



هيئة أبوظبي للزراعة والسلامة الغذائية
ABU DHABI AGRICULTURE AND FOOD
SAFETY AUTHORITY

CODE OF PRACTICE

No. (28) of 2019

PERMITTED ADDITIVES IN FOOD



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I. Introduction and Background

ADAFSA is responsible for assuring that foods displayed in the market in Abu Dhabi emirate are safe and suitable (i.e. properly labeled) under its mandate of Food Law No (02) of 2008.

Food business operators shall be responsible for ensuring the compliance with legal requirements pertaining to food additives use.

This code of practice shall be used without prejudice to the labeling provisions of UAE technical regulations regarding specific foods (vertical and horizontal technical regulations) and in conjunction with all applicable food laws in addition to the regulations and directives approved by Abu Dhabi Government.

III. Scope

This code applies to foods produced domestically, as well as foods imported from other emirates and countries.

III. Related Documents

The following legislation has being considered during setting this code, and recommended to be read in conjunction with:

- ADAFSA regulation no. (1) for the year 2008 " vDescription of Violations related to food & its handling".
- ADAFSA regulation no. (3) for the year 2008 "Recall and Traceability of feed & food".
- ADAFSA regulation no.(6) for the year 2010 "food hygiene throughout the food chain".

Changes to the applicable labeling legislation is expected in the future where the code of practice will be amended as, and when, appropriate.

IV. Purpose

This Code of Practice for food additives use has been developed with the aim:

- to provide the food Industry (i.e. manufacturers, producers and retailers) with practical advice on how best to use food additives in food products.
- to provide a guidance to the consumers on the permitted food additives.
- to make sure that permitted food additives in UAE are in line with the international standards.

V. Definitions

In this code of practice the terms and expressions of the food Law No. 2 for the year 2008 and the relevant regulations shall apply, in addition to that for the purposes of this document the following terms and expressions shall have the meaning hereby assigned to them, unless the text indicates otherwise:

Acceptable Daily Intake (ADI)	is an estimate of the amount of a food additive, expressed on a body weight basis that can be ingested daily over a lifetime without appreciable health risk and expressed as mg/kg from body weight
Antioxidant	Substance used for the protection of food products against deterioration caused by oxidation
Artificial flavorings	Substances obtained synthetically and not chemically identical to substances present in natural products.
Emulsifiers	Substances which, when added to a foodstuff, aid the formation of a uniform dispersion of two or more immiscible substances
Flavor enhancer	Substances with little or no odor, the primary purpose of which is to increase the flavor effect of certain food components
Food Additive	Any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include contaminants or substances added to food for maintaining or improving nutritional qualities or sodium chloride.
Horizontal technical regulation	The legislations/standards are applicable to all foods intended for the consumer.

JECFA	Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives
Lake	A salt prepared by reaction of one of the water soluble pigments with the basic radical aluminum or calcium.
Maximum Use Level of additives	is the highest concentration of the additive determined to be functionally effective in a food or food category and agreed to be safe as set out by the national legislations or Codex Alimentarius Commission. It is generally expressed as mg additive/kg or liter of food.
Natural coloring agent	A material extracted, isolated, or otherwise derived-with or without intermediates-from vegetables, animals, minerals or any other sources, which when added to a foodstuff is capable (alone or through reaction with another substance) of imparting a distinguishing color thereto
Natural flavorings	Substances obtained from raw materials (vegetables, animals) in the raw state or processed by physical, microbiological or enzymatic means
Flavorings	are defined as imparting odor and/or taste to foods and are generally used in the form of mixtures of a number of flavoring preparations and defined chemical substances.
Preservatives	Any additives which inhibit, or arrest decomposition of foodstuffs by micro-organism.
Processing Aid	any substance or material not including apparatus or utensils, and not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or its ingredients to fulfill a certain technological purpose during treatment or processing and which may result in the non-intentional but unavoidable presence of residues or derivatives in the final product. They do not present any health risk and do not have any technological effect on the final product.
no-observed-adverse-effect level" (NOAEL)	The highest exposure that does not produce this adverse effect is called the no-observed-effect level (NOEL) or the no-observed-adverse-effect level (NOAEL).
Quantum satis	mean that no maximum numerical level is specified

and substances shall be used in accordance with good manufacturing practice, at a level not higher than is necessary to achieve the intended purpose and provided the consumer is not misled.

Sale by retail

any sale to a person buying otherwise than for the purpose of resale but does not include a sale to caterers for the purposes of their catering business or a sale to manufacturers for the purposes of their manufacturing business

Stabilizers

Substances which, when added to a foodstuff, aid the maintenance of a uniform dispersion of two or more immiscible substances

Synthetic coloring agent

A material produced by synthesis of any similar artificial method and which when added to the food is capable (alone or through reaction with another substance) of imparting a distinguishing color thereto.

Technical Regulation

Mandatory standard mainly issued by the Emirates Authority for Standardization and Metrology, and governs food commodity and contains some labeling provisions applicable to that food

Thickeners

Substances which, when added to a foodstuff, increase its viscosity

Vertical technical regulation

Vertical legislation/standard mainly governs specific food commodity and contains technical requirements and provisions applicable to that food.

Without appreciable health risk

means that there is a reasonable certainty of no harm to consumers if an additive is used at levels that do not exceed those set out by the National/Regional legislations or Codex Alimentarius Commission

Section 1- Understanding Food Additives

1.1 Introduction

Food additives play an important part in our food supply ensuring that our food is safe and suitable, meeting consumer needs and demands. Food additives are not a recent discovery as they have been used by mankind for centuries. Our ancestors used salt to preserve meats and fish, added herbs and spices to improve the flavor of foods, preserved fruit with sugar, and pickled olives and cucumbers in a vinegar solution. Today, with the advent of processed foods, there has been a massive explosion in the chemical adulteration of foods with additives. Considerable controversy has been associated with the potential threats and possible benefits of food additives.

The purpose for using food additives includes improving the quality of food by increasing its shelf life and improving the taste or appearance of a food. Additionally, consumers can be offered wider choice of food in the market

Many food additives occur naturally (e.g. Red beet from beetroot and purple anthocyanins from grape skin), whereas some food additives can be manufactured whether they are found naturally or not

The primary aim of the food-manufacturing industry is to provide a wide range of safe, wholesome, nutritious and attractive products in order to meet consumer requirements for quality, convenience and variety. It would be impossible to do this without the use of food additives. They are essential in the battery of tools used by the food manufacturer to convert agricultural raw materials into products that are safe, stable, of consistent quality and readily prepared and consumed.

Over the last 50 years, developments in food science and technology have led to the discovery of many new substances that can fulfill numerous functions in foods. These food additives are now readily available (e.g. emulsifiers in margarine, sweeteners in low-calorie products) and a wider range of preservatives and antioxidants which slow product spoilage and rancidity whilst maintaining taste.

1.2 Numerical Identification of Food additives

Many food additives have long complex names. Sometimes these are abbreviated. Some have more than one name and a few include letters from the Greek alphabet, which can be confusing, hence to help reduce this confusion, each additive is given a short code number.

Additives used in foods to be labeled clearly in the list of ingredients, either by specific name or by recognized numerical identification together with class titles as required by the relevant technical regulations and standards.

The numbering identification of food additives in UAE follows that of the International Numbering System (INS) as determined by the Codex Alimentarius.

Some food labels may list additives with the prefix letter 'E'. If a food additive number has the prefix letter 'E' it has been approved by the European Community. This doesn't necessary mean permitted for use in UAE.

1.3 Labeling of Food Additives

The labeling is required to inform consumers on the presence of additives in foods. Additives are required by technical Regulation to be identified by their class name and by an individual name or code number as prescribed in the UAE. CAC standard "labeling of pre-packaged food" and the code of practice of ADAFSA Food Labeling as well.

Many people, including consumers have the interest to know what these additive codes stand for where these additives are listed as part of the ingredients list on the food label. On the other hand, some food additives may have an adverse reaction on some people and food labeling assist them to avoid any certain food additive.

When reading food additive on the food label, the class name of the food additive will be listed along with the additive name or code number.

Example

Antioxidant	(Sulphur dioxide)	or	Antioxidant (220)
(class name)	(Additive name)		(class name) (code number)

Additionally when food additives and processing aids are sold as such shall not be described or presented on any label or in any labeling in a manner than is false, misleading or deceptive or is likely to create an erroneous impression regarding their character in any respect.

Food additives and processing aids when sold as such shall not be described or presented on any label or in any labeling by words, pictorial or other devices which refer to or are suggestive, either directly or indirectly, of any other product with which such food additives might be confused, or in such a manner as to lead the purchaser or consumer to suppose that the food additive is connected with or derived from such other product; provided that the term "x flavor" may be used to describe a flavor which is not derived from, but reproduces the flavor of "x".

Food additives (Irradiated food additives) which have been treated with ionizing radiation, shall be so designated.

Food additive label with a shelf-life not exceeding 18 months shall carry the date of minimum durability using words such as "will keep at least until ...".

The words "For Food Use" or a statement substantially similar thereto shall appear in a prominent position on the label.

Food additives when sold as such should comply with the mandatory labeling requirements under the relevant legislation, which applies to the labeling of "food additives" sold as such whether sale by retail or other than by retail, including sales to caterers and food manufacturers for the purpose of their businesses and includes food processing aids.

The label of food additive shall bear the following minimum information:

- Details of the food additive
- Instructions on keeping and use
- Net contents
- The name and address of the manufacturer, packer, distributor, importer, exporter or vendor.
- Country of origin
- Lot identification

Section 2- Food Additives; Classes and Functional Use

2.1 General Considerations

The general requirements for all permitted food additives are as following:

- (a) should be completely free from ingredient which is not allowed as per Islamic rules. It must meet the Halal requirements in the UAE regulations (i.e. All food additives containing or manufactured from pork products or ethanol alcohol that is not resulting from natural fermentation or used as solvent for additives exclusively in certain proportions).
- (b) should not react with food ingredients or its containers.
- (c) should be packed in suitable firmly sealed hygienic containers so as to avoid its contact with outer atmosphere or contamination.
- (d) the containers of food additives should be transported in such a way as to avoid their breakage or damage.
- (e) the containers of food additives should be stored in cold dry places, far away from sources of direct light and contamination.

Food additives are grouped into classes according to their function. Different types of additive are used for different purposes, though many individual additives perform more than one function. For the purposes of both classification and regulation, they are grouped according to their primary function. The main groupings, or classes, of additives are explained below, together with their functions and some examples of their use.

2.2 Functional Classes of Food Additives

The main Classes of food additives and their technological functions are listed below:

Functional class (Sub class)	Technological Functions
Acidity regulator (acid, alkali, base, buffer, buffering agent, pH adjusting agent)	<i>adjust the acid or alkaline level in food or maintain sour or sharp taste which delays bacterial growth</i>
Anti-caking agent (anti-caking agent, anti-stick agent, drying agent, dusting powder)	<i>reduces the tendency of individual food particles to adhere or improves flow characteristics</i>
Antioxidant (antioxidant, antioxidant synergist)	<i>retards or prevents the oxidative deterioration of a food and slows down color and flavor changes in food</i>

Bulking agent (bulking agent, filler)	<i>contributes to the volume of a food without contributing significantly to its available energy.</i>
Colors	<i>enhances food appearance and restore color to foods</i>
Color fixative (color fixative, color stabilizer)	<i>stabilizes, retains or intensifies an existing color of a food.</i>
Emulsifier (emulsifier, emulsifying salt, plasticizer, dispersing agent, surface active agent, surfactant, wetting agent)	<i>facilitates the formation or maintenance of an emulsion between two or more immiscible phases (i.e. ensure mixtures of oil and water stay mixed together)</i>
Firming agent	<i>contributes to firmness of food or interact with gelling agents to produce or strengthen a gel.</i>
Flavor enhancer (flavor enhancer, flavor modifier, tenderizer)	<i>enhances the existing taste and/or odor of a food</i>
Flavoring (excluding herbs and spices and intense sweeteners)	<i>intense preparations which are added to foods to impart taste and/or odor, which are used in small amounts and are not intended to be consumed alone, but do not include herbs, spices and substances which have an exclusively sweet, sour or salt taste.</i>
Foaming agent (Whipping agent, aerating agent)	<i>facilitates the formation of a homogeneous dispersion of a gaseous phase in a liquid or solid food (i.e. maintains the uniform dispersion of gases in aerated food).</i>
Anti foaming agents	<i>acts in stopping or reducing foaming</i>
Gelling agent	<i>modifies food texture through gel formation</i>
Glazing agent (coating, sealing agent, polish)	<i>imparts a coating to the external surface of a food (i.e. Protects food and help in making it looks shiny)</i>

Humectant (moisture/water retention agent, wetting agent)	<i>retards moisture loss from food or promotes the dissolution of a solid in an aqueous medium (i.e. keeps the food moist and prevent from drying out)</i>
Intense sweetener	<i>replaces the sweetness normally provided by sugars in foods without contributing significantly to their available energy.</i>
Preservative (anti-microbial preservative, anti-mycotic agent, bacteriophage control agent, chemosterilant, disinfection agent)	<i>improve food safety by controlling growth of mould, bacteria and yeasts</i>
Propellant	<i>gas, other than air, which expels a food from a container (i.e. used in aerosol food containers to spray out the contents)</i>
Raising agent	<i>liberates gas and thereby increase the volume of a food (i.e. used mainly in bakery products to assist in rising)</i>
Sequestrant	<i>forms chemical complexes with metallic ions</i>
Stabilizers (binder, firming agent, water binding agent, foam stabilizer)	<i>maintains the homogeneous dispersion of two or more immiscible substances in a food (i.e. allow various ingredients to remain together)</i>
Thickener (thickening agent, texturizer, bodying agent)	<i>increases the viscosity of a food with uniform consistency</i>

The most frequently used food additives are listed below with key considerations to be taken into account when applying or using within food:

2.2.1 Colors

The primary reasons for adding colors to foods include:

- To offset color loss due to exposure to light, air, extremes of temperature, moisture and storage conditions.
- To compensate for natural or seasonal variations in food raw materials or the effects of processing and storage to meet consumer expectations (Masking or disguising inferior quality, however, are unacceptable uses of colours).
- To enhance colors those occur naturally but at levels weaker than those usually associated with a given food.

The following shall be met in applying colors:

1. No natural or synthetic coloring matter shall be added to food products except those mentioned in the relevant legislation in Section 7.
2. The color shall be capable of dissolving or dispersing in the foodstuff in case it is used without solvents.
3. Carrot oil shall contain no more than 25 ppm of hexan.
4. Lake may be used in coloring foods products.
5. The toxic mineral elements shall not exceed the following (Arsenic 3 ppm, Lead 10 ppm, Heavy metals 40 ppm)
6. Coloring matter may be used in the following cases:
 - Official ink used for stamping the slaughtered animals with distinguishing marks.
 - Synthetic coloring of the fully ripe citrus fruits.
7. Synthetic coloring matter shall fulfill the characteristics specified in the legislation.
8. Natural coloring matter shall be packed in dark-colored glass containers or any other suitable, firmly sealed hygienic containers under an inert gas as far as possible so as to avoid its contact with outer atmosphere or contamination.
9. The containers of coloring matter shall be filled so that the minimum net content volume shall not be less than 90% from the water capacity of used container.
10. If foods contain any of the following food colors:

Sunset Yellow (INS 110)*

Carmoisine (INS 122)*

Tartrazine (INS 102)*

Quinoline Yellow (INS 104)*

Allura Red (INS 129)*

Ponceau 4R (INS 124)*

The following must appear anywhere on the label:

'Name or INS -number of the color(s): **may have an adverse effect on activity and attention in children**.'

* With the exception of foods where the colour(s) has been used for the purposes of health or other marking on meat products or for stamping or decorative colouring on eggshells

2.2.2 Preservatives

No preservatives other than those mentioned in the relevant legislation in section 7 shall be used in food products. Preservatives help stop food spoiled and mean that food can be kept safe for longer. Most food that has a long shelf-life is likely to include preservatives, unless another method of preserving has been used' such as freezing, canning or drying.

Use of sulfite compounds preservatives shall not be permitted in fresh vegetables and fruits.

Example:

To stop mould or bacteria growing, dried fruit is often treated with sulphur dioxide (INS 220); and Processed comminuted meat, poultry, and game products are often treated with nitrites (INS 249 to INS 250) during the curing process.

More traditional preservatives such as sugar, salt and vinegar are also still used to preserve some foods preservatives are probably the single most important class of additives, as they play an important role in the safety of the food supply. All food raw materials are subject to biochemical processes and microbiological action, which limit their keeping qualities. Preservatives are used to extend the shelf-life of certain products and ensure their safety through that extended period. Most importantly they retard bacterial degradation, which can lead to the production of toxins and cause food poisoning. Thus they help in keeping food safe over the shelf-life of the product, which itself may be extended by their use. The continued perception of preservatives as undesirable, to which the many labels protesting "no artificial preservatives" testify, is therefore an unfortunate consumer misapprehension.

2.2.3 Antioxidants

Any food made using fats or oils - from meat pies to mayonnaise - is likely to contain antioxidants. These make foods last longer by helping to stop the fats, oils and certain vitamins from combining with oxygen in the air become rancid and lose color.

Example

Vitamin C, also called ascorbic acid (INS 300), is one of the most widely used antioxidants in many foodstuff.

Antioxidants reduce the oxidative deterioration that leads to rancidity, loss of flavor, color and nutritive value of foodstuffs. Fats, oils, flavoring substances, vitamins and colors can all oxidize spontaneously with oxygen when exposed to air.

The rate of deterioration can vary considerably and is influenced by the presence of natural antioxidants and other components, availability of oxygen, and sensitivity of the substance to oxidation, temperature and light.

Example

Oxidation can be avoided, or retarded, by a number of means, such as replacing air by inert packaging gases, removal of oxygen with glucose oxidase (INS 1102), incorporation of UV-absorbing substances in transparent packaging materials, cooling, and use of sequestering agents. These may not be possible in all cases, or sufficient for an adequate shelf-life for some foods.

Antioxidants are used to retard oxidative deterioration and extend shelf-life. Some antioxidants actually remove oxygen by self-oxidation such as ascorbic acid, whilst others interfere in the mechanism of oxidation such as tocopherols, gallic acid esters, BHA and BHT.

All have specific properties, making them more effective in some applications than in others.

Often a combination of two or more antioxidants is more effective than any one used simply because of their synergistic effects. The presence of sequestering agents, such as citric acid, may also have a synergistic effect, by reducing the availability of metallic ions that may catalyse oxidation reactions. The use of the powerful synthetic antioxidants BHA, BHT and the gallic acid esters is very restricted. Tocopherols, which can be either natural or synthetic, are less restricted but are less effective in the protection of processed foods.

Antioxidants cannot restore oxidized food; they can only retard the oxidation process. As oxidation is a chain reaction process, it needs to be retarded as early as possible. The most effective use of antioxidants is therefore in the fats and oils used in the manufacturing process.

No antioxidants and antioxidant synergists other than those mentioned in the relevant legislation in section 7 should be used in food products.

2.2.4 Sweeteners

The desire for the pleasure of sweetness has a strong influence on what people choose to eat and drink. Since early times, people have sought out foods with sweet taste. Drawings on the walls of Egyptian tombs show bee-keepers collecting honey, and sugar cane was grown in India some 2000 years ago.

Today, sucrose, or table sugar, is the taste standard by which all other sweeteners are measured. An "ideal" sweetener tastes like sucrose, is colorless, odorless, readily soluble, stable and economical. Some sweeteners, like sugar, contain calories. And some are low-calorie or calorie free sweeteners are lower in calories and safer for teeth; sweeteners are often used instead of sugar in products such as fizzy drinks, yoghurt and chewing gum.

Sweeteners perform an obvious function. They come in two basic types – “bulk” and “intense”, and are permitted in foods that are either energy-reduced or have no added sugar. They are also sold direct to consumers as “table-top” sweeteners well-known to dieters and diabetics (e.g. table top sweetener Sunette contains acesulfame-K). Intense sweeteners (e.g. aspartame, saccharin, and acesulfame-K) have, as their name suggests, a very high sweetening property, variable from type to type but generally several magnitudes greater than that of sucrose.

Example

Aspartame is approximately 200 times sweeter than sugar, weight for weight; saccharin 300–500 times; and acesulfame-K 130 –200 times.)

Bulk sweeteners, where the majority are polyols, including sorbitol, isomaltitol and lactitol are less sweet, but provide volume and hence mouth feel. Amongst the polyols, maltitol is one of the sweetest and xylitol, which is the sweetest, has the same sweetness intensity as sucrose. Due to the reduced sweetness characteristics of the majority of polyols, it is possible to blend them with other polyols or with intense sweeteners to improve the sweetness and taste quality. This property is known as sweetness synergy. Another benefit is the ability to mask the undesired bitter metallic after taste of some intense sweeteners.

Commonly used combinations include, saccharin, acesulfame-K with aspartame, there are many more types of sweetener (bulk or intense) are useful in low-calorie products, and are increasingly sought after by many consumers, and for special dietary products such as for diabetics.

Artificial sweeteners or nutritive (sugar alcohols) are not allowed in certain baby foods.

No sweeteners other than those mentioned in in the relevant legislation in section 7 should be used in food products.

2.2.5 Emulsifiers, Stabilizers, Thickeners and Gelling Agents

The purpose of emulsifiers and stabilizers is to facilitate the mixing together of ingredients that normally would not mix, namely fat and water. This mixing of the aqueous and lipid phases is then maintained by stabilizers. These additives are essential in the production of mayonnaise, chocolate products and fat spreads.

Example

The manufacture of fat spreads (reduced-fat substitutes for butter and margarine), has made a significant contribution to consumer choice and dietary change, and would not be possible without the use of emulsifiers and stabilizers.

Other reduced- and low-fat versions of a number of products are similarly dependent on this technology.

In addition to this function, the term stabilizer is also used for substances that can stabilize, retain or intensify an existing color of a food and substances that increase the binding capacity of the food to allow the binding of food pieces into reconstituted food.

Gelling agents are used to change the consistency of food. Thickeners help give body to food in the same way as adding flour thickens a sauce.

Example

- Emulsifiers such as Lecithins (INS 322), help mix ingredients together that would normally separate, such as oil and water.
- Stabilizers, such as locust bean gum (INS 410) made from carob beans, help stop these ingredients from separating again.
- Emulsifiers and stabilizers also give foods a consistent texture. They are used in foods such as low-fat spreads and other sweet and savory foods.
- The most common gelling agent is pectin (INS 440), which is used to make jam.

No Emulsifiers, stabilizers, and thickeners other than those mentioned in in the relevant legislation in section 7 should be used in food products.

2.2.6 Flavor Enhancers and Flavorings

Flavor enhancers are used to bring out the flavor in a wide range of savory and sweet foods without adding a flavor of their own.

Example

Monosodium glutamate, known as MSG, is added to fresh meat, poultry, and game.

Flavor enhancers are also used in a wide range of other foods including savory snacks, ready meals and condiments.

Flavorings, in contrast, are added to a wide range of foods, usually in very small amounts, to give a particular taste or smell. Flavorings don't have INS numbers.

Although flavor enhancers are categorized as additives, flavorings are technologically different and regulated separately, even though they are often considered by the general public to be the same thing. Flavorings are defined as imparting odor and/or taste to foods and are generally used in the form of mixtures of a number of flavoring preparations and defined chemical substances. These do not include edible substances and products intended to be consumed as such, or substances that have exclusively a sweet, sour or salty taste, i.e. ordinary food ingredients such as sugar, lemon juice, vinegar or salt.

The following shall met in flavorings permitted for use in food products:

- Only artificial flavorings & flavor enhancer mentioned in GSO standard no. 707 shall be used, as well as the European Regulation no. 1334 and its amendments on on flavourings and certain food ingredients with flavouring properties for use in and on foods.
- The maximum limit of biological active substances present in food product to which natural flavorings are added does not exceed what is mentioned in Table "A".
- Plants mentioned in Table "B" as a source of natural flavorings shall not be used.

In addition to the types of flavoring such as process flavors or smoke flavors, there are three distinct classes of flavoring substances: natural (e.g. citral); nature identical (e.g. vanillin); and artificial (e.g. ethyl vanillin). Any flavorings labeled as "natural" must meet the legal definition.

As with additives, some flavorings are sold direct to the consumer for domestic culinary use. Vanilla and peppermint are amongst the best known, as well as the popular brandy and rum essences. Anyone who has ever added too much flavoring to a home-made cake or a batch of peppermint creams will appreciate the minute quantities in which they are used. Similarly, in commercial manufacture, the quantity of flavoring used is extremely small in relation to that of other ingredients. Most flavorings are developed from substances naturally present in foods. Citrus and orange oils, for example, are amongst the most common natural source materials used in flavoring preparations and substances.

Some sweeteners have also been found to have flavor-enhancing properties and have been authorized for use as such.

Example

neohesperidine DC (INS 959) can enhance the flavor of meat products and margarine, and acesulfame K, aspartame and thaumatin are used to enhance the flavor of chewing gum and desserts.

2.2.7 General principles for the use of flavourings

- The use of flavourings in food should not lead to unsafe levels of their intake.
- Flavourings should be of a purity suitable for use in food. Unavoidable impurities should not be present in the final food at levels that would pose an unacceptable risk to health. 3.3 The use of flavourings is justified only where they impart or modify flavour to food, provided that such use does not mislead the consumer about the nature or quality of food.
- Flavourings should be used under conditions of good manufacturing practice, which includes limiting the quantity used in food to the lowest level necessary to accomplish the desired flavouring effect.
- Flavourings may contain non-flavouring food ingredients, including food additives and foodstuffs, necessary for their production, storage, handling, and use. Such ingredients may also be used to facilitate the dilution, dissolution, or dispersion of flavourings in food. Non-

flavouring food ingredients should be: a) Limited to the lowest level required to ensure the safety and quality of the flavourings, and to facilitate their storage and ease of use; b) Reduced to the lowest level reasonably possible when not intended to accomplish a technological function in the food itself; and,

- c) used in accordance with the provisions of the Codex General Standard for Food Additives (GSFA; CODEX STAN 192) whenever they are intended to provide a technological function in the finished food.

2.3 Justified Use of Food Additives

A food additive should be used only where permitted by the relevant legislation and only where it performs a technological function as specified in section 2.2 above. Unless expressly permitted, food additives must not be added to food.

The use of food additives is justified only when such use has an advantage, does not present an appreciable health risk to consumers, does not mislead the consumer, and serves one or more of the technological functions that set out by codex Alimentarius, and only where these objectives cannot be achieved by other means that are economically and technologically practicable:

- a. The quantity should not exceed the amount specified for the desired change.
- b. to preserve the nutritional quality of the food; an intentional reduction in the nutritional quality of a food would be justified in the circumstances dealt with in sub-paragraph (b) and also in other circumstances where the food does not constitute a significant item in a normal diet;
- c. to provide necessary ingredients or constituents for foods manufactured for groups of consumers having special dietary needs;
- d. to enhance the keeping quality or stability of a food or to improve its organoleptic properties, provided that this does not change the nature, substance or quality of the food so as to deceive the consumer;

Example;

lecithin–emulsifier (INS 322) may be added to reduced fat creams to help maintain texture. Sorbitol–humectant (INS 420)–may be added to mixed dried fruit to maintain the moisture level and softness of the fruit.

- e. to provide aids in the manufacture, processing, preparation, treatment, packing, transport or storage of food, provided that the additive is not used to disguise the effects of the use of faulty raw materials or of undesirable (including unhygienic) practices or techniques during the course of any of these activities.

Section 3- Food Additives versus Processing Aids

Whilst many of the substances used as additives may also be used as processing aids, the latter function is outside the scope of additives legislation. The differentiating criterion, and the question that any manufacturer must ask in terms of regulatory requirements, is “does it continue to function in the final food?” This is the essential technical difference between a processing aid and an additive.

Example

Sulphur dioxide (INS 220) may be used to prevent discoloration of fruit destined for pie making, but would have no effect in the fruit pie itself, and indeed would be cooked off during processing. Thus, in this application, it is a processing aid used in the making of a fruit pie, not an additive performing a function in the pie itself.

Many of consumers will be used to similar techniques in the kitchen, such as using lemon juice to prevent discoloration. In the complex world of food manufacture, where production is increasingly specialized and expertise focused at specific sites, it is not unusual for the manufacturer of an end product to buy in many of his supplies as part-processed proprietary ingredients. So additives may be needed at the “intermediate” stage, but would have no function in the final product, and would therefore not appear on the label, unless considered to have the potential to cause an allergenic reaction.

Example 1

Anti-caking agents may be required in dry ingredients to prevent them from turning lumpy before being made into a fancy cake, but will have no effect once the cake is baked and decorated, so the anti-caking agent functions as an additive in the dry mix, but is a processing aid as far as the cake is concerned.

Example 2

Release agents used to prevent food from sticking to a mould or, perhaps, slicing equipment. as part of the process of production, not the composition of the food, even though there may be traces of the “processing aid” left on the product, as there would be on a cake from greasing the cake tin.

Section 4- Carry-over of Food Additives into Foods

4.1 Conditions applying to carry-over of food additives

Other than by direct addition, an additive may be present in a food as a result of carry-over from a raw material or ingredient used to produce the food, provided that:

- a. The additive is acceptable for use in the raw materials or other ingredients (including food additives) in accordance with the relevant legislations and technical regulations;
- b. The amount of the additive in the raw materials or other ingredients (including food additives) does not exceed the maximum use level set out.
- c. The food into which the additive is carried over does not contain the additive in greater quantity than would be introduced by the use of raw materials, or ingredients under proper technological conditions or manufacturing practice, consistent with the relevant legislation and standards.
- d. An additive may be used in a raw material or other ingredient if the raw material or ingredient is used exclusively in the preparation of a food that is in conformity with the provisions of the relevant legislation and standards.
- e. The presence of a food additive shall be permitted in a compound food other than as referred to in this code, where the food additive is permitted in one of the ingredients of the compound food;
- f. The presence of a food additive shall be permitted in a food, where the food additive is permitted in accordance with this code and the provisions of the relevant legislation and standards; and has been carried over to the food via the food additive; and has no technological function in the final food.
- g. The presence of a food additive shall be permitted in a food, which is to be used solely in the preparation of a compound food, and provided that the compound food complies with this code.

Example

Fruit yoghurt consisting of plain (unflavored) yoghurt and a fruit preparation would be permitted to contain sorbates, are permitted in dried fruit preparations, even though they are not permitted in plain yoghurts. The level used must not exceed the maximum use level for the fruit preparation element of the yoghurt.

4.2 Foods for which the carry-over of food additives is unacceptable

Carry-over of a food additive from a raw material or ingredient is unacceptable for foods belonging to the following food categories; unless a food additive provision in the specified category is stated in this code and/or in the relevant individual product legislation and standards:

- a- Infant formulae, follow-up formulae, processed cereal-based foods and baby foods and formulae for special medical purposes for infants.
- b- Complementary foods for infants and young children.

Section 5- Safety Evaluation of Food Additives

An additive is permitted for use in foods only if it is permitted according to the relevant legislation or it can be demonstrated that no harmful effects are expected to result from the requested use.

This involves an evaluation of data obtained through extensive testing of the additive. Safety assessments are based on reviews of all available toxicological data in both humans and animal models. From the available data, the maximum use level of additive that has no demonstrable toxic effect is determined. This is called the "no-observed-adverse-effect level" (NOAEL) and is used to determine the "Acceptable Daily Intake" (ADI) for each food additive.

The ADI provides a large safety margin and is the amount of a food additive that can be consumed daily over a lifetime without any adverse effect on health. ADAFSA encourages the lowest possible levels of an additive in a food. To ensure people do not exceed the ADI by consuming too much of, or too many products containing a particular additive.

Safety of food additives should be demonstrated through scientific procedures. Currently, the development of maximum use levels for the use of food additives with numerical acceptable daily intakes is still not carried out in UAE. The available data necessary for the evaluation or re-evaluation of food additives are insufficient to conduct the safety assessment and toxicological evaluations of food additives used in foods.

In case where no National technical regulations and standard is available, it is highly recommended to refer to the codex standard no 192 and the Joint FAO/WHO Expert Committee on Food Additives (JECFA) to conform to the maximum use level and ADI of those additives that have been evaluated by the JECFA.

Example

ADI and acceptable daily amount of E210 "benzoic acid" per person

A group ADI of 0.5 mg/kg bw for benzoic acid and its salts was established at the 27th JECFA (1983) was maintained at the 46th JECFA (1996)

Table one

	ADI	0.5 mg/kg bw
Average body weight (kg)	ADI x bw	Acceptable daily amount per person (mg)
Adults (Asian) = 55	5 x 55	275
Adults = 60	5 x 60	300
Children = 15	5 x 15	75

Table Two

Food categories and subcategories	MLs (mg/kg food)	Consumption (g or ml/day)*	Food additive intake (mg/day)
Dulce de leche	1000	0.36	0.36
Margarine	1000	4.0	4.0
Jams, jellies, marmalades	1000	0.84	0.84
Fruit and vegetable juices and nectars	1000	275	275
Soft drinks	500	259	129.5
Cooler-type beverages, sangria, aperitifs and liqueurs	500	0.74	0.37
Cachaça	500	0.76	0.38
Mayonnaise	1000	0.96	0.96

The food additive daily intake (E210) in food category Jams, jellies, marmalades is lower than the acceptable daily amount for adults and children (see Table one), while the estimated dietary exposure for the same food additive from food categories Fruit and vegetables juices and nectars exceed the acceptable daily amount for adults and children(see Table one).

JECFA is actively supported by certain of the Member States that contribute to the work of the International Program on Chemical Safety (IPCS) .

The IPCS is a joint venture of the United Nations Environment Program, the International Labor Organization and the World Health Organization. One of the main objectives of the IPCS is to carry out and disseminate evaluations of the effects of chemicals on human health and the quality of the environment

Other relevant legislation mentioned in section 7 shall be considered in case where no information is available on food additives.

Without prejudice to what are mentioned in relevant National technical regulation or standard, only those food additives should be endorsed and included in this code that, so far as can be judged on the evidence presently available from JECFA, present no appreciable health risk to consumers at the use levels proposed.

The inclusion of a food additive should have taken into account any ADI, or equivalent safety assessment established for the additive and its probable daily intake from all food sources. Where the food additive is to be used in foods eaten by special groups of consumers (i.e. diabetics, those on special medical diets, sick individuals on formulated liquid diets), account shall be taken of the probable daily intake of the food additive by those consumers.

The quantity of an additive added to food is at or below the maximum use level and is the lowest level necessary to achieve the intended technical effect.

Where a food contains a mixture of food additives that perform the same technological function, the sum of the proportion of these additives in the food must not be more than 1.

The sum of the proportion of food additives in a food is calculated by –

- dividing the concentration of each food additive in a food by the maximum use level for that additive in that food; and
- adding the proportions together for each of the food additives performing the same technological function See the example below:

Example

$$\text{Sum of the proportion of food additives} = \frac{\text{Conc A}}{\text{MPLA}} + \frac{\text{Conc B}}{\text{MPLB}} + \frac{\text{Conc C}}{\text{MPLC}}$$

In this formula –

MPLA = Maximum use level for food additive A in mg/kg

MPLB = Maximum use level for food additive B in mg/kg

MPLC = Maximum use level for food additive C in mg/kg

Conc A = concentration of food additive A in the food in mg/kg

Conc B = concentration of food additive B in the food in mg/kg

Conc C = concentration of food additive C in the food in mg/kg

Food additives should be of appropriate food grade quality and should at all times conform with the applicable Specifications of Identity and Purity recommended by the Codex Alimentarius in case the absence of such specifications on the national level.

In terms of safety, food grade quality is achieved by conformance of additives to their specifications as a whole (not merely with individual criteria) and through their production, storage, transport, and handling in accordance with Good Manufacturing Practice (GMP).

Section 6- Good Manufacturing Practice (GMP)

All food additives subject to the provisions of this code should be used under conditions of good manufacturing practice, which include the following:

- a) the quantity of the additive added to food should be limited to the lowest possible level necessary to accomplish its desired effect;
- b) the quantity of the additive added to food should be Quantum satis.
- c) the quantity of the additive that becomes a component of food as a result of its use in the manufacturing, processing or packaging of a food and which is not intended to accomplish any physical, or other technical effect in the food itself, is reduced to the extent reasonably possible; and,
- d) the additive is of appropriate food grade quality and is prepared and handled in the same way as a food ingredient.

Section 7- The Relevant Legislation on Additives permitted in Food

7.1 Applicable Legislation on Additives permitted in Food

- a) All food additives shall be permitted only in accordance with the UAE.S CAC -Technical Regulation- number 192 "General Standard for Food Additives".
- b) In the absence of information on the food additive as mentioned in paragraph "a", it shall be referenced to other legislation according to the sequence follows:

- 1) Codex Alimentarius Commission standard 192 and JECFA database.
- 2) Other international organization reference (if any).
- 3) Regional reference such as EU or/and FSANZ.
- 4) Country level reference in the developed countries.
- 5) Country level reference in other countries.

7.1 Assigning Food Additive uses by Food Category System

- The food category system, which is mentioned in UAE.S CAC -Technical Regulation- number 192, is considered as a tool for assigning food additive uses. The food category system applies to all foodstuffs. The food category system in 192 Describe each food category and sub-category. there may be instances where clarification is necessary as regards the position of a certain food product. For example, some foods may meet the description of more than one category.
- All additives permitted in each sub-category of food are listed in the applicable legislation- section 7.1, together with conditions of use, including restricted uses in specified foods and maximum limits. In general, additives not listed are not permitted to be used.
- The food category system is used to simplify the reporting of food additive uses and do not have any implications for the labelling of food.
- The food category system is based on the following principles:
 - a) The food category system is hierarchical, meaning that when an additive is recognized for use in a general category, it is recognized for use in all its sub-categories, unless otherwise stated. Similarly, when an additive is recognized for use in a sub-category, its use is recognized in any further subcategories or individual foodstuffs mentioned in a sub-category.
 - b) The food category system is based on product descriptors of foodstuffs as marketed, unless otherwise stated.
 - c) The food category system takes into consideration the carry-over principle. By doing so, the food category system does not need to specifically mention compound foodstuffs (e.g. prepared meals, such as pizza, because they may contain, pro rata, all the additives endorsed for use in their components), unless the compound foodstuff needs an additive that is not endorsed for use in any of its components.
- There are instances in the applicable Regulations where no numerical maximum level is specified for additive use (i.e Ascorbic acid E300 in frozen fish category/ Titanium dioxide E171 in all food). This is because there is no need on safety grounds to set maximum level. Rather, a level of quantum satis (QS) is set. QS is defined in the Regulations and means that additives shall be used in the food concerned in accordance with good manufacturing practice. This means that it must not be used at a level higher than is necessary to achieve the intended purpose and must not be used in a way that misleads the consumer.

References:

- Codex General Standard for Food Additives CXC 192
- UAE.S CAC 192 General Standard for Food Additives
- UAE.S GSO CAC 107/2007 General Standard for the Labeling of Food Additives when sold as such.
- UAE S/GSO 707/1997 Flavorings Permitted for use in foodstuffs.
- Food Additives Legislation Guidance to compliance / Food Standards Agency- 2015
- Food Additives Legislation Guidance note / Food Standards Agency-2002
- Regulation (EC) No 1333: 2008 of the European parliament and its amendments on food additives.
- Regulation (EC) No 1334: 2008 of the European parliament and its amendments on flavourings and certain food ingredients with flavouring properties for use in and on foods.
- List of Codex Specifications for Food Additives (CAC/MISC 6)
- GUIDELINES FOR THE SIMPLE EVALUATION OF DIETARY EXPOSURE TO FOOD ADDITIVES CAC/GL 3-1989 Adopted 1989. Revision 2014
- Guidance on food Additives - 2010 - Food Safety Authority Of Ireland
- STANDARD 1.3.1 FOOD ADDITIVES- FSANZ- 2016
- EU Guidance notes on the classification of food extracts with colouring properties-2013
- Identifying Food Additives /New Zealand Food Safety Authority-2016
- ADAFSA Bylaw no. (1) for the year 2008 " Description of Violations related to food & its handling".
- ADAFSA Bylaw (3) for the year 2008 "Recall and Traceability of feed & food".
- ADAFSA Bylaw (6) for the year 2010 "food Hygiene throughout the food chain".

Annex of Tables

Table A: Mmaximum Limit of Biological active substances present in food where natural flavorings are added

Biologically active substance	Maximum limit ppm in the final product ready for consumption		
	Food	Beverage	Exception
Agaric acid	20.0	20.0	100 in foods containing
Aloin	0.1	0.1	Mushrooms
Beta-Azarone	0.1	0.1	-
Berberine	0.1	0.1	-
Coumarin	2.0	2.0	-
Hydrocyanic acid	0.1	0.1	-
Hypericine	0.1	0.1	25 in confectionery
Pulegone	25.0	100	10 in caramels
Quassine	5.0	5.0	50 in marzipan
Quinine	0.1	85	05 in stone fruit juice
Safrole	1	1	1 in pastilles
Santonin	0.1	0.1	250 in mint flavoured beverages
Thujones	0.5	0.5	350 in mint confectionery
350 in mint confectionery			10 in pastilles
Quassine	5.0	5.0	-
Quinine	0.1	85	-
Safrole	1	1	-
Santonin	0.1	0.1	-
Thujones	0.5	0.5	-

Table B: Plants unsuitable as source of natural flavorings

Latin botanical name	English name	Prohibited part
- <i>Anemone hepatica</i>	Liver wort	Herb
- <i>Atropa belladonna</i>	Deadly night shade	Whole plant
- <i>Bryonia alba</i>	White bryony	Roots
- <i>Chenopodium ambrosioides</i>	Mexican goose foot	Herbs
- <i>Convallaria mayalis</i>	Lily of the valley	Whole plant
- <i>Daphne mezereum</i>	Mezereum	Whole plant
- <i>Dryopteris filix-mass</i>	Male fern	Rhizomes
- <i>Heliotropium europaeum</i>	Heliotrope	Leaves
- <i>Piscida erythrina</i>	Jamaica dogswood	Roots
- <i>Polypodium vulgare</i>	Polypody	Roots
- <i>Punica granatum</i>	Pomegranate tree	Roots
- <i>Urginea scilla</i>	Squill	Bulb

This code of practice represents Abu Dhabi Agriculture and Food Safety Authority (ADAFSA) advice on this topic. Food Business Operators (FBOs) can use an equivalent approach if this satisfies the requirements of the applicable statutes and regulations. To discuss an alternative approach or any inquiries regarding this code, contact ADAFSA staff.

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