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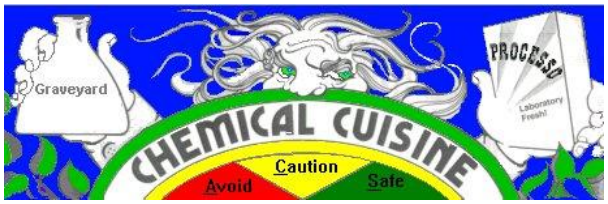

Chemical Cuisine: CSPI's Guide to Food Additives

Introduction to Food Additives..

Shopping was easy when most food came from farms. Now, factory-made foods have made chemical additives a significant part of our diet. Most people may not be able to pronounce the names of many of these chemicals, but they still want to know what the chemicals do and which ones are safe and which are poorly tested or possibly dangerous. This listing provides that information for most common additives. A simple general rule about additives is to avoid sodium nitrite, saccharin, caffeine, olestra, acesulfame K, and artificial coloring. Not only are they among the most questionable additives, but they are used primarily in foods of low nutritional value. Also, don't forget the two most familiar additives: sugar and salt. They may pose the greatest risk because we consume so much of them. Fortunately, most additives are safe and some even increase the nutritional value of the food. Additional information about some of the additives is available elsewhere in this Web site. Use the search engine provided to locate that information.

Glossary

ANTIOXIDANTS retard the oxidation of unsaturated fats and oils, colorings, and flavorings. Oxidation leads to rancidity, flavor changes, and loss of color. Most of those effects are caused by reaction of oxygen in the air with fats.

CARCINOGEN is a chemical or other agent that causes cancer in animals or humans.

CHELATING AGENTS trap trace amounts of metal atoms that would otherwise cause food to discolor or go rancid.

EMULSIFIERS keep oil and water mixed together.

FLAVOR ENHANCERS have little or no flavor of their own, but accentuate the natural flavor of foods. They are often used when very little of a natural ingredient is present.

THICKENING AGENTS are natural or chemically modified carbohydrates that absorb some of the water that is present in food, thereby making the food thicker. Thickening agents "stabilize" factory-made foods by keeping the complex mixtures of oils, water, acids, and solids well mixed.

Cancer Testing

Chemicals usually are tested for an ability to cause cancer by feeding large dosages to small numbers of rats and mice. Large dosages are used to compensate for the small number of animals that can be used (a few hundred is considered a big study, though it is tiny compared to the U.S. population of 270 million). Also, the large dosages can compensate for the possibility that rodents may be less sensitive than people to a particular chemical (as happened with thalidomide). Some people claim that such tests are improper and that large amounts of any chemical would cause cancer. That is not true. Huge amounts of most chemicals do *not* cause cancer. When a large dosage causes cancer, most scientists believe that a smaller amount would also cause cancer, but less frequently. It would be nice if lower, more realistic dosages could be used, but a test using low dosages and a small number of animals would be extraordinarily insensitive. It would also be nice if test-tube tests not using any animals were developed that could cheaply and accurately identify cancer-causing chemicals. While some progress has been made in that direction, those tests have not proven reliable. Thus, the standard high-dosage cancer test on small numbers of animals is currently the only practical, reasonably reliable way to identify food additives (and other chemicals) that might cause cancer.

The Delaney Clause is an important part of the federal Food, Drug, and Cosmetic Act. That important consumer-protection clause specifically bans any additive that "is found to induce cancer when ingested by man or animal." The food and chemical industries are seeking to weaken or repeal that law.

Alphabetical Listing of Additives

Safe. The additive appears to be safe.

 **Cut back on this. Not toxic, but large amounts may be unsafe or promote bad nutrition.**

 **Caution. May pose a risk and needs to be better tested. Try to avoid.**

 **Certain people should avoid these additives.**

 **Everyone should avoid. Unsafe in amounts consumed or is very poorly tested and *not worth any risk*.**

 ACESULFAME-K... Artificial sweetener: *Baked goods, chewing gum, gelatin desserts, soft drinks.*	This artificial sweetener, manufactured by Hoechst, a giant German chemical company, is widely used around the world. It is about 200 times sweeter than sugar. In the United States, for several years acesulfame-K (the K is the chemical symbol for potassium) was permitted only in such foods as sugar-free baked goods, chewing gum, and gelatin desserts. In July 1998, the FDA allowed this chemical to be used in soft drinks, thereby greatly increasing consumer exposure. The safety tests of acesulfame-K were conducted in the 1970s and were of mediocre quality. Key rat tests were afflicted by disease in the animal colonies; a mouse study was several months too brief and did not expose animals during gestation. Two rat studies suggest that the additive might cause cancer. It was for those reasons that in 1996 the Center for Science in the Public Interest urged the FDA to require better testing before permitting acesulfame-K in soft drinks. In addition, large doses of acetoacetamide, a breakdown product, have been shown to affect the thyroid in rats, rabbits, and dogs. Hopefully, the small amounts in food are not harmful.
 ALGINATE, PROPYLENE GLYCOL ALGINATE. Thickening agents, foam stabilizer: *Ice cream, cheese, candy, yogurt.*	Alginate, an apparently safe derivative of seaweed (kelp), maintains the desired texture in dairy products, canned frosting, and other factory-made foods. Propylene glycol alginate, a chemically-modified algin, thickens acidic foods (soda pop, salad dressing) and can stabilize the foam in beer.
 ALPHA TOCOPHEROL (Vitamin E) ... Antioxidant, nutrient: *Vegetable oil.*	Vitamin E is abundant in whole wheat, rice germ, and vegetable oils. It is destroyed by the refining and bleaching of flour. Vitamin E prevents oils from going rancid. Recent studies indicate that large amounts of vitamin E may help reduce the risk of heart disease and cancer.
ARTIFICIAL COLORINGS.	Most artificial colorings are synthetic chemicals that do not occur in nature. Because colorings are used almost solely in foods of low nutritional value (candy, soda pop, gelatin desserts, etc.), you should simply avoid all artificially colored foods. In addition to problems mentioned below, colorings cause hyperactivity in some sensitive children. The use of coloring usually indicates that fruit or other natural ingredient has not been used.
•  BLUE 1 ... Artificial coloring: *Beverages, candy, baked goods.*	Inadequately tested; suggestions of a small cancer risk.
•  BLUE 2 ... Artificial coloring: *Pet food, beverages, candy.*	The largest study suggested, but did not prove, that this dye caused brain tumors in male mice. The FDA concluded that there is "reasonable certainty of no harm."
•  CITRUS RED 2 ... Artificial coloring: *Skin of some Florida oranges only.*	Studies indicated that this additive causes cancer. The dye does not seep through the orange skin into the pulp. No risk except when eating peel.
•  GREEN 3 ... Artificial colorings: *Candy, beverages.*	A 1981 industry-sponsored study gave hints of bladder cancer, but FDA re-analyzed the data using other statistical tests and concluded that the dye was safe. Fortunately, this possibly carcinogenic dye is rarely used.
•  RED 3 ... Artificial coloring: *Cherries in fruit cocktail, candy, baked goods.*	The evidence that this dye caused thyroid tumors in rats is "convincing," according to a 1983 review committee report requested by FDA. FDA's recommendation that the dye be banned was overruled by pressure from elsewhere in the Reagan Administration.
•  RED 40 ... Artificial coloring: *Soda pop, candy, gelatin desserts, pastry, pet food, sausage.*	The most widely used food dye. While this is one of the most-tested food dyes, the key mouse tests were flawed and inconclusive. An FDA review committee acknowledged problems, but said evidence of harm was not "consistent" or "substantial." Like other dyes, Red 40 is used mainly in junk foods.
•  YELLOW 5 .. Artificial coloring: *Gelatin dessert, candy, pet food,*	The second most widely used coloring causes mild allergic reactions, primarily in aspirin-sensitive persons.

baked goods.	
•  YELLOW 6 ... Artificial coloring: *Beverages, sausage, baked goods, candy, gelatin.*	Industry-sponsored animal tests indicated that this dye, the third most widely used, causes tumors of the adrenal gland and kidney. In addition, small amounts of several carcinogens contaminate Yellow 6. However, the FDA reviewed those data and found reasons to conclude that Yellow 6 does not pose a significant cancer risk to humans. Yellow 6 may also cause occasional allergic reactions.
 ARTIFICIAL AND NATURAL FLAVORING ... Flavoring: *Soda pop, candy, breakfast cereals, gelatin desserts, and many other foods.*	Hundreds of chemicals are used to mimic natural flavors; many may be used in a single flavoring, such as for cherry soda pop. Most flavoring chemicals also occur in nature and are probably safe, but they are used almost exclusively in junk foods. Their use indicates that the real thing (often fruit) has been left out. Companies keep the identity of artificial (and natural) flavorings a deep secret. Flavorings may include substances to which some people are sensitive, such as MSG or HVP.
 ASCORBIC ACID (Vitamin C), SODIUM ASCORBATE... Antioxidant, nutrient, color stabilizer: *Cereals, fruit drinks, cured meats.*	Ascorbic acid helps maintain the red color of cured meat and prevents the formation of nitrosamines, which promote cancer (see SODIUM NITRITE). It helps prevent loss of color and flavor by reacting with unwanted oxygen. It is used as a nutrient additive in drinks and breakfast cereals. Sodium ascorbate is a more soluble form of ascorbic acid. ERYTHORBIC ACID is very similar to ascorbic acid, but has no value as a vitamin. Large amounts of ascorbic acid may reduce the severity of colds and offer other health benefits.
  ASPARTAME ... Artificial sweetener: *"Diet" foods, including soft drinks, drink mixes, gelatin desserts, low-calorie frozen desserts, packets*	Aspartame (Equal, NutraSweet), made up primarily of two amino acids, was thought to be the perfect artificial sweetener, but questions have arisen about the quality of the cancer tests, which should be repeated. Some persons have reported adverse behavioral effects (dizziness, hallucinations, headache) after drinking diet soda, but such reports have not been confirmed in controlled studies. If you think you've experienced adverse effects due to aspartame, avoid it. Also, people with the rare disease PKU (phenylketonuria) need to avoid it. There is little evidence that this or other artificial sweeteners have helped people lose weight, though those additives might help some strong-willed dieters. Indeed, since 1980, consumption of artificial sweeteners and rates of obesity have both soared.
 BETA-CAROTENE ... Coloring; nutrient: *Margarine, shortening, non-dairy whiteners.*	Beta-carotene is used as an artificial coloring and a nutrient supplement. The body converts it to Vitamin A, which is part of the light-detection mechanism of the eye and which helps maintain the normal condition of mucous membranes. Large amounts of beta-carotene in the form of dietary supplements increased the risk of lung cancer in smokers and did not reduce the risk in non-smokers. Smokers should certainly not take beta-carotene supplements, but the small amounts used as food additives are safe.
 BROMINATED VEGETABLE OIL (BVO) ... Emulsifier, clouding agent: *Soft drinks.*	BVO keeps flavor oils in suspension and gives a cloudy appearance to citrus-flavored soft drinks. Eating BVO leaves small residues in body fat; it is unclear whether those residues pose any risk. Fortunately, BVO is not widely used.
 BUTYLATED HYDROXYANISOLE (BHA) ... Antioxidant: *Cereals chewing gum, potato chips, vegetable oil.*	BHA retards rancidity in fats, oils, and oil-containing foods. While most studies indicate it is safe, some studies demonstrated that it caused cancer in rats. This synthetic chemical can be replaced by safer chemicals (e.g., vitamin E), safer processes (e.g., packing foods under nitrogen instead of air), or can simply be left out (many brands of oily foods, such as potato chips, don't use any antioxidant).
 BUTYLATED HYDROXYTOLUENE (BHT) ... Antioxidant: *Cereals, chewing gum, potato chips, oils, etc.*	BHT retards rancidity in oils. It either increased or decreased the risk of cancer in various animal studies. Residues of BHT occur in human fat. BHT is unnecessary or is easily replaced by safe substitutes (see discussion of BHA). Avoid it when possible.
 CAFFEINE ... Stimulant: *Naturally occurring in coffee, tea, cocoa, coffee-flavored yogurt and frozen desserts. Additive in soft drinks, gum, and waters.*	Caffeine is the only drug that is present naturally or added to widely consumed foods (quinine is the other drug used in foods). It is mildly addictive, one possible reason that makers of soft drinks add it to their products. Many coffee drinkers experience withdrawal symptoms, such as headaches, irritability, sleepiness, and lethargy, when they stop drinking coffee. Because caffeine increases the risk of miscarriages (and possibly birth defects) and inhibits fetal growth, it should be avoided by women who are pregnant or considering becoming pregnant. It also may make it harder to get pregnant (but don't use it as a birth-control pill!). Caffeine also keeps many people from sleeping, causes jitteriness, and affects calcium metabolism. The caffeine in a cup or two of coffee is harmless to most people. But if you drink more than a couple of cups of coffee or cans of caffeine-containing soda per day, experience symptoms noted above, are at risk of osteoporosis, or are pregnant, you should rethink your habit.
 CALCIUM (or SODIUM) PROPIONATE ... Preservative*: Bread, rolls, pies, cakes.*	Calcium propionate prevents mold growth on bread and rolls. The calcium is a beneficial mineral; the propionate is safe. Sodium propionate is used in pies and cakes, because calcium alters the action of chemical leavening agents.
 CALCIUM (or SODIUM) STEAROYL	These additives strengthen bread dough so it can be used in bread-making machinery and help produce a more uniform grain and greater volume. They act as whipping agents in dried, liquid,

LACTYLATE ... Dough conditioner, whipping agent: *Bread dough, cake fillings, artificial whipped cream, processed egg whites*.	or frozen egg whites and artificial whipped cream. SODIUM STEAROYL FUMARATE serves the same function.
 CARMINE; COCHINEAL EXTRACT ... Artificial coloring.	Cochineal extract is a coloring extracted from the eggs of the cochineal beetle, which lives on cactus plants in Peru, the Canary Islands, and elsewhere. Carmine is a more purified coloring made from cochineal. In both cases, the actual substance that provides the color is carminic acid. These colorings, which are extremely stable, are used in some red, pink, or purple candy, yogurt, Campari, ice cream, beverages, and many other foods, as well as drugs and cosmetics. These colorings have caused allergic reactions that range from hives to life-threatening anaphylactic shock. It is not known how many people suffer from this allergy. The Food and Drug Administration should ban cochineal extract and carmine or, at the very least, require that they be identified clearly on food labels so that people could avoid them. Natural or synthetic substitutes are available. A label statement should also disclose that, Carmine is extracted from dried insects so that vegetarians and others who want to avoid animal products could do so.
 CARRAGEENAN ... Thickening and stabilizing agent*: Ice cream, jelly, chocolate milk, infant formula*.	Carrageenan is obtained from seaweed. Large amounts of carrageenan have harmed test animals' colons; the small amounts in food are safe.
 CASEIN, SODIUM CASEINATE ... Thickening and whitening agent: *Ice cream, ice milk, sherbet, coffee creamers*.	Casein, the principal protein in milk, is a nutritious protein containing adequate amounts of all the essential amino acids. People who are allergic to casein should read food labels carefully, because the additive is used in some "non-dairy" and "vegetarian" foods.
 CITRIC ACID, SODIUM CITRATE ... Acid, flavoring, chelating agent: *Ice cream, sherbet, fruit drink, candy, carbonated beverages, instant potatoes*.	Citric acid is versatile, widely used, cheap, and safe. It is an important metabolite in virtually all living organisms and is especially abundant naturally in citrus fruits and berries. It is used as a strong acid, a tart flavoring, and an antioxidant. Sodium citrate, also safe, is a buffer that controls the acidity of gelatin desserts, jam, ice cream, candy, and other foods.
COCHINEAL EXTRACT: see CARMINE	
 CORN SYRUP ... Sweetener, thickener: *Candy, toppings, syrups, snack foods, imitation dairy foods*.	Corn syrup,which consists mostly of dextrose, is a sweet, thick liquid made by treating cornstarch with acids or enzymes. It may be dried and used as corn syrup solids in coffee whiteners and other dry products. Corn syrup contains no nutritional value other than calories, promotes tooth decay, and is used mainly in foods with little intrinsic nutritional value.
 CYCLAMATE ... Artificial sweetener: *Diet foods*.	This controversial high-potency sweetener was used in the United States in diet foods until 1970, at which time it was banned. Animal studies indicated that it causes cancer. Now, based on animal studies, it (or a byproduct) is believed not to cause cancer directly, but to increase the potency of other carcinogens and to harm the testes.
 DEXTROSE (GLUCOSE, CORN SUGAR) ... Sweetener, coloring agent: *Bread, caramel, soda pop, cookies, many other foods*	Dextrose is an important chemical in every living organism. A sugar, it is a source of sweetness in fruits and honey. Added to foods as a sweetener, it represents empty calories and contributes to tooth decay. Dextrose turns brown when heated and contributes to the color of bread crust and toast. Americans consume about 25 pounds per year of dextrose -- and a total of about 150 pounds per year of all refined sugars.
 EDTA ... Chelating agent: *Salad dressing, margarine, sandwich spreads, mayonnaise, processed fruits and vegetables, canned shellfish, soft drinks.*	Modern food-manufacturing technology, which involves rollers, blenders, and containers made of metal, results in trace amounts of metal contamination in food. EDTA (ethylenediamine tetraacetic acid) traps metal impurities, which would otherwise promote rancidity and the breakdown of artificial colors. It is safe.
 ERYTHORBIC ACID ... Antioxidant, color stabilizer: *Cured meats*.	see ASCORBIC ACID above.
 FERROUS GLUCONATE ... Coloring, nutrient: *Black olives*.	Used by the olive industry to generate a uniform jet-black color and in pills as a source of iron. Safe.
 FOOD-STARCH, MODIFIED	see STARCH, MODIFIED below.
	A solid at room temperature, inexpensive, highly acidic, fumaric acid is the ideal source of

 FUMARIC ACID ... Tartness agent: *Powdered drinks, pudding, pie fillings, gelatin desserts*.	tartness and acidity in dry food products. However, it dissolves slowly in cold water, a drawback cured by adding DIOCTYL SODIUM SULFOSUCCINATE (DSS), a detergent-like additive that appears to be safe.
 GELATIN ... Thickening and gelling agent: *Powdered dessert mixes, yogurt, ice cream, cheese spreads, beverages.*	Gelatin is a protein obtained from animal hides and bones. It has little nutritional value, because it contains little or none of several essential amino acids.
 GLYCERIN (GLYCEROL) ... Maintains water content: *Marshmallows, candy, fudge, baked goods*.	In nature, glycerin forms the backbone of fat and oil molecules. The body uses it as a source of energy or as a starting material in making more-complex molecules.
 GUMS: Arabic, Furcelleran, Ghatti, Guar, Karaya, Locust Bean, Tragacanth, Xanthan ... Thickening agents, stabilizers: *Beverages, ice cream, frozen pudding, salad dressing, dough, cottage cheese, candy, drink mixes*.	Gums are derived from natural sources (bushes, trees, seaweed, bacteria) and are poorly tested, though probably safe. They are not absorbed by the body. They are used to thicken foods, prevent sugar crystals from forming in candy, stabilize beer foam (arabic), form a gel in pudding (furcelleran), encapsulate flavor oils in powdered drink mixes, or keep oil and water mixed together in salad dressings. Gums are often used to replace fat in low-fat ice cream, baked goods, and salad dressings. Tragacanth has caused occasional severe allergic reactions.
 HEPTYL PARABEN ... Preservative: *Beer, non-carbonated soft drinks*.	Heptyl paraben -- short for the heptyl ester of para-hydroxybenzoic acid -- is a preservative. Studies suggest that this rarely used additive chemical is safe, but it, like other additives in alcoholic beverages, has never been tested in the presence of alcohol (such as in animals weakened by long-term consumption of alcohol).
 HIGH-FRUCTOSE CORN SYRUP ... Sweetener: *Soft drinks, other processed foods*.	Corn syrup can be treated with enzymes to convert some of its dextrose to fructose, which results in High Fructose Corn Syrup (HFCS). HFCS has largely replaced ordinary sugar used in soft drinks and many other foods because it is cheaper. Americans consume about 59 pounds per year of HFCS (and a total of 150 pounds per year of all refined sugars).
 HYDROGENATED STARCH HYDROLYSATE (HSH) ... Sweetener: *Dietetic and reduced-calorie foods*.	HSH, like sorbitol, is slightly sweet and poorly absorbed by the body. Like sorbitol, and other sugar alcohols, eating significant amounts of HSH may cause intestinal gas and diarrhea.
 HYDROGENATED VEGETABLE OIL, PARTIALLY HYDROGENATED VEGETABLE OIL ... Fat, oil, shortening: *Margarine, crackers, fried restaurant foods, baked goods*.	Vegetable oil, usually a liquid, can be made into a semi-solid shortening by reacting it with hydrogen. Hydrogenation reduces the levels of polyunsaturated oils — and also creates *trans* fats, which promote heart disease (they act like saturated fats). Ideally, food manufacturers would replace hydrogenated shortening with less-harmful ingredients.
 HYDROLYZED VEGETABLE PROTEIN (HVP) ... Flavor enhancer: *Instant soups, frankfurters, sauce mixes, beef stew*.	HVP consists of vegetable (usually soybean) protein that has been chemically broken down to the amino acids of which it is composed. HVP is used to bring out the natural flavor of food (and, perhaps, to enable companies to use less real food). It contains MSG and may cause adverse reactions in sensitive individuals.
 INVERT SUGAR ... Sweetener: *Candy, soft drinks, many other foods*.	Invert sugar, a 50-50 mixture of two sugars, dextrose and fructose, is sweeter and more soluble than sucrose (table sugar). Invert sugar forms when sucrose is split in two by an enzyme or acid. It provides "empty calories," contributes to tooth decay, and should be avoided.
 LACTIC ACID ... Controls acidity: *Spanish olives, cheese, frozen desserts, carbonated beverages*.	This safe acid occurs in almost all living organisms. It inhibits spoilage in Spanish-type olives, balances the acidity in cheese-making, and adds tartness to frozen desserts, carbonated fruit-flavored drinks, and other foods.
 LACTOSE ... Sweetener: *Whipped topping mix, breakfast pastry*.	Lactose, a carbohydrate found only in milk, is one of Nature's ways of delivering calories to infant mammals. One-sixth as sweet as table sugar, lactose is added to food as a slightly sweet source of carbohydrate. Milk turns sour when bacteria convert lactose to lactic acid. Many people, especially non-Caucasians, have trouble digesting lactose. Bacteria in their guts may produce gas.
 LECITHIN ... Emulsifier, antioxidant: *Baked goods, margarine, chocolate, ice cream*.	A common constituent of animal and plant tissues, lecithin is a source of the nutrient choline. It keeps oil and water from separating out, retards rancidity, reduces spattering in a frying pan, and leads to fluffier cakes. Major natural sources are egg yolk and soybeans.

 MALTITOL ... Sweetener: *Dietetic and other reduced calorie foods*.	Like mannitol, sorbitol, and other sugar alcohols, maltitol may be expected to promote flatulence and other gastrointestinal symptoms.
 MANNITOL ... Sweetener, other uses: *Chewing gum, low-calorie foods.*	Not quite as sweet as sugar and poorly absorbed by the body, it contributes only half as many calories as sugar. Used as the "dust" on chewing gum, mannitol prevents gum from absorbing moisture and becoming sticky. Safe — except that large amounts that are used in gum may have a laxative effect and even cause diarrhea.
 MONO- and DIGLYCERIDES ... Emulsifier: *Baked goods, margarine, candy, peanut butter*.	Makes bread softer and prevents staling, improves the stability of margarine, makes caramels less sticky, and prevents the oil in peanut butter from separating out. Mono- and diglycerides are safe, though most foods they are used in are high in refined flour, sugar, or fat.
 MONOSODIUM GLUTAMATE (MSG) ... Flavor enhancer: *Soup, salad dressing, chips, frozen entrees, restaurant foods*.	This amino acid brings out the flavor in many foods. While that may sound like a treat for taste buds, the use of MSG allows companies to reduce the amount of real ingredients in their foods, such as chicken in chicken soup. In the 1960s, it was discovered that large amounts of MSG fed to infant mice destroyed nerve cells in the brain. After that research was publicized, public pressure forced baby-food companies to stop adding MSG to their products (it was used to make the foods taste better to parents). Careful studies have shown that some people are sensitive to MSG. Reactions include headache, nausea, weakness, and burning sensation in the back of neck and forearms. Some people complain of wheezing, changes in heart rate, and difficulty breathing. Some people claim to be sensitive to very small amounts of MSG, but no good studies have been done to determine just how little MSG can cause a reaction in the most-sensitive people. To protect the public's health, manufacturers and restaurateurs should use less or no MSG and the amounts of MSG should be listed on labels of foods that contain significant amounts. People who believe they are sensitive to MSG should be aware that other ingredients, such as natural flavoring and hydrolyzed vegetable protein, also contain glutamate. Also, foods such as Parmesan cheese and tomatoes contain glutamate that occurs naturally, but no reactions have been reported to those foods.
 OLESTRA (Olean) ... Fat substitute: *Chips, crackers*.	Olestra is Procter & Gamble's synthetic fat that is not absorbed by the body, but runs right through. Procter & Gamble suggests that replacing regular fat with olestra will help people lose weight and lower the risk of heart disease. Olestra can cause diarrhea and loose stools, abdominal cramps, flatulence, and other adverse effects. Those symptoms are sometimes severe. Even more importantly, olestra reduces the body's ability to absorb fat-soluble carotenoids (such as alpha and beta-carotene, lycopene, lutein, and canthaxanthin) from fruits and vegetables. Those nutrients are thought by many experts to reduce the risk of cancer and heart disease. Olestra enables manufacturers to offer greasy-feeling low-fat snacks, but consumers would be much better off with baked snacks, which are perfectly safe and just as low in calories. Products made with olestra should not be called "fat free," because they contain substantial amounts of *indigestible* fat.
 PHOSPHORIC ACID; PHOSPHATES ... Acidulant, chelating agent, buffer, emulsifier, nutrient, discoloration inhibitor: *Baked goods, cheese, powdered foods, cured meat, soda pop, breakfast cereals, dehydrated potatoes*.	Phosphoric acid acidifies and flavors cola beverages. CALCIUM and IRON PHOSPHATES act as mineral supplements. SODIUM ALUMINUM PHOSPHATE is a leavening agent. CALCIUM and AMMONIUM PHOSPHATES serve as food for yeast in baking. SODIUM ACID PYROPHOSPHATE prevents discoloration in potatoes and sugar syrups. While excessive consumption of phosphates could lead to dietary imbalances that might contribute to osteoporosis, only a small fraction of the phosphate in the American diet comes from additives. Most comes from meat and dairy products.
 PLANT STEROL ESTERS ... Cholersterol-lowering Additive: *Margarine, other foods* .	These substances, which are extracted from pine trees, reduce the absorption of cholersterol from food and lower blood cholersterol levels. They are not toxic, but they may reduce the body's absorption of nutrients called carotenoids that are thought to reduce the risk of cancer and heart disease. Used in Benecol-brand products (margarine, salad dressing, and others).
 POLYSORBATE 60 ... Emulsifier: *Baked goods, frozen desserts, imitation dairy products*.	Polysorbate 60 is short for polyoxyethylene-(20)- sorbitan monostearate. It and its close relatives, POLYSORBATE 65 and 80, work the same way as mono- and diglycerides, but smaller amounts are needed. They keep baked goods from going stale, keep dill oil dissolved in bottled dill pickles, help coffee whiteners dissolve in coffee, and prevent oil from separating out of artificial whipped cream.
 POTASSIUM BROMATE ... Flour improver: *Bread and rolls.*.	This additive has long been used to increase the volume of bread and to produce bread with a fine crumb (the not-crust part of bread) structure. Most bromate rapidly breaks down to form innocuous bromide. However, bromate itself causes cancer in animals. The tiny amounts of bromate that may remain in bread pose a small risk to consumers. Bromate has been banned virtually worldwide except in Japan and the United States. It is rarely used in California because a cancer warning might be required on the label. In 1999, the Center for Science in the Public Interest petitioned the FDA to ban bromate.

PROPYL GALLATE ... Antioxidant preservative: *Vegetable oil, meat products, potato sticks, chicken soup base, chewing gum.*	Propyl gallate retards the spoilage of fats and oils and is often used with BHA and BHT, because of the synergistic effects these preservatives have. The best studies on rats and mice were peppered with suggestions (but not proof) that this preservative might cause cancer. Avoid.
 QUININE ... Flavoring: *Tonic water, quinine water, bitter lemon.*	This drug can cure malaria and is used as a bitter flavoring in a few soft drinks. There is a slight chance that quinine causes birth defects, so, to be on the safe side, pregnant women should avoid quinine-containing beverages and drugs. Relatively poorly tested.
SACCHARIN ... Artificial sweetener: *"Diet" products, soft drinks (especially fountain drinks at restaurants), packets.*	Saccharin (Sweet 'N Low) is 350 times sweeter than sugar and is used in dietetic foods or as a tabletop sugar substitute. Many studies on animals have shown that saccharin can cause cancer of the urinary bladder. In other rodent studies, saccharin has caused cancer of the uterus, ovaries, skin, blood vessels, and other organs. Other studies have shown that saccharin increases the potency of other cancer-causing chemicals. And the best epidemiology study (done by the National Cancer Institute) found that the use of artificial sweeteners (saccharin and cyclamate) was associated with a higher incidence of bladder cancer. In 1977, the FDA proposed that saccharin be banned, because of studies that it causes cancer in animals. However, Congress intervened and permitted it to be used, provided that foods bear a warning notice. It has been replaced in many products by aspartame (NutraSweet). In 1997, the diet-food industry began pressuring the U.S. and Canadian governments and the World Health Organization to take saccharin off their lists of cancer-causing chemicals. The industry acknowledges that saccharin causes bladder cancer in male rats, but argues that those tumors are caused by a mechanism that would not occur in humans. Many public health experts respond by stating that, even if that still-unproved mechanism were correct in male rats, saccharin could cause cancer by additional mechanisms and that, in some studies, saccharin has caused bladder cancer in mice and in female rats and other cancers in both rats and mice. In May 2000, the U.S. Department of Health and Human Services removed saccharin from its list of cancer-causing chemicals. Later that year, Congress passed a law removing the warning notice that likely will result in increased use in soft drinks and other foods and in a slightly greater incidence of cancer.
SALATRIM ... Modified fat: *baked goods, candy.*	This manufactured fat (developed by Nabisco) has the physical properties of regular fat, but the manufacturer claims it provides only about 5/9 as many calories. Its use can enable companies to make reduced-calorie claims on their products. Salatrim's low calorie content results from its content of stearic acid, which the manufacturer says is absorbed poorly, and short-chain fatty acids, which provide fewer calories per unit weight. Critics have charged that it does not provide as big a calorie reduction as claimed by Nabisco. Moreover, only very limited testing has been done to determine effects on humans. Eating small amounts of salatrim is probably safe, but large amounts (30g or more per day) increase the risk of such side effects as stomach cramps and nausea. No tests have been done to determine if the various food additives (salatrim, olestra, mannitol, and sorbitol) that cause gastrointestinal symptoms can act in concert to cause greater effects. Nabisco declared salatrim safe and has marketed it, as the law allows, without formal FDA approval. (Nabisco has since sold salatrim to another company, Cultor.) In June 1998, the Center for Science in the Public Interest urged the FDA to ban salatrim until better tests were done and demonstrated safety.
SALT (Sodium Chloride) ... Flavoring: *Most processed foods, soup, potato chips, crackers.*	Salt is used liberally in many processed foods and restaurant meals. Other additives contribute additional sodium. A diet high in sodium increases the risk or severity of high blood pressure, which increases the risk of heart attack and stroke. Everyone should eat less salt: avoid salty processed foods and restaurant meals, use salt sparingly, and enjoy other seasonings.
SODIUM BENZOATE ... Preservative: *Fruit juice, carbonated drinks, pickles, preserves.*	Manufacturers have used sodium benzoate for a century to prevent the growth of microorganisms in acidic foods.
SODIUM CARBOXYMETHYLCELLULOSE (CMC) ... Thickening and stabilizing agent; prevents sugar from crystallizing: *Ice cream, beer, pie fillings, icings, diet foods, candy*	CMC is made by reacting cellulose with a derivative of acetic acid. Studies indicate it is safe.
	Meat processors love sodium nitrite because it stabilizes the red color in cured meat (without nitrite, hot dogs and bacon would look gray) and gives a characteristic flavor. Sodium nitrate is used in dry cured meat, because it slowly breaks down into nitrite. Adding nitrite to food can lead to the formation of small amounts of potent cancer-causing chemicals (nitrosamines), particularly in fried bacon. Nitrite, which also occurs in saliva and forms from nitrate in several vegetables, can undergo the same chemical reaction in the stomach. Companies now add ascorbic acid or erythorbic acid to bacon to inhibit nitrosamine formation, a measure that has greatly reduced the problem. While nitrite and nitrate cause only a small risk, they are still worth avoiding.

 SODIUM NITRITE, SODIUM NITRATE ... Preservative, coloring, flavoring: *Bacon, ham, frankfurters, luncheon meats, smoked fish, corned beef.*	Several studies have linked consumption of cured meat and nitrite by children, pregnant women, and adults with various types of cancer. Although those studies have not yet proven that eating nitrite in bacon, sausage, and ham causes cancer in humans, pregnant women would be prudent to avoid those products. The meat industry justifies its use of nitrite and nitrate by claiming that it prevents the growth of bacteria that cause botulism poisoning. That's true, but freezing and refrigeration could also do that, and the U.S. Department of Agriculture has developed a safe method using lactic-acid-producing bacteria. The use of nitrite and nitrate has decreased greatly over the decades, because of refrigeration and restrictions on the amounts used. The meat industry could do the public's health a favor by cutting back even further. Because nitrite is used primarily in fatty, salty foods, consumers have important nutritional reasons for avoiding nitrite-preserved foods.
 SORBIC ACID, POTASSIUM SORBATE ... Prevents growth of mold: *Cheese, syrup, jelly, cake, wine, dry fruits.*	Sorbic acid occurs naturally in many plants. These additives are safe.
 SORBITAN MONOSTEARATE ... Emulsifier: *Cakes, candy, frozen pudding, icing.*	Like mono- and diglycerides and polysorbates, this additive keeps oil and water mixed together. In chocolate candy, it prevents the discoloration that normally occurs when the candy is warmed up and then cooled down.
 SORBITOL ... Sweetener, thickening agent, maintains moisture. *Dietetic drinks and foods, candy, shredded coconut, chewing gum.*	Sorbitol occurs naturally in fruits and berries and is a close relative of sugars. It is half as sweet as sugar. It is used many dietetic foods. It is used in non-cariogenic (non-decay-causing) chewing gum because oral bacteria do not metabolize it well. Some diabetics use sorbitol-sweetened foods because it is absorbed slowly and does not cause blood sugar to increase rapidly. Moderate amounts of sorbitol may have a strong laxative effect and even cause diarrhea, but otherwise it is safe.
 STARCH ... Thickening agent: *Soup, gravy.*	Starch, the major component of flour, potatoes, and corn, is used in many foods as a thickening agent. However, starch does not dissolve in cold water. Chemists have solved this problem by reacting starch with various chemicals to create MODIFIED STARCHES (see next entry).
 STARCH, MODIFIED ... Thickening agent: *Soup, gravy, baby food.*	Modified starches are used in processed foods to improve their consistency and keep the solids suspended. Starch and modified starches sometimes replace large percentages of more nutritious ingredients, such as fruit. Choose baby foods without added starches (starch-thickened baby foods have contained as little as 25 percent as much of the fruit ingredients as 100-percent-fruit baby foods). One small study suggested that modified starches can promote diarrhea in infants.
 SUCRALOSE ... Artificial sweetener: *Diet foods.*	Approved in the United States in April 1998, sucralose (a synthetic chemical) can be used in soft drinks, baked goods, ice cream, sweetener packets, and other products. It previously had been used in Canada, Europe, and elsewhere. Sucralose is safer than saccharin and cyclamate and doesn't raise the concerns that tests on acesulfame-K and aspartame have raised.
 SUGAR (SUCROSE) ... Sweetener: *Table sugar, sweetened foods.*	Sucrose, ordinary table sugar, occurs naturally in fruit, sugar cane, and sugar beets. Americans consume about 65 pounds of sucrose per year. That figure is down from 102 pounds per year around 1970, but the decrease has been more than made up for with HIGH-FRUCTOSE CORN SYRUP and DEXTROSE. About 156 pounds of all refined sugars are produced per person per year, an increase of 28 percent since 1983. Interestingly that's just when the use of ASPARTAME started skyrocketing. In other words, it appears that artificial sweeteners have not replaced sugar, but may have stimulated America's sweet tooth. Sugar and sweetened foods may taste good and supply energy, but most people eat too much of them. Sugar, corn syrup, and other refined sweeteners make up 16 percent of the average diet, but provide no vitamins, minerals, or protein. That means that a person would have to get 100 percent of his or her nutrients from only 84 percent of his or her food. Sugar and other refined sugars can promote obesity, tooth decay, and, in people with high triglycerides, heart disease.
 SULFITES (SULFUR DIOXIDE, SODIUM BISULFITE) ... Preservative, bleach: *Dried fruit, wine, processed potatoes.*	Sulfiting agents prevent discoloration (dried fruit, some "fresh" shrimp, and some dried, fried, or frozen potatoes) and bacterial growth (wine). They also destroy vitamin B-1 and, most important, can cause severe reactions, especially in asthmatics. If you think you may be sensitive, avoid all forms of this additive, because it has caused at least twelve known deaths and probably many more.
 THIAMIN MONONITRATE ... *Vitamin B-1.*	Perfectly safe, despite adding minuscule amounts of nitrate to our food.
 VANILLIN, ETHYL VANILLIN ... Substitute for vanilla: *Ice cream, baked goods, beverages, chocolate, candy, gelatin desserts.*	Vanilla flavoring is derived from a bean, but vanillin, the major flavor component of vanilla, is cheaper to produce in a factory. A derivative, ethyl vanillin, comes closer to matching the taste of real vanilla. Both chemicals are safe.

VEGETABLE OIL STEROLS ... Cholesterol-lowering Additive: *Margarine, other foods.*	These substances, which are extracted from soybeans, reduce the absorption of cholersterol from food and lower blood cholersterol levels. They are not toxic, but they may reduce the body's absorption of nutrients called carotenoids that are thought to reduce the risk of cancer and heart disease. Used in Take Control-brand margarine.

SUMMARY OF ADDITIVES' SAFETY

SAFE

These appear to be safe, though a few people may be allergic to any additive.

- ALGINATE
- ALPHA TOCOPHEROL (Vitamin E)
- ASCORBIC ACID (Vitamin C)
- BETA-CAROTENE
- CALCIUM PROPIONATE
- CALCIUM STEAROYL LACTYLATE
- CARRAGEENAN
- CASEIN
- CITRIC ACID
- EDTA
- ERYTHORBIC ACID
- FERROUS GLUCONATE
- FUMARIC ACID
- GELATIN
- GLYCERIN (Glycerol)
- GUMS: Arabic, Furcelleran, Ghatti, Guar, Karaya, Locust Bean, Xanthan
- LACTIC ACID
- LECITHIN
- MONO- and DIGLYCERIDES
- PHOSPHATE SALTS
- PHOSPHORIC ACID
- PLANT STEROL ESTERS
- POLYSORBATE 60, 65, 80
- POTASSIUM SORBATE
- PROPYLENE GLYCOL ALGINATE
- SODIUM ASCORBATE
- SODIUM BENZOATE
- SODIUM CARBOXYMETHYLCELLULOSE (CMC)
- SODIUM CASEINATE
- SODIUM CITRATE
- SODIUM PROPIONATE
- SODIUM STEAROYL LACTYLATE
- SORBIC ACID
- SORBITAN MONOSTEARATE
- STARCH, MODIFIED STARCH
- SUCRALOSE
- THIAMIN MONONITRATE
- VANILLIN, ETHYL VANILLIN
- VEGETABLE OIL STEROL ESTERS

CUT BACK

Not toxic, but large amounts may be unsafe or promote bad nutrition. See main text for details.

- CAFFEINE
- CORN SYRUP
- DEXTROSE (CORN SUGAR, GLUCOSE)
- HIGH-FRUCTOSE CORN SYRUP
- HYDROGENATATED STARCH HYDROLYSATE
- HYDROGENATED VEGETABLE OIL
- INVERT SUGAR
- MALTITOL
- MANNITOL
- SALATRIM
- SALT
- SORBITOL
- SUGAR

CAUTION

These additives may pose a risk and need to be better tested. Try to avoid..

- ARTIFICIAL COLORINGS
  - CITRUS RED 2
  - RED 40
- ASPARTAME (Nutrasweet)
- BROMINATED VEGETABLE OIL (BVO)
- BUTYLATED HYDROXYANISOLE (BHA)
- BUTYLATED HYDROXYTOLUENE (BHT)
- HEPTYL PARABEN
- QUININE

CERTAIN PEOPLE SHOULD AVOID

May cause allergic reactions or other problems. See main text for details.

- ARTIFICIAL COLORINGS
  - YELLOW 5
- ARTIFICIAL AND NATURAL FLAVORING
- ASPARTAME (Nutrasweet)
- BETA-CAROTENE
- CAFFEINE
- CARMINE; COCHINEAL
- CASEIN
- GUM TRAGACANTH
- HVP (HYDROLYZED VEGETABLE PROTEIN)
- LACTOSE
- MSG (MONOSODIUM GLUTAMATE)
- QUININE
- SODIUM BISULFITE,
- SULFITES
- SULFUR DIOXIDE

AVOID

The additive is unsafe in the amounts consumed or is very poorly tested.

- ACESULFAME POTASSIUM
- ARTIFICIAL COLORINGS
  - BLUE 1
  - BLUE 2
  - GREEN 3
  - RED 3
  - YELLOW 6
- CYCLAMATE
- OLESTRA (Olean)
- POTASSIUM BROMATE
- PROPYL GALLATE
- SACCHARIN
- SODIUM NITRITE, SODIUM NITRATE

Food Additive Cemetery -- Additives That Have Been Banned

The food and chemical industries have said for decades that all food additives are well tested and safe. And most additives are safe. However, the history of food additives is riddled with additives that, after many years of use, were found to pose health risks. Those listed below have been banned. The moral of the story is that when someone says that all food additives are well tested and safe you should take their assurances with a grain of salt.

The food and chemical industries have said for decades that all food additives are well tested and safe. And most additives are safe. However, the history of food additives is riddled with additives that, after many years of use, were found to pose health risks. Those listed below have been banned. The moral of the story is that when someone says that all food additives are well tested and safe you should take their assurances with a grain of salt.

Additive	Function	Natural or Synthetic	Year Banned	Problem
Agene (nitrogen trichloride)	flour bleaching and aging agent	synthetic	1949	dogs that ate bread made from treated flour suffered epileptic-like fits; the toxic agent was methionine sulfoxime
Artificial colorings:				
• Butter yellow	artificial coloring	synthetic	1919	toxic, later found to cause liver cancer
• Green 1	artificial coloring	synthetic	1965	liver cancer
• Green 2	artificial coloring	synthetic	1965	insufficient economic importance to be tested
• Orange 1	artificial coloring	synthetic	1956	organ damage

• Orange 2	artificial coloring	synthetic	1960	organ damage
• Orange B	artificial coloring	synthetic	1978 (ban never finalized)	cancer
• Red 1	artificial coloring	synthetic	1961	liver cancer
• Red 2	artificial coloring	synthetic	1976	possible carcinogen
• Red 4	artificial coloring	synthetic	1976	high levels damaged adrenal cortex of dog; after 1965 it was used only in maraschino cherries and certain pills; it is still allowed in externally applied drugs and cosmetics
• Red 32	artificial coloring	synthetic	1956	damages internal organs and may be a weak carcinogen; since 1956 it continues to be used under the name Citrus Red 2 only to color oranges (2 ppm)
• Sudan 1	artificial coloring	synthetic	1919	toxic, later found to be carcinogenic
• Violet 1	artificial coloring	synthetic	1973	cancer (it had been used to stamp the Department of Agriculture's inspection mark on beef carcasses)
• Yellow 1 and 2	artificial coloring	synthetic	1959	intestinal lesions at high dosages
• Yellow 3	artificial coloring	synthetic	1959	heart damage at high dosages
• Yellow 4	artificial coloring	synthetic	1959	heart damage at high dosages
cinnamyl anthranilate	artificial flavoring	synthetic	1982	liver cancer
cobalt salts	stabilize beer foam	synthetic	1966	toxic effects on heart
coumarin	flavoring	tonka bean	1954	liver poison
cyclamate	artificial sweetener	synthetic	1970	bladder cancer, damage to testes; now not thought to cause cancer directly, but to increase the potency of other carcinogens
diethyl pyrocarbonate (DEPC)	preservative (beverages)	synthetic	1972	combines with ammonia to form urethane, a carcinogen
dulcin (p-ethoxy-phenylurea)	artificial sweetener	synthetic	1950	liver cancer
ethylene glycol	solvent	humectant	synthetic	kidney damage
monochloroacetic acid	preservative	synthetic	1941	highly toxic
nordihydroguaiaretic acid (NDGA)	antioxidant	desert plant	1968 (FDA), 1971 (USDA)	kidney damage
oil of calamus	flavoring	root of calamus	1968	intestinal cancer
polyoxyethylene-8-stearate (Myrj 45)	emulsifier	synthetic	1952	high levels caused bladder stones and tumors
safrole	flavoring (root beer)	sassafras	1960	liver cancer
thiourea	preservative	synthetic	c.1950	liver cancer

Thanks to Doug Pierce at Threshold Media for his assistance. Threshold Media, 13268 Country Ridge Dr., Germantown, MD 20874; phone 301.601.9668.

NZ Govt web site

Food Additives
What are food additives ?
Food additives are an important component of our food supply. They mean that we can enjoy a wide variety of foods throughout the year. They also have an important role in ensuring that our food lasts longer and is easier to use.

There are good reasons for the use of food additives. They can be used to:

· improve the keeping quality or stability of a food. For example, sorbitol - humectant (420) - may be added to mixed dried fruit to maintain the moisture level and softness of the fruit;

· preserve food when this is the most practical way of extending its storage life. For example, sulphur dioxide - preservative (220) - is added to some meat products such as sausage meat to prevent the bugs that cause food poisoning from growing; and

· improve the taste or appearance of a processed food. For example, lecithin - emulsifier (322) - may be added to margarine to help maintain texture.

Additives are used in processed foods in relatively small quantities. Many substances used as additives also occur naturally, such as vitamin C or ascorbic acid (300) in fruit and lecithin (322) in eggs or soy beans.

How do I know what additives are in food?
If you want to know more about a particular food additive look at the ingredient list on the food label where you will find the additives name and number, for example, food acid (260).

You can use this information to gain a better understanding of what is in the food you eat and why different food additives are used.

This is an example of an ingredient list which might appear on a packaged stir-fry meal:

Ingredients - pork, wheat flour, capsicum, pineapple, green beans, sweet corn, sugar, tomato paste, pineapple concentrate, thickener (1422), food acids (270, 260), soy sauce, salt, natural flavours, vegetable gum (415), water added.

The name of an approved food additive must be spelt out in full on a food label if it doesn't have an appropriate class name or if a number hasn't been allocated to it.

What do additives do?
Some food additives have more than one use. Food additives are listed according to their functional or class names;

· colourings add or restore colour to foods;

· colour retention agents retain or intensify the colour of a food;

· preservatives help protect against deterioration caused by microorganisms;

· artificial sweetening substances are substances which impart a sweet taste for fewer kilojoules/calories than sugar;

· flavour enhancers improve the flavour and/or aroma of food;

· flavourings restore taste losses due to processing, maintain uniformity and make food more palatable;

· anti-caking agents keep powdered products such as salt, flowing freely when poured;

· emulsifiers help to prevent oil and water mixtures separating into layers;

· food acids help maintain a constant level of sourness in food;

· humectants prevent foods such as dried fruits from drying out;

· mineral salts improve the texture of foods, such as processed meats;

· thickeners and vegetable gums improve texture and maintain uniform consistency;

· stabilisers maintain the uniform dispersion of substances in a food;

· flour treatment agents are substances added to flour to improve baking quality or appearance;

· glazing agents impart a shiny appearance or provide a protective coating to a food;

· propellants are gases which help propel food from a container.

Who controls the use of food additives?

The use of food additives in foods is regulated by theFood Standards Codeand enforced in Australia under State and Territory food laws. Foods made in New Zealand may also comply with the provisions of theFood Standards Code.. The use of food additives in foods are regulated in a general standard for food additives.

The Australia New Zealand Food Authority (ANZFA) is responsible for the development of, or variation to, food standards in theFood Standards Code. The Australia New Zealand Food Standards Council (ANZFSC), made up of State, Territory, Commonwealth and New Zealand Health Ministers, makes the final decision.

Before ANZFA recommends to ANZFSC the use of any new additive in a particular food, we need to know:

Is the additive safe to eat (at the requested level in that particular food)?

Are there good technological reasons for the use of the additive?

Will consumers be clearly informed about its presence?

Only if we are satisfied on these points will we recommend a maximum level of the additive permitted in particular foods, based on technological need and providing it is well within safe limits.

Food additive safety
ANZFA only allows additives if it can be demonstrated that no harmful effects are expected to result. This involves our scientists evaluating the data obtained from extensive testing of the additive. A decision on food additive safety is based on the acceptable daily intake (ADI), which is the amount of a food additive that can be eaten every day for an entire lifetime without adverse effect.

The new standard
ANZFA has recently reviewed the current food additives standard as part of the overall review of all food standards which will harmonise standards for Australia and New Zealand.

Each individual food standard has been reviewed to bring it up to date with the modern food supply. This includes dietary evaluation in Australia and New Zealand to ensure that consumption is well within safe levels even for big eaters of certain foods.

The new standard is more flexible for industry to develop new products while ensuring public health and safety. It is anticipated that it will come into effect later in 1999.

It also brings Australia and New Zealand into line with international standards, which will help our exports.

Intolerance and food additives
Adverse reactions to food additives occur in a small proportion of the population.

A few people are intolerant to some food a d ditives. Intolerance does not depend on whether the food additive is derived from a natural or synthetic source. More people are intolerant to common foods (such as peanuts, milk or eggs) than to food additives.

The labelling of food products helps people who are sensitive to some food additives to avoid them.

Detailed Information on Additives
If you would like more detailed information on the regulation of food additives please contact us on 1300 652 166, but if you want more information on a particular food additive in a food, then ring the manufacturer. You can find their address on the food label and many also provide tollfree telephone numbers.

Food additives
Food additives play an important part in our food supply ensuring that our food is safe and meets the needs of consumers. Many food additives have long complex names. Sometimes these are abbreviated, sometimes not. Some have more than one name and a few include letters from the Greek alphabet! The food

additives list can be confusing so, to help reduce this confusion, each food additive is given a short code number. Many people like to know what these food additive codes stand for and some people may choose to avoid certain food additives. This list is a convenient way to check food labels as you shop, to let you know what the food additive is and what it does

How to find out about a food additive
If you want to know more about a particular food additive look at the ingredient list on the food label where you will find the food additive' s name, function and number, for example, acidity regulator (260). You can use this information to gain a better understanding of what is in the food you eat. For example, acidity regulators help maintain a constant acid level in foods. This can help prevent foods from spoiling, keep them safe, as well as change the flavour of the food.

Food additives are used in processed foods in relatively small quantities. Many substances used as food additives also occur naturally, such as vitamin C or ascorbic acid (300) in fruit or lecithin (322) in egg yolks, soya beans, peanuts and maize.

Just as food additives are chemical substances, so are all the foods to which they are added. Foods are made up of many thousands of chemical substances. The human body cannot distinguish between a chemical naturally present in a food and that same chemical present as an additive.

What are food additives used for?
There are good reasons for the use of food additives. They can be used to:

Improve the taste or appearance of a processed food. For example, beeswax - glazing agent (901) is used to coat apples to improve their appearance.

Improve the keeping quality or stability of a food. For example, sorbitol - humectant (420) - may be added to mixed dried fruit to maintain the moisture level and softness of the fruit.

Preserve food when this is the most practical way of extending its storage life. For example, sulphur dioxide - preservative (220) - is added to some meat products such as sausage meat to prevent microbial growth.
With the help of the food additive list, you can look up the numbers to identify the additives by name:

Thickener (1422) - acetylated distarch adipate
Acidity regulator (270) - lactic acid
Acidity regulator (260) - acetic acid, glacial
Thickener (415) - xanthan gum

What do food additives do?
Some food additives have more than one use. Food additives are listed according to their functional or class names. Examples of the most common functions are:

Acids / Acidity regulators / Alkalis help to maintain a constant acid level in food. This is important for taste, as well as to influence how other substances in the food function. For example, an acidified food can retard the growth of some micro-organisms.

Anti-caking agents reduce the tendency of individual food particles to adhere and improve flow characteristics. For example, seasoning with an added anti-caking agent flows freely and doesn' t clump together.

Antioxidants retard or prevent the oxidative deterioration of foods. For example, in fats and oils, rancid flavours can develop when they are exposed to oxygen. Antioxidants prevent this from happening.

Bulking agents contribute to the volume of the food, without contributing significantly to its available energy. For example, sugar often contributes to the volume of lollies, while some low-joule foods need bulking agents added to them to replace the bulk normally provided by sugar.

Colourings add or restore colour to foods. For example, icing mixture is coloured to make it more attractive on cakes.

Emulsifiers facilitate or maintain oil and water from separating into layers. For example, emulsifiers may be used in margarine to prevent oil forming a layer on top of the margarine.

Firming agents / Stabilisers maintain the uniform dispersion of substances in solid and semi-solid foods.

Flavour enhancers enhance the existing taste and/or odour of a food.

Foaming agents maintain the uniform dispersion of gases in aerated foods.

Gelling agents modify the texture of the food through gel formation.

Glazing agents impart a coating to the external surface of the food, for example a wax coating on fruit to improve its appearance.

Humectants reduce moisture loss in foods. For example, glycerine may be added to icing to prevent it from drying out.
Preservatives retard or prevent the deterioration of food by micro-organisms, and thus prevent spoilage of foods.

Raising agents liberate gases, thereby increasing the volume of a food. Raising agents are often used in baked goods.

Sweeteners replace the sweetness normal provided by sugars in foods without contributing significantly to their available energy.

Thickeners increase the viscosity of a food. For example, a sauce might contain a thickener to give it the desired consistency.

Who controls the use of food additives?
Food Standards Australia New Zealand carries out safety assessments of food additives before they are allowed to be used. They following things are checked:

Is the food additive safe (at the requested level in that particular food)?

Are there good technological reasons for the use of the food additive?

Will consumers be clearly informed about its presence?

A food additive is approved for use by Food Standards Australia New Zealand only if it can be demonstrated that no harmful effects are expected to result from the requested use. Extensive testing of food additives is required, and Food Standards Australia New Zealand evaluates this data to determine if the food additive is safe. In addition, an ' exposure assessment' is undertaken, which estimates the likely amount that would be consumed if the food additive were permitted for use. This estimated amount of consumption is then compared to the ' acceptable daily intake' (ADI), which is the amount of a food additive that can be eaten every day for an entire lifetime without adverse effect.

When satisfied on these points Food Standards Australia New Zealand recommends a maximum level of the food additive permitted in particular foods, based on technological need and providing it is well within safe limits.

Food additives by numbers
The Food Standards Code requires food labels to list all ingredients in descending order of proportion by weight. The labelling required by law is there to inform consumers about the presence of additives in foods.

Food additives are required to be identified by their class name and by an individual name or code number. The numbers used are based on an international system used to identify food additives.

The code numbering system replaces long names on labels but still provides consumers with adequate information about the presence of food additives.

This means, for example, that the substance known as brilliant blue cannot be listed simply as 'colour'. The label of the food containing added colour must state not only the class name 'colour' but also the specific name of the food additive: for example 'colour (Brilliant blue FCF)'. To simplify the label, the number for this food additive may use instead of the specific name: for example 'colour (133)'.

Food labelling allows you to identify the presence of additives in packaged food and to make an informed choice about the foods you buy.

This is an example of an ingredient list, which might appear on a packaged stir-fry meal:

Ingredients - pork (30%), wheat flour (10%), capsicum, pineapple, green beans, sweet corn, sugar, tomato paste, pineapple concentrate, water, thickener (1422), acidity regulators (270, 260), soy sauce, salt, flavours, thickener (415).

Intolerance and food additives
Adverse reactions to food additives occur in small proportion of the population. More people are intolerant to common foods (such as peanuts, milk or eggs) than to food additives. Intolerance does not depend on whether the food additive is derived from a natural or synthetic source.

The labelling of food products helps people who are sensitive to some food additives to avoid them.

Additive	**Function**	**Natural or Synthetic**	**Year Banned**	**Problem**
Agene (nitrogen trichloride)	flour bleaching and aging agent	synthetic	1949	dogs that ate bread made from treated flour suffered epileptic-like fits; the toxic agent was methionine sulfoxime
Artificial colorings:				
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• Red 4	artificial coloring	synthetic	1976	high levels damaged adrenal cortex of dog; after 1965 it was used only in maraschino cherries and certain pills; it is still allowed in externally applied drugs and cosmetics
• Red 32	artificial coloring	synthetic	1956	damages internal organs and may be a weak carcinogen; since 1956 it continues to be used under the name Citrus Red 2 only to color oranges (2 ppm)
• Sudan 1	artificial coloring	synthetic	1919	toxic, later found to be carcinogenic
• Violet 1	artificial coloring	synthetic	1973	cancer (it had been used to stamp the Department of Agriculture’s inspection mark on beef carcasses)
• Yellow 1 and 2	artificial coloring	synthetic	1959	intestinal lesions at high dosages
• Yellow 3	artificial coloring	synthetic	1959	heart damage at high dosages
• Yellow 4	artificial coloring	synthetic	1959	heart damage at high dosages
cinnamyl anthranilate	artificial flavoring	synthetic	1982	liver cancer
cobalt salts	stabilize beer foam	synthetic	1966	toxic effects on heart
coumarin	flavoring	tonka bean	1954	liver poison
cyclamate	artificial sweetener	synthetic	1970	bladder cancer, damage to testes; now not thought to cause cancer directly, but to increase the potency of other carcinogens
diethyl pyrocarbonate (DEPC)	preservative (beverages)	synthetic	1972	combines with ammonia to form urethane, a carcinogen
dulcin (p-ethoxy-phenylurea)	artificial sweetener	synthetic	1950	liver cancer
ethylene glycol	solvent	humectant	synthetic	kidney damage
monochloroacetic acid	preservative	synthetic	1941	highly toxic
nordihydroguaiaretic acid (NDGA)	antioxidant	desert plant	1968 (FDA), 1971 (USDA)	kidney damage
oil of calamus	flavoring	root of calamus	1968	intestinal cancer
polyoxyethylene-8-stearate (Myrj 45)	emulsifier	synthetic	1952	high levels caused bladder stones and tumors

safrole	flavoring (root beer)	sassafras	1960	liver cancer
thiourea	preservative	synthetic	c.1950	liver cancer

Thanks to Doug Pierce at Threshold Media for his assistance. Threshold Media, 13268 Country Ridge Dr., Germantown, MD 20874; phone 301.601.9668.

H3>(updated September 2002)

Symbols used in this list:

a = alpha; *b* = beta; *d* = delta; *g* = gamma.

Prescribed Name	**Code Number**
Acacia or gum Arabic (thickener, stabiliser)	414
Acesulphame potassium (sweetener)	950
Acetic acid, glacial (acidity regulator)	260
Acetic and fatty acid esters of glycerol (emulsifier, stabiliser)	472a
Acetylated distarch adipate (thickener, stabiliser)	1422
Acetylated distarch phosphate (thickener, stabiliser)	1414
Acid treated starch (thickener, stabiliser)	1401
Adipic acid (acidity regulator)	355
Agar (thickener, gelling agent, stabiliser)	406
Alginic acid (thickener, stabiliser)	400
Alitame (sweetener)	956
Alkaline treated starch (thickener, stabiliser)	1402
Alkanet or Alkannin (colour)	103
Allura red AC (colour)	129
Aluminium (colour)	173
Aluminium, calcium, sodium, magnesium, potassium and ammonium salts of fatty acids (emulsifier, stabiliser, anti-caking agent)	470
Aluminium silicate	559
Amaranth (colour)	123
Ammonium acetate (acidity regulator)	264
Ammonium adipates (acidity regulator)	359
Ammonium alginate (thickener, stabiliser)	403
Ammonium bicarbonate or Ammonium hydrogen carbonate (acidity regulator, raising agent)	503
Ammonium chloride (bulking agent)	510
Ammonium citrate or triammonium citrate (acidity regulator)	380
Ammonium fumarate (acidity regulator)	368
Ammonium lactate (acidity regulator)	328
Ammonium malate (acidity regulator)	349
Ammonium phosphates (acidity regulator)	342
Ammonium salts of phosphatidic acid (emulsifier)	442
alpha - amylase (enzyme)	1100
Annatto extracts (colour)	160b
Anthocyanins or Grape skin extract or Blackcurrant extract (colour)	163
Arabinogalactan or Larch gum (thickener, gelling agent, stabiliser)	409
Ascorbic acid (antioxidant)	300
Ascorbyl palmitate (antioxidant)	304
Aspartame (sweetener)	951
Azorubine or Carmoisine (colour)	122

beta-apo-8' Carotenal (colour)	160e
beta-apo-8' Carotenoic acid methyl or ethyl ester (colour)	160f
Beeswax, white and yellow (glazing agent)	901
Beet red (colour)	162
Bentonite (anti-caking agent)	558
Benzoic acid (preservative)	210
Bleached starch (thickener, stabiliser)	1403
Bone phosphate (anti-caking agent, emulsifier)	542
Brilliant black BN or Brilliant black PN (colour)	151
Brilliant blue FCF (colour)	133
Brown HT (colour)	155
Butane (propellant)	943a
Butylated hydroxyanisole (antioxidant)	320
Butylated hydroxytoluene (antioxidant)	321
Calcium acetate (acidity regulator)	263
Calcium alginate (thickener, stabiliser, gelling agent)	404
Calcium aluminium silicate (anti-caking agent)	556
Calcium ascorbate (antioxidant)	302
Calcium benzoate (preservative)	213
Calcium carbonate (colour, anti-caking agent)	170
Calcium chloride (firming agent)	509
Calcium citrates (acidity regulator, stabiliser)	333
Calcium cyclamate or sodium cyclamate or cyclamate (sweetener)	952
Calcium disodium ethylenediaminetetraacetate or calcium disodium EDTA (preservative, antioxidant)	385
Calcium fumarate (acidity regulator)	367
Calcium gluconate (acidity regulator, firming agent)	578
Calcium glutamate (flavour enhancer)	623
Calcium hydroxide (acidity regulator, firming agent)	526
Calcium lactate (acidity regulator)	327
Calcium lactylate or Calcium oleyl lactylate or Calcium stearoyl lactylate (emulsifier, stabiliser)	482
Calcium malates (acidity regulator)	352
Calcium oxide (acidity regulator)	529
Calcium phosphates (acidity regulator, emulsifier, stabiliser, anti-caking agent)	341
Calcium propionate (preservative)	282
Calcium silicate (anti-caking agent)	552
Calcium sorbate (preservative)	203
Calcium sulphate (firming agent)	516
Calcium tartrate (acidity regulator)	354
Caramel I (colour)	150a
Caramel II (colour)	150b
Caramel III (colour)	150c
Caramel IV (colour)	150d
Carbon black or vegetable carbon (colour)	153
Carbon dioxide (propellant)	290
Carmines or Carminic acid or Cochineal (colour)	120
Carnauba wax (glazing agent)	903
Carotene (colour)	160a
Carrageenan (thickener, gelling agent, stabiliser)	407
Cellulose microcrystalline and powdered	460

(anti-caking agent)	
Chlorophyll (colour)	140
Chlorophyll-copper complex (colour)	141
Choline salts (emulsifier)	1001
Citric acid (acidity regulator, antioxidant)	330
Citric and fatty acid esters of glycerol (emulsifier, stabiliser)	472c
Cupric sulphate (mineral salt)	519
Curcumin or Turmeric (colour)	100
Dextrin roasted starch (thickener, stabiliser)	1400
Diacetyltartaric and fatty acid esters of glycerol (emulsifier)	472e
Dimethyl dicarbonate (preservative)	242
Dioctyl sodium sulphosuccinate (emulsifier)	480
Disodium 5 -guanylate (flavour enhancer)	627
Disodium 5 -inosinate (flavour enhancer)	631
Disodium 5'-ribonucleotides (flavour enhancer)	635
Distarch phosphate (thickener, stabiliser)	1412
Dodecyl gallate (antioxidant)	312
Enzyme treated starches (thickener, stabiliser)	1405
Erythorbic acid (antioxidant)	315
Erythritol (humectant, sweetener)	968
Erythrosine (colour)	127
Ethyl maltol (flavour enhancer)	637
Fast green FCF (colour)	143
Ferric ammonium citrate (acidity regulator, anti-caking agent)	381
Ferrous gluconate (colour retention agent)	579
Flavoxanthin (colour)	161a
Fumaric acid (acidity regulator)	297
Gellan gum (thickener, stabiliser, gelling agent)	418
Glucono *delta* -lactone or Glucono delta-lactone (acidity regulator, raising agent)	575
Glucose oxidase (antioxidant)	1102
Glycerin or glycerol (humectant)	422
Glycerol esters of wood rosins (emulsifier, stabiliser)	445
Glycine (flavour enhancer)	640
Gold (colour)	175
Green S (colour)	142
Guar gum (thickener, stabiliser)	412
4-Hexylresorcinol (antioxidant)	586
Hydrochloric acid (acidity regulator)	507
Hydroxypropyl cellulose (thickener, stabiliser, emulsifier)	463
Hydroxypropyl distarch phosphate (thickener, stabiliser)	1442
Hydroxypropyl methylcellulose (thickener, stabiliser, emulsifier)	464
Hydroxypropyl starch (thickener, stabiliser)	1440
Indigotine (colour)	132
Iron oxide (colour)	172
Isobutane (propellant)	943b
Isomalt (humectant, sweetener, bulking agent, anti-caking agent)	953
Karaya gum (thickener, stabiliser)	416
Kryptoxanthin (colour)	161c
Lactic acid (acidity regulator)	270
Lactic and fatty acid esters of glycerol (emulsifier, stabiliser)	472b
Lactitol (sweetener, humectant)	966

L-Cysteine monohydrochloride (raising agent)	920
Lecithin (antioxidant, emulsifier)	322
L-Glutamic acid (flavour enhancer)	620
Lipases (enzyme)	1104
L-Leucine (flavour enhancer)	641
Locust bean gum or Carob bean gum (thickener, stabiliser)	410
Lutein (colour)	161b
Lycopene (colour)	160d
Lysozyme (enzyme, preservative)	1105
Magnesium carbonate (acidity regulator, anti-caking agent)	504
Magnesium chloride (firming agent)	511
Magnesium gluconate (acidity regulatory, firming agent)	580
Magnesium glutamate (flavour enhancer)	625
Magnesium lactate (acidity regulator)	329
Magnesium oxide (anti-caking agent)	530
Magnesium phosphates (acidity regulator, anti-caking agent)	343
Magnesium silicate or Talc (anti-caking agent)	553
Magnesium sulphate (firming agent)	518
Malic acid (acidity regulator)	296
Maltitol and maltitol syrup or hydrogenated glucose syrup (sweetener, stabiliser, emulsifier, humectant)	965
Maltol (flavour enhancer)	636
Mannitol (sweetener, humectant)	421
Metatartaric acid (acidity regulator)	353
Methyl ethyl cellulose (thickener, stabiliser, emulsifier, foaming agent)	465
Methyl cellulose (thickener, stabiliser, emulsifier)	461
Methylparaben or Methyl-p-hydroxy-benzoate (preservative)	218
Mixed tartaric, acetic and fatty acid esters of glycerol (emulsifier, stabiliser)	472f
Mono- and di-glycerides of fatty acids (emulsifier, stabiliser)	471
Monoammonium L-glutamate (flavour enhancer)	624
Monopotassium L-glutamate (flavour enhancer)	622
Monosodium L-glutamate or MSG (flavour enhancer)	621
Monostarch phosphate (thickener, stabiliser)	1410
Natamycin or Pimaricin (preservative)	235
Neotame (sweetener)	961
Nisin (preservative)	234
Nitrogen (propellant)	941
Nitrous oxide (propellant)	942
Octafluorocyclobutane (propellant)	946
Octyl gallate (antioxidant)	311
Oxidised polyethylene (humectant)	914
Oxidised starch (thickener, stabiliser)	1404
Paprika oleoresins (colour)	160c
Pectins (thickener, stabiliser, gelling agent)	440
Petrolatum or petroleum jelly (glazing agent)	905b
Phosphated distarch phosphate (thickener, stabiliser)	1413
Phosphoric acid (acidity regulator)	338
Polydextrose (humectant, bulking agent, stabiliser, thickener)	1200
Polydimethylsiloxane or	900a

Dimethylpolysiloxane (anti-caking agent, emulsifier)	
Polyethylene (40) stearate (emulsifier)	431
Polyethylene glycol 8000 (antifoaming agent)	1521
Polyglycerol esters of fatty acids (emulsifier)	475
Polyglycerol esters of interesterified ricinoleic acid (emulsifier)	476
Polysorbate 60 or Polyoxyethylene (20) sorbitan monostearate (emulsifier)	435
Polysorbate 65 or Polyoxyethylene (20) sorbitan tristearate (emulsifier)	436
Polysorbate 80 or Polyoxyethylene (20) sorbitan monooleate (emulsifier)	433
Polyvinylpyrrolidone (stabiliser)	1201
Ponceau 4R (colour)	124
Potassium acetate or Potassium diacetate (acidity regulator)	261
Potassium adipate (acidity regulator)	357
Potassium alginate (thickener, stabiliser)	402
Potassium aluminium silicate	555
Potassium ascorbate (antioxidant)	303
Potassium benzoate (preservative)	212
Potassium bisulphite (preservative)	228
Potassium carbonates (acidity regulator, stabiliser)	501
Potassium chloride (gelling agent)	508
Potassium citrates (acidity regulator, stabiliser)	332
Potassium ferrocyanide (anti-caking agent)	536
Potassium fumarate (acidity regulator)	366
Potassium gluconate (sequestrant)	577
Potassium lactate (acidity regulator, humectant, bulking agent)	326
Potassium malates (acidity regulator)	351
Potassium metabisulphite (preservative)	224
Potassium nitrate (preservative, colour fixative)	252
Potassium nitrite (preservative, colour fixative)	249
Potassium phosphates (acidity regulator, emulsifier, stabiliser)	340
Potassium polymetaphosphate or Sodium metaphosphate, insoluble or Sodium polyphosphates, glassy (emulsifier, stabiliser)	452
Potassium propionate (preservative)	283
Potassium pyrophosphate or Sodium acid pyrophosphate or Sodium pyrophosphate (emulsifiers, acidity regulators, stabilisers)	450
Potassium silicate (anti-caking agent)	560
Potassium sodium tartrate (acidity regulator, stabiliser)	337
Potassium sorbate (preservative)	202
Potassium sulphate (acidity regulator)	515
Potassium sulphite (preservative)	225
Potassium tartrate or Potassium acid tartrate (acidity regulator, stabiliser)	336
Potassium tripolyphosphate or Sodium tripolyphosphate (acidity regulator)	451
Processed eucheuma seaweed (thickener, gelling agent, stabiliser)	407a
Propane (propellant)	944
Propionic acid (preservative)	280
Propyl gallate (antioxidant)	310
Propylene glycol (humectant)	1520
Propylene glycol alginate (thickener, emulsifier)	405

Propylene glycol mono- and di-esters or Propylene glycol esters of fatty acids (emulsifier)	477
Propylparaben or Propyl-p-hydroxy-benzoate (preservative)	216
Proteases (papain, bromelain, ficin) (stabiliser, enzyme)	1101
Quinoline yellow (colour)	104
Rhodoxanthin (colour)	161f
Riboflavin or Riboflavin 5'-phosphate sodium (colour)	101
Rubixanthin (colour)	161d
Saccharin or calcium saccharin or sodium saccharine or potassium saccharine (sweetener)	954
Saffron or Crocetin or Crocin (colour)	164
Shellac (glazing agent)	904
Silicon dioxide, amorphous (anti-caking agent)	551
Silver (colour)	174
Sodium acetates (acidity regulator)	262
Sodium alginate (thickener, stabiliser, gelling agent)	401
Sodium aluminium phosphate (acidity regulator, emulsifier)	541
Sodium aluminosilicate (anti-caking agent)	554
Sodium ascorbate (antioxidant)	301
Sodium benzoate (preservative)	211
Sodium bisulphite (preservative)	222
Sodium carbonate or Sodium bicarbonate (acidity regulator, raising agent, anti-caking agent)	500
Sodium carboxymethylcellulose (thickener, stabiliser)	466
Sodium citrates (acidity regulator, emulsifier, stabiliser)	331
Sodium erythorbate (antioxidant)	316
Sodium ferrocyanide (anti-caking agent)	535
Sodium fumarate (acidity regulator)	365
Sodium lactate (acidity regulator, humectant, bulking agent)	325
Sodium lactylate or sodium oleyl lactylate or sodium stearoyl lactylate (emulsifier, stabiliser)	481
Sodium malates (acidity regulator, humectant)	350
Sodium metabisulphite (preservative)	223
Sodium nitrate (preservative, colour fixative)	251
Sodium nitrite (preservative, colour fixative)	250
Sodium phosphates (acidity regulator, emulsifier, stabiliser)	339
Sodium propionate (preservative)	281
Sodium sorbate (preservative)	201
Sodium sulphate (acidity regulator)	514
Sodium sulphite (preservative)	221
Sodium tartrates (acidity regulator)	335
Sorbic acid (preservative)	200
Sorbitan monostearate (emulsifier)	491
Sorbitan tristearate (emulsifier)	492
Sorbitol or sorbitol syrup (sweetener, humectant, emulsifier)	420
Stannous chloride (antioxidant)	512
Starch acetate esterified with acetic anhydride (thickener, stabiliser)	1420
Starch sodium octenylsuccinate (thickener, stabiliser)	1450
Stearic acid or fatty acid (glazing agent,	570

foaming agent)	
Succinic acid (acidity regulator)	363
Sucralose (sweetener)	955
Sucrose acetate isobutyrate (emulsifier, stabiliser)	444
Sucrose esters of fatty acids (emulsifier)	473
Sulphur dioxide (preservative)	220
Sunset yellow FCF (colour)	110
Tannic acid or tannins (colour, emulsifier, stabiliser, thickener)	181
Tartaric acid (acidity regulator, antioxidant)	334
Tartrazine (colour)	102
tert-Butylhydroquinone (antioxidant)	319
Thaumatin (flavour enhancer, sweetener)	957
Titanium dioxide (colour)	171
alpha -Tocopherol (antioxidant)	307
delta -Tocopherol (antioxidant)	309
gamma -Tocopherol (antioxidant)	308
Tocopherols concentrate, mixed (antioxidant)	306
Tragacanth gum (thickener, stabiliser)	413
Triacetin (humectant)	1518
Triethyl citrate (antifoaming agent)	1505
Violoxanthin (colour)	161e
Xanthan gum (thickener, stabiliser)	415
Xylitol (sweetener, humectant, stabiliser)	967

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