

# DRAFT UGANDA STANDARD

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## Cereals — Vocabulary

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The Executive Director  
Uganda National Bureau of Standards  
P.O. Box 6329  
Kampala  
Uganda  
Tel: +256 414 333 250/1/2/3  
Fax: +256 414 286 123  
E-mail: [info@unbs.go.ug](mailto:info@unbs.go.ug)  
Web: [www.unbs.go.ug](http://www.unbs.go.ug)

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## Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 203, *Cereals, pulses and related products and processes*

This second edition cancels and replaces the first edition (US 331:2001), which has been technically revised.

It's technically identical with ISO 5527:2015 but includes vocabulary in English only

# Cereals — Vocabulary

## 1 Scope

This Draft Uganda Standard defines terms relating to cereals

The terms are given under the following subheadings:

- 3.1 General terms
- 3.2 Terms relating to physiology
- 3.3 Terms relating to morphology
- 3.4 Terms relating to technology of cereals
- 3.5 Terms relating to cereal products
- 3.6 Terms relating to test and sampling methods

Note 1, See US 330 for a list of principal cereal species with their botanic names and common names.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 General terms

#### 3.1.1

##### **blight**

fungus disease of cereals

#### 3.1.2

##### **bread-making cereals**

cereals that are suitable for making bread and other products

EXAMPLE Wheat, rye, triticale.

### 3.1.3

#### **bulk store**

large store in which grain is stored unpackaged in large quantities

### 3.1.4

#### **bunted grain**

grains filled with a fetid smelling dust comprising the spores of bunts

### 3.1.5

#### **cereals**

grains of plants, usually cultivated, belonging to the *Poaceae* family

Note 1 to entry: A list of these plants is given in ISO 5526.

### 3.1.6

#### **consignment**

physical quantity of grain on offer, dispatched or received at one time, and covered by a particular contract or shipping document

Note 1 to entry: A consignment may be composed of one or more lots.

### 3.1.7

#### **cultivar**

#### **variety**

unique and uniform member of a species of plant (except for hybrid species) that retains its characteristics from generation to generation through its natural mode of reproduction

### 3.1.8

#### **damaged grain**

whole kernel which is distinctly discoloured or damaged by water, insects, heat or any other causes

### 3.1.9

#### **ear cockle**

nematode seed gall having a blackish brown colouration and containing a mass of small dried-up nematode worms of the species *Anguina tritici*, which become active when immersed in water

Note 1 to entry: This term does not apply to batches of grain containing seeds of corn or purple cockle (*Lychnis githago* Scop. or *Agrostemma githago* L.).

### 3.1.10

#### **ergot**

sclerotium of the fungus *Claviceps purpurea* which may infect wheat but mostly rye

Note 1 to entry: Sclerotia develop in the ear instead of a seed. Sclerotia contain more than 40 poisonous ergot alkaloids.

### 3.1.11

#### **extraneous matter**

fraction consisting of inorganic extraneous matter and organic extraneous matter

### 3.1.12

#### **foreign grain**

seeds, other than cereals, present in the sample or in the lot under consideration

### 3.1.13

#### **fracture**

surface presented by the endosperm of a broken grain, which can be either mealy, semi-vitreous or vitreous in appearance

**3.1.14****fusarium-contaminated grain**

grain of which the pericarp is contaminated by mycelia of *Fusarium* spp

Note 1 to entry: Such grain has a slightly scalded, shrivelled appearance and shows diffuse spots, with badly delimited contours, of pink and/or white colouration.

**3.1.15****grains attacked by pests**

grains which show damage owing to attack by rodents, insects, mites or other pests

**3.1.16****harmful seed****toxic seed**

seeds which, if present in quantities above a certain limit, may have a toxic, harmful, damaging or dangerous effect on health, organoleptic properties or technological performance

**3.1.17****heat damaged grain**

resulting from the effect of heat, grain with a chestnut to black colouration, and of which a section of the endosperm is yellowish-grey or brownish black

**3.1.18****hidden infestation**

those insects which are present within individual grains because either they are at juvenile stages and have developed from eggs laid inside the grains or they have entered the interior of individual grains through cracks or other damage, usually to feed

Note 1 to entry: Hidden infestation is not normally apparent upon first examination of the sample.

**3.1.19****impurities**

damaged grains and all organic and inorganic materials other than cereals grains

Note 1 to entry: The impurities comprise four main categories as follows: damaged grains; other cereals; extraneous matter; harmful and/or toxic seeds, bunted grains and ergot.

**3.1.20****impurity of animal origin**

matter of animal origin (eggs, larvae, nymphs or adults of insects and their fragments, rodent hairs and their fragments, mites and their fragments) separated from the product under specified conditions

**3.1.21****infestation****pest species**

live insect and mite species which, during some stage(s) of their life cycle, are capable of causing damage to the grain

**3.1.22****initial observed infestation**

those free-living insects that are immediately apparent to the eye when the sample is first examined

**3.1.23****mealy fracture**

fracture surface of endosperm that is completely loose in texture and starchy in appearance

**3.1.24****moth**

species of the order *Lepidoptera* (*Heterocera*), which are less brightly coloured than butterflies and fly mainly at night

Note 1 to entry: Butterflies (*Rhopalocera*) and moths (*Heterocera*) belong to the same order *Lepidoptera*, but butterflies are not encountered in grain storage.

#### **3.1.25**

##### **mouldy grains**

grains with moulds visible to the naked eye on 50 % of the surface and/or inside the kernel

#### **3.1.26**

##### **packed unit**

quantity of grain or milled product packed in a bag or a retail pack

#### **3.1.27**

##### **pericarp damage**

primary type of damage that causes kernel to be non-whole, consisting of cracks, cuts, abrasions, and chips or pieces of missing endosperms

#### **3.1.28**

##### **bran**

milling fraction obtained from removal of outer layer of cereals

#### **3.1.29**

##### **seed grain**

grain intended for sowing

#### **3.1.30**

##### **semi-vitreous fracture**

fracture surface of endosperm that is partly mealy and partly vitreous in appearance

#### **3.1.31**

##### **shrivelled grain**

##### **shrunken grains**

grains which are poorly filled, light and thin, whose build-up of reserves has been halted due to physiological or pathological factors

#### **3.1.32**

##### **small grains**

sound grains of small size which pass through a sieve of a particular aperture size

#### **3.1.33**

##### **spring cereals**

varieties (cultivars) of cereals which are planted in the spring and which flower in the same spring

#### **3.1.34**

##### **sprouted grain**

grains in which the radicle or plumule is clearly visible to the naked eye

Note 1 to entry: Sprouted grains of cereals (soft wheat, durum wheat, rye and triticale) are not always taken into account as such, but according to the  $\alpha$ -amylase activity which results from their presence and which is expressed as the falling number.

#### **3.1.35**

##### **stress crack**

tiny fissure inside a kernel starting near the centre and extending outward through the vitreous

endosperm but which does not extend all the way outward to the pericarp

#### **3.1.36**

##### **total damaged kernels**

kernels and pieces of grain kernels that are badly ground damaged, weather damaged, damaged by fungi, insect bored, frost damaged, germ damaged, sprout damaged, or otherwise materially damaged

**3.1.37****vitreous fracture**

fracture surface of endosperm that is completely compact and translucent in appearance

**3.1.38****vitreous grain**

whole sound grain having a natural translucent appearance

Note 1 to entry: These are not considered to be impurities.

**3.1.39****waxy cereals**

<wheat, barley, maize, rice, sorghum> cereal with starch composed almost entirely of amylopectine

**3.1.40****weevily grain**

grain attacked by grain weevil (*Sytophilus granarius*)

Note 1 to entry: The weevil lays eggs in stored grain, the larvae feed inside the grain.

**3.1.41****winter cereals**

varieties (cultivars) of cereals which are planted in the autumn and which flower in the next spring

Note 1 to entry: Flowering occurs only if plants are subjected to certain natural and artificial conditions of vernalization usually involving cold treatment, which occurs naturally if planted before winter frost.

**3.1.42****barley**

fruit of the cereal crop *Hordeum vulgare* belonging to the *Poaceae* family

**3.1.43.1****feed barley**

barley whose grains are used for feeding animals

**3.1.43.2****highland barley****hulless barley****naked barley**

mutant caryopsis of cultivated barley belonging to the *Poaceae* family which easily separates from the glume

**3.1.43.3****malting barley**

barley having certain characteristics (physical, chemical, germinative and others) which enable it to be converted to malt

**3.1.43****foxtail millet****millet in husk**

caryopsis of cultivated cereal crop that belongs to the *Poaceae* family

Note 1 to entry: The husk of the caryopsis can be red, orange, yellow, white, purple or black in colour; its fruit is oval, yellow in colour, and may be non-glutinous or glutinous.

**3.1.44****corn****maize**

fruit cereal crop, usually cultivated, belonging to the *Poaceae* family, often tooth-shaped, triangular and almost rounded, usually yellow or white in colour

#### 3.1.44.1

##### **baby corn**

form of corn for human consumption whose young ears are harvested when silks become visible

#### 3.1.44.2

##### **dent corn**

form of corn whose mature kernel has the shape of a horse's tooth with a depression in the crown

#### 3.1.44.3

##### **field corn**

corn whose mature grains — the common commodity corn, mostly flint and dent types — are mainly used for animal feed either directly or as part of a pre-processed feed

#### 3.1.44.4

##### **flint corn**

form of corn whose mature kernel has a smooth, vitreous, appearance and a rather round shape

#### 3.1.44.5

##### **flour corn**

kind of corn whose kernels are composed largely of soft starch instead of vitreous starch

#### 3.1.44.6

##### **genetically modified corn**

##### **GMO**

maize obtained by using recombinant DNA technology, able to transfer specific genes from one organism (e.g. animals, plants, microorganisms) to another, in order to give it one or several new characteristics

#### 3.1.44.7

##### **maize hardness**

amount of vitreous endosperm in the kernel relative to the amount of floury endosperm present in the maize kernel

#### 3.1.44.8

##### **pop corn**

form of corn whose mature kernels have the ability to pop during rapid cooking because of the build-up of internal pressure during rapid heating

#### 3.1.44.9

##### **sweet corn**

form of corn whose kernels have so much sugar and so little starch that they are wrinkled and translucent when dried

#### 3.1.44.10

##### **waxy corn**

##### **glutinous corn**

type of corn which contains less than 5 % mass fraction amylose on dry matter, the rest being amylopectin

#### 3.1.45

##### **rice**

fruits of *Oryza sativa* or *Oryza glaberrima*, of the family *Poaceae*

#### 3.1.45.1

##### **abdominal white rice**

##### **white belly**

head rice with the opaque portion at the ventral surface or the same side of the embryo

**3.1.45.2****aromatic rice**  
**fragrant rice**  
**scented rice**

rice varieties containing a natural aromatic odour different to other rice varieties which especially appears after cooking

**3.1.45.3****brown rice**  
**cargo rice**  
**hulled rice**  
**husked rice**  
**loonzain rice**

paddy from which the husk only has been removed

Note 1 to entry: The processes of husking and handling may result in some loss of bran.

Note 2 to entry: For convenience and classification purposes, this entry is identical to that of [3.5.3.1](#).

**3.1.45.4****chalky kernel**

head rice (except waxy rice) whose whole surface has an opaque and floury appearance

**3.1.45.5****chip**

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

**3.1.45.6****damaged kernel**

head rice showing evident deterioration due to moisture, pests, disease or other causes.

**3.1.45.7****extra well-milled rice**

husked rice obtained by milling in such a way that all of the husk and almost all of the embryo have been removed

**3.1.45.8****genetically modified rice**

rice obtained by using recombinant DNA technology, able to transfer specific genes from one organism (e.g. animals, plants, microorganisms) to another, in order to give it one or several new characteristics

**3.1.45.9****glutinous rice**  
**waxy rice**

type of rice whose kernels have a white and opaque appearance

Note 1 to entry: The starch of waxy rice consists almost entirely of amylopectin. After cooking, the kernels tend to stick together.

**3.1.45.10****grain chalkiness**

head rice whose a part of the endosperm is not translucent (except waxy rice)

**3.1.45.11****head rice**

whole kernel or portion of kernel with a length greater than or equal to three-quarters of the average length of the test sample kernels

**3.1.45.12****hull****husk**

envelope, flowering glumes and glumes, which encloses the whole kernel

**3.1.45.13****immature rice kernel**

head rice which is unripe and badly developed

**3.1.45.14****large broken kernel**

part of kernel with a length less than three-quarters but greater than one-half of the average length of the test sample kernels

**3.1.45.15****long-grain glutinous rice**

fruits of long-grain and glutinous paddy rice, which generally is oval or long and thin in shape and whose kernels have a white and opaque appearance

Note 1 to entry: The starch of waxy rice consists almost entirely of amylopectin. The kernels have a tendency to stick together after cooking.

**3.1.45.16****long-grain non-glutinous rice**

fruit of non-glutinous paddy rice, generally is oval or long and thin in shape, and has relative low stickiness and high expansibility

**3.1.45.17****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 of the test sample kernels

**3.1.45.18****medium to short-grain non-glutinous rice**

fruit of medium to short-grain non-glutinous paddy rice, which kernel generally is oval or round type in shape

**3.1.45.19****milled rice****white rice**

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

**3.1.45.20****non-glutinous rice****non-waxy rice**

type of rice having a translucent endosperm whose starch contains amylopectin and amylose

Note 1 to entry: The more amylose non-glutinous rice contains, the more sticky it is after cooking.

**3.1.45.21****paddy rice****rough rice**

fruits of cultivated paddy rice, including its husk and caryopsis, as harvested

**3.1.45.22****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

**3.1.45.23****partly gelatinized kernel**

parboiled rice which is not fully gelatinized and shows an endosperm white and opaque areas

**3.1.45.24****peck****pecky kernel**

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 or rice which has brown/black colouration due to bacterial or fungal diseases

**3.1.45.25****red kernel**

head rice having red bran

**3.1.45.26****red streaked rice**

head rice or broken kernel rice with red streaks of length greater than or equal to half of the kernel length

**3.1.45.27****short-grain glutinous rice**

fruits of short-grain and glutinous paddy, which generally is oval in shape, varieties of rice whose kernels have a white and opaque appearance

Note 1 to entry: The starch of waxy rice consists almost entirely of amylopectin. The kernels have a tendency to stick together after cooking.

**3.1.45.28****small broken kernel**

part of kernel with a length less than a quarter of the average length of the test sample kernels

**3.45.29****well milled rice**

husked rice with most of the husk and the embryo removed by milling

**3.1.45.30****white back rice**

husked rice whose dorsal surface located on the opposite side of the embryo is partially chalky

**3.1.45.31****white core rice**

husked rice partially chalky at the centre part of the endosperm

**3.1.45.32****whole kernels**

grains without any broken part or piece of grains having a length greater than or equal to nine-tenths of the average length of test sample kernels

Note 1 to entry: Average length: arithmetic mean of the test sample kernels that are not immature or malformed and without any broken parts.

**3.1.46****wheat**

straw cereal crop sown in winter or spring

Note 1 to entry: The mature plant is characterized by a spike and grain is a naked caryopsis more or less red or white and ovoid.

#### **3.1.46.1**

##### **alternative wheat**

##### **late autumn wheat, en GB**

##### **winter wheat, en GB**

wheat sown equally well during the autumn or winter

#### **3.1.46.2**

##### **blending wheat**

wheat with special characteristics, mixed in small quantities to others to produce flour better suited for its intended purpose

#### **3.1.46.3**

##### **bread wheat**

##### **bread-making wheat**

common wheat which has the appropriate physical, chemical, rheological and other properties for a bread product (such as leavened bread)

#### **3.1.46.4**

##### **wheat broken grains**

grains in which part of the endosperm is exposed, or grains without germ

#### **3.1.46.5**

##### **durum wheat shrivelled grains**

shrivelled (shrunken), light, thin whole grains, in which accumulation of nutritive elements is finished owing to physiological and pathological influences, and which pass through a specific sieve for each species of grain

#### **3.1.46.6**

##### **feed wheat**

wheat whose grains are used for feeding animals

#### **3.1.46.7**

##### **genetically modified wheat**

wheat obtained by using recombinant DNA technology, able to transfer specific genes from one organism (e.g. animals, plants, microorganisms) to another, in order to give it one or several new characteristics

#### **3.1.46.8**

##### **hard wheat**

wheat with kernels having a high hardness criterion

#### **3.1.46.9**

##### **medium hard wheat**

wheat with medium gluten content, and a medium hard texture

#### **3.1.46.10**

##### **mottled grains**

##### **sick grains**

##### **sick wheats**

grains which show, at places other than on the germ itself, colourations between brown and brownish black, including in the crease

Note 1 to entry: Sick wheat is not considered to be an impurity except for durum wheat.

#### **3.1.46.11**

##### **non-wholly-vitreous grain**

##### **partly vitreous grain**

grain which is partially vitreous

Note 1 to entry: This expression is used to indicate a defect affecting durum wheat.

**3.1.46.12****smutty grains**

grains coloured on the outside by the presence of spores of smuts (*Ustilago* spp.)

Note 1 to entry: Smutty grains should not be confused with grains simply soiled with earth or dust. This distinction can only be made by microscope.

Note 2 to entry: Spores are often clustered in the hairs of wheat brush.

**3.1.46.13****bunted grains**

grains coloured on the outside by the presence of brown-black spores of bunt (*Tilletia* spp.)

Note 1 to entry: Both *Tilletia foetida* and *Tilletia caries* can cause common (stinking) bunt, which is sometimes characterized by a fishy odour.

Note 2 to entry: Spores are often clustered in the brush hairs of wheat.

**3.1.46.14****soft wheat**

wheat with low gluten content, and a soft, floury endosperm ratio of not less than 70 % mass fraction; in general, it is suitable for cake, biscuit, and low-volume breads

**3.2 Terms relating to physiology****3.2.1****dormancy**

natural state of suspended growth and metabolism of a viable seed which does not germinate when placed under normal or optimal conditions of light, temperature and moisture

**3.3.2****enzyme**

biocatalyst and protein substance produced by living cells which catalyses a biochemical reaction in living organism

**3.3.3****germ****shoot****sprout**

resulting plantule when a dormant seed undergoes the process of germination

Note 1 to entry: The radicle and the plumule are visible at this stage.

Note 2 to entry: See also 3.3.1.17.

**3.3.4****germination**

physiological activity which precedes plant growth

Note 1 to entry: All the events which occur when the seed passes from dormancy to active growth of a new plantlet.

Note 2 to entry: The visible end result of this activity, the protrusion of the radicle and plumule, is referred to as "sprouting".

Note 3 to entry: The terms "germination" and "sprouting" are not synonyms.

**3.3.5****germinative capacity**

ability of a grain to germinate, or number of grains that can potentially germinate (e.g. once the seed has move out of dormancy), under experimentally defined conditions which do not include any limitation of duration of germination

Note 1 to entry: Germinative capacity is expressed as the percentage of grains germinating.

### **3.2.6**

#### **germinative force**

#### **germinative energy**

ability of a grain to germinate, or number of grains that do germinate, under experimentally defined conditions at a given time

Note 1 to entry: Germinative force is expressed as the percentage of grains germinating at a given time.

### **3.2.7**

#### **grain brightness**

“lustrous” external appearance of grain which has not been discoloured or damaged by adverse weather conditions, by pests or by unsuitable conditions of storage

### **3.2.8**

#### **maturity**

state of a grain when physiologically fully developed and stable after the maturation period

### **3.2.9**

#### **physiological maturity**

stage when a cereal kernel has maximum accumulation of dry mass, i.e. when a black layer becomes visible at the base of the kernel

Note 1 to entry: This matter is not visible for all maize kernels. It is generally absent for other straw cereals.

### **3.2.10**

#### **respiration**

oxidative process occurring within living cells by which the chemical energy of organic molecules is released in a series of metabolic steps involving the consumption of oxygen and the liberation of carbon dioxide and water

## **3.3 Terms relating to morphology**

### **3.3.1 General terms**

#### **3.3.1.1**

##### **aleurone grains**

##### **protein bodies**

granules present in the cells of the aleurone layer, composed principally of globulin-type proteins, and containing phytin and mineral constituents

#### **3.3.1.2**

##### **aleurone layer**

##### **proteinaceous layer**

outermost, highly differentiated, proteinaceous layer(s) of the endosperm

#### **3.3.1.3**

##### **amylopectin**

polysaccharide constituent of starch, the macromolecules of which have glucose units linked in a branched structure

#### **3.3.1.4**

##### **amylose**

polysaccharide constituent of starch, the macromolecules of which have glucose units linked in a predominantly linear structure

**3.3.1.5****awn**

bristle-like extension of the glume or lemma of certain cereals

**3.3.1.6****beard****brush****brush of grain**

tuft of very short hairs at the non-germ end of the caryopsis of certain cereals

**3.3.1.7****birefringence****maltose cross**

characteristic of cereal starch observed through a microscope under polarized light

**3.3.1.8****cotyledon**

first leaf of the embryo as a seed sprouts

**3.3.1.9****crease**

longitudinal depression of variable depth and width or ventral furrow, situated on the ventral side (the side opposite the embryo of the grain) of certain cereal grains

Note 1 to entry: It is absent in the case of many cereals, but in wheat it may reach two-thirds of the thickness of the grain.

**3.3.1.10****cross cells****cross-cell layer**

outer of the two cellular layers which together comprise the endocarp, the longer side of which is perpendicular to the main axis of the grain

**3.3.1.11****cuticle**

pellicule covering the epidermis

**3.3.1.12****embryo**

living organism, which develops from a seed

**3.3.1.13****endosperm**

tissue containing reserve substances in cereal grains

Note 1 to entry: "Endosperm" is a botanical term, the technological term "kernel" is close to "endosperm", but not

synonymous, and it means that part of the starchy grain obtained after removing the envelopes.

**3.3.1.14****epicarp**

exocarp, the outer layer of skin on a seed

**3.3.1.15****epidermis**

outermost cellular layer, generally covered by a cuticle

**3.3.1.16****flowering glume**

part of the plant comprising the lemma and the palea which wraps directly every flower of *Poaceae*

Note 1 to entry: Lemma is the lower of the two bracts enclosing the flower of *Poaceae*. Palea is the upper of the two bracts enclosing the flower of *Poaceae*.

### 3.3.1.17

#### **germ**

that part of the grain which develops into a young plant

Note 1 to entry: The embryo and the scutellum are parts of the germ.

Note 2 to entry: See also 3.3.3.

### 3.3.1.18

#### **glume**

bract which covers and protects a spikelet

### 3.3.1.19

#### **hull**

#### **pericarp**

thin covering which encloses the whole kernel, glume, and grain husks

### 3.3.1.20

#### **husk**

leaf-like sheaths which enclose the ear

### 3.3.1.21

#### **hyaline layer**

refractive zone between the testa and the aleurone layer

### 3.3.1.22

#### **lemma**

lower glume of the *Poaceae* flower

Note 1 to entry: The lower of the two bracts enclosing the flower in the spikelet of grasses.

### 3.3.1.23

#### **longitudinal cells**

epidermal cells having their longer sides parallel to the main axis of the grain

### 3.3.1.24

#### **palea**

upper bract that with the lemma encloses the flower in the spikelet of grasses

### 3.3.1.25

#### **pigment**

any colouring matter in the cells and tissues of plants

### 3.3.1.26

#### **scutellum**

complex tissue in the shape of a shield which separates the embryo from the endosperm

### 3.3.1.27

#### **seed-coat**

#### **testa**

true seed-coat layer(s) of the caryopsis, fused between the pericarp and the nucellar epidermis (hyaline layer)

Note 1 to entry: The seed coat is cuticularized and may contain a pigmented layer.

**3.3.1.28****spike**

pistillate or female inflorescence originated from the axillary bud apices

**3.3.1.29****straw**

dry stems and leaves of cereal crop, left after the grains have been removed by threshing, usually used as low quality feed-component

**3.3.1.30****tassel**

branched staminate or male inflorescence arises from the shoot apical meristem and located at the tip of the main stem

**3.3.2 Terms specific to corn****3.3.2.1****black layer****hilar layer**

layer of dense cells situated at the tip cap of the corn kernel on its cob which is laid down by the mature kernel and appear as a dark brown spot

**3.3.2.2****cob**

term indicating the organ formed by an axis carrying the grains of corn

**3.3.2.3****silk**

elongated style originated from ovary and protruded over the tip of a young ear corn at anthesis

**3.4 Terms relating to technology of cereals****3.4.1 General terms****3.4.1.1****aeration of grain**

operation consisting of introducing air into a mass of grain using a flow rate which is adequate to achieve or maintain levels of temperature and humidity required for satisfactory storage

**3.4.1.2****bin**

compartment of a silo, large container or an enclosed space intended for storing grain in bulk

**3.4.1.3****bolting****sieving****sifting**

separation of particles according to their size, by means of a sieve having apertures of known size

Note 1 to entry: The term “bolting” was formerly used predominantly to describe the separation of flour from the products of grinding, and is still used in the United Kingdom and in France.

**3.4.1.4****dockage**

waste material which is removed from grains as it is being processed before milling

#### **3.4.1.5**

##### **gelatinization**

loss of the native crystalline organization of a starch granule when it is heated above a particular temperature in an aqueous medium

#### **3.4.1.6**

##### **grading**

operation consisting of identifying then separating batches of cereals according to their appearance and physical condition or according to one of their special (chemical, technological) characteristics

#### **3.4.1.7**

##### **grain drying**

operation which consists of reducing the moisture content of a mass of grain by various processes (hotair drying, ventilation, dehumidification, etc.)

#### **3.4.1.8**

##### **grain silo**

individual storage unit consisting of one or more bins with an installation for handling grain

#### **3.4.1.9**

##### **lot**

identified quantity of material from which a sample can be taken and analysed to determine one (or several) characteristic(s)

#### **3.4.1.10**

##### **pearling**

process of removing husk or outer seed coat by abrasion

#### **3.4.1.11**

##### **plansifter**

sifting machine consisting of a number of superimposed sieves gyrating together in a horizontal plane, for sustained grading of all milling product

#### **3.4.1.12**

##### **preliminary cleaning**

##### **pre-cleaning**

brief cleaning before storage, during which coarse impurities and dust are removed by dry mechanical methods (sifting and ventilation)

#### **3.4.1.13**

##### **retrogradation**

crystallization of gelatinized starch and water mixture during cooling

#### **3.4.1.14**

##### **screenings**

losses on cleaning, composed mainly of small-sized and broken grains

#### **3.4.1.15**

##### **sieve**

device for the purpose of sieving, consisting of a medium mounted in a frame

Note 1 to entry: For test sieves, see ISO 2395.

#### **3.4.1.16**

##### **sieve-cleaning brush**

self-propelling brush underneath the sieve of a plansifter and of a purifier which frees the sieve apertures

of obstructing particles

**3.4.1.17****spontaneous heating**

abnormal rise in temperature produced naturally in a grain mass as a result of bad storage conditions

**3.4.2 Terms specific to wheat****3.4.2.1****bran**

outer layers or seed coat of the wheat grain

Note 1 to entry: This term can also be used for rice.

**3.4.2.2****bran brush****bran duster****bran finisher**

machine for removing particles of endosperm, not detached by the breaking process, from the bran coats

**3.4.2.3****break flour**

flour produced by the break rolls as the grain passes through the break system of the milling process

**3.4.2.4****break middling**

mixture of particles of pure endosperm and endosperm with adhering bran (composite particles produced by break rolls as the grain passes through the break system of the milling process)

**3.4.3.5****break system**

stage in the milling process where the grain is broken open and treated on successive rolls to separate the endosperm from the bran coat

**3.4.2.6****breaking**

fragmentation, principally by shearing by means of fluted rollers, during the first part of the milling process

**3.4.2.7****brushing**

operation of mechanically cleaning a surface (of grain, grain covering or sieve) by means of a brush

**3.4.2.8****centrifugal****reel**

bolting device with a cylindrical or prismatic rotor covered with a sieving cloth of known aperture size

**3.4.2.9****flour enrichment**

further addition of a substance that is already present in the flour but not in sufficient amounts to meet the nutritional requirements, usually refers to vitamins, minerals or amino acids

**3.4.2.10****flour yield**

amount of flour obtained by a particular mill and milling method

Note 1 to entry: Flour yield is expressed as a percentage.

#### **3.4.2.11**

##### **germinal brush**

##### **grain brush**

machine used principally at the end of cleaning to remove impurities adhering to the surface of grain

#### **3.4.2.12**

##### **grain separator**

wheat cleaning machine that removes both larger and finer foreign material

#### **3.4.2.13**

##### **granulation**

coarseness or fineness of the flour

Note 1 to entry: In baking, pasta or biscuit technology, the particle size and size distribution pertain to the flour end-use value.

#### **3.4.2.14**

##### **gravity table**

wheat cleaning machine that removes foreign material of similar size and shape as the wheat on the base of density

#### **3.4.2.15**

##### **grinding mill**

device used to carry out fragmenting operations

Note 1 to entry: The grinding mills most commonly used in flour milling are roller mills, although hammer mills, pin mills, etc., are also used.

#### **3.4.2.16**

##### **middlings**

particles of the outer layers or seed coat of the wheat grain, extracted from the bread flour system which have yet to be ground into flour

#### **3.4.2.17**

##### **milling**

process to remove the hull and parts or all of the bran from cereals; grinding grain into flour

#### **3.4.2.18**

##### **milling yield**

amount of utilizable milled products produced in the course of milling

#### **3.4.2.19**

##### **reduction system**

section of the wheat milling process that grinds purified granular endosperm particles into flour by utilizing a succession of grinding and sifting passages

#### **3.4.2.20**

##### **roller mill**

machine generally comprising two pairs of rollers arranged symmetrically, used for grinding cereals and reducing them to flour and milling by-products

Note 1 to entry: Each pair of rollers is independent, and the surfaces of the rollers can be either fluted to separate the endosperm from the bran (breaking), or smooth to reduce the endosperm fragments to flour (reduction).

#### **3.4.2.21**

##### **second clear**

part of flour obtained at the end of the milling process mainly composed of protein layer and little pieces of bran and germ and flour

**3.4.2.22****semolina**

product milled, usually from durum wheat, to coarse but uniform granulation, to make pasta products

**3.4.2.23****shorts**

mixture of small pieces of bran and fibrous material remaining after the flour has been extracted from the wheat

**3.4.2.24****sizing**

section of the wheat milling process that removes small parts of bran and germ attached to endosperm particles; this is achieved by light grinding, sifting, and purification

**3.4.2.25****tail end**

final stages of the milling process where the last particles of flour are extracted

**3.4.2.26****yellow pigment content**

essential quality factor of raw materials for the production of pasta, defined as the content of extractable carotenoids of the endosperm

Note 1 to entry: Yellow pigment content is expressed as milligrams of  $\beta$ -carotene per 100 g of dry matter.

**3.4.3 Terms relating specifically to rice****3.4.3.1****coefficient of water absorption**

ratio of the mass of rice after cooking to the mass of the same rice before cooking

**3.4.3.2****dehusk**

removing the husk from seeds

**3.4.3.3****elastic recovery**

tendency of grain of cooked rice to return to its initial form, once the stress to which it has been subjected is released

Note 1 to entry: Elastic recovery is expressed as a percentage.

**3.4.3.4****firmness**

resistance to extrusion of cooked rice

**3.4.3.5****gelatinization**

hydration process conferring the jelly-like state typical of the coagulated colloids, which are named

“gels”, on kernels

**3.4.3.6****gelatinization temperature**

temperature at which about 90 % of the starch granules have swelled irreversibly

**3.4.3.7**

gelatinization time

time necessary for 90 % of the kernels to pass from their natural state to the gel state

#### **3.4.3.8**

##### **milling**

removing almost all of the bran and embryo from husked rice using a machine

#### **3.4.3.9**

##### **paddy table**

grain cleaning machine that removes foreign material that has different density

#### **3.4.3.10**

##### **swelling**

thickness of grains of rice after cooking

Note 1 to entry: Swelling is expressed in millimetres.

Note 2 to entry: Swelling is the increase in volume of the rice during cooking. It can be measured as the increase in thickness of the grain by determining the thickness of the rice before and after cooking. Measurements of thickness after various cooking times give a curve indicating the course of swelling.

### **3.5 Terms relating to cereal products**

#### **3.5.1 General terms**

##### **3.5.1.1**

##### **bakery**

place where the manufacture of baked products (including bread) is carried out and where such products may be sold

##### **3.5.1.2**

##### **composite flour**

flour made by blending wheat flour with other cereals flour (varying amounts)

##### **3.5.1.3**

##### **dry gluten**

residue obtained from wet gluten dried according to specified conditions

##### **3.5.1.4**

##### **flour**

finely milled wheat endosperm with a particle size of less than 250 µm

##### **3.5.1.5**

##### **flour improver**

substance added to flour to facilitate the manufacture of specific baked products

##### **3.5.1.6**

##### **gluten**

visco-elastic proteinaceous material formed when flour and water are mixed into a dough, and which may be isolated by washing which eliminates the starchy endosperm particles and cell walls as well as the soluble proteins

Note 1 to entry: In some countries, the term "gluten" stands for "wheat gluten" and glutes from other cereals are called maize gluten, rice gluten, etc.

##### **3.5.1.7**

##### **ready-to-eat cereals**

flaked, puffed, shredded, crushed, or granular products made from wheat, maize or rice, although oats and barley are also used; may be enriched with vitamins, minerals, sugar, syrup, honey, etc.

**3.5.1.8****softening of gluten**  
**weakening of gluten**

reduction in the firmness of gluten

**3.5.1.9****wet gluten**

visco-elastic substance, composed principally of two protein fractions (gliadin and glutenin) in a hydrated form

**3.5.2 Terms relating specifically to wheat****3.5.2.1****bleaching of flour**

destruction of flour pigments by the addition of substances having a specific oxidizing action

**3.5.2.2****bulgur**

food product resulting from a three-stage treatment of wheat (mainly *Triticum durum*) consisting of a pre-cooking stage followed by drying and coarse crushing and, finally, partial decortication

**3.5.2.3****wheat flour**

main final product of wheat milling cleared of the husk and of the germ

**3.5.3.4****wholemeal**

whole grain flour (whole grain grist) for example made of wheat, from which nothing has been removed (gran, seed) and nothing has been added and which, therefore, includes nearly all or all components of the wheat in its natural proportions

**3.5.3 Terms relating specifically to rice****3.5.3.1****brown rice****cargo rice****hulled rice****husked rice****loonzain rice**

paddy from which the husk only has been removed

Note 1 to entry: The processes of husking and handling may result in some loss of bran.

Note 2 to entry: For convenience and classification purposes, this entry is identical to that of 3.1.45.3.

**3.5.4 Terms relating specifically to corn****3.5.4.1****corn and cob meal****corn ear chops****ground ear corn**

milled product of whole corn ears

**3.5.4.2****corn chop****corn meal****ground corn**

corn grain ground without removing the germ or any part of the kernel

#### **3.5.4.3**

##### **corn flour**

flour milled from corn

#### **3.5.4.4**

##### **corn grits**

main final products of corn dry milling

#### **3.5.4.5**

##### **corn oil**

oil extracted from corn germ isolated by wet milling or dry milling

#### **3.5.4.6**

##### **cracked corn**

corn of which the kernels are broken into several pieces

#### **3.5.4.7**

##### **dry milling**

obtaining the maximum yield of grits; while making the minimum amount of flour, and recovering the maximum amount of germ in the flour of large particles with the maximum oil content

Note 1 to entry: Dry milling may or may not include de-germing as a preliminary step.

#### **3.5.4.8**

##### **flaked maize**

product made from maize, which has been treated with steam, rolled and dried; highly digestible, rich in starch

#### **3.5.4.9**

##### **maize gluten**

##### **corn gluten feed**

animal feeding stuffs, high in protein, and obtained after maize has been milled after starch extraction

#### **3.5.4.10**

##### **wet milling**

milling operation which is primarily performed by steeping kernels in water for the purpose of the isolation and recovery of starch

### **3.5.5 Terms relating to other cereals**

#### **3.5.5.1**

##### **husked kaoliang**

##### **milled sorghum**

main final products of sorghum milling

## **3.6 Terms relating to test and sampling methods**

### **3.6.1 General terms**

#### **3.6.1.1**

##### **aggregate sample**

##### **composite sample**

aggregation and homogenization of two or more samples, taken independently within a given lot

#### **3.6.1.2**

##### **alkali digestibility test**

##### **alkali test**

method to differentiate the susceptibility of raw milled rice grains to alkali digestion after being steeped in a (17 ± 0,5) g/l KOH solution at room temperature or at 30 °C for 23 h and measurement of the degree of starch spreading using a seven-point scale; spreading values correspond to starch gelatinization temperature

**3.6.1.3****breaking susceptibility test**

test for the potential for kernel fragmentation or breakage when subjected to impact forces

**3.6.1.4****crude protein content**

quantity of crude protein obtained from the nitrogen content as determined by applying an appropriate factor depending on the type of cereal or pulse

**3.6.1.5****ethanol soluble protein test**

test for measuring the denaturation of protein at high temperature

**3.6.1.6****floaters test**

one of the methods used to measure hardness in which the number of kernels floating in a 1,275 relative density solution of sodium nitrate or other suitable chemicals

**3.6.1.7****flowing product**

product to be sampled moving through a conveying system, or in free-fall from a spout or chute

**3.6.1.8****grain elongation ratio during cooking**

lengthwise expansion of cooked rice calculated from the ratio of the average length of cooked grains over that of raw milled grains

**3.6.1.9****homogenization**

thorough blending by mechanical or manual means so that contaminants and physical properties are evenly distributed throughout the aggregate or laboratory sample

**3.6.1.10****increment**

amount of material taken at one time at each individual sampling point throughout a lot

**3.6.1.11****mass per hectolitre**

ratio of the mass of a cereal to the volume it occupies after being poured into a container under well defined conditions

Note 1 to entry: Mass per hectolitre is expressed in kilograms per hectolitre at a given moisture content.

Note 2 to entry: Mass per hectolitre is not synonymous with density (mass/volume), but is *packing density*, which allows for edge effects incurred at the contact points of the measuring vessel.

**3.6.1.12****laboratory sample**

sample prepared by homogenizing and dividing the aggregate sample for sending to the laboratory and intended for inspection or testing

**3.6.1.13****liveliness**

ability of one strand of pasta to slide smoothly over another, which depends on the degree of strand to strand adhesion

Note 1 to entry: Liveliness is applicable only to pasta in the form of long strands.

Note 2 to entry: Liveliness depends on the geometry of the product, the stickiness of the surface and the firmness of the pasta.

#### **3.6.1.14**

##### **moisture content**

loss of mass fraction of water undergone by the product under specified conditions

Note 1 to entry: Moisture content is expressed as a percentage mass fraction.

#### **3.6.1.15**

##### **nitrogen content**

quantity of nitrogen determined after application of a specified procedure

#### **3.6.1.16**

##### **optimum cooking time**

time after which a continuous white line visible at the centre of a strand of pasta during cooking disappears, as determined by crushing using a crushing plate in the case of long, solid stands of pasta (e.g. spaghetti) or by cutting the stand at right angles with a blade in the case of short, hollow strands of pasta (e.g. macaroni)

Note 1 to entry: By convention, the white line is considered to have disappeared when it is visible only as a row of dots.

#### **3.6.1.17**

##### **Pekar test**

test of flour characteristics made by comparing the colour (and brightness) of a flour against a standard sample; each sample is placed side by side on a flat rectangular, black-stained piece of wood, pressed down to a smooth surface and compared with the standard

#### **3.6.1.18**

##### **purifier**

machine with one to three layers or decks of sieves set in an oscillating frame; its principle is based on sizing and density to separate a mixture of pure endosperm, composite pieces of endosperm and bran, and branny material

#### **3.6.1.19**

##### **rheological properties**

physical properties of dough such as elasticity, extensibility and resistance to deformation

#### **3.6.1.20**

##### **sampling**

act of drawing or constituting a sample

#### **3.6.1.21**

##### **sampling error**

part of uncertainty of a given characteristic due to the heterogeneity of its distribution and the deficiencies (supposed known and accepted) of the sampling plan

#### **3.6.1.22**

##### **starch release**

release of starch from pasta during cooking in water, indicating the state of surface breakdown of the pasta

Note 1 to entry: The amount of starch released can be assessed by means of a tactile investigation which estimates the tackiness of the surface to the touch.

#### **3.6.1.23**

##### **surface condition**

condition of surface disintegration of cooked pasta; it can be assessed visually using reference photographs

#### **3.6.1.24**

##### **tetrazolium germination test**

viability test, predictor of seed viability on the basis of their relative respiration rate when hydrated

**3.6.1.25****turbidity test**

test for measuring the denaturation of water-soluble and saline-soluble proteins

**3.6.1.26****warm germination test****cold germination test**

tests performed for determining the ability of seeds to germinate under specific environmental conditions

**3.6.2 Terms relating specifically to rice****3.6.2.1****husked rice yield**

amount of husked rice obtained from paddy

**3.6.2.2****milled head rice yield**

amount of milled head rice obtained from paddy or husked rice

**3.6.2.3****milled rice yield**

amount of milled rice (head rice and those grains which are considered as head rice, broken kernels and chips) obtained from paddy or husked rice

**3.6.3 Terms relating specifically to wheat****3.6.3.1****alveogram**

diagram obtained by means of an alveograph

**3.6.3.2****alveograph**

apparatus for measuring the visco-elastic properties of doughs made from wheat flour

**3.6.3.3****amylogram**

diagram obtained by means of an amylograph

**3.6.3.4****amylograph**

apparatus used to determine the viscosity of a flour and water slurry when the starch is gelatinized by heating, through a temperature predetermined cycle

**3.6.3.5****amylograph viscosity**

maximum viscosity reached by a suspension of flour and water which is gelatinized by heating under set conditions

**3.6.3.6****Brabender unit****BU**

unit that indicates the viscosity of starch paste measured by a Brabender Visco-amylograph

Note 1 to entry: Brabender Visco-amylograph refers to a product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product. Other equipment may be used if it can be shown to give comparable results.

### **3.6.3.7**

#### **Brabender Visco-amylograph**

rotational instrument which permits continuous determination of viscosity during cooking and cooling the starch paste

Note 1 to entry: Brabender Visco-amylograph refers to a product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product. Other equipment may be used if it can be shown to give comparable results.

### **3.6.3.8**

#### **consistency**

resistance of a dough to being mixed in a farinograph at a specified constant speed

Note 1 to entry: Consistency is expressed in arbitrary units (farinograph units, FU).

### **3.6.3.9**

#### **dough test**

test made on dough to obtain information on the bread-making quality of the flour or to determine the effects of ingredients or additives

### **3.6.3.10**

#### **extensibility**

physical property of dough related to stretching or increasing in size without breaking when stretched

### **3.6.3.11**

#### **extensogram**

diagram obtained by means of an extensograph

### **3.6.3.12**

#### **extensograph**

apparatus for the determination of the resistance to extension and also the extensibility of doughs made from wheat flour

### **3.6.3.13**

#### **falling number**

##### **FN**

total time required to activate a viscometer stirrer and allow it to fall a predetermined distance through an aqueous gel prepared from heating a mixture of flour or semolina and water in a viscometer tube, and which is undergoing liquefaction due to attack by the amylases

Note 1 to entry: Falling number is expressed in seconds.

Note 2 to entry: Time is counted from immersion of viscometer tube in the water bath.

### **3.6.3.14**

#### **falling number Hagberg test**

rapid screening test for grain soundness (no sprouting)

### **3.6.3.15**

#### **farinogram**

diagram obtained by means of a farinograph

### **3.6.3.16**

#### **farinograph**

apparatus for the determination of changes in water absorption and dough-mixing characteristics of wheat flours, as a function of time

**3.6.3.17****liquefaction number****LN**

result of a simple calculation to convert the falling number into a value used to estimate the composition of mixtures of grain, flour or semolina necessary to produce a sample of the required falling number

Note 1 to entry: LN values, unlike falling numbers, are additive.

**3.6.3.18****sedimentation index**

number indicating the volume of the sediment obtained under specified conditions from a suspension of test flour, prepared from the wheat, in a solution of lactic acid and propan-2-ol

Note 1 to entry: Sedimentation index is expressed in millilitres.

Note 2 to entry: The sedimentation index is determined by the Zeleny test.

**3.6.3.19****undersize fraction of semolina**

by convention, the percentage of semolina which passes through the sieve specified for a given semolina

**3.6.3.20****valorigram**

diagram obtained by means of a valorigraph

**3.6.3.21****valorigraph**

apparatus for the determination of the water absorption of wheat flours and for estimation of the consistency of doughs made from them

**3.6.3.22****visco-elastic index**

ten times the ratio of the mean value of the elastic recovery to the difference between the mean value of firmness and 100

## Bibliography

- [1] US 330:2001, *Cereals — Vocabulary*
- [2] ISO 5527:2015, *Cereals — Vocabulary*

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