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Cocoa beans — Specification

Fèves de cacao — Spécifications

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 34, *Food products*, Subcommittee SC 18, *Cocoa* (former WG 4, *Cocoa,* of ISO/TC 34).

This second edition cancels and replaces the first edition (ISO 2451:1973), which has been technically revised.

Cocoa beans — Specification

1 Scope

This International Standard specifies the requirements, classification, test methods, sampling, packaging, and marking for cocoa beans.

Recommendations relating to storage and disinfestation are given as a guide in Annexes A and B respectively.

2 Normative references

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

ISO 1114, *Cocoa beans — Cut test*

ISO 2291, *Cocoa beans — Determination of moisture content (Routine method)*

ISO 2292, *Cocoa beans — Sampling*

3 Terms and definitions

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

3.1
adulteration
alteration of the composition of graded cocoa by any means whatsoever so that the resulting mixture or combination is either not of the grade prescribed, or its quality or flavour is injuriously affected, or its bulk or mass is altered

3.2
bean cluster
two or more beans joined together which cannot be separated by using the finger and thumb of both hands

3.3
bean count
total number of whole beans per 100 g derived in accordance with the test method specified in Annex C

3.4
broken bean
cocoa bean of which a fragment is missing, the remaining part being more than half of a whole bean

3.5
cocoa bean
seed of the cocoa tree (*Theobroma cacao* Linnaeus)

Note 1 to entry: Commercially, and for the purposes of this International Standard, the term refers to the whole seed, which has been fermented and dried.

3.6
contamination
presence of a smoky, hammy, or other smell not typical to cocoa, or a substance not natural to cocoa, which is revealed during the cut test or physical inspection of a sample

3.7
cut test
procedure by which the cotyledons of cocoa beans are exposed for the purpose of determining the incidence of defective and/or slaty cocoa beans, and/or violet or purple beans, and/or the presence of contamination within a sample

3.8
defective bean
internally mouldy or insect-damaged bean

3.9
dry cocoa
commercial term designating cocoa beans which have been evenly dried throughout and of which the moisture content corresponds to the specified requirements as in 5.2

3.10
fair fermented beans
cocoa beans that are not more than 10 % slaty and 10 % defective by count of the sample

3.11
flat bean
cocoa bean that is too thin to be cut to give a complete surface of the cotyledons

3.12
foreign matter
any substance other than cocoa beans and residue

3.13
fragment
piece of cocoa bean equal to or less than half the original bean

3.14
germinated bean
cocoa bean of which the shell has been pierced, split, or broken by the growth of the seed-germ

3.15
good fermented beans
cocoa beans that are not more than 5 % slaty and 5 % defective by count of the sample

3.16
insect-damaged/infested bean
a cocoa bean of which the internal parts are found to contain insects or mites at any stage of development, or show signs of damage caused thereby, which are visible to the naked eye

3.17
main crop
the bean count consistent/typical for the main crop period during peak harvest for that particular origin

3.18
mouldy bean
cocoa bean on the internal parts of which mould is visible to the naked eye

Note 1 to entry: Mould is not to be confused with white spot, which is a concentration of theobromine or cocoa fat.

3.19
piece of shell
part of the shell without any of the kernel

3.20
residue
any cocoa element other than whole cocoa beans, flat beans, and clusters which does not pass through the sieve (broken beans, fragments, and pieces of shell) with the exception of husk or placenta which is to be considered as foreign matter

3.21
sieve
screen with round holes the diameter of which shall be 5,0 mm

3.22
sieving
material that passes through the sieve

3.23
slaty bean
cocoa bean that shows a slaty colour on at least half of the surface of the cotyledons exposed by the cut test

3.24
smoky bean
cocoa bean with a smoke-off flavour

Note 1 to entry: A flavour which is reminiscent of wood smoke, acrid smoke, burnt rubber, smoked bacon, or soot.

3.25
violet or purple bean
cocoa bean that shows a violet or purple colour on at least half of the surface of the cotyledons exposed by the cut test

4 Preparation

Cocoa beans shall be fermented and then dried until their moisture content no longer exceeds that specified in 5.2.

5 Requirements

5.1 General requirements

5.1.1 Odour

Lots of cocoa beans shall be free from contamination.

5.1.2 Adulteration

Lots of cocoa beans shall be free from any evidence of adulteration.

5.1.3 Foreign matter

Lots of cocoa beans shall be virtually free from foreign matter.

5.1.4 Living insects and other infestation

Lots of cocoa beans shall be virtually free from living insects, insect eggs, larvae, and any developmental stages, free from mites, rodents, or other types of infestation.

5.1.5 Broken beans, fragments, and pieces of shell

Lots of cocoa beans shall be reasonably free from broken beans, fragments, and pieces of shell.

5.1.6 Violet or purple beans

Lots of cocoa beans shall be within the standard for violet or purple beans, typical of the specified grade or origin.

5.2 Moisture content

The moisture content of lots of cocoa beans on loading in the producing country and on discharge outside the producing country, shall not exceed 7,5 % mass fraction.

5.3 Other quality characteristics

Lots of cocoa beans shall be reasonably

— uniform in size and

— fermented.

Lots of cocoa beans shall be

— fit for production of a foodstuff and

— reasonably free from bean clusters, flat beans, germinated beans, residue, and sieving.

5.4 Grade standards

5.4.1 Classification for cocoa beans

Any lot of cocoa beans shall be classified according to the categories listed below. Either Table 1, Table 2, or Table 3 shall be used for the classification. For all three types of classifications, the proportion of defective beans shall be determined by the test method specified in ISO 1114. As an exception, for the purpose of Table 3, germinated and flat beans shall not be considered defective.

Table 1 — Producing country internal classification for fermented beans

Grade	Percentage of beans		
	Mouldy	Slaty	Insect damaged, germinated, or flat
1	3	3	3
2	4	8	6
The percentages are the maximum. The percentages given in the last column apply to the combined total of all the defects specified in the column header.			

Table 2 — Producing country internal classification for unfermented beans

Grade	Percentage of beans		
	Mouldy	Slaty	Insect damaged, germinated, or flat
1	3	≥20	3
2	4	≥20	6
The percentages are the maximum except for slaty, where the percentage is the minimum. The percentages given in the last column apply to the combined total of all the defects specified in the column header.			

Table 3 — International trade classification for fermented beans

Grade	Percentage of beans	
	Slaty	Mouldy and/or insect damaged
Good fermented	5	5
Fair fermented	10	10
The percentages are the maximum. The percentages given in the last column apply to all the combined total of all defects specified in the column header.		

When a bean has several defects, it shall be classified in one category only, i.e. the least favourable. The decreasing order of gravity is as follows:

— mouldy beans;

— slaty beans;

— insect-damaged beans;

— germinated beans, flat beans (not applicable to Table 3).

5.4.2 Substandard cocoa (applicable to Tables 1 and 2 only)

Any lot of fermented cocoa beans, which exceeds one of the limits accepted for grade 2 shall be regarded as substandard and marked "SS". Any lot of unfermented cocoa beans, which either does not meet the minimum level of slaty specified or exceeds one of the other limits accepted for grade 2 shall be regarded as substandard and marked "SS". Substandard cocoa shall only be marketed under special contract.

5.5 Bean size standards

Bean size is defined by the bean count and is usually expressed by the number of beans per 100 g.

a) Large beans: bean count of less or equal to 100.

b) Medium beans: bean count of 101 to 120.

c) Small beans: bean count greater than 120.

5.6 Sieving standards

The mass of the sieving carried out in accordance with the method specified in Annex D should not exceed 1,5 % of the mass of the whole sample.

6 Sampling

Sampling shall be carried out in accordance with the requirements of ISO 2292.

7 Methods of test

Testing shall be carried out in accordance with the requirements of ISO 1114, ISO 2291, and the methods specified in Annexes C through E.

8 Packaging

Bags for packaging shall be clean, sound, sufficiently strong, and properly sewn.

Cocoa shall be shipped in new bags only.

Bags and liners, if used, shall be of food grade materials.

Ink or paint used for marking shall be food grade.

9 Marking

Each bag of cocoa beans shall be officially sealed. The bag or seal shall show at least the following information:

a) the producing country;

b) the name of the product and the grade or the marks to indicate substandard cocoa ("SS" for English-speaking countries; "HS" for French-speaking countries);

c) any other identification marks necessary according to the national regulations in force;

d) lot number.

Annex A
(informative)

Storage

A.1 Consignments of cocoa beans should be placed in warehouses constructed and used in such a way as to keep their moisture content sufficiently low and consistent with local conditions.

The beans should be stored on gratings or deckings giving a clear space above ground of at least 7 cm for air circulation.

Measures should be taken to prevent infestation by insects, rodents, and other pests.

A.2 The bags of cocoa beans should be stacked in such a way that:

a) individual grades and brands are separated by a passage at least 60 cm wide, similar to that which should be left between the bags and the walls of the warehouse;

b) disinfestation by fumigation and/or careful spraying with suitable insecticides can be carried out if necessary;

c) contamination by odours or flavours, or by dust from other products such as other foods, or by products such as oil, cement, and tar should be avoided.

A.3 Periodically during storage and immediately before shipment, the moisture content of each lot should be checked.

Annex B
(informative)

Disinfestation

If the use of pesticides to control insects, rodents, and other pests in cocoa is necessary, any residues should not exceed the maximum residue limits indicated for the pesticides used as prescribed by the FAO/WHO Codex Committee on Pesticides, FAO/WHO Expert Committee on Pesticide Residues, and by the Government of the importing country. Great care should be exercised in the choice of pesticides and in the technique of their application to avoid incurring risk of tainting or the addition of toxic residues to cocoa.

Annex C
(normative)

Method for assessing the bean count

C.1 Principle

The count is to determine the average number of whole cocoa beans that weigh 100 g.

C.2 Preparation of the test sample

After sieving in accordance with this International Standard, the sample shall be emptied onto a clean, dry, flat surface and then thoroughly mixed.

A test sample of not less than 600 g shall be obtained by using a flat-bottomed shovel drawn across the middle of the whole sample and weighed to the nearest 1 g.

Divide/split the sample to a quarter fraction by using a splitter/divider, or split by quartering by hand. This fraction shall be weighed; the mass can fluctuate but shall be a quarter of the total mass of the entire sample.

C.3 Determination

The residue, foreign matter, flat beans, and any bean clusters shall be removed from the test sample, and then weighed and replaced by an equivalent mass of whole beans taken randomly from the remainder of the whole sample. The total number of beans in the test sample shall then be counted and the resulting number is known as the bean count and shall be expressed by the number of beans per 100 g.

C.4 Expression of result

The bean count, n_{BEAN}, shall be expressed as number of beans per 100 g, as given by Formula (C.1):

$$\text{Bean count} = \frac{n_{\mathrm{WHOLE}} \times 100}{m_{\mathrm{WHOLE}}} \tag{C.1}$$

where

n_{WHOLE} is the number of whole beans;

m_{WHOLE} is the mass of whole beans (g).

Annex D
(normative)

Method for assessing the sievings

D.1 Preparation of the sample

The entire sample[1)] shall be weighed, well mixed, and then sieved through a screen with round holes the diameter of which shall be 5 mm.

The quantity passing through the sieve, which is known as the sieving, shall be collected and weighed.

The percentage of the sieving is obtained by comparing the mass of the sieving against the total net mass of the whole sample multiplied by 100.

Once the measurement has been effected, the matter which has been extracted for testing shall NOT be re-integrated into the arbitration sample[2)].

D.2 Expression of result

The value of the sieving, S (%), is given by Formula (D.1):

$$S = \frac{m \times 100}{m_{\mathrm{TOTAL}}} \tag{D.1}$$

where

m is the mass of the sieving;

m_{TOTAL} is the total mass of the sample.

1) Or divide/split the sample to a quarter fraction by using a splitter/divider, or split by quartering by hand. This fraction shall be weighed; the mass can fluctuate but shall be a quarter of the total mass of the entire sample.

2) The sample from which the test sample used for estimating the sievings were obtained.

Annex E
(normative)

Method for assessing residue, flat beans, bean clusters, foreign matter

E.1 Preparation of the sample

The entire sample[3)] shall be prepared in accordance with the method described in ISO 2292.

E.2 Determination

The entire sample shall be emptied into a tray of sufficient size to facilitate the measurement of residue, flat beans, bean clusters, and foreign matter.

Each category i.e. residue, flat beans, bean clusters, and foreign matter shall be separated, aggregated and weighed and the mass shall be expressed in relation to the mass of the entire sample multiplied by 100.

Once the measurement has been effected, the matter which has been extracted for testing shall NOT be re-integrated into the arbitration sample.

E.3 Expression of result

The quality parameter, P_{QUALITY} (%), is given by Formula (E.1):

$$P_{\mathrm{QUALITY}} = \frac{m_{\mathrm{QP}} \times 100}{m_{\mathrm{TOTAL}}} \tag{E.1}$$

where

m_{QP} is the mass of the quality parameter;

m_{TOTAL} is the total net mass of the sample.

3) Or divide/split the sample to a quarter fraction by using a splitter/divider, or split by quartering by hand. This fraction shall be weighed; the mass can fluctuate but shall be a quarter of the total mass of the entire sample.

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