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Rice — Specification

Riz — Spécifications

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 7301 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 4, *Cereals and pulses*.

This third edition cancels and replaces the second edition (ISO 7301:2002), which has been technically revised.

Rice — Specification

1 Scope

This International Standard gives the minimum specifications for rice (*Oryza sativa* L.) which is subject to international trade. It is applicable to the following types: husked rice and milled rice, parboiled or not, intended for direct human consumption. It is neither applicable to other products derived from rice, nor to waxy rice (glutinous rice).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 712, *Cereals and cereal products — Determination of moisture content — Reference method*

3 Terms and definitions

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

3.1
paddy
paddy rice
rough rice
rice retaining its husk after threshing

3.2
husked rice
brown rice
cargo rice
paddy from which the husk only has been removed

NOTE The processes of husking and handling may result in some loss of bran.

3.3
milled rice
white rice
husked rice from which almost all of the bran and embryo have been removed by milling

3.3.1
undermilled rice
milled rice obtained by milling husked rice, but not to the degree necessary to meet the requirements of well-milled rice

3.3.2
well-milled rice
milled rice obtained by milling husked rice in such a way that most of the bran and part of the embryo have been removed

3.3.3
extra-well-milled rice
milled rice obtained by milling husked rice in such a way that almost all of the bran and the embryo have been removed

3.4
parboiled rice
husked or milled rice processed from paddy or husked rice that has been soaked in water and subjected to a heat treatment so that the starch is fully gelatinized, followed by a drying process

3.5
waxy rice
glutinous rice
varieties of rice whose kernels have a white and opaque appearance

NOTE The starch of waxy rice consists almost entirely of amylopectin. The kernels have a tendency to stick together after cooking.

3.6
whole kernel
husked or milled kernel without any broken part, or part of kernel with a length greater than or equal to nine-tenths of the **average length** (3.12) of the test sample kernels

NOTE See Figure 1.

3.7
head rice
whole kernel (3.6) or part of kernel with a length greater than or equal to three-quarters of the **average length** (3.12) of the test sample kernels

NOTE See Figure 1.

3.8
large broken kernel
part of kernel with a length less than three-quarters but greater than one-half of the **average length** (3.12) of the test sample kernels

NOTE See Figure 1.

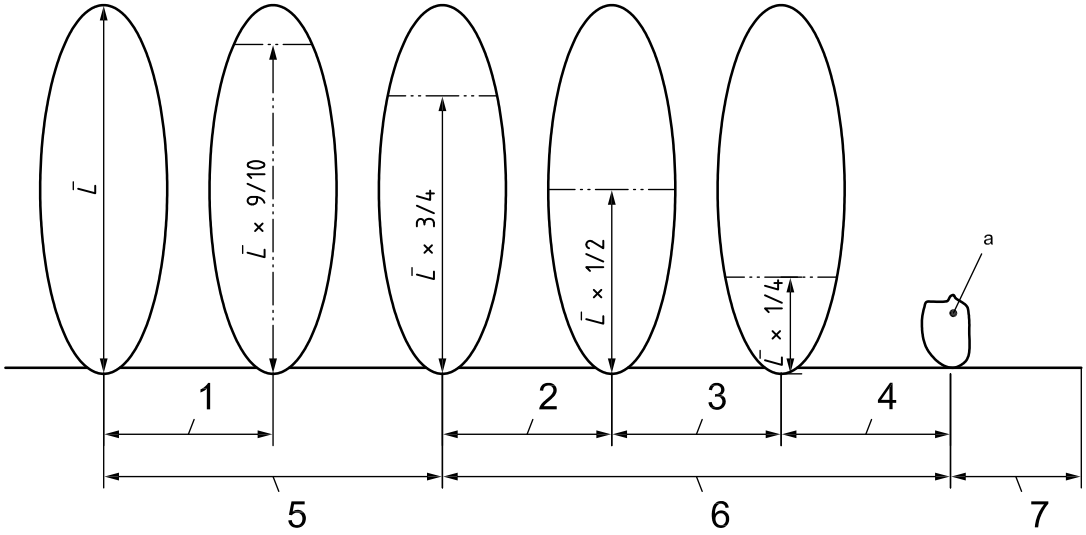
3.9
medium broken kernel
part of kernel with a length less than or equal to one-half but greater than one-quarter of the **average length** (3.12) of the test sample kernels

NOTE See Figure 1.

3.10
small broken kernel
part of kernel with a length less than or equal to one-quarter of the **average length** (3.12) of the test sample kernels but which does not pass through test sieve with round apertures having diameter 1,4 mm

NOTE See Figure 1.

3.11
chip
part of kernel which passes through a test sieve complying with ISO 5223[1], and with round apertures having diameter 1,4 mm



Key

1	whole kernel (3.6)	5	head rice (3.7)
2	large broken kernel (3.8)	6	broken kernel
3	medium broken kernel (3.9)	7	chips (3.11)
4	small broken kernel (3.10)	$\bar{L}$	average length

[a] Not passing through a test sieve with round apertures having diameter 1,4 mm.

Figure 1 — Size of kernels, broken kernels and chips

3.12
average length
$\bar{L}$
arithmetic mean of the length of the test sample kernels that are not immature or malformed and without any broken parts

NOTE 1 See definition of **immature kernel** or **malformed kernel** (3.16)

NOTE 2 Calculation of the average length is given in A.4.3.2.

3.13
extraneous matter
inorganic and organic components other than whole or broken kernels of rice

3.13.1
inorganic extraneous matter
inorganic components, such as stone, sand and dust

3.13.2
organic extraneous matter
extraneous matter including edible and non-edible

3.13.2.1
edible organic extraneous matter
extraneous matter, such as bran, non-toxic foreign seeds, flour lumps, and other food

3.13.2.2
non-edible organic extraneous matter
extraneous matter, including husks, pieces of straw, and impurities of animal origin, such as dead insects and their fragments

3.14
heat-damaged kernel
head rice or broken kernel that has changed its normal colour as a result of microbiological heating

NOTE This category includes kernel that is yellow to dark yellow in the case of non-parboiled rice and orange to dark orange in the case of parboiled rice, due to a microbiological alteration.

3.15
damaged kernel
head rice or broken kernel showing evident deterioration due to moisture, pests, disease or other causes, but excluding **heat-damaged kernels** (3.14)

3.16
immature kernel
malformed kernel
head rice or broken kernel which is unripe or badly developed

3.17
chalky kernel
head rice or broken kernel of non-parboiled rice, except **waxy rice** (3.5), whose whole surface has an opaque and floury appearance

3.18
red kernel
head rice or broken kernel having a red bran covering more than one-quarter of its surface

3.19
red-streaked kernel
head rice or broken kernel with red bran streaks of length greater than or equal to one-half of the **average length** (3.12), but where the surface covered by these red streaks is less than one-quarter of the total surface

3.20
partly gelatinized kernel
head rice or broken kernel of parboiled rice which is not fully gelatinized and shows a distinct white opaque area

3.21
peck
head rice or broken kernel of parboiled rice of which more than one-quarter of the surface is dark brown or black in colour due to the parboiling process

4 Specifications

4.1 General, sensory and health specifications

Kernels of rice, husked or milled, broken or not, shall be sound, clean and free from foreign odours or odour which indicates deterioration. They shall also be free from toxic or any harmful matter.

The level of additives and pesticides and other contaminants shall not exceed the maximum limits permitted by the national regulations of the country of destination or, in their absence, by CAC/MRL 1[8] and associated database, CAC/MRL 2[9], and CAC/MRL 3[10] (developed by FAO/WHO Codex Alimentarius).

Living insects which are visible to the naked eye shall not be present.

4.2 Physical and chemical specifications

4.2.1 The mass fraction of moisture shall be not greater than 15,0 %.

NOTE Lower moisture contents can be required for certain destinations depending on the climate, duration of transport and storage. For further details, see ISO 6322-1[2], ISO 6322-2[3], and ISO 6322-3[4].

4.2.2 The physical specifications shall be determined in accordance with the method specified in Annex A and shall not exceed the limits given in Table 1.

4.3 Contract specifications

All commercial contracts shall show clearly the:

a) total percentage of broken kernels permitted, classified according to the agreed categories, and the relative proportion of each category;

b) total percentage permitted, not exceeding the maximum values for the specifications detailed in Table 1, determined in accordance with the method described in Annex A.

If the contract deals with a specific kind of rice or a specific variety of rice, in order to evaluate the homogeneity of the lot, the contract can specify both the average length and its related coefficient of variation, determined according to A.4.3.2 and A.4.3.3, respectively.

Specifications shall be determined in accordance with the method described in Annex A.

5 Test methods

The moisture content shall be determined in accordance with ISO 712.

The other tests shall be carried out using the methods specified in Annexes A and B.

6 Packaging

The packaging material shall not transmit any smell or taste and shall not contain substances which may damage the product or constitute a health risk. If bags are used, they shall be clean, sufficiently strong and well stitched or sealed.

Table 1 — Contract specifications

Specification (definition reference)	Husked rice non-parboiled	Milled rice non-parboiled	Husked rice parboiled	Milled rice parboiled
Inorganic extraneous matter (3.13.1), % mass fraction	0,5	0,5	0,5	0,5
Organic extraneous matter (3.13.2), % mass fraction	1,0	0,5	1,0	0,5
Paddy (3.1), % mass fraction	2,5	0,3	2,5	0,3
Husked rice non-parboiled (3.2), % mass fraction	—	1,0	1,0	1,0
Milled rice non-parboiled (3.3), % mass fraction	1,0	—	1,0	1,0
Husked rice parboiled (3.2, 3.4), % mass fraction	1,0	1,0	—	1,0
Milled rice parboiled (3.3, 3.4), % mass fraction	1,0	1,0	1,0	—
Chip (3.11), % mass fraction	0,1	0,1	0,1	0,1
Heat-damaged kernel (3.14), % mass fraction	2,0[a]	2,0	2,0[a]	2,0
Damaged kernel (3.15), % mass fraction	4,0	3,0	4,0	3,0
Immature or malformed kernel (3.16), % mass fraction	8,0	2,0	8,0	2,0
Chalky kernel (3.17), % mass fraction	5,0[a]	5,0	—	—
Red kernel and red-streaked kernel (3.18, 3.19), % mass fraction	12,0[b]	12,0	12,0[b]	12,0
Partly gelatinized kernel (3.20), % mass fraction	—	—	11,0[a]	11,0
Peck (3.21), % mass fraction	—	—	4,0	2,0
Waxy rice (3.5), % mass fraction	1,0[a]	1,0	1,0[a]	1,0

— Not applicable.

[a] After milling.

[b] Only full red husked (cargo) rice is considered here.

Annex A
(normative)

Methods of analysis for rice specifications

A.1 Principle

Manual separation and weighing of the broken kernels and of the categories in Table 1.

A.2 Apparatus

A.2.1 **Sample divider**, conical sampler or multiple-slot sampler with a distribution system.

EXAMPLE Sample divider specified in ISO 24333[6].

A.2.2 **Test sieve**, with round apertures of diameter 1,4 mm, ISO 5223[1].

A.2.3 **Tweezers**, **scalpel**, and **paintbrush**.

A.2.4 **Small bowls**.

A.2.5 **Balance**, capable of being read to the nearest 0,01 g.

A.2.6 **Tray**, or other means, coloured in contrast with the colour of the rice to be evaluated.

A.2.7 **Micrometer**, or other measuring device not deforming the kernels, capable of being read to the nearest 0,01 mm.

A.3 Sampling

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 24333[6].

It is important the laboratory receive a truly representative sample which has not been damaged or changed during transport or storage.

A.4 Procedure

A.4.1 General

Note if an odour, particular or foreign to rice, is detected, as well as the presence of all anomalies.

Verify the presence of living or dead insects by visual examination and report their number.

A.4.2 Preparation of the test sample

Weigh and carefully mix the laboratory sample to make it as homogeneous as possible. Then reduce it, if necessary, using a sample divider (A.2.1) to obtain a test sample of about 800 g.

Divide the obtained test sample into two equal test portions of about 400 g, using the sample divider (A.2.1).

A.4.3 Determination

A.4.3.1 General

When a kernel or a part of kernel can be classified in more than one category with reference to Table 1, it shall be classified in the category where the maximum permissible value is the lowest. All parts of kernels which get stuck in the apertures of a test sieve shall be considered as being retained by the test sieve.

A.4.3.2 Average length (3.12)

On one of the two test portions (A.4.2):

a) separate two sets of 100 kernels without any broken part, by random sampling;

b) measure the length of the kernels using the micrometer (A.2.7) and calculate the arithmetic means of the length for both sets of kernels ($\overline{L}_1$ and $\overline{L}_2$);

c) calculate the average length $\overline{L}$ (3.12) of the two sets of kernels $(\overline{L}_1 + \overline{L}_2)/2$; if the value of $100\,(\overline{L}_1 - \overline{L}_2)/\overline{L}$ is higher than 2, return all the kernels to the tray and repeat from step a);

d) return all the kernels to the test portion.

A.4.3.3 Coefficient of variation of the length

From the measures of kernels in A.4.3.2 b), calculate the coefficient of variation as follows.

The values are:

$$L_1, L_2 \ldots L_i \ldots L_n$$

where L_i is the length of a single rice kernel.

The arithmetic mean is given by:

$$\overline{L} = \frac{\sum_{i=1}^{n} L_i}{n}$$

The standard deviation is given by:

$$s = \sqrt{\frac{\sum_{i=1}^{n} L_i^2 - \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{n}}{n-1}}$$

The coefficient of variation, expressed as a percentage, is given by

$$C_V = \frac{s}{\overline{L}} \times 100\ \%$$

Usually, the coefficient of variation of an homogeneous lot of rice does not exceed a value of 5 %.

A.4.3.4 Husked rice, non-parboiled (see Figure A.1)

Weigh one of the test portions (A.4.2) to the nearest 0,1 g, record the mass as m_w, and spread it on the tray (A.2.6). Separate the inorganic extraneous matter (3.13.1), the organic extraneous matter (3.13.2; 3.13.2.1 and 3.13.2.2), the paddy (3.1), the milled rice non-parboiled (3.3), the husked rice parboiled (3.2 and 3.4) and the milled rice parboiled (3.3 and 3.4), into small bowls (A.2.4), with the aid of tweezers, scalpel and paintbrush (A.2.3). Weigh the six fractions obtained to the nearest 0,01 g, and record the masses as m_1, m_2, m_3, m_4, m_5, and m_6.

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.

Weigh the first aliquot part to the nearest 0,01 g and record the mass as m_x. Spread it out and separate the damaged kernels (3.15), the immature or malformed kernels (3.16) and the red kernels (3.18) into small bowls. Weigh the three fractions obtained to the nearest 0,01 g, and record the masses as m_7, m_8, and m_9.

Weigh the second aliquot part to the nearest 0,01 g and record the mass as m_y. Separate the chips (3.11) by the test sieve (A.2.2), then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (3.8), medium broken kernels (3.9), and small broken kernels (3.10). Put the fractions obtained into small bowls. Weigh the four fractions to the nearest 0,01 g and record the masses as m_{10}, m_{11}, m_{12}, and m_{13}.

Proceed with the laboratory milling of the third aliquot part. Weigh the obtained milled rice to the nearest 0,01 g and record the mass as m_z. Spread it out and separate the heat-damaged kernels (3.14), the chalky kernels (3.17) and waxy rice (3.5) into small bowls. Weigh the three fractions obtained to the nearest 0,01 g and record the masses as m_{14}, m_{15}, and m_{16}.

A.4.3.5 Milled rice, non-parboiled (see Figure A.2)

Weigh one of the test portions (A.4.2) to the nearest 0,1 g, record the mass as m_w, and spread it on the tray (A.2.6). Separate the inorganic extraneous matter (3.13.1), the organic extraneous matter (3.13.2; 3.13.2.1 and 3.13.2.2), the paddy (3.1), the husked rice non-parboiled (3.2), the husked rice parboiled (3.2 and 3.4) and the milled rice parboiled (3.3 and 3.4) into small bowls (A.2.4), with the aid of tweezers, scalpel and paintbrush (A.2.3). Weigh the six fractions obtained to the nearest 0,01 g and record the masses as m_1, m_2, m_3, m_4, m_5, and m_6.

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.

Weigh the first aliquot part to the nearest 0,01 g and record the mass as m_x. Spread it out and separate the heat-damaged kernels (3.14), the damaged kernels (3.15), the immature or malformed kernels (3.16), the chalky kernels (3.17), the red kernels (3.18), together with the red-streaked kernels (3.19) and the waxy rice (3.5) into small bowls. Weigh the six fractions obtained to the nearest 0,01 g and record the masses as m_7, m_8, m_9, m_{10}, m_{11}, and m_{16}.

Weigh the second aliquot part to the nearest 0,01 g and record the mass as m_y. Separate the chips (3.11) by the test sieve (A.2.2), then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (3.8), medium broken kernels (3.9) and small broken kernels (3.10). Put the fractions obtained into small bowls. Weigh the four fractions to the nearest 0,01 g and record the masses as m_{12}, m_{13}, m_{14}, and m_{15}.

A.4.3.6 Husked rice, parboiled (see Figure A.3)

Weigh one of the test portions (A.4.2) to the nearest 0,1 g, record the mass as m_w, and spread it on the tray (A.2.6). Separate the inorganic extraneous matter (3.13.1), the organic extraneous matter (3.13.2; 3.13.2.1 and 3.13.2.2), the paddy (3.1), the husked rice non-parboiled (3.2), the milled rice non-parboiled (3.3) and the milled rice parboiled (3.3 and 3.4) into small bowls (A.2.4) with the aid of tweezers, scalpel and paintbrush

(A.2.3). Weigh the six fractions obtained to the nearest 0,01 g and record the masses as m_1, m_2, m_3, m_4, m_5, and m_6.

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.

Weigh the first aliquot part to the nearest 0,01 g and record the mass as m_x. Spread it out and separate the damaged kernels (3.15), the immature or malformed kernels (3.16) and the red kernels (3.18) into small bowls. Weigh the three fractions obtained to the nearest 0,01 g and record the masses as m_7, m_8, and m_9.

Weigh the second aliquot part to the nearest 0,01 g and record the mass as m_y. Separate the chips (3.11) by the test sieve (A.2.2), then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (3.8), medium broken kernels (3.9) and small broken kernels (3.10). Put the four fractions obtained into small bowls. Weigh the fractions to the nearest 0,01 g and record the masses as m_{10}, m_{11}, m_{12}, and m_{13}.

Proceed with the laboratory milling of the third aliquot part. Weigh the milled rice to the nearest 0,01 g and record the mass as m_z. Spread it out and separate the heat-damaged kernels (3.14), the partly gelatinized kernels (3.20) and the pecks (3.21) into small bowls. Weigh the three fractions obtained to the nearest 0,01 g and record the masses as m_{14}, m_{15}, and m_{16}.

Proceed with the milling of the fourth aliquot part and determine the percentage of waxy rice (3.5) according to Annex B.

A.4.3.7 Milled rice, parboiled (see Figure A.4)

Weigh one of the test portions (A.4.2) so obtained to the nearest 0,1 g, record the mass as m_w, and spread it on the tray (A.2.6). Separate the inorganic extraneous matter (3.13.1), organic extraneous matter (3.13.2; 3.13.2.1 and 3.13.2.2), the paddy (3.1), the husked rice non-parboiled (3.2), the milled rice non-parboiled (3.3) and the husked rice parboiled (3.3 and 3.4) into small bowls (A.2.4), with the aid of tweezers, scalpel and paintbrush (A.2.3). Weigh the six fractions obtained to the nearest 0,01 g and record the masses as m_1, m_2, m_3, m_4, m_5, and m_6.

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.

Weigh the first aliquot part to the nearest 0,01 g and record the mass as m_x. Spread it out and separate the heat-damaged kernels (3.14), the damaged kernels (3.15), the immature or malformed kernels (3.16), the red kernels (3.18), together with the red streaked kernels (3.19), the partly gelatinized kernels (3.20) and the pecks (3.21) into small bowls. Weigh the six fractions obtained to the nearest 0,01 g and record the masses as m_7, m_8, m_9, m_{10}, m_{11}, and m_{12}.

Weigh the second aliquot part to the nearest 0,01 g and record the mass as m_y. Separate the chips (3.11) by the test sieve (A.2.2), then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (3.8), medium broken kernels (3.9) and small broken kernels (3.10). Put the fractions obtained into small bowls. Weigh the four fractions to the nearest 0,01 g and record the masses as m_{13}, m_{14}, m_{15}, and m_{16}.

Weigh the third aliquot part to the nearest 0,01 g and determine the percentage of waxy rice (3.5) according to Annex B.

A.5 Expression of results

Report the result obtained for the categories given in Table A.1 as a mass fraction, expressed as a percentage, of the product as received.

Table A.1 — Expression of results

Categories	Husked rice non-parboiled[a]	Milled rice non-parboiled[b]	Husked rice parboiled[c]	Milled rice parboiled[d]
Inorganic extraneous matter (3.13.1)	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$
Organic extraneous matter (3.13.2; 3.13.2.1; 3.13.2.2)	$\frac{m_2 \times 100}{m_w}$	$\frac{m_2 \times 100}{m_w}$	$\frac{m_2 \times 100}{m_w}$	$\frac{m_2 \times 100}{m_w}$
Paddy (3.1)	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$
Husked rice non-parboiled (3.2)	—	$\frac{m_4 \times 100}{m_w}$	$\frac{m_4 \times 100}{m_w}$	$\frac{m_4 \times 100}{m_w}$
Milled rice non-parboiled (3.3)	$\frac{m_4 \times 100}{m_w}$	—	$\frac{m_5 \times 100}{m_w}$	$\frac{m_5 \times 100}{m_w}$
Husked rice parboiled (3.2 and 3.4)	$\frac{m_5 \times 100}{m_w}$	$\frac{m_5 \times 100}{m_w}$	—	$\frac{m_6 \times 100}{m_w}$
Milled rice parboiled (3.3 and 3.4)	$\frac{m_6 \times 100}{m_w}$	$\frac{m_6 \times 100}{m_w}$	$\frac{m_6 \times 100}{m_w}$	—
Heat-damaged kernels (3.14)	$\frac{m_{14} \times 100}{m_z}$	$\frac{m_7 \times 100}{m_x}$	$\frac{m_{14} \times 100}{m_z}$	$\frac{m_7 \times 100}{m_x}$
Damaged kernels (3.15)	$\frac{m_7 \times 100}{m_x}$	$\frac{m_8 \times 100}{m_x}$	$\frac{m_7 \times 100}{m_x}$	$\frac{m_8 \times 100}{m_x}$
Immature or malformed kernel (3.16)	$\frac{m_8 \times 100}{m_x}$	$\frac{m_9 \times 100}{m_x}$	$\frac{m_8 \times 100}{m_x}$	$\frac{m_9 \times 100}{m_x}$
Chalky kernel (3.17)	$\frac{m_{15} \times 100}{m_z}$	$\frac{m_{10} \times 100}{m_x}$	—	—
Partly gelatinized kernel (3.20)	—	—	$\frac{m_{15} \times 100}{m_z}$	$\frac{m_{11} \times 100}{m_x}$
Peck (3.21)	—	—	$\frac{m_{16} \times 100}{m_z}$	$\frac{m_{12} \times 100}{m_x}$
Red and red streaked kernel (3.18) and (3.19)	$\frac{m_9 \times 100}{m_x}$	$\frac{m_{11} \times 100}{m_x}$	$\frac{m_9 \times 100}{m_x}$	$\frac{m_{10} \times 100}{m_x}$
Waxy rice (3.5)	$\frac{m_{16} \times 100}{m_z}$	$\frac{m_{16} \times 100}{m_x}$	$\frac{m_{17} \times 100}{m_{17} + m_{18}}$	$\frac{m_{17} \times 100}{m_{17} + m_{18}}$
Large broken kernel (3.8)	$\frac{m_{10} \times 100}{m_y}$	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{10} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$
Medium broken kernel (3.9)	$\frac{m_{11} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{11} \times 100}{m_y}$	$\frac{m_{14} \times 100}{m_y}$
Small broken kernel (3.10)	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{14} \times 100}{m_y}$	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{15} \times 100}{m_y}$
Chip (3.11)	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{15} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{16} \times 100}{m_y}$
Average length (A.4.3.2)	$\bar{L}$	$\bar{L}$	$\bar{L}$	$\bar{L}$
Coefficient of variation of the length (A.4.3.3)	C_V	C_V	C_V	C_V

[a] For the meaning of the symbols, refer to the scheme of procedure given in Figure A.1.
[b] For the meaning of the symbols, refer to the scheme of procedure given in Figure A.2.
[c] For the meaning of the symbols, refer to the scheme of procedure given in Figure A.3.
[d] For the meaning of the symbols, refer to the scheme of procedure given in Figure A.4.

Report the result for each category to one decimal place by rounding it to the nearest integral multiple. If there are two successive integral multiples equally near to the given number, the even integral multiple should be selected as the rounded number. Carry out the rounding always in one step.

Although ISO 80000-1[7] specifies two different rules for rounding if there are two successive integral multiples equally near to the given number, for the purposes of this International Standard the above-mentioned rule (i.e. ISO 80000-1[7], rule A) should be used, as in this way the rounding errors are minimized.

EXAMPLES

Given number	Rounded number
18,23	18,2
18,26	18,3
18,37	18,4
18,25	18,2
18,35	18,4
18,347	18,3
18,251	18,3

A.6 Test report

The test report shall contain at least the following information:

a) all information necessary for the complete identification of the sample;

b) the sampling method used, if known;

c) the sample mass;

d) the test method used, with reference to this International Standard (ISO 7301:2011);

e) the date of analysis;

f) any operating details not specified in this annex, or regarded as optional, together with details of any incidents likely to have influenced the results;

g) the test results obtained.

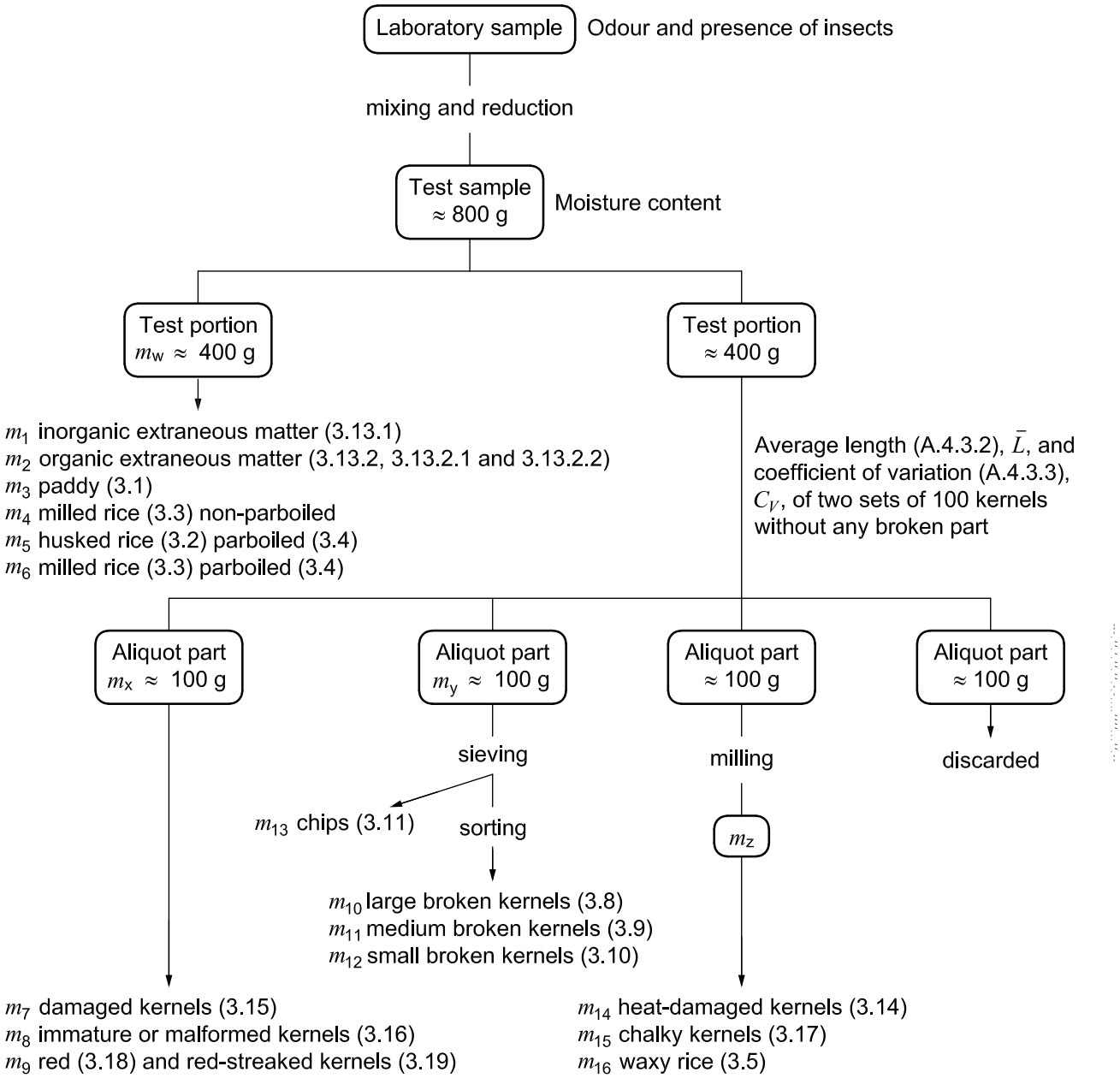


Figure A.1 — Scheme of procedure for husked rice non-parboiled

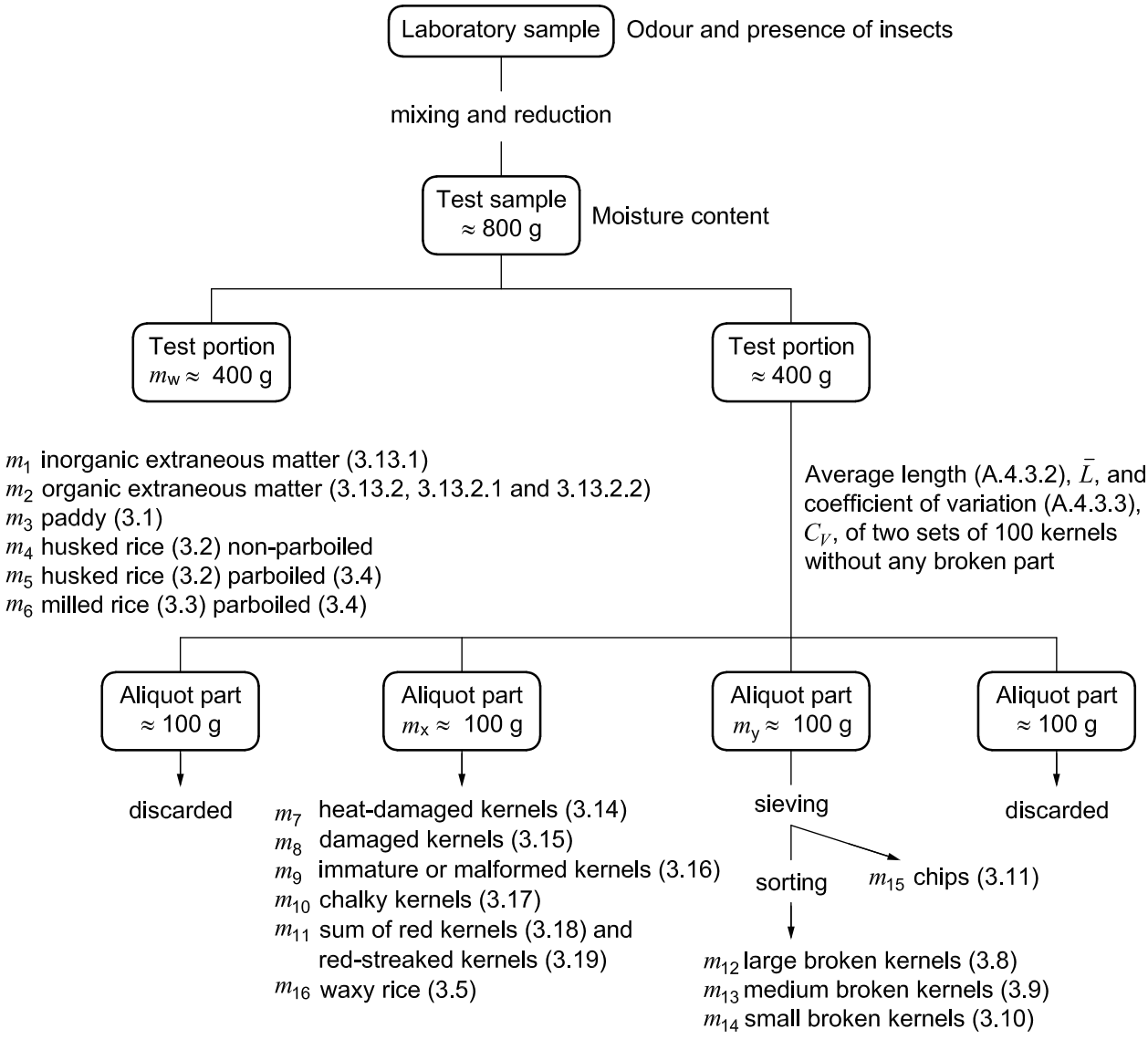


Figure A.2 — Scheme of procedure for milled rice non-parboiled

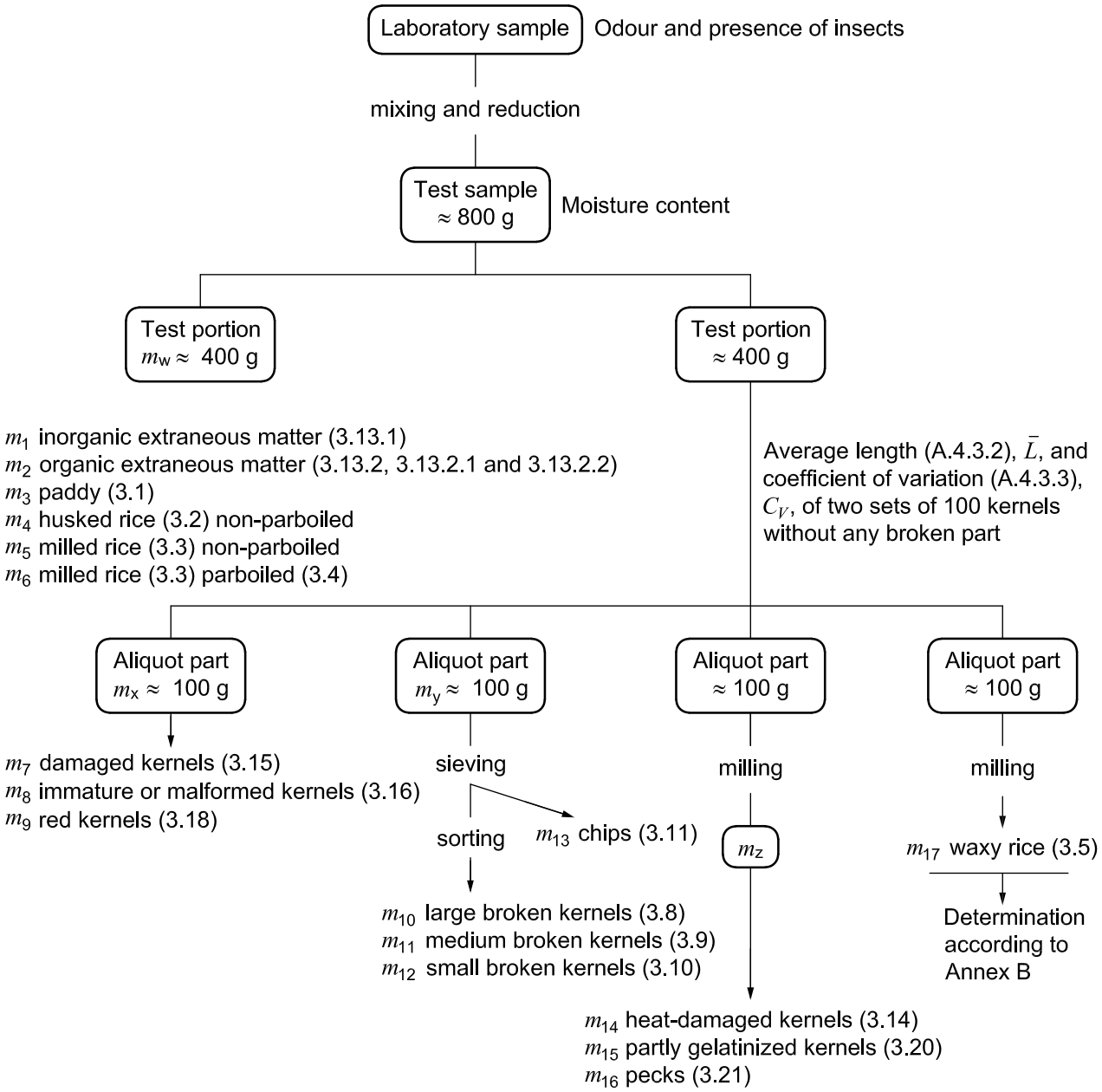


Figure A.3 — Scheme of procedure for husked rice parboiled

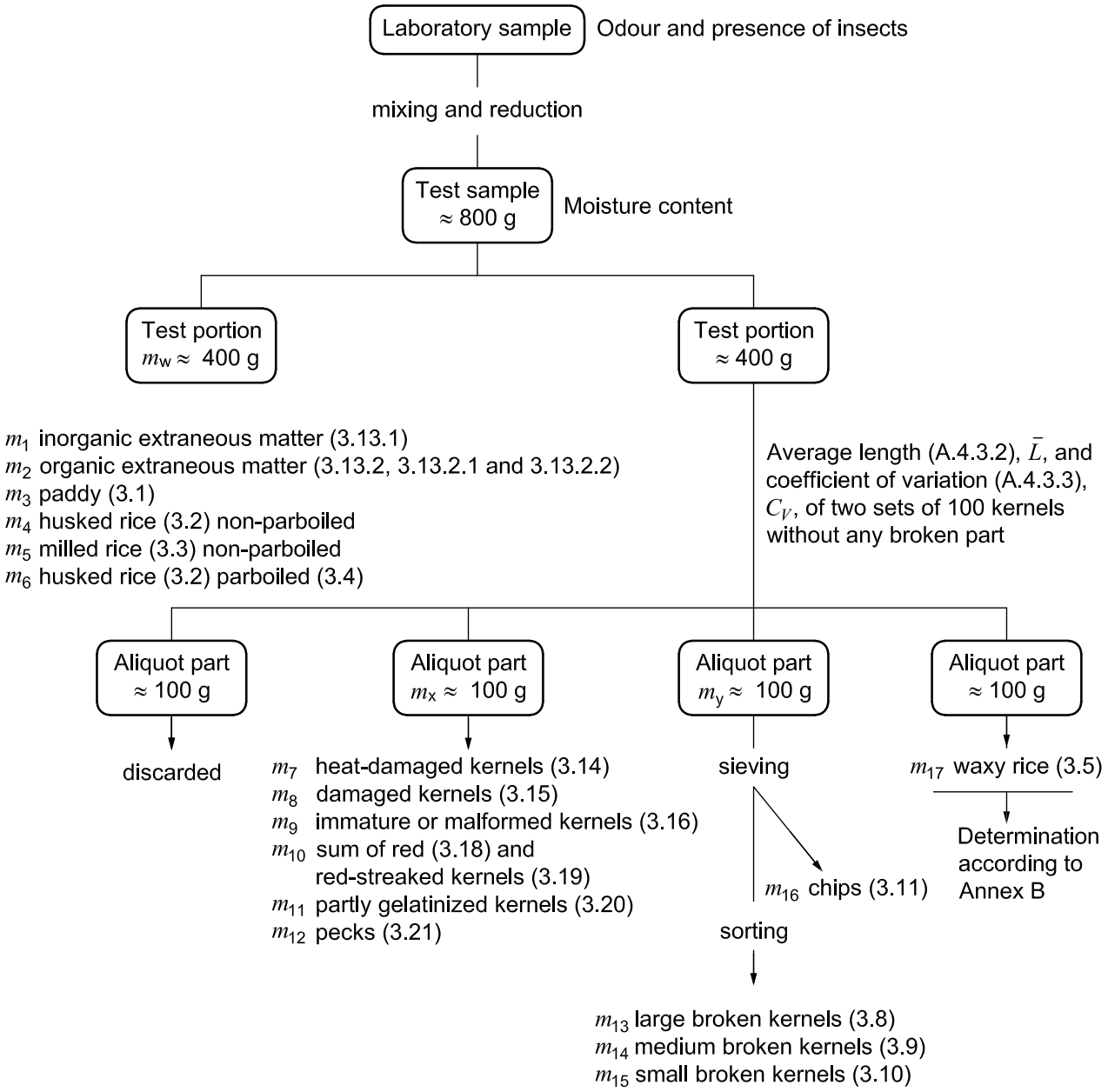


Figure A.4 — Scheme of procedure for milled rice parboiled

Annex B
(normative)

Determination of waxy rice in parboiled rice

B.1 Principle

Waxy rice kernels have a reddish brown colour when stained in an iodine solution, while non-waxy rice kernels show a blue colour.

B.2 Reagents and materials

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity.

B.2.1 Iodine stock solution, containing 0,2 g iodine and 2,0 g potassium iodide in 100 ml water.

B.2.2 Iodine working solution, dilute the stock solution (B.2.1) two times (by volume) with water. Prepare daily.

B.2.3 Tissue paper.

B.3 Apparatus

B.3.1 Balance, capable of being read to the nearest 0,01 g.

B.3.2 Glass beaker, capacity 250 ml.

B.3.3 Small white-coloured bowls, or any white-coloured container.

B.3.4 Wire basket.

B.3.5 Stirrer rod.

B.3.6 Tweezers or forceps.

B.4 Sampling

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 24333[6].

It is important the laboratory receive a truly representative sample which has not been damaged or changed during transport or storage.

B.5 Determination

B.5.1 Weigh a portion of about 100 g milled rice and put it into a glass beaker (B.3.2).

B.5.2 Add approximately 80 ml of iodine working solution (B.2.2) to soak the kernels and stir until all the kernels are submerged under the solution. Let the kernels soak in the solution for 30 s.

B.5.3 Pour the rice and solution into a wire basket (B.3.4) and shake the basket slightly in order to drain out the solution. Then place the basket on a piece of tissue paper (B.2.3) to absorb the excess liquid.

B.5.4 Pour the stained kernels into a bowl (B.3.3). Separate the reddish brown kernels of waxy rice from the dark blue kernels of non-waxy rice.

B.5.5 Weigh the waxy rice portion, m_{17}, and the non-waxy rice portion, m_{18}, to the nearest 0,1 g.

B.5.6 Calculate the waxy rice content, w, expressed as a percentage mass fraction, from the equation:

$$w = \frac{m_{17}}{m_{17} + m_{18}} \times 100\ \%$$

Bibliography

[1] ISO 5223, *Test sieves for cereals*

[2] ISO 6322-1, *Storage of cereals and pulses — Part 1: General recommendations for the keeping of cereals*

[3] ISO 6322-2, *Storage of cereals and pulses — Part 2: Practical recommendations*

[4] ISO 6322-3, *Storage of cereals and pulses — Part 3: Control of attack by pests*

[5] ISO 6646, *Rice — Determination of the potential milling yield from paddy and from husked rice*

[6] ISO 24333, *Cereals and cereal products — Sampling*

[7] ISO 80000-1, *Quantities and units — Part 1: General*

[8] CAC/MRL 1, *Maximum residue limits (MRLs) for pesticides*. A database is available (viewed 2010-09-29) at: http://www.codexalimentarius.net/pestres/data/pesticides/index.html

[9] CAC/MRL 2, *Maximum residue limits for veterinary drugs in food*

[10] CAC/MRL 3, *Extraneous maximum residue limits* (*EMRLs*)

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