# Miscellany35: Harmful Food Additives

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Commentary on recent news, reading and events of personal interest.

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# **Harmful Food Additives**

From time to time I have written on harmful food additives, including carrageenan, potassium sorbate, and potassium metabisulphite. Here is a summary from previous articles, plus information about another harmful food additive – sodium metabisulphite.

#### Potassium Metabisulphite

Potassium metabisulphite ... often used in wines. This additive gives me a dull headache that starts the day after I have a glass of wine and lasts for two days. The additive sulfur dioxide does not cause any problems (see <a href="http://www.foundationwebsite.org/Miscellany25.htm">http://www.foundationwebsite.org/Miscellany25.htm</a> for more information). Here is some information from the entry on postassium metabisulfite from Wikipedia.

Potassium metabisulfite, K2S2O5, is a white crystalline powder with a pungent sulfur odour. The main use for the chemical is as an antioxidant or chemical sterilant. It is a sulfite and is chemically very similar to sodium metabisulfite, with which it is sometimes used interchangeably. Potassium metabisulfite is generally preferred out of the two as it does not contribute sodium to the diet.

Potassium metabisulfite has a monoclinic crystal structure which decomposes at 190°C, yielding 1 K2O (potassium monoxide), and 2 SO2 (sulfur dioxide) molecules. The potassium monoxide is a solid salt, whereas the sulfur dioxide is a gas.

#### Uses

<u>Wine.</u> Potassium metabisulfite is a common wine or must additive, where it forms sulfur dioxide gas (SO2). This both prevents most wild microorganisms from growing, and it acts a potent antioxidant, protecting both the color, and delicate flavors of wine.

<u>Beer.</u> Potassium metabisulfite is sometimes used in the brewing industry to inhibit the growth of wild yeasts, bacteria, and fungi. This is called 'stabilizing'. It is used both by homebrewers and commercial brewers alike. It is not used as much for brewing beer, because the wort is almost always boiled, which kills most microorganisms anyway.

#### Potassium Sorbate

Potassium sorbate ... used as a preservative in many things, especially in drinks containing citric acid, in apple juice, and in cocktail mixers such as coconut cream. If I ingest it from a drink, it causes a severe pain in the center of my chest, and makes breathing difficult. It is known to have caused fatal reactions. If I ingest it from a non-drink, such as a peach preserve, then it does not cause a severe chest pain, but simply palpitations of the heart for several hours, and pressure and pounding in the head.

## Update 23 April 2009

I have written previously about harmful food additives. The following is an extract from the section "Where Has All the Flavor Gone" of my article Miscellany 18, posted at <a href="http://www.foundationwebsite.org/Miscellany18.htm">http://www.foundationwebsite.org/Miscellany18.htm</a>. See also the section "Australian Wine: No Added Sulfites, No Headaches" of my article Miscellany25, posted at <a href="http://www.foundationwebsite.org/Miscellany25.htm">http://www.foundationwebsite.org/Miscellany25.htm</a>.

There are plenty of other additives that are harmful to human beings. I am allergic to potassium sorbate, which is a preservative often used in citrus drinks, such as apple juice, wine coolers, or cocktail mixes, such as piña colada or daiquiri mix. This chemical causes me to have severe chest pain, and difficulty breathing. This reaction is not all that uncommon, and can be fatal.

If you check the World Wide Web on the Internet (search phrase "potassium sorbate"), you will find that some people claim that potassium sorbate has been given a bum rap – that it is not at all dangerous. For example, the Lumen Foods website states, "It is hard to imagine a naturally-occurring nutrient that has been more maligned or more mischaracterized than potassium sorbate – the potassium salt of sorbic acid." (<a href="http://www.soybean.com/ps.htm">http://www.soybean.com/ps.htm</a>). Whatever bad press potassium sorbate has been given is richly deserved. This preservative is very dangerous, and can be fatal.

(It took me quite a while to find out that I was allergic to potassium sorbate. Every once in a while I would have a terrible reaction to a soft drink or mix. I would read the labels of what I had drunk, but there were always so many added chemicals that I could not determine which one was causing my problem. Then, one day, in the early 1980s, a friend offered me a "wine cooler," which triggered the allergic reaction. To my good fortune, the wine cooler had but a single added ingredient – potassium sorbate. My problem was solved. As chance would have it, my children heard a television report a couple of weeks later, discussing the fact that potassium sorbate preservatives could cause fatal reactions.)

Unfortunately for me, I am allergic to the sulfites that occur, either added or naturally, in wine. If I take a large glass of red wine, I almost always get a headache that starts the next morning and lasts for the rest of the day, the night, and the next day. Fortunately, I can purchase, in some stores, "organic" wines, to which no sulfites have been added. Wines from France, Italy, and other foreign countries also tend not to have sulfites added. Champagne appears to have lower levels of sufites.

It is a shame that so many poisons are added to our food. No wonder today's food tastes so bad. No wonder there has been such an increase in colon cancer. We are simply pickling our guts. [End of update.]

Here is information extracted from the Wikipedia on potassium sorbate.

Potassium sorbate is a mild preservative. Its primary use is as a food preservative (E number 202). Its molecular formula is C6H7O2K and its systematic name is potassium (E,E)-hexa-2,4-dienoate. Potassium sorbate is effective in a variety of applications including food, wine, and personal care.

## Usage

Potassium sorbate is used to inhibit molds, and yeasts in many foods, such as cheese, wine, yogurt, and baked goods. It can also be found in the ingredients list of many dried fruit products. In addition, herbal dietary supplement products generally contain potassium sorbate, which acts to prevent mold and microbes and to increase shelf life, and is used in such tiny quantities that there is no known adverse health effects. Labeling of this preservative reads as "potassium sorbate" on the ingredient statement. Also, it is used in many personal care products to inhibit the development of microorganisms for shelf stability. Some manufacturers are using this preservative as a replacement for parabens.

Also known affectionately as "wine stabilizer", potassium sorbate produces sorbic acid when added to wine. It serves two purposes. When active fermentation has ceased and the wine racked the final time after clearing, potassium sorbate will render any surviving yeast incapable of multiplying. Yeast living at that moment can continue fermenting any residual sugar into CO2 and alcohol, but when they die no new yeast will be present to cause future fermentation. When a wine is sweetened before bottling, potassium sorbate is used to prevent refermentation when used in conjunction with potassium metabisulfite. It is primarily used with sweet wines and sparkling wines, but may be added to table wines which exhibit difficulty in maintaining clarity after fining.

Some molds (notably some Trichoderma and Penicillium strains) and yeasts are able to detoxify sorbates by decarboxylation, producing 1,3-pentadiene. The pentadiene manifests as a typical odor of kerosene or petroleum.

#### Synthesis

Potassium sorbate is the potassium salt of sorbic acid.

#### Toxicology

This gentle preservative is considered to be safe and mild because of its long term safety record and non-toxic profile. Potassium sorbate is non-irritating and non-sensitizing. Although allergic reactions to potassium sorbate is very rare and it is well tolerated when administered internally, sorbic acid is a possible skin irritant, and may cause rashes, asthma and hyperactivity. In rare cases, this can translate to an allergic reaction to potassium sorbate. It may also affect children's health, behaviour and learning and can be found on lists of additives to avoid, with alternatives being refrigeration, freezing and ascorbates 300-304.

## [End of Wikipedia extract.]

The Wikipedia article is flat-out wrong on the "gentleness" of potassium sorbate. It causes severe reactions in some people, and can be fatal.

## Carrageenan

Carrageenan ... used as a thickener in many products, such as ice cream and yogurt. Causes stomache upset, deterioration of mammary-gland tissues. In some formulations, is carcinogenic (see <a href="http://www.foundationwebsite.org/Miscellany18.htm">http://www.foundationwebsite.org/Miscellany18.htm</a> for more information).

Here is some information from Wikipedia on carrageenan.

Carrageenans or carrageenins are a family of linear sulphated polysaccharides extracted from red seaweeds. The name is derived from a type of seaweed that is abundant along the Irish coastline near the village of Carragheen. Gelatinous extracts of carrageen seaweed (also known as Irish moss) have been used as food additives for hundreds of years. Research has raised concerns about the health implications of carrageenan consumption.

#### Uses

Carrageenans are large, highly flexible molecules which curl forming helical structures. This gives them the ability to form a variety of different gels at room temperature. They are widely used in the food and other industries as thickening and stabilizing agents. A particular advantage is that they are thixotropic—they thin under shear stress and recover their viscosity once the stress is removed. This means that they are easy to pump but stiffen again afterwards.

For example, they can be used in:

Desserts, ice cream, milk shakes, sauces - gel to increase viscosity, PayDay bars contain carrageenans.

Beer - clarifier to remove haze-causing proteins

Pâtés and processed meat - Substitute fat to increase water retention and increase volume Toothpaste - stabilizer to prevent constituents separating

Fire fighting foam - thickener to cause foam to become sticky

Shampoo and cosmetic creams - thickener

Air freshener gels

Shoe polish - gel to increase viscosity

Biotechnology - gel to immobilize cells/enzymes

Personal lubricants - laboratory studies suggest that carrageenans might function as a topical microbicides, blocking sexually-transmitted viruses such as HIV, HPV and herpes [2][3] Lambda carrageenan is used in animal models of inflammation used to test analgesics. Dilute carrageenan solution (1-2%) injected subcutaneously causes swelling and pain.

There are three main commercial classes of carrageenan:

Kappa - strong, rigid gels. Produced from Kappaphycus cottonii

lota - soft gels. Produced from Eucheuma spinosum

Lambda - form gels when mixed with proteins rather than water, used to thicken dairy products. The most common source is Gigartina from Southern Europe.

It is interesting to note, however, that a lot of red algal species produce different types of carrageenans during their developmental history. For instance, the genera Gigartina produces mainly Kappa carrageenans during its gametophytic stage, and Lambda carrageenans during its sporophytic stage.

All are soluble in hot water, but in cold water only the Lambda form (and the sodium salts of the other two) are soluble.

When used in food products, carrageenan has the EU additive E-number E407. Although introduced on an industrial scale in the 1930s, the first use was in China around 600 BC (where Gigartina was used) and in Ireland around 400 AD.

The largest producer is the Philippines, where cultivated seaweed produces about 80% of the world supply. The most commonly used are Cottonii (Eucheuma cottonii) and Spinosum (Eucheuma spinosum), which together provide about three quarters of the World production. These grow at sea level down to about 2 metres. The seaweed is normally grown on nylon lines strung between bamboo floats and harvested after three months or so when each plant weighs around 1 kg.

The Cottonii variety has been reclassified as Kappaphycus cottonii by Maxwell Doty (1988), thereby introducing the genus Kappaphycus, on the basis of the phycocolloids produced (namely kappa carrageenan).

After harvest, the seaweed is dried, baled, and sent to the carrageenan manufacturer. There the seaweed is ground, sifted to remove impurities such as sand, and washed thoroughly. Next, the cellulose is removed from the carrageenan by centrifugation and filtration. The resulting carrageenan solution is then concentrated by evaporation. It is dried and ground to specification.

#### Health concerns

There is evidence from studies performed on rats, guinea pigs and monkeys which indicates that degraded carrageenan (poligeenan) may cause ulcerations in the gastro-intestinal tract and gastro-intestinal cancer. Poligeenan is produced from carrageenan subjected to high temperatures and acidity. The average carrageenan molecule weighs over 100,000 Da while poligeenans have a molecular weight of less than 50 kDa. A scientific committee working on behalf of the European Commission has recommended that the amount of degraded carrageenan be limited to a maximum of 5% (which is the limit of detection) of total carrageenan mass. Upon testing samples of foods containing high molecular weight carrageens, researchers found no poligeenan.

#### Trivia

Carrageenan has also been used to thicken skim milk, in an attempt to emulate the consistency of whole milk. This usage did not become popular.

[End of Wikipedia extract.]

#### Sodium Metabisulfite

Sodium metabisulfite ... used for color retention in sugar-free milk chocolate. Causes immediate and severe diarrhea, gas, and abdominal pain, lasting for about a day.

Here is information on Wikipedia on sodium metabisulfite.

Sodium metabisulfite or sodium pyrosulfite (American spelling; English spelling is Sodium metabisulphite or sodium pyrosulphite) is an inorganic compound of chemical formula Na2S2O5. The name is sometimes referred to as disodium (metabisulfite, etc). It is used as a sterilizer and antioxidant/preservative.

#### Uses

<u>Food additive.</u> It is used as a food additive, mainly as a preservative and is sometimes identified as E223. As an additive, it may cause allergic reactions, particularly skin irritation, gastric irritation and asthma. It is not recommended for consumption by children.

<u>Sterilization / Cleaning agent.</u> It is commonly used in homebrewing preparations to sanitize equipment.

It is also used as a cleaning agent for potable water reverse osmosis membranes in desalination systems.

<u>Packaging.</u> It can be purchased in powdered form, and is also the primary ingredient in campden tablets. In solid form it ranges in color from white to slightly yellow. Sodium metabisulfite is also used to remove chloramine from drinking water.

## Chemical properties

When mixed with water, sodium metabisulfite releases sulfur dioxide (SO2), a pungent, unpleasant smelling gas that can also cause breathing difficulties in some people. For this reason, sodium metabisulfite has fallen from common use in recent times, with agents such as hydrogen peroxide becoming more popular for effective and odorless sterlization of equipment.

Sodium metabisulfite is also used to remove chloramine from drinking water after treatment, as well as many industrial uses.

## [End of Wikipedia article.]

Here is information from the BASF Chemical Company website (<a href="http://www.inorganics.basf.com">http://www.inorganics.basf.com</a>), a producer of sodium metabisulfite.

## **Applications**

In the chemical and pharmaceutical industries for various purposes, e. g. as a reducing agent, for purifying and isolating aldehydes and ketones. For destroying waste bromine.

In drinking water treatment to remove excess chlorine. In the treatment of wastewater, e. g. from electroplating plants, to neutralize chromic acid; to remove excess chlorine in the neutralization of cyanide. In special cases to remove oxygen from boiler feed water.

For cleaning and bleaching wool, jute, and other vegetable fibres.

In the paper and pulp industry for bleaching ground wood.

Sodium Metabisulfite photo grade in the photographic and film industry for preparing developer solutions, for acidifying fixing baths.

Sodium Metabisulfite food grade (E223): For preserving foodstuffs (restricted use in accordance with the additives approval regulations, E 223). As anti-melanosis additive for sea food.

## Safety

Risk of serious damage to eyes. Contact with acids liberates toxic sulfur dioxide (SO<sub>2</sub>) gas. Harmful if swallowed. Higher concentrations of the substance may cause a strong chemical

oxygen consumption in biological sewage-treatment plants and/or waterways. Avoid contact with nitrites and nitrates and strong oxidizing agents: violent reactions are possible. During the handling of these products the data and reference in the safety data sheet are to be considered. In addition the necessary caution and good industrial hygiene while handling chemicals have to been kept.

# [End of BASF extract.]

Here is some additional information from the Kencro Chemicals website (http://www.kencro.ca).

## Toxicological properties:

Route of entry	<u>Effect</u>
Skin contact	May cause skin irritation with prolonged exposure. Sulphite sensitive individual may experience a severe and deadly allergic reaction.
Eye contact	May cause moderate irritation. Prolonged contact may be severely irritating or cause burns.
Inhalation	May cause irritating effects of the respiratory tract. Breathing of dust may aggravate asthma or other pulmonary diseases. May produce gastro intestinal upset, nausea or vomiting.
Ingestion	Will cause adverse health effects. Ingestions of large doses may be fatal,

#### Update 30 April 2009

Because I am allergic to potassium sorbate and potassium metabisulphite, I read the ingredient labels of the foods and drinks I consume. Unfortunately, many food producers do not use the ordinary chemical names for additives, but use the International Numbering System (INS) numbers issued by the Codex Alimentarius Commission of the Food and Agricultural Organization / World Health Organization (FAO/WHO) of the United Nations (UN). The following is a list of 45 additives having the functional class "preservative," from the Codex General Standard for Food Additives (GSFA) Online Database, at <a href="http://www.codexalimentarius.net">http://www.codexalimentarius.net</a> (the list is from URL <a href="http://www.codexalimentarius.net/gsfaonline/additives/results.html?techFunction=18&searchBy=tf">http://www.codexalimentarius.net/gsfaonline/additives/results.html?techFunction=18&searchBy=tf</a> ).

## INS No. Food Additive or Group

220 Sulfur dioxide

512 Stannous chloride

200 Sorbic acid

221 Sodium sulfite

201 Sodium sorbate

281 Sodium propionate

232 Sodium ortho-phenylphenol

250 Sodium nitrite

251 Sodium nitrate

223 Sodium metabisulfite

222 Sodium hydrogen sulfite

262(ii) Sodium diacetate

211 Sodium benzoate

262(i) Sodium acetate

280 Propionic acid

225 Potassium sulfite

202 Potassium sorbate

283 Potassium propionate

249 Potassium nitrite

252 Potassium nitrate

224 Potassium metabisulfite

228 Potassium bisulfite

212 Potassium benzoate

235 Pimaricin (Natamycin)

231 ortho-Phenylphenol

234 Nisin

218 Methyl para-hydroxybenzoate

1105 Lysozyme

384 Isopropyl citrates

239 Hexamethylene tetramine

1102 Glucose oxidase from Aspergillus niger var.

236 Formic acid

579 Ferrous gluconate

214 Ethyl para-hydroxybenzoate

386 Disodium ethylene diamine tetra acetate

230 Diphenyl

242 Dimethyl dicarbonate

203 Calcium sorbate

282 Calcium propionate

227 Calcium hydrogen sulfite

385 Calcium disodium ethylene diamine tetra acetate

213 Calcium benzoate

263 Calcium acetate

210 Benzoic acid

260 Acetic acid, glacial

The numbers that I look for are 202 (potassium sorbate), 223 (sodium metabisulfite) and 224 (potassium metabisulfite). I also look for 407, which is the INS number for carrageenan and its salts, and for 461, which is the INS number for methyl cellulose. I am not allergic to carrageenan or methyl cellulose, but I find them very hard to digest. They are often used as thickeners, such as in ice cream or yogurt, to make them "smooth and creamy." If I eat ice cream containing carrageenan or methyl cellulose, the ice cream will "stay" in my stomach for an hour or so (the uncomfortable feeling of indigestion – I imagine the same feeling as if I had eaten cotton, grass or seaweed, which are somewhat similar to these chemicals). Other thickeners such as guar gum (INS No. 412) and xanthan gum (INS No. 415) and pectins (INS No. 440) do not bother me – except to give ice cream and yogurt a strange, unnatural consistency (pectin less so than the gums).

If you are interested, take a look at the Codex Alimentarius GSFA Online website. It is very interesting to read about the many additives that are added to our food. There are 23 food additive functional classes: Acid, Acidity regulator, Anticaking agent, Antifoaming agent, Antioxidant, Bulking agent, Colour, Colour retention agent, Emulsifier, Emulsifying salt, Firming agent, Flavour enhancer, Flour treatment agent, Foaming agent, Gelling agent, Glazing agent, Humectant, Preservative, Propellant, Raising agent, Stabilizer, Sweetener, and Thickener. Within these categories are about 300 chemicals or chemical groups. Given that many of these

chemicals are synthetic, it is no wonder that human beings now have so many allergies and ailments – the diet of industrial civilization consists of a myriad of chemicals that mankind never ingested during its evolution. The additives that cause me severe reactions are of the "preservative" functional class. If you have allergies or other symptoms (e.g., restless leg syndrome, often caused by monosodium glutamate (INS No. 621)), it would be rational to start examining the ingredients in the foods that you eat, and see if you can trace the problem to one or more additives. [End of update.]

# <u>Update 7 May 20</u>09

In the United States, the use of INS numbers is rare – most labels contain chemical names, not INS numbers. In Europe and a number of other countries, the use of INS numbers is prevalent. In Europe, INS numbers are preceded on labels with an "E", and they are called "E-numbers." Here follows part of the Wikipedia entry for "E-Number":

"E numbers are number codes for food additives and are usually found on food labels throughout the European Union. The numbering scheme follows that of the International Numbering System (INS) as determined by the Codex Alimentarius committee. Only a subset of the INS additives are approved for use in the European Union, the 'E' prefix which stands for Europe. In casual language in the UK and Ireland, the term "E-number" is used as a pejorative term for artificial food additives, and products may promote themselves as "free of E-numbers" even though most of the (natural) ingredients contain components that also have an E-number (e.g. Vitamin C (E300) or lycopene, the colour in tomatoes). To have a diet without any components that also have an E-number is basically impossible. Free of E-numbers thus refers mainly to the use of additives, not to the absence of components with an E-number.

"E numbers are also encountered on food labeling in other jurisdictions, including the GCC [Gulf Cooperation Council], Australia, New Zealand and Israel. The "E" prefix is omitted in Australia and New Zealand. They are increasingly (though still rarely) found on North American packaging, especially in Canada."

The Wikipedia entry contains the following table, which summarizes E-numbers by numeric range.

# Classification by numeric range

100–199 <u>Colours</u>	100–109	yellows
	110–119	oranges
	120–129	reds

	130–139	blues & violets
	140–149	greens
	150–159	browns & blacks
	160–199	others
200–299 Preservatives	200–209	<u>sorbates</u>
	210–219	<u>benzoates</u>
	220–229	<u>sulphites</u>
	230–239	phenols & formates (methanoates)
	240–259	<u>nitrates</u>
	260–269	acetates (ethanoates)
	270–279	lactates
	280–289	propionates (propanoates)
	290–299	others
300–399	300–305	ascorbates (vitamin C)

Antioxidants & acidity regulators	306–309	Tocopherol (vitamin E)
	310–319	gallates & erythorbates
	320–329	lactates
	330–339	citrates & tartrates
	340–349	<u>phosphates</u>
	350–359	malates & adipates
	360–369	succinates & fumarates
	370–399	others
400–499 Thickeners, stabilisers & emulsifiers	400–409	<u>alginates</u>
	410–419	natural gums
	420–429	other natural agents
	430–439	polyoxyethene compounds
	440–449	natural <u>emulsifiers</u>
	450–459	phosphates

	460–469	<u>cellulose</u> compounds
	470–489	fatty acids & compounds
	490–499	others
500–599 pH regulators & anti-caking agents	500–509	mineral acids & bases
	510–519	chlorides & sulphates
	520–529	sulphates & hydroxides
	530–549	alkali metal compounds
	550–559	silicates
	570–579	stearates & gluconates
	580–599	others
600–699 <u>Flavour enhancers</u>	620–629	glutamates
	630–639	<u>inosinates</u>
	640–649	others
900–999	900–909	waxes

Miscellaneous	910–919	synthetic glazes
	920–929	improving agents
	930–949	packaging gases
	950–969	sweeteners
	990–999	foaming agents
1100–1599 Additional chemicals	New chemics schemes	als that do not fall into standard classification

NB: Not all examples of a class fall into the given numeric range. Moreover, many chemicals, particularly in the E400–499 range, have a variety of purposes.

## [End of Wikipedia extract.]

The Wikipedia article contains much additional information about each specific additive, such as which ones are dangerous or are banned in the European Union.

INS numbers (E-numbers) are of particular interest to Jews and Moslems, because they can indicate whether an additive is made from a proscribed food product, such as pork or shellfish. Here follows an entry from the WorldOfIslam Portal (<a href="http://special.worldofislam.info/Food/numbers.html">http://special.worldofislam.info/Food/numbers.html</a>).

"E-Numbers represent specific food additives, used by the food industry in the manufacture of various food products. These E-Numbers have been formulated by the European Economic Community (EEC) and are universally adopted by the food industry worldwide.

"It is known that many E-numbers contain unlisted haraam ingredients in them. Generally additives derived from animals and insects.

"E-numbers are reference numbers used by the European Union to facilitate identification of food additives. All food additives used in the European Union are identified by an E-number. The "E" stands for "Europe" or "European Union". Normally each food additive is assigned a unique number, though occasionally, related additives are given an extension ("a", "b", or "i", "ii") to another E-number.

"The Commission of the European Union assigns e-numbers after the additive is cleared by the Scientific Committee on Food (SCF), the body responsible for the safety evaluation of food additives in the European Union. The convention for assigning E-numbers is:

100-199	food colors
200-299	preservatives
300-399	antioxidants, phosphates, and complexing agents
400-499	thickeners, gelling agents, phosphates, humectants, emulsifiers
500-599	salts and related compounds
600-699	flavor enhancers
700-899	not used for food additives (used for feed additives)
900-999	surface coating agents, gases, sweeteners
1000-1399	miscellaneous additive
1400-1499	starch derivatives

E-numbers are only used for substances added directly to food products, so contaminants, enzymes and processing aids, which may be classified as additives in the USA, are not included in the E-number system.

There is an EU directive on food labeling which requires food additives to be listed in the product ingredients whenever they are added for technological purposes. This includes coloring, sweetening and favor enhancement as well as for preservation, thickening, emulsifying and the like. Ingredients must be listed in descending order of weight, which means that are generally found close to the end of the list of ingredients. However, substances used in the protection of plants and plant products, flavorings and substances added as nutrients (e.g., minerals, trace elements or vitamins) do not need to be included in the ingredient list. Because of this, some substances that are regulated as food additives in other countries may be exempt from the food additive definition in the EU.

#### Additives which are ALWAYS of animal origin, such as (HARAAM):

- E120 Cochineal: a red colour obtained from female insects
- E441 Gelatine : derived from the bones and/ or hides of cattle and/ or pigs
- E542 Edible Bone Phosphate : an extract from animal bones
- E904 Shellac: a resin from the lac insect

Whilst some additives with a common code such as E47, can be either of animal or plant origin and this latter type needs to be investigated on a case-by-case basis per product/ manufacturer.

The main additives you need to be aware of are:

• Glycerol / Glycerin / Glycerine (E422) - haraam if obtained from pork or non-halal meat sources.

- Emulsifiers (E470 to E483) haraam if obtained from pork or non-halal sources.
  Edible Bone Phosphate (E542) haraam if obtained from pork or non-halal meat sources."

[End of extract from WoldOfIslam Portal.]