

DEFINITION OF TERMS FOR APPLICATION IN THE LAYOUT FOR CODEX STANDARDS FOR FRESH FRUITS AND VEGETABLES

Introduction: This document defines the terms used in the Codex Committee on Fresh Fruits and Vegetables (CCFFV) standard layout as well as to facilitate the implementation and uniform interpretation of the provisions within CCFFV standards. It is written in the sequence of the CCFFV Standard Layout to facilitate faster referencing and ease of application.

PART 1: DEFINITION OF TERMS USED IN CCFFV STANDARDS

The Terms and Definitions in this section, follows the sequence of the CCFFV Standards.

1. SCOPE: This indicates the general name of the fresh fruit and vegetables (FFV) being standardized and the point of application of the standard along the food chain.

Fresh Fruit and Vegetable¹: Fruits and vegetables whose physical and textural characteristics have not been changed or processed in any manner including by salting, freezing, cooking, juicing, sugaring, hydrating, smoking dehydrating or drying. They may undergo post-harvest practices to maintain freshness, shelf life and to facilitate transportation, storage and handling without affecting their raw nature as when harvested.

Fresh: this word has different meanings depending how and where it is used in the standard. The most common meanings are:

- Recently harvested, not preserved by any means and in a state of vigour.
- Not dull, stale, wilted or faded.

Fruit: The seed-bearing structure developed from the ovary and surrounding tissue of a flowering plant. In some plants it is the edible part, the mesocarp (flesh or pulp layer) located between the exocarp (peel/skin) and the endocarp (the seed/s). Fruits are divided into the following two groups.

Climacteric fruits: Fruits having a ripening process that is accompanied by increased production of ethylene due to the increase of respiration rate and continue ripening after harvest. Climacteric fruits intended to be eaten when ripe should be harvested at [the stage of physiological maturity appropriate stage of maturity] that facilitates the ripening process accompanied by the fruit's normal taste and odour.

Non-climacteric fruits: Fruits having a ripening process that is not accompanied by increased respiration rate and are unable to continue ripening after harvest. Non-climacteric fruits intended to be eaten when ripe should be harvested at its maximum maturity or early ripe stages.

Vegetable: The edible non-fruit portions of plants including bulbs, flowers, leaves, roots, corm, stems, tubers, rhizomes, sprouts as well as fruiting vegetables from some annual plants such as cucumbers, sweet peppers, tomatoes, and mushrooms.

Point of Application: The physical locations where the standard is applied; namely – shipping point, en-route and destination.

- **Shipping Point:** Physical location from where the FFV is shipped into the trade channel, it can be a field, packhouse or warehouse/storage.
- **En-route:** Any point in-transit i.e., between the shipping point and the final destination of the FFV (both are indicated on the shipping documents).

¹ In some cases, the definition of fruit and vegetable is based on their traditional use versus botanical nomenclature. E.g., watermelon and cantaloupe are considered as fruits while cucumbers and pumpkins are considered as vegetables; tomato is a fruit but is traditionally considered as a vegetable. Therefore, consideration should also be given to each product's traditional use and not solely botanical definition/nomenclature.

- **Destination:** The final point of arrival of the product (indicated on the shipping documents) usually for international FFV trade, this is the foreign port of arrival or importer's warehouse depending on trade agreement.

2. DEFINITION OF PRODUCE: This section of the standard identifies the family, species, sub-species/ varieties and/or cultivars and – where necessary the part of the plant being standardized.

Species: A group of closely related organisms that are similar capable of interbreeding and reproducing fertile offspring. Wherever the term “species” is mentioned in the standard it refers to the species listed in Section I Definition of Produce.

Variety: Taxon that has been selected for a particular attribute or combination of attributes, and is clearly distinct, uniform, and stable in its characteristics and when propagated by appropriate means, retains those characteristics. In some cases, the term “cultivar” (cultivated varieties) is equivalent to “variety” which is a single botanic taxon of the lowest known rank. Varieties are recognized for their unique characteristics by authorities for variety protection. They may have been derived by mutation or hybridization.

Cultivar: Cultivated varieties

Hybrids: FFV produced by crossing two species, varieties or cultivars or developed from a series of crosses between such parents. Hybrids between species are called interspecific hybrids.

Mutant: An organism or individual differing from the parental strain/s due to a genetic alteration

Commercial Type: Produce with similar technical characteristics and/or appearance, but which may belong to different varieties.

Industrial Processing: The process of transforming the physical, organoleptic and textural characteristics of raw FFV into a new product through chemical, biological or physical means. Industrial processing of FFV include juice extraction, pulp/puree creation, canning, preserving, freezing or drying/dehydrating. However, trimming, peeling, cutting, washing, grading, sorting and packaging are part of FFV preparation for marketing and are not considered processing.

3. PROVISIONS CONCERNING QUALITY

3.1 MINIMUM REQUIREMENTS

Minimum Requirements are the lowest organoleptic prerequisites that FFV must meet to be traded, thereby meeting consumer performance expectations and food safety criteria. These requirements change based on individual FFV physiological characteristics, trade practices and food safety concerns. Deviations/exceptions from these prerequisites are permissible and are referred to as an “allowance”, and collectively as “Tolerances for defects allowed”.

Intact/whole: The fruit or vegetable as it was harvested having no physical parts/pieces missing. However, depending on the characteristics of the FFV (roots, rhizomes and tubers such as yams, ginger, taro) may be trimmed and still be considered as whole/intact.

Sound: The fruit or vegetable is free from physical injury, decay, and the presence of live or dead insects including insect, eggs and larvae affecting its appearance, eating and/or keeping quality and market value.

Clean: Free from visible extraneous and foreign objectionable matter on the FFV surface, including soil, dirt and residues of agricultural production inputs, evident to the naked eye or with adjusted corrected vision lenses. Permissible post-harvest treatments such as waxes, shredded paper used for cushioning and other wrapping materials are allowed, their minute particles are not considered as making the product unclean.

Extraneous Matter: Vegetal matter associated with the part of the plant the FFV was harvested from. Extraneous matter in fruits are leaves, twigs and loose stems/peduncles.

Foreign Matter: Vegetal and non-vegetal matter not associated with the part of the plant the FFV was harvested from. It also includes stones, sticks, bark, soil, metal, plastic, debris and glass.

Firm: The textural level of turgidity/compactness in the part of the plant being traded, with flesh that is acceptable as part of the FFV characteristics. Firmness is interpreted differently based on the section in which it appears and the innate physical characteristics of the FFV being standardized.

Fresh in appearance: The FFV having its original external skin and condition (physical and textural characteristics) or as close as possible to when harvested. Portraying the desired unimpaired quality except in some fruits, a change of colour that may occur due to the ripening process.

Pests: Any animal or micro-organisms species, strain or bio type whose presence or actions are detrimental to FFV quality, keeping quality/storage and/or safety.

Pest Damage: Physical injury to FFV skin and/or flesh caused by any animal or micro-organisms species, strain or bio type feeding/gnawing, living on or in it including current or past presence of pests at any stage of their development, along with their nest/frass, excreta or dead pest fragments).

Foreign smell and/or taste: Smell or taste not associated with natural FFV due to inappropriate post-harvest practices/conditions and transportation. In such cases the FFV absorbs the foreign smell and/or taste

Damage caused by low and/or high temperatures: This includes damage caused to the FFV before or after harvesting due to exposure to non-product specific temperatures and/or extreme temperatures such as frost or heat. Damages may appear as freezer burn, frozen flesh, certain types of sunburn, chilling injury, sunscald, frostbitten and freezing. Common damages caused by low and/or high temperatures are:

- **Sunburn:** Discoloration of the FFV's surface due to direct exposure to sun's rays. Depending on the FFV, the affected area may be thickened, tough or leathery with underlying discoloured flesh.
- **Sunscald:** Discoloration of the FFV's surface due to direct and intense exposure to sun's rays. Depending on the FFV, the affected area may appear whitish grey, dry paper-like, blistered and/or flattened. The underlying flesh may be dry and discoloured.
- **Frostbitten:** Damage to the FFV resulting from freezing temperatures (below 0°C or 32°F) in the field before harvest. This may manifest as the following defects in the FFV- skin discoloration, soft or flabby tissue, external and/or internal flesh darkening.
- **Chilling Injury:** Damage to the FFV resulting from non-ambient low temperatures during post-harvest transportation and storage.
- **Freezing/Frozen:** the FFV is completely or partly frozen and in some cases accompanied by a translucent appearance.

Abnormal external moisture: Moisture from sources not associated with condensation after refrigerated storage and/or transportation.

Defects: These are classified as progressive and non-progressive defects in the FFV resulting from deterioration, physical injury and/or physiological factors affecting the appearance or market quality of the produce.

- **Progressive/Condition defects:** Defects having impact on the FFV that worsen over time such as unhealed bruises, skin breaks, decay, mould. Such defects will eventually result in the FFV losing its utility. These factors vary depending on the specific characteristics of each FFV
- **Non-progressive/Quality defects:** These are defects that do not worsen overtime, such as misshapen, healed cuts, undersize, immaturity, russets, some skin marks and residues of sap or wax from the plant. These factors vary depending on the specific characteristics of each FFV.

Some common FFV defects include:

- **Pest Damage:** Physical injury to, or that detracts from the appearance of the FFV caused by pest (insects, mammals, birds etc.)- feeding/gnawing, living on or in. This definition also includes the presence of dead pest or pests at any stage of their development.
- **Bruise:** A physical injury caused by an impact that ruptures the outer surface/skin of the FFV and may or may not impact the underlying tissue.
- **Rubbing:** Injuries to FFV skin caused by friction between the fruits surface and the tree limb or branch or with other fruits, side of packaging and other foreign objects. Due to this rubbing, the skin suberizes.
- **Decay:** Deterioration and/or decomposition of tissue induced by fungi, bacteria resulting from injury (physical damage), pest damage, diseases and or senescence; and/or fungi as a natural process of change/senescence affecting the appearance or market quality of the produce.

- **Rot:** To decompose due to biological action. Depending on individual FFV physical characteristics and trade practices other descriptors such as “soft rot” or “decay” is used instead of rot
- **Mould:** A fungus that grows on FFV that causes decay.
- **Translucent:** water-soaked condition resulting in the FFV having a glassy appearance
- **Misshapen:** The physical shape of the FFV does not fully conform to the established/normal shape characteristics and therefore its appearance is affected or seriously affected.
- **Damage:** Any specific defect or an equally objectionable variation of defects or a combination of defects, which materially detracts from the appearance, edibility, utility or shipping quality of the FFV. Damage may be caused by physical means, insects, pests and unfavourable environmental factors such as heat, wind, hail and frost.

3.1.1 Minimum Maturity Requirements: Horticultural maturity.

Maturity²: The fruit has attained a physiological stage of development at which it possesses the desired characteristics/pre-requisites to provide the minimum accepted sensory attributes to the consumer (normal taste/flavour, odour and texture).

- **Maturity measurements most used for fruits at inspection points include** sugar content (total soluble solids degrees or percentage Brix), total soluble solids; acid ratio, shape, juice content, ground colour changes and pressure testing of the flesh using a penetrometer.

Sufficiently developed (vegetables, roots, rhizomes, tubers etc.): measured by ground colour, skin texture, flavour, leaf texture, shape, firmness/compactness, days from planting or flowering.

(The following terms firm, tender, flabby, pithy, shrivelled, woody, translucent are used to indicate stages of Sufficient Development and together with the general quality or condition of vegetables, used to describe maturity).

Immature/not sufficiently developed: FFV that have not attained the physiological and biochemical stage of development at which they possess the desired characteristics/pre-requisites to provide the minimum accepted sensory attributes to the consumer

3.2 Classification: The placing of FFV into groups/classes based on physical and physiochemical characteristics/parameters (shape, colour, taste/maturity and the presence or absence of defects).

3.2.1 “Extra” Class: Selection of FFV of superior quality. The produce shall have the characteristics typical of the variety or commercial type and shall fulfil the minimum requirements. The produce may have slight superficial defects only, unless otherwise indicated in the standard. The slight superficial defects should affect only very small areas of the produce and should hardly contrast with the typical colouring, nature of the skin or typical shape. The produce shall not have any defect affecting the internal quality.

3.2.2 Class I: Selection of fruit or vegetables of good quality. The produce shall have the characteristics typical of the variety or commercial type and shall fulfil the minimum requirements. The produce may have slight defects only in shape, development, colouring and skin, unless otherwise indicated in the standard. The slight defects should affect only small areas of the produce and should only slightly contrast with the typical colouring, nature of the skin or typical shape. The produce shall not have any defect affecting the internal quality.

3.2.2 Class II: Selection of fruit or vegetables of marketable quality. The produce may have defects regarding shape, development, colouring and skin as well as the minimum requirements, unless otherwise indicated in the standard. The produce shall not have serious defects affecting the internal quality.

4. PROVISION CONCERNING SIZING

Size: The physical dimension or mass of the FFV measured by one of, or a combination of the following:

Count: The number of FFV per package or to a set volume/dimension.

²In some non-English languages maturity and ripeness are the same word and have the same meaning.

Horticultural maturity/Sufficiently developed: The fruit has attained a minimal level of physiological development (organoleptic characteristics) at which it can be traded and/or consumed.

Physiological maturity/ Fully developed: the fruit has attained a biological stage of development that results in the fruit being able to continue development (ripening) even it is detached from the plant.

Length: The longitudinal axis of the FFV measured from the stem end/peduncle to the blossom /growth end/apex excluding the peduncle.

Diameter: the greatest dimension (equatorial section) of the FFV measured at right angles to a line from the stem to the blossom end; or determined by the FFV passing through a round opening in any position. Diameter is measured either by the maximum or minimum diameter of the equatorial section of each FFV or a diameter range per package.

Weight: the individual weight of each FFV or a weight range per package

Minimum size: the absolute smallest acceptable size or size range in the standard.

Maximum size: the absolute largest acceptable individual size or size range in the standard.

Undersize: the FFV size is lower than the size that is indicated on the package or the minimum size allowed.

Oversize: the FFV size is larger than the size that is indicated on the package or the maximum size allowed.

Uniformity in size: A size or size range that is defined to guarantee uniform appearance of the FFV in the package with respect to the physical dimensions. It may be expressed by a fixed size, minimum and maximum size, or a minimum/maximum number of units in the package.

5. PROVISIONS CONCERNING TOLERANCES

Tolerances: The maximum percentage of all the allowances/deviations that are permitted within a lot of FFV or a class, from the requirements of the standard. Tolerances are assessed on samples taken from the lot in accordance with a pre-set ratio and/or based on recognized internationally agreed methods of sampling (such as OECD or Codex rules for conformity checks). The cumulated defects found in a sample must be set in context to the weight or number of the sample, to calculate the percentage and check whether the tolerances are met.

5.1.1 Quality tolerances: The collective maximum deviation allowed for produce not meeting the quality requirements, expressed in percentage, by number or weight.

Allowance: The amount of a factor/defect (e.g., staining) deviation permitted by a minimum requirement in a lot of produce. The allowance can be part of the tolerance or separate/independent.

5.2 Size tolerances: Maximum deviation allowed for produce not meeting the indicated size i.e., larger or smaller. This deviation is expressed as a percentage, by number or weight.

6. PROVISIONS CONCERNING PRESENTATION

6.1 Uniformity: Terms used to indicate that the FFV in a package and/or a lot are similar in variety, shape, size and/or size range, colour and/or a colour range.

Lot: A quantity of produce presented for inspection as one unit, having similar characteristics regarding type and or variety and origin:

Sublot: the result of dividing very large volumes of FFV such as a car lot (rail carload) or boat load into smaller ones for inspection purposes.

6.2 Packaging

Package: Individual containers of produce that individually or collectively facilitate safe handling, storage, transportation and sale of the produce. Packages vary in size and function based on the produce characteristics and its trade practices. Its main function is to contain, protect and preserve the product. Types of packages are:

- **Sales package:** Individual containers in which produce is offered for sale. These may be small, containing a few grams of products such as fresh herbs or as large as pallet-bins holding 200 kg of watermelons or pumpkins.
- **Consumer Packages:** Sales packages/ units intended for direct sale to the consumer. These can vary in size due to the intended/targeted consumer.
- **Pre-package/Primary package:** Sales packages having product enclosed completely or only partially, but in such a way that the contents cannot be altered without opening or changing the packaging. Protective films covering/wrapping single produce are not considered as a pre-package

- **Bulk Containers:** Large receptacles or packages such as pallet bins or bags, rail cars and other large shipping packages and/or containers in which the FFV may be in direct contact with the transportation unit and/or the atmosphere. Some bulk containers such as pallet bins are sometimes used as sales packages

In all cases, packages/receptacles in which the FFV is packaged must be of such quality and strength as to protect the FFV during transportation and handling. Recycled and re-usable packages meeting the requirements in this section are acceptable.

The materials used inside the package must be clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications, is allowed, provided the printing or labelling has been done with non-toxic ink or glue. Stickers individually affixed to the produce shall be such that, when removed, they neither leave visible traces of glue nor lead to skin defects.

6.2.1 Description of Containers: The type containers in which the FFV is placed in such as or multilayer, consumer sales package and bulk containers.

7. PROVISIONS CONCERNING MARKING OR LABELLING

7.1 Consumer Packages: See previous Section 6.2.

7.1.1 Name of produce: The common name or the trade name under which the product is traded.

Trade Name: A name or denomination developed or selected by a trader or specific industry for which no legal protection has been sought or obtained in any country. Example: The name of pear variety is Forelle, a special colour grading is named "Vermont Beauty", the latter being a trade name connected to the variety.

Trademark Name: A name or denomination developed or selected by a trader or specific industry for which legal protection has been sought and granted or obtained in any country. Example: Thompson Seedless (table grapes). Trademark named produce often require special organoleptic requirements such as prescribed maturity, colour and/or size requirements.

Synonym: Officially accepted name that can replace the variety name that refers to the same variety ...

7.1.2 Origin of produce: The country in which the product was grown and harvested. Optionally, this may include addition of the name of the geographical physical location within the country.

7.2. Non-retail Containers: Any container that is not intended to be offered for direct sale to the consumer. The food in the non-retail container is for further food business activities before being offered to the consumer.

7.2.1 Identification: The name and physical address of the exporter, packer/dispatcher and the receiver/importer

7.2.4 Commercial Specifications: This include stating the:

- **Class:** A rank of quality expressed in accordance with Section 3.2 Classification
- **Size:** If sized, should be expressed in accordance with Section 4. Provision Concerning Sizing

7.2.5 Official Control Mark: Stamp, adhesive sticker or signage on the package reflecting the inspection status of the lot.

PART 2: ADDITIONAL TERMS

These additional terms though may not be part of the Standard Layout or standards they are some of most used words in Codex Committee on Fresh Fruits and Vegetables (CCFFV) standard development and application methods. They are also very important in reporting conformity or non-conformity with CCFFV Standards.

Colour Variation: Differences in colour occurring with the same variety of FFV

Conformity check: Inspection carried out by an inspector to check that FFV conform to the requirements laid down in a standard

Excreta: fresh or dried bodily waste from living organisms

Senescence: The gradual aging/deterioration of FFV due to physical and physio-biochemical changes which naturally occur. It may be accompanied by either flesh softening, changes in colour and structure and other organoleptic characteristics. Its progression at a point renders the FFV unsuitable for consumption.

Well-formed/Well shaped: The FFV have the normal shape characteristic of the variety.

Stalk/Peduncle: A stalk bearing a flower or flower cluster or a fructification which attaches the stem-end of the fruit to the plant.

Blossom/Growth End/Apex: The part of FFV opposite the stalk/peduncle at which the vegetative growth stops.

Terms describing firmness in:

- (i) **Fresh Fruits and Vegetables:** In some fresh fruits, firmness is measured using a pressure tester (penetrometer). The penetrometer's result is also used to describe levels of flesh development and maturation/ripeness in some fruits such as apples, pear, apricot, peaches and nectarines. The degree of firmness (without a pressure tester) is described progressively as:
 - **Hard:** the fruit's flesh is tenacious and not yielding to moderate hand/finger pressure
 - **Firm:** the flesh yields very slightly to moderate hand/finger pressure
 - **Firm ripe:** the fruit is ripe, but the flesh yields slightly to moderate hand/finger pressure
 - **Ripe:** the flesh yields readily to moderate hand/finger pressure
 - **Over-ripe:** the flesh has softened and has signs of breakdown, yields readily to hand/finger pressure, deterioration is quickening, and the produce is unacceptable for wholesale trade.
- (ii) **Roots, Rhizomes, Corm and Tubers:** Firm means these are turgid, solid, tenacious and do not yield readily to hand/finger pressure.
- (iii) **Leafy Vegetables:** Firm means these vegetables are crisp, not wilted or flabby and can be readily snapped/torn by hand.

Terms Describing Degrees of Freshness:

- (i) **Fresh:** Normal succulence, brightness and firmness shown like when harvested. This is important as any impairment of original fresh quality reduces the product's value.
- (ii) **Firm:** Compact, solid, substantial and yields very slightly to moderate hand/finger pressure. Indicative of normal development and good condition. Very important in root crops, cucurbits, some eggplants, etc.
- (iii) **Crisp:** Turgid, brittle and breaks readily. This denotes a fresh condition that is desirable, e.g., in celery and rhubarb.
- (iv) **Tender:** Succulent and of delicate texture. This is a desirable condition in vegetables, e.g., asparagus, artichokes and string beans.
- (v) **Flabby:** Soft, limp, pliable, and lacking firmness. Flabbiness is often due to loss of stored nutrients and water on account of improper storage conditions, sprouting or old age, such as in sprouted potatoes or aged carrots.

- (vi) **Pithy:** Open texture with air spaces in pith or central portion that is usually the result of malnutrition. This condition is especially applicable to celery, radishes, turnips and carrots.
- (vii) **Shrivelled:** Shrunken, drawn, or wrinkled resulting in a marked change in form and often in size. This is an extreme condition resulting from excessive transpiration or old age.
- (viii) **Spongy:** Easily compressed and of loose open texture. This is usually the result of very rapid or irregular growth in commodities such as poorly headed cabbage or lettuce and immature or sprouted onions.