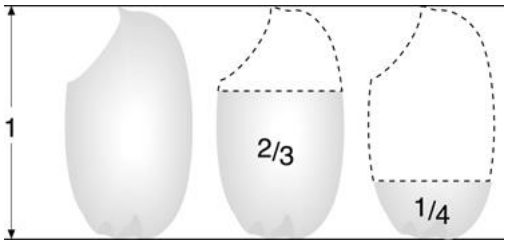

Figure A.3 — Examples of broken grains

Figure A.4 — Examples of chalky grains