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Animal feeding stuffs — Vocabulary

Aliments des animaux — Vocabulaire



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Foreword

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This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 10, *Animal feeding stuffs*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides definitions of generic terms related to animal feeding stuffs. It aims to encourage a mutual and consistent understanding and use of uniform terms in processes and frameworks dealing with the management of risk. This vocabulary document, which contains some common technical terms used in feed industry, is compiled for proper understanding of special language words or terms associated with the technical field.

This document can be applied as a reference by competent authorities, as well as specialists involved in standardization systems, to better and more accurately understand relevant text, correspondences and communications.

Animal feeding stuffs — Vocabulary

1 Scope

This document defines terms relating to animal feeding stuffs.

NOTE It includes the most common and frequently used terms in the field of animal feeding stuffs.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 General terms

3.1.1

antibiotic

antimicrobials produced by, or derived from, a micro-organism which destroys or inhibits the growth of other micro-organisms

3.1.2

antimicrobial agent

substance of natural, semi-synthetic or synthetic origin that at in vivo concentrations kills or inhibits the growth of microorganisms by interacting with a specific target

3.1.3

antioxidant

substance prolonging the storage life of *feed* (3.2.17) and *feed ingredients* (3.2.21) by protecting them against deterioration caused by oxidation

3.1.4

buffer

substance used in livestock *rations* (3.2.42) to help resist changes in the acidity of the digestive tract

EXAMPLE Sodium bicarbonate.

3.1.5

carrier

material to which *feed ingredients* (3.2.21) are added (e.g. absorbed, impregnated, coated) to facilitate their uniform distribution in *feed* (3.2.17)

3.1.6

chelated mineral

organic mineral complex formed between an organic molecule and a mineral

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3.1.7

diluent

substance mixed with *feed ingredients* (3.2.21) to reduce their concentration and make them more acceptable to animals, safer and easier to *mix* (3.4.18) uniformly in a *feed* (3.2.17)

Note 1 to entry: Diluent may also be a *carrier* (3.1.5).

3.1.8

emulsifier

substance that makes it possible to form or maintain a homogeneous mixture of two or more immiscible phases in *feed* (3.2.17)

Note 1 to entry: Emulsifier is commonly added to *milk replacers* (3.2.36) to prevent fat from separating.

3.1.9

flavouring compound

flavouring enhancer

substance included in *feed* (3.2.17) or *feed ingredients* (3.2.21) to improve smell or palatability

3.1.10

macro-mineral

major mineral

mineral required by animals in relatively large amounts

EXAMPLE Calcium (Ca), phosphorus (P), magnesium (Mg), potassium (K), chlorine (Cl), sulfur (S), sodium (Na).

Note 1 to entry: Macro-minerals are generally required in gram quantities per head per day.

3.1.11

micro-ingredient

vitamin, mineral or other material usually required in *feed* (3.2.17) in small amounts

3.1.12

micro-mineral

trace mineral

mineral required by animals in small amounts

EXAMPLE 1 Manganese (Mn), copper (Cu), zinc (Zn), selenium (Se), iron (Fe), cobalt (Co), iodine (I).

EXAMPLE 2 Micro-minerals are required in units of mg/kg or smaller.

3.1.13

non-structural carbohydrate

NSC

simple carbohydrate, such as starch and sugar, stored inside the cell that serves as a cellular energy source

Note 1 to entry: Non-structural carbohydrates are rapidly and easily digested by an animal.

3.1.14

nutrient allowance

recommendation for the nutrient amounts necessary for maintenance, growth, gestation, yield, work or performance that includes a safety margin to account for variability in *feed ingredients* (3.2.21), environment, animal health, storage losses and waste in the feeding process

3.1.15

nutrient requirement

minimum amount of nutrients (such as protein, minerals and vitamins) and energy necessary to meet animals' needs for maintenance, growth, reproduction, yield or performance

Note 1 to entry: Nutrient requirement does not include a safety margin in *ration* (3.2.42) formulation.

3.1.16

prebiotic

non-digestible compounds in *feed* (3.2.17) that beneficially affect animals by selectively stimulating the growth and/or activity of one or a limited number of non-pathogenic bacteria population(s) in the colon

3.1.17

preservative

substance or, when applicable, micro-organism that protects *feed* (3.2.17) against deterioration caused by micro-organisms or their metabolites

3.1.18

probiotic

direct-fed microbial

DFM

live micro-organisms that, when administered in adequate amounts, confer a health benefit on the host

EXAMPLE Lactic acid producing strains, e.g. *Lactobacillus*.

3.1.19

undesirable substance

substance or product, with the exception of pathogenic agents, that is present in and/or on the product intended for animal *feed* (3.2.17) and causes a potential danger to animal or human health or to the environment or could adversely affect livestock production

3.1.20

veterinary drug

substance applied or administered to animals, whether used for therapeutic, prophylactic, metaphylactic or diagnostic purposes or for modification of physiological functions or behaviour

3.2 Terms related to feed and feeding

3.2.1

ad libitum feeding

ad lib feeding

feeding system by which animals can eat from a prepared *diet* (3.2.15) as much as they desire

3.2.2

aquatic feed

feed (3.2.17) that is fed to animals living in water

3.2.3

balanced diet

balanced ration

feed (3.2.17), *diet* (3.2.15) or *ration* (3.2.42) that contains all known required nutrients in proper amounts and proportions based upon recommendations of recognized authorities in animal nutrition for a given set of physiological requirements

3.2.4

barn-dried hay

hay (3.2.31) dried indoors by blowing air through it

Note 1 to entry: It is usually more nutritious than field-dried hay.

3.2.5

bran

milling fraction obtained from the removal of the outer layer of cereals

3.2.6

canned pet food

feed (3.2.17) for pets, which has been processed, packaged, sealed and sterilized for preservation in cans or similar containers

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3.2.7

chaff

hulls (3.2.33) or other seed coverings, together with other plant parts separated from seeds during threshing or processing

3.2.8

coccidiostat

antiprotozoal agent used to prevent and/or control coccidial infections

EXAMPLE Lasalocid, monensin, narasin, salinomycin.

3.2.9

complementary feed

compound feed (3.2.11) that has a high content of certain substances but is not sufficient for a *ration* (3.2.42) and so is used in combination with other *feed* (3.2.17)

Note 1 to entry: Complementary feed is a form of compound feed.

3.2.10

complete feed

nutritionally adequate *feed* (3.2.17) compounded by a specific formula that is used as the sole *ration* (3.2.42) and that is capable of maintaining life and/or promoting production without any additional substance except water

Note 1 to entry: Complete feed is a form of *compound feed* (3.2.11).

3.2.11

compound feed

formula feed

feed mixture

mixture of at least two *feed materials* (3.2.23), whether or not containing *feed additives* (3.2.18), for oral animal feeding in the form of a *complementary feed* (3.2.9) or a *complete feed* (3.2.10)

3.2.12

concentrate

feed (3.2.17) that contains high amounts of a nutrient or nutrients (usually rich in energy and/or protein but low in fibre) and mixed with other ingredients [usually *micro-ingredients* (3.1.11)] intended to be diluted or mixed to produce a *complementary feed* (3.2.9) or a *complete feed* (3.2.10)

EXAMPLE Concentrate may be unsafe if fed *free choice* (3.2.27) or alone.

3.2.13

crumble

pelleted *feed* (3.2.17) that has been broken into smaller granular pieces

3.2.14

cured feed

feed (3.2.17) that has been preserved, for example, by drying, chemical additives or other preservation methods

3.2.15

diet

feed ingredient (3.2.21) or a mixture of ingredients, including water, that is consumed by animals

3.2.16

distillers' grain

residual grain or by-product of a fermentation process in alcohol production from grains (especially corn), which may be fed wet or dry

3.2.17

feed

feed stuff

feeding stuff

single or multiple materials, whether processed, semi-processed or raw, and whether or not containing additives, for oral animal feeding

3.2.18

feed additive

substance intentionally added to *feed* (3.2.17) and/or water, not consumed as feed by itself, whether or not it has a nutritional value, that affects the characteristics of feed including organoleptic properties, animal products, animal production or performance or welfare, or the environment

Note 1 to entry: Microorganisms, enzymes, acidity regulators, trace elements, vitamins and other products fall within the scope of this definition, depending on the purpose of use and the method of administration.

Note 2 to entry: *Coccidiostats* (3.2.8) and histomonostats are a category of feed additives.

Note 3 to entry: Feed additive does not include *feed materials* (3.2.23) and *premixtures* (3.2.39).

3.2.19

feed conversion ratio

FCR

ratio describing the amount of *feed* (3.2.17) consumed per unit of production, e.g. weight gain, milk, eggs production

3.2.20

feed grade

quality of *feed* (3.2.17) suitable for animal, but not human, consumption

3.2.21

feed ingredient

component part or constituent of any mixture making up a *feed* (3.2.17), whether or not it has a nutritional value in the animal's *diet* (3.2.15), including *feed additives* (3.2.18)

Note 1 to entry: Ingredients are of plant, animal or aquatic origin, or other organic or inorganic substances.

3.2.22

feed intended for a particular nutritional purpose

functional feed

feed (3.2.17) that can satisfy a particular nutritional purpose by virtue of its particular composition or method of manufacture, which clearly distinguishes it from ordinary feed

Note 1 to entry: Feed intended for a particular nutritional purpose does not include *medicated feed* (3.2.34).

3.2.23

feed materials

products of vegetable or animal origin and products derived from industrial processing, either organic or inorganic substances, whether or not containing *feed additives* (3.2.18), that are intended for use in oral animal feeding to meet animals' nutritional needs

Note 1 to entry: Feed materials can be in their natural state, fresh or preserved.

Note 2 to entry: Feed materials may be fed to animals either directly as such, or after processing, or in the preparation of *compound feed* (3.2.11), or as *carrier* (3.1.5) of *premixtures* (3.2.39).

3.2.24

feed supplement

supplementary feed

feed ingredient (3.2.21) used with another to improve the nutrient balance or performance of the animal and that can be fed undiluted, diluted and mixed to produce a *complete feed* (3.2.10) or as *free choice* (3.2.27) with other parts of the *ration* (3.2.42)

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3.2.25

fish meal

product obtained by drying and processing whole fish or parts thereof, of one or various species

3.2.26

forage

fodder

plants or plant parts other than separated grains that are fed to or grazed by domestic animals

Note 1 to entry: Forage may be fresh, dry or ensiled, e.g. pasture, green chop, *hay* ([3.2.31](#)), *haylage* ([3.2.32](#)).

3.2.27

free choice

self-fed

feeding system by which animals are given free access to the separate components or groups of components constituting their *diets* ([3.2.15](#))

3.2.28

gluten

visco-elastic proteinaceous material formed when flour and water are mixed into a dough, and that may be isolated by washing, which eliminates the starchy endosperm particles and cell walls as well as the *soluble proteins* ([3.3.23](#))

3.2.29

grits

coarsely ground grain from which *bran* ([3.2.5](#)) and germ have been removed and that is usually *screened* ([3.4.25](#)) to uniform particle size

3.2.30

groats

grain from which *hulls* ([3.2.33](#)) have been removed

3.2.31

hay

aerial portion of grass or herbage especially cut and cured for animal feeding

3.2.32

haylage

silage ([3.2.47](#)) made from *forages* ([3.2.26](#)) that is partially dried

Note 1 to entry: Haylage may be stored in a silo or cut and compressed into bags.

Note 2 to entry: Haylage and silage are both ensiled forages but haylage is drier than silage and its *dry matter* ([3.3.11](#)) percent is higher than 50 %.

3.2.33

hull

husk

outer covering of grain or other seed

3.2.34

medicated feed

feed ([3.2.17](#)) that contains *veterinary drugs* ([3.1.20](#))

3.2.35

middlings

by-product of milling

Note 1 to entry: It consists of granular particles containing differing proportions of grain, endosperm, *bran* ([3.2.5](#)) and *gluten* ([3.2.28](#)).

3.2.36

milk replacer

compound feed (3.2.11) administered in dry or liquid form for feeding young animals such as calves, lambs or kids as a complement to, or substitute for, post-colostral milk

3.2.37

mineral mix

mineral supplement

mineral feed

feed (3.2.17) that mainly consists of mineral elements, which is as an entire mix free-flowing

3.2.38

oilseed meal

oilseed cake

feed (3.2.17), high in protein, made from the residue of seeds that have been crushed to produce oil

3.2.39

premixture

premix

uniform mixture of one or more *micro-ingredients* (3.1.11)/*feed additives* (3.2.18) with a *diluent* (3.1.7) and/or *carrier* (3.1.5), and that is not intended for direct feeding to animals

Note 1 to entry: Premixtures are used to facilitate the uniform dispersion of the micro-ingredients/additives in a larger mix.

3.2.40

protein supplement

protein concentrate

feed (3.2.17) or mixture of *feed ingredients* (3.2.21) containing a mass fraction of 20 % or more protein or protein equivalent

3.2.41

range cube

large *pellet* (3.4.20) designed to be offered to animals on the ground

3.2.42

ration

daily ration

amount of total *feed* (3.2.17) that is provided to an individual animal over a 24-hour period

3.2.43

roughage

feed (3.2.17) high in fibre that tends to be bulky, coarse and low in energy

EXAMPLE Forage (3.2.26), hay (3.2.31), silage (3.2.47) and haylage (3.2.32) are sometimes called "roughage".

Note 1 to entry: The fibre content of roughage is mostly greater than a volume fraction of 18 %.

3.2.44

rumen-protected feed

feed (3.2.17) that has been treated or combined with another substance to prevent the breakdown of the nutrients by micro-organisms in the rumen

EXAMPLE Rumen-protected fat, bypass protein.

3.2.45

screenings

small, imperfect kernels, broken grains, *hulls* (3.2.33), weed seeds and other foreign material obtained from the cleaning of grain

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3.2.46

semi-moist pet food

meat-based *feed* (3.2.17) product for pets or aquatic animals that has been partially dried to prevent microbial decomposition

3.2.47

silage

feed (3.2.17) resulting from an anaerobic fermentation process of sugars in *forage* (3.2.26) with a high moisture content and that is preserved in a succulent condition

EXAMPLE Corn silage, *haylage* (3.2.32).

3.2.48

silage additive

substance, such as enzymes or microorganisms, that is intended to be incorporated into *forage* (3.2.26) to improve the production of *silage* (3.2.47)

Note 1 to entry: Silage additives enhance the production of lactic acid and/or a rapid decrease in pH of the forage during the *ensiling process* (3.4.11).

3.2.49

sweet feed

commercial *feed* (3.2.17) sweetened with molasses or other sweeteners to improve palatability

3.2.50

texturized and sticky feed

mix of assorted grains and commercial *feed* (3.2.17) (generally pelleted) treated with a coating of molasses

3.2.51

total mixed ration

TMR

homogenous mixture of all *ration* (3.2.42) ingredients [e.g. *forages* (3.2.26), grains, *feed supplements* (3.2.24)] that is supplied to an animal for a 24-hour period

Note 1 to entry: In practice, the 24-hour allotment of the mixture may be offered in one or more feedings.

3.3 Terms related to sampling and feed analysis

3.3.1

acid detergent fibre

ADF

amount of residue (primarily cellulose, lignin and variable amounts of silica) remaining after boiling a *feed* (3.2.17) sample in an acid detergent solution

Note 1 to entry: ADF does not include hemicellulose.

Note 2 to entry: ADF is often used to calculate *digestibility* (3.3.9), *total digestible nutrients* (3.3.24) and/or *net energy* (3.3.18) for lactation.

3.3.2

as fed

content of a substance (e.g. feed nutrient) with moisture included

Note 1 to entry: The content of a substance on an as-fed basis is always lower than on a *dry-matter basis* (3.3.12).

3.3.3
chemical analysis
analytical chemistry

standardized or validated chemical analytical methods used to determine the composition of a *feed* (3.2.17) sample

Note 1 to entry: Chemical analysis consists of wet chemical methods and instrumental methods.

3.3.4
composite sample
aggregate sample

aggregate of incremental samples taken from the same sampled portion

3.3.5
crude ash

inorganic part of a *feed* (3.2.17), consisting of mineral elements determined in a laboratory by incineration at a high temperature and weighing the residue

3.3.6
crude fat

total fat content of a *feed* (3.2.17) determined by a laboratory test

Note 1 to entry: Crude fat includes some waxes, pigments and other lipids to a minor degree in addition to true fats.

3.3.7
crude fibre

residue obtained after acid and alkaline digestion of a *feed* (3.2.17) sample that contains cellulose, hemicellulose, lignin and pectin

Note 1 to entry: Crude fibre has been replaced by *acid detergent fibre* (3.3.1) and *neutral detergent fibre* (3.3.19) in ruminant nutrition but it is still reported for monogastric nutrition.

Note 2 to entry: The cellulose, hemicellulose, lignin and pectin that form the plant cell wall are known as “structural carbohydrates” or “fibre”.

3.3.8
crude protein
CP

total protein content of a *feed* (3.2.17), which is determined by analysing the nitrogen content of feed and multiplying the result by a factor

Note 1 to entry: This factor is generally equal to 6,25. However, it may differ in some categories of *feed materials* (3.2.23), such as grains due to difference in the quality of amino acids constituents of protein.

Note 2 to entry: The reference method for analysing the crude protein content on the basis of the nitrogen content is the Kjeldahl method.

Note 3 to entry: Crude protein includes true protein and other nitrogen-containing substances, such as ammonia, amino acids and nitrates.

3.3.9
digestibility

measure of the apparent extent that a *feed* (3.2.17) or nutrient is digested, usually expressed as a percentage of the amount consumed

3.3.10
digestible energy
DE

apparent energy of a *feed* (3.2.17) that is available to the animal by digestion

Note 1 to entry: Digestible energy is calculated as the difference between the *gross energy* (3.3.14) content of a feed and energy contained in the feces (fecal energy or FE).

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3.3.11

dry matter

dry mass

DM

residue left after all the moisture has been removed by drying (e.g. 100 % dry matter)

3.3.12

dry-matter basis

method used to compare nutrient composition or animal intake of *feed* (3.2.17) by eliminating differences in moisture content

3.3.13

dry-matter intake

DMI

amount of moisture-free *feed* (3.2.17) or *diet* (3.2.15) consumed by animals

3.3.14

gross energy

GE

total combustible energy in a *feed* (3.2.17) that is determined by the amount of heat produced when a feed sample is completely burnt in a bomb calorimeter

3.3.15

metabolizable energy

ME

amount of the useful energy in a *feed* (3.2.17) that represents that portion of the feed *gross energy* (3.3.14) not lost in feces, urine and eructated gas

3.3.16

metabolizable protein

total amount of amino acids absorbed in small intestine of ruminants, which is supplied by both rumen-undegradable protein (by-pass protein) and rumen-microbial protein

3.3.17

near-infrared analysis

near-infrared spectroscopy

NIRS

chemical analysis (3.3.3) method that uses a specific wavelength of near-infrared region to estimate constituents (e.g. moisture) and parameters [e.g. *digestibility* (3.3.9)] of *feed* (3.2.17)

Note 1 to entry: The accuracy of NIRS is dependent on correct calibration of the instrument with a sufficient number of representative feed samples.

3.3.18

net energy

NE

amount of *feed* (3.2.17) energy actually available for animal maintenance and production

Note 1 to entry: Net energy can be further partitioned into the net energy necessary for maintenance (NE_M), growth (NE_G) and lactation (NE_L).

Note 2 to entry: Net energy is calculated as the difference between *metabolizable energy* (3.3.15) of a feed and heat increment (heat produced in body during digestion of feed, metabolism of nutrients and excretion of waste).

3.3.19

neutral detergent fibre

NDF

insoluble fraction containing all plant cell wall components left after boiling a *feed* (3.2.17) sample in a neutral detergent solution

Note 1 to entry: NDF is of low *digestibility* (3.3.9) but can be broken down somewhat by the digestive tract microorganisms.

Note 2 to entry: NDF value is used to predict ruminant feed intake.

3.3.20

non-protein nitrogen

NPN

nitrogen not derived from true protein, but usable by rumen microbes to build microbial protein

EXAMPLE Urea.

3.3.21

proximate analysis

analytical determinations of major categories of components in *feed* (3.2.17) consisting of moisture (water), *crude ash* (3.3.5), *crude fat* (3.3.6), *crude fibre* (3.3.7), *crude protein* (3.3.8) and nitrogen free extract (NFE) in feed

3.3.22

soluble intake protein

SIP

portion of the protein intake that is completely soluble in rumen fluid and rapidly utilized by rumen microorganisms to synthesize rumen-microbial protein

Note 1 to entry: Soluble intake protein forms part (or all) of the degradable intake protein (DIP) value of a *feed* (3.2.17).

3.3.23

soluble protein

portion of *crude protein* (3.3.8) that goes into a solution of pepsin in dilute hydrochloric acid

Note 1 to entry: ISO 6655 specifies a method for determination of soluble nitrogen content of animal feeding stuffs.

3.3.24

total digestible nutrients

TDN

sum of the digestible fibre, protein, lipid and carbohydrate content of *feed* (3.2.17), which expresses the energy value of feed as calculated using formulae and not reported as measured values

Note 1 to entry: TDN is directly related to *digestible energy* (3.3.10) and is often calculated based on *acid detergent fibre* (3.3.1)

3.4 Terms related to feed processing and technology

3.4.1

aspirate

remove *chaff* (3.2.7), dust or other light materials by use of air

3.4.2

blend

mingle or combine two or more ingredients or *feed* (3.2.17), but not necessarily to achieve uniform dispersion

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3.4.3

chip

cut or break into fragments or small thin slices

3.4.4

chop

reduce particle size by cutting with knives or other sharp-edged instruments

3.4.5

clip

remove the ends of whole grain

3.4.6

condition

achieve pre-determined moisture levels and/or temperature of ingredients or a mixture of ingredients prior to further processing

3.4.7

cook

heat in the presence of moisture to alter chemical and/or physical characteristics or to sterilize

3.4.8

crack

reduce particle size by a combined breaking and crushing action

3.4.9

crimp

roll ([3.4.24](#)) with corrugated rollers, possibly involving *conditioning* ([3.4.6](#)) and cooling

3.4.10

dehull

remove the outer covering from grain or seeds

3.4.11

ensiling process

ensilage

process by which the natural deterioration of organic matter is controlled by acidification in an anaerobic condition resulting from natural fermentation and/or the addition of a *silage additive* ([3.2.48](#))

3.4.12

expand

subject a *feed* ([3.2.17](#)) or ingredients to moisture, pressure and temperature to *gelatinize* ([3.4.15](#)) the starch portion and then increase the volume by an abrupt reduction in pressure

3.4.13

extract

remove fat or oil from materials by heat and mechanical pressure or by solvents

3.4.14

extrude

press or push *feed* ([3.2.17](#)) through constrictions under pressure

3.4.15

gelatinize

rupture starch granules by a combination of moisture, heat and pressure or by mechanical shear

3.4.16

grind

reduce particle size using a grinding machine such as hammer mill, roller feed or disc mill

3.4.17

irradiate

treat, prepare or alter by exposure to a specific level and duration of radiation

3.4.18

mix

combine two or more materials with or without *feed additives* ([3.2.18](#)) by agitation to a specific degree of dispersion

3.4.19

pearl

reduce dehulled grain into smooth particles by machine brushing or abrasion

3.4.20

pellet

agglomerate *feed* ([3.2.17](#)) by compacting and forcing through die openings by any mechanical process

3.4.21

pop

expand ([3.4.12](#)) whole or cracked grain by heat, sometimes under pressure

3.4.22

press

compact or mould seed or fruit by pressure, to *extract* ([3.4.13](#)) fat, oil or juice

3.4.23

puff

expand ([3.4.12](#)) whole, cracked or processed grain by pressure and heating

3.4.24

roll

change the shape and/or size of particles by compressing them between rollers, sometimes involving *conditioning* ([3.4.6](#))

3.4.25

screen

separate various-sized particles by passing over and/or through screens

3.4.26

sift

sieve

pass materials through wire sieves to separate particles of different sizes

3.4.27

steam

treat ingredients with steam to alter physical and/or chemical properties

3.4.28

wafer

agglomerate *feed* ([3.2.17](#)) of a fibrous nature by compressing it into a form usually having a diameter or cross-section measurement greater than its length

Bibliography

- [1] ISO 6655, *Animal feeding stuffs — Determination of soluble nitrogen content after treatment with pepsin in dilute hydrochloric acid*

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Price group A

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