

Common Food Additives

Types of Food Ingredients

The following summary lists the types of common food ingredients, why they are used, and some examples of the names that can be found on product labels. Some additives are used for more than one purpose.

Types of Ingredients	What They Do	Examples of Uses	Names Found on Product Labels
Preservatives	Prevent food spoilage from bacteria, molds, fungi, or yeast (antimicrobials); slow or prevent changes in color, flavor, or texture and delay rancidity (antioxidants); maintain freshness	Fruit sauces and jellies, beverages, baked goods, cured meats, oils and margarines, cereals, dressings, snack foods, fruits and vegetables	Ascorbic acid, citric acid, sodium benzoate, calcium propionate, sodium erythorbate, sodium nitrite, calcium sorbate, potassium sorbate, BHA, BHT, EDTA, tocopherols (Vitamin E)
Sweeteners	Add sweetness with or without the extra calories	Beverages, baked goods, confections, table-top sugar, substitutes, many processed foods	Sucrose (sugar), glucose, fructose, sorbitol, mannitol, corn syrup, high fructose corn syrup, saccharin, aspartame, sucralose, acesulfame potassium (acesulfame-K), neotame
Color Additives	Offset color loss due to exposure to light, air, temperature extremes, moisture and storage conditions; correct natural variations in color; enhance colors that occur naturally; provide color to colorless and "fun" foods	Many processed foods, (candies, snack foods margarine, cheese, soft drinks, jams/jellies, gelatins, pudding and pie fillings)	FD&C Blue Nos. 1 and 2, FD&C Green No. 3, FD&C Red Nos. 3 and 40, FD&C Yellow Nos. 5 and 6, Orange B, Citrus Red No. 2, annatto extract, beta-carotene, grape skin extract, cochineal extract or carmine, paprika oleoresin, caramel color, fruit and vegetable juices, saffron (Note: Exempt color additives are not required to be declared by name on labels but may be declared simply as colorings or color added)
Flavors and Spices	Add specific flavors (natural and synthetic)	Pudding and pie fillings, gelatin dessert mixes, cake mixes, salad dressings, candies, soft drinks, ice cream, BBQ sauce	Natural flavoring, artificial flavor, and spices

Flavor Enhancers	Enhance flavors already present in foods (without providing their own separate flavor)	Many processed foods	Monosodium glutamate (MSG), hydrolyzed soy protein, autolyzed yeast extract, disodium guanylate or inosinate
Fat Replacers (and components of formulations used to replace fats)	Provide expected texture and a creamy "mouth-feel" in reduced-fat foods	Baked goods, dressings, frozen desserts, confections, cake and dessert mixes, dairy products	Olestra, cellulose gel, carrageenan, polydextrose, modified food starch, microparticulated egg white protein, guar gum, xanthan gum, whey protein concentrate
Nutrients	Replace vitamins and minerals lost in processing (enrichment), add nutrients that may be lacking in the diet (fortification)	Flour, breads, cereals, rice, macaroni, margarine, salt, milk, fruit beverages, energy bars, instant breakfast drinks	Thiamine hydrochloride, riboflavin (Vitamin B ₂), niacin, niacinamide, folate or folic acid, beta carotene, potassium iodide, iron or ferrous sulfate, alpha tocopherols, ascorbic acid, Vitamin D, amino acids (L-tryptophan, L-lysine, L-leucine, L-methionine)
Emulsifiers	Allow smooth mixing of ingredients, prevent separation Keep emulsified products stable, reduce stickiness, control crystallization, keep ingredients dispersed, and to help products dissolve more easily	Salad dressings, peanut butter, chocolate, margarine, frozen desserts	Soy lecithin, mono- and diglycerides, egg yolks, polysorbates, sorbitan monostearate
Stabilizers and Thickeners, Binders, Texturizers	Produce uniform texture, improve "mouth-feel"	Frozen desserts, dairy products, cakes, pudding and gelatin mixes, dressings, jams and jellies, sauces	Gelatin, pectin, guar gum, carrageenan, xanthan gum, whey
pH Control Agents and acidulants	Control acidity and alkalinity, prevent spoilage	Beverages, frozen desserts, chocolate, low acid canned foods, baking powder	Lactic acid, citric acid, ammonium hydroxide, sodium carbonate
Leavening Agents	Promote rising of baked goods	Breads and other baked goods	Baking soda, monocalcium phosphate, calcium carbonate
Anti-caking agents	Keep powdered foods free-flowing, prevent moisture absorption	Salt, baking powder, confectioner's sugar	Calcium silicate, iron ammonium citrate, silicon dioxide
Humectants	Retain moisture	Shredded coconut, marshmallows, soft candies, confections	Glycerin, sorbitol

Yeast Nutrients	Promote growth of yeast	Breads and other baked goods	Calcium sulfate, ammonium phosphate
Dough Strengtheners and Conditioners	Produce more stable dough	Breads and other baked goods	Ammonium sulfate, azodicarbonamide, L-cysteine
Firming Agents	Maintain crispness and firmness	Processed fruits and vegetables	Calcium chloride, calcium lactate
Enzyme Preparations	Modify proteins, polysaccharides and fats	Cheese, dairy products, meat	Enzymes, lactase, papain, rennet, chymosin
Gases	Serve as propellant, aerate, or create carbonation	Oil cooking spray, whipped cream, carbonated beverages	Carbon dioxide, nitrous oxide

"Types of Food Ingredients" 2004. International Food Information Council (IFIC) and U.S. Food and Drug Administration. June 3, 2008. <<http://www.cfsan.fda.gov/~dms/foodic.html>>

Name	Function	Food Use and Comments	CSPI-Safety
Acesulfame K (Acesulfame Potassium, Sunette)	Nonnutritive sweetener	It is about 200 times sweeter than sugar. Chewing gum, diet soft drinks, frozen desserts, gelatin, no-sugar-added baked goods (heat stable), tabletop sweetener [Sunette] and Sweet One.) pudding, candies, diet drink mixes.	Avoid: The safety tests of acesulfame-K were conducted in the 1970s and were of mediocre quality. Two rat studies suggest the additive might cause cancer. It was for those reasons that in 1996 CSPI urged the FDA to require better testing before permitting acesulfame-K in soft drinks. In addition, large doses of acetaminophen, a breakdown product, have been shown to affect the thyroid in rats, rabbits, and dogs. The FDA and the Food and Agriculture Organization/World Health Organization (FAO/WHO) Joint Expert Committee on Food Additives have evaluated the sweetener's safety. "More than 90 studies support the safety of acesulfame-K," Tarantino says.
Acetic Acid	pH control; preservative	Acid or vinegar is acetic acid; many food uses.	
Adipic acid	pH control	Buffer and neutralizing agent; used in confectionery.	
Alginate, Propylene Glycol Alginate	Foam stabilizers, thickening agents	Beer, candy, cheese, ice cream, yogurt. Alginate is made from seaweed (kelp) and thickens dairy products, canned frostings, and other foods. Propylene glycol alginate thickens acidic foods like salad dressing. It also can stabilize the foam in beer.	Safe: 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 dressing), can stabilize the foam in beer.

Name	Function	Food Use and Comments	CSPI-Safety
Alitame (Novasweet)		Baked goods, beverages, frozen desserts, tabletop sweeteners. Stable in both acidic and non acidic foods.	US approval pending
Antioxidant	Preservative	Substances added to foods to prevent the oxygen present in the air from causing undesirable changes in flavor or color. BHA, BHT, and tocopherols are examples of antioxidants	
Ammonium alginate	Stabilizer and thickener; texturizer	Extracted from seaweed. Widespread food use	
Annatto	Colorant	Extracted from seeds of Bixa orellana. Butter, cheese, margarine, shortening, and sausage casings; coloring foods in general	
Arabinogalactan	Stabilizer and thickener; texturizer	Extracted from Western larch tree. Widespread food use; bodying agent in essential oils, nonnutritive sweeteners, flavor bases, non-standardized dressings and pudding mixes.	
Artificial and Natural Flavorings	Flavoring	Soda pop, candy, breakfast cereals, gelatin desserts, and many other foods.	Caution: Hundreds of chemicals are used to mimic natural flavors; many may be used in a single flavoring. Most flavoring chemicals also occur in nature. Flavorings may include substances to which some people are sensitive, such as MSG or HVP.
Ascorbic acid (Vitamin C, Erythorbic acid)	Nutrient; antioxidant; preservative, color stabilizer	Widespread use in foods to prevent rancidity, browning; used in meat curing; Generally Recognized as Safe (GRAS) additive. Cereal, cured meat, fruit drinks. It helps maintain the red color of luncheon meats and other cured foods, and it prevents the formation of cancer-promotic nitrosamines. Vitamin C is also used to increase the vitamin content of many foods including fruit drinks.	Safe: Ascorbic acid helps maintain the red color of cured meat and prevents the formation of nitrosamines, which promote cancer (see SODIUM NITRITE). Vitamin C is also used to increase the vitamin content of foods like "fruit" drinks. 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. Erythorbic acid is similar to ascorbic acid, but it has no value as a vitamin.

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Aspartame (Equal, NutraSweet)	Nonnutritive sweetener	Soft drinks, chewing gums, powdered beverages, whipping toppings, puddings, gelatin, and tabletop sweetener.	<p>Safe: Acute, subacute and chronic toxicity studies with aspartame, and its decomposition products, conducted in mice, rats, hamsters and dogs have consistently found no adverse effect of aspartame with doses up to at least 4000 mg/kg bw/day. Critical review of all carcinogenicity studies conducted on aspartame found no credible evidence that aspartame is carcinogenic. (Magnuson BA et al. Aspartame: a safety evaluation based on current use levels, regulations, and toxicological and epidemiological studies. Crit Rev Toxicol. 2007; 37(8):629-727.</p> <p>Aspartame contains the amino acid Phenylalanine. Persons with Phenoketonuria (PKU) have an inability to breakdown Phenylalanine and should avoid aspartame. Although safe when consumed at reasonable levels (50 mg/kg) or 2.2 pounds of body weight, a segment of the population is apparently sensitive to this substance even when consumed in small amounts.</p>
Azodicarbonami de	Flour treating agent	Aging and bleaching ingredient in cereal flour.	

Name	Function	Food Use and Comments	CSPI-Safety
Benzoic acid (Sodium Benzoate)	Preservative	Fruit juice, carbonated drinks, pickles. Widespread food use.	<p>Caution: Manufacturers have used sodium benzoate (and its close relative benzoic acid) for a century to prevent the growth of microorganisms in acidic foods. The substances occur naturally in many plants and animals. They appear to be safe for most people, though they cause hives, asthma, or other allergic reactions in sensitive individuals.</p> <p>Another problem occurs when sodium benzoate is used in beverages that also contain ascorbic acid (vitamin C). The two substances, in an acidic solution and in the presence of heat and light, can react together to form small amounts of benzene, a chemical that causes leukemia and other cancers. Storing soft drinks in warm conditions speeds up the formation of benzene.</p>
Benzoyl peroxide	Flour treating agent	Bleaching agent in flour; may be used in some cheeses	
Beta-apo-8 carotenol	Colorant	Natural food color. General use not to exceed 30 mg per lb or pint of food.	
Beta-Carotene	Colorant, nutritional additive	Margarine, shortening, non-dairy whiteners, beverages, breakfast cereals, supplements. 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.	Safe: 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.	Caution: Eating BVO leaves small residues in body fat; it is unclear whether those residues pose any risk. BVO is rarely used.

Name	Function	Food Use and Comments	CSPI-Safety
BHA (butylated hydroxyanisole)	Antioxidant; preservative	Fats, oils, dry yeast, beverages, breakfast cereals, dry mixes, shortening, potato flakes/chips, chewing gum, sausage, vegetable oils; often used in combination with BHT. Protect some of the natural nutrients in food, such as vitamin A. BHA retards the rancidity in fats, oils, and oil-containing foods.	Avoid: While some studies indicate it is safe, other studies demonstrate that it causes cancer in rats, mice, and hamsters. However, a chemical that causes cancer in at least one organ in three different species indicates that it might be carcinogenic in humans. That is why the U.S. Department of Health and Human Services considers BHA to be “reasonably anticipated to be a human carcinogen.” Nevertheless, the Food and Drug Administration still permits BHA to be used in foods. 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).
BHT (butylated hydroxytoluene)	Antioxidant; preservative	Rice, fats, oils, potato granules, breakfast cereals, potato flakes, shortening, chewing gum, sausage; often used in combination with BHA. Protect some of the natural nutrients in food, such as vitamin A. BHT retards rancidity in oils.	Caution: 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.
Binder	Texturizer	A substance that many be added to foods to thicken or improve texture.	
Biotin	Nutritional additive	Rich natural sources are liver, kidney, pancreas, yeast, milk; vitamin supplement.	
Bromelin	Meat tenderizer	An enzyme that can dissolve or degrade the proteins collagen and elastin to soften meat and poultry tissue. It is derived from pineapple fruit and leaves.	

Name	Function	Food Use and Comments	CSPI-Safety
Caffeine	Stimulant	Naturally occurring in coffee, tea, cocoa, coffee-flavored yogurt and frozen desserts. Additive in soft drinks, energy drinks, gum and waters.	<p>Caution: Caffeine increases alertness, slightly increases blood pressure and heart rate and increases urine production.</p> <p>Some individuals are more sensitive to caffeine than others. Caffeine may cause some individuals to feel jittery, have indigestion or have trouble sleeping. Many coffee drinkers experience withdrawal symptoms, such as headaches, irritability, sleepiness, and lethargy, when they stop drinking coffee. Note that some "energy" drinks contain far more caffeine than most soft drinks.</p> <p>The March of Dimes recommends that women who are pregnant or trying to become pregnant consume no more than 200 milligrams (mg) of caffeine per day (equal to about one 12-ounce cup of coffee a day) to prevent miscarriage.</p>
Calcium alginate	Stabilizer and thickener; texturizer	Extracted from seaweeds. Widespread food use.	
Calcium carbonate	Nutritional additive	Mineral supplement.	
Calcium lactate	Preservative	General purpose and/or miscellaneous use.	
Calcium phosphate	Leavening agent; sequestrant, nutrient	General purpose and/or miscellaneous use; mineral supplement.	
Calcium (or sodium) propionate	Preservative	Bakery products (bread rolls, pies, cakes), alone or with sodium propionate; inhibits mold and other microorganisms.	Safe: 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 silicate	Anti-caking agent	Used in baking powder, salt and food; GRAS for use in baking powder and salt.	

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Calcium (or sodium) Stearoyl lactate, Calcium (or sodium) stearoyl fumarate	Dough conditioner, whipping agents	Bread dough, cake fillings, artificial whipped cream, processed egg whites.	Safe: These additives strengthen bread dough so it can be used in commercial bread-making machinery and help produce a more uniform grain and greater volume. They act as whipping agents in dried, liquid, or frozen egg whites and artificial whipped cream.
Canthaxanthin	Colorant	Widely distributed in nature. Color for foods; more red than carotene.	
Caramel	Colorant	Miscellaneous and color for foods.	
Carob bean gum	Stabilizer and thickener	Extracted from bean of carob tree (Locust bean). Numerous foods like confections, syrups, cheese spreads, frozen desserts, and salad dressings.	
Carrageenan	Emulsifier; stabilizer and thickener, binder, gelling agent	Extracted from seaweed. A variety of foods, primarily those with a water or milk base, especially ice cream, jelly, chocolate milk, infant formula, cottage cheese.	Safe: Carrageenan is an indigestible family of large molecules obtained from seaweed.
Caprenin	Fat replacer	Replaces cocoa butter, composed of caprylic, capric and behenic acids and glycerine. Used in confectionery.	
Cellulose/ Sodium carboxymethyl (CMC)	Emulsifier; stabilizer and thickener.	Component of all plants. Inert bulking agent in foods; may be used to reduce caloric content of food. Prevents sugar from crystallizing. Ice cream, beer, pie fillings, icings, diet foods, candy.	Safe: CMC is made by reacting cellulose with a derivative of acetic acid. Studies indicate it is safe.

Name	Function	Food Use and Comments	CSPI-Safety
Citric acid	Preservative; antioxidant; pH control agent; sequestrant, acid, flavoring, chelating agent	Widely distributed in nature in both plants and animals. Miscellaneous use; used in lard, shortening, sausage, margarine, chili con carne, cured meats, and freeze-dried meats. It can be used as an additive to protect the fresh color of meat cuts during storage. Citric acid also helps protect flavor and increases the effectiveness of antioxidants. Ice cream, sherbet, fruit drink, candy, carbonated beverages, instant potatoes.	Safe: 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.
Citrus Red No. 2	Colorant	Coloring skins of oranges.	
Cochineal, Cochineal extract, carmine	Colorant	Derived from the dried female insect (cochineal beetle) which lives on cactus plants in Peru, the Canary Islands, and elsewhere. Carmine is a more purified coloring made from the cochineal. In both cases, the actual substance that provides the color is carminic acid. Provides red color for such foods as meat products and beverages. Used in red, pink, or purple candy, yogurt, Campari, ice cream, beverages, and many other foods, as well as drugs and cosmetics.	Caution: These colorings have caused allergic reactions that range from hives to life-threatening anaphylactic shock.
Corn endosperm oil	Colorant	Source of xanthophyll for yellow color. Used in chicken feed to color yolks of eggs and chicken skin.	

Name	Function	Food Use and Comments	CSPI-Safety
Cornstarch	Anti-caking agent; drying agent formulation aid; processing aid; surface-finishing agent	Digestible polysaccharide used in many foods often in a modified form; example foods include baking powder, baby foods, soups, sauces, pie fillings, imitation jellies, and custards.	
Corn syrup	Flavoring agent; humectant; nutritive sweetener; preservative, thickener	Derived from hydrolysis of cornstarch Employed in numerous foods, such as baby foods, bakery products, toppings, meat/poultry products, beverages, condiments and confections (candy, marshmallows), syrups, snack foods, imitation dairy foods.	Cut back: 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.
Cyclamate	Nonnutritive sweetener	Diet foods, tabletop sweetener, baked goods.	A petition for cyclamate reapproval is currently under review by the U.S. Food and Drug Administration (FDA).
Dextrose (glucose)	Flavoring agent; humectant; nutritive sweetener, synergist	Derived from cornstarch. Major users of dextrose are confection, wine and canning industries; used to flavor meat products; used in production of caramel, bread, soda pop, cookies, and many other foods.	Cut back: Dextrose is glucose sugar refined from corn starch. Dextrose is a sweetener and a readily available source of energy. It is a source of sweetness in fruits and honey. Dextrose turns brown when heated and contributes to the color of bread crust and toast.
Diglycerides, Diacylglycerol	Emulsifiers	Uses include frozen desserts, lard, shortening, and margarine.	Safe: This is the diglyceride part of the long-used emulsifier, mono- and diglycerides.
Dioctyl sodium sulfosuccinate	Emulsifier; processing aid; surface active agent	Employed in gelatin dessert, dry beverages, fruit juice drinks, and noncarbonated beverages with cocoa fat; used in production of cane sugar and in canning.	
Disodium guanylate	Flavoring	Derived from dried fish or seaweed. Variety of uses.	

Name	Function	Food Use and Comments	CSPI-Safety
Disodium inosinate	Flavoring	Derived from dried fish or seaweed, sodium guanylate a by-product. Variety of uses.	
EDTA (Ethylenediaminetetraacetic acid)	Antioxidant; sequestrant, chelating agent	Calcium disodium and disodium salt of EDTA employed in a variety of foods including soft drinks, alcoholic beverages, dressings, canned vegetables, margarine, pickles, sandwich spreads, and sausage, mayonnaise, processed fruits and vegetables, canned shellfish, soft drinks.	Safe: 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.
Emulsifier	Fat replacer	Substance added to products such as meat spreads, to prevent separation of product components to ensure consistency. Examples of these types of additives include lecithin, and mono- and di-glycerides. Used in cake mixes, cookies, icings, and dairy products.	
EPG (esterified propoxylated glycerol)	Fat replacer	Reduced-calorie fat replacer. May partially or fully replace fats and oils in all typical consumer and commercial applications.	
Erythorbic Acid			
Ferrous Gluconate	Colorant, nutrient	Black olives. Used by the olive industry to generate a uniform jet-black color and in pills as a source of iron.	
Ficin	Meat tenderizer	Enzyme derived from fig trees.	Safe

Name	Function	Food Use and Comments	CSPI-Safety
Fructose (laevulose)	Nutritive sweetener	Health drinks and other products. This is a little sweeter than table sugar. Modest amounts of fructose occur naturally in fruits and vegetables, which also contain other sugars. Fructose is derived from table sugar and found in high-fructose corn syrup (HFCS).	Cut back: Modest amounts of fructose are safe and do not boost blood glucose levels, making the sweetener attractive to diabetics. However, large amounts increase triglyceride (fat) levels in blood and, thereby, increase the risk of heart disease. Large amounts consumed on a regular basis also may affect levels of such hormones as insulin, leptin, and ghrelin, that regulate appetite, thereby contributing to weight gain and obesity.
Fumaric Acid	Tartness agent	Powdered drinks, pie fillings, gelatin desserts.	Safe: Fumaric is solid at room temperature, inexpensive, and highly acidic. It is the ideal source of 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	Stabilizer and thickener; texturizer, gelling agent	Derived from collagen, which is derived from the skin, tendons, ligaments, or bones of livestock. Employed in many foods including confectionery, powdered dessert mixes, marshmallows, cheese spreads, beverages, jellies and ice cream. It may be used in canned hams or jellied meat products.	Safe: 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. Persons who have religious reasons for not consuming pork and/or beef products, may avoid products with gelatin.
Glycerine (glycerol)	Humectant	Miscellaneous and general purpose additive, maintains water content in candy, fudge, baked goods.	Safe: 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.
Grape skin extract	Colorant	Colorings for carbonated drinks, beverage bases, aides, and alcoholic beverages.	

Name	Function	Food Use and Comments	CSPI-Safety
Gums: Arabic, Furcelleran, Ghatti, Guar, Karaya, Locust Bean, Tragacanth, Xanthan	Thickening agents, stabilizers: texturizer, carbohydrate-based fat replacer	Beverages, ice cream, frozen pudding, salad dressing, dough, cottage cheese, candy, drink mixes, processed meats, desserts. Guar: Extracted from seeds of the guar plant. Employed in such foods as cheese, salad dressings, ice cream, and soups. Arabic: Gummy exudate of Acacia plants. Used in a variety of foods. Ghatti: Gummy exudate of plant growing in India and Ceylon. A variety of food uses.	Some caution, some safe: 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 drinks.	Caution: Heptyl paraben -- short for the heptyl ester of para-hydroxybenzoic acid -- is a preservative. Studies suggest that this rarely used additive chemical is safe.
High-Fructose Corn Syrup/Maltodextrine/	Nutritive sweetener	Soft drinks, other processed foods. HFCS starts out as cornstarch. Companies use enzymes or acids to break down the starch into its glucose subunits. Then other enzymes convert different proportions of the glucose to fructose. The resulting syrups contain as much as 90 percent fructose, but most HFCS is 42 percent or 55 percent fructose.	Cut back: Our consumption of high-fructose corn syrup (HFCS) has soared since around 1980. That's because this sweet syrupy liquid is cheaper and easier for some companies to use than sugar. HFCS has been blamed for the obesity epidemic, because rates of obesity have climbed right along with HFCS consumption. However, there isn't enough evidence that HFCS is any more harmful (or healthier) than sugar.
High Maltose Corn Syrup	Preservative: Improves shelf life, inhibits bacterial growth, fermentation, other purposes:	Candy, baked goods, beer.	

Name	Function	Food Use and Comments	CSPI-Safety
Humectant		Substance added to foods to help retain moisture and soft texture. An example is glycerine, which may be used in dried meat snacks.	Safe: Acids or enzymes are used to break down cornstarch into a syrup rich in maltose (35 percent or more), a disaccharide. High maltose corn syrup, corn syrup solids, and maltodextrin are similar, and are produced in a wide variety of formulations for different applications. Compared to high-fructose corn syrup, though, relatively small amounts of the three above ingredients are used.
Hydrogen peroxide	Bleaching agent	Modification of starch, and bleaching tripe; bleaching agent.	
Hydrogenated starch hydrolysate (HSH)	Nutritive Sweetener	Dietetic and reduced calorie foods.	Cut back: 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.
Hydrolyzed vegetable (plant) protein (HVP)	Flavoring	To flavor various meat products, instant soups, sauce mixes, beef stew. They are made from protein obtained from a plant source such as soy or wheat, or from an animal source, such as milk. The source used must be identified in the label.	Caution: 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.
Inulin	Fat substitute	Margarine, baked goods, fillings, dairy foods, frozen desserts, salad dressings.	Safe: It's a naturally occurring soluble fiber. Inulin doesn't raise blood sugar levels, so it may help people with diabetes. It also stimulates the growth of friendly bacteria in the large intestine.
Invert sugar	Humectant; nutritive sweetener	Primarily used in confection and brewing industry. Candy, soft drinks, many other foods.	Cut back: 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" and contributes to tooth decay.
Iron	Nutritional additive	Dietary supplements and foods.	
Iron-ammonium citrate	Anti-caking agent	Used in salt.	

Name	Function	Food Use and Comments	CSPI-Safety
Karaya gum	Stabilizer and thickener	Derived from dried extract of <i>Sterculia urens</i> . Variety of food uses; a substitute of tragacanth gum.	
Lactic acid	Preservative, pH control	Spanish olives, cheese, frozen desserts, carbonated beverages. Normal product of human metabolism. Numerous uses in foods and beverages; a miscellaneous general purpose additive.	Safe: 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.
Lactitol	Sweetener/ Sugar alcohol	Candy, chocolates, baked goods, ice cream, and other sugar-free foods.	Cut back: Lactitol, like sorbitol, mannitol, and xylitol, is a sugar alcohol, also called a polyol. It is made from lactose, or milk sugar. Like other sugar alcohols, lactitol is not absorbed well by the body (which means it has fewer calories per gram than table sugar) and does not promote tooth decay. However, large amounts (above 20 to 30 grams) may cause loose stools or diarrhea.
Lactose	Nutritive sweetener	Whipped topping mix, breakfast pastry.	Caution: 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, may be lactose intolerant. They have trouble digesting lactose. Bacteria in the gut results in the formation of gas.
Lecithin (phosphatidylcholine)	Emulsifier; surface active agent, antioxidant	Normal tissue component of the body; naturally occurring in eggs; commercially derived from soybeans. Margarine, chocolate and wide variety of other uses. Baked goods, margarine, chocolate, ice cream.	Safe: 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/ Sugar alcohol	Candy, chocolates, jams, and sugar free foods.	Cut back: Maltitol, like sorbitol, mannitol, and xylitol, is a sugar alcohol, also called a polyol. It is made by hydrogenating maltose, which is obtained from corn syrup.

Name	Function	Food Use and Comments	CSPI-Safety
Maltodextrin/ High fructose corn syrup/ high maltose corn syrup	Thickening agent, sweetener. Carbohydrate-based fat replacer (adds buttery flavor)	Made from corn, canned fruit, salad dressing, instant pudding, butter-flavored "sprinkles" for melting on hot foods	Safe: It's made from starch. Some maltodextrins are easily digested and absorbed, while others are chemically processed so that they are "resistant"--they can't be broken down by digestive enzymes. That makes them an "isolated fiber." These resistant maltodextrins may help lower blood sugar levels, but don't help prevent constipation.
Mannitol	Anti-caking agent; nutritive sweetener; stabilizer and thickener; texturizer	Special dietary foods/ low-calorie foods. A sugar alcohol, "dust" on chewing gum	Cut back: Mannitol, like sorbitol and xylitol, is a sugar alcohol, also called a polyol. Like other sugar alcohols, mannitol is not as sweet as sugar, not absorbed well by the body (which means it provides only half as many calories per gram as table sugar), and does not promote tooth decay. However, large amounts may have a laxative effect and even cause diarrhea. The FDA requires foods "whose reasonably foreseeable consumption may result in a daily ingestion of 20 grams of mannitol" to bear this mild warning: "Excess consumption may have a laxative effect."
Methylparaben	Preservative	Food and beverages	
Microparticulated protein (Simples, K-blazer)	Protein-based fat replacer	Processed from the proteins of milk or egg white into mist-like particles that roll over the tongue, making it feel and taste like fat. It is creamy, heat stable in some cooking and baking but not frying. Used in ice cream, dairy products, baked goods, coffee creamers, salad dressings, sauces, and soups. It is made from whey protein or milk and egg protein.	

Name	Function	Food Use and Comments	CSPI-Safety
Modified food starch	Drying agent, formulation aid; processing aid; surface finishing agent	Digestible polysaccharide used in many foods and stages of food processing; examples include baking powder; puddings; pie fillings, baby foods, soups, sauces, candies, etc.. Starch that has been chemically altered to improve its thickening properties. Before the starch is modified, it is separated from the protein through isolation techniques; therefore, the source of the starch used is not required on the label.	
Monoglycerides and diglycerides	Emulsifiers	Widely used in foods such as frozen desserts, lard, shortening and margarine. Baked goods, margarine, candy, and 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.	Safe: Mono- and diglycerides are safe, though most foods they are used in are high in refined flour, sugar, or fat.
MSG (monosodium glutamate)	Flavoring	To enhance the flavor of a variety of foods including various meat products. It comes from a common amino acid, glutamic acid, and must be declared as monosodium glutamate on meat and poultry labels. Soup, salad dressing, chips, frozen entrees, restaurant foods.	Caution: This amino acid brings out the flavor in many foods. 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, wheezing, changes in heart rate, and difficulty breathing. 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

Name	Function	Food Use and Comments	CSPI-Safety
Mycoprotein	Meat substitute	<p>Quorn brand foods. Mycoprotein, the novel ingredient in Quorn-brand frozen meat substitutes, is made from processed mold (<i>Fusarium venenatum</i>). Though the manufacturer's (Marlow Foods) advertising and labeling implied that the product is "mushroom protein" or "mushroom in origin," the mold (or fungus) from which it is made does not produce mushrooms. Rather, the mold is grown in liquid solution in large tanks. It has been used in the United Kingdom since the 1990s and has also been sold in continental Europe. Quorn foods have been marketed in the United States since 2002. The chunks of imitation meat are nutritious, but the prepared foods in which they are used may be high in fat or salt.</p>	<p>Caution: Several percent of consumers are sensitive to Quorn products, resulting in vomiting, nausea, diarrhea, and, less often, hives and potentially fatal anaphylactic reactions. Many people have gone to emergency rooms for treatment of Quorn-related reactions. Quorn-containing "vegetarian" products served at restaurants, cafeterias, and other foodservice locations are often not identified and are not required to bear a warning label.</p>
Neotame	Nonnutritive sweetener	Diet soft drinks and other diet foods.	
Oat fiber, wheat fiber	Isolated fiber	Cereal, crackers, bread, muffins.	<p>Safe: Neotame, produced by NutraSweet Co. (maker of aspartame), is about 8,000 times sweeter than table sugar and 40 times sweeter than aspartame. Neotame is chemically related to aspartame, but the difference confers greater chemical stability, enabling the new sweetener to be used in baked foods. It likely will be used mostly in low-calorie foods, but may also be used to adjust the flavor of other foods. It was approved by the U.S. FDA in 2002, but is still rarely used.</p>

Name	Function	Food Use and Comments	CSPI-Safety
Oatrim	Carbohydrate based fat replacer	Derived from oat fiber; has the added advantage of providing satiety. Creamy taste, replaces bulk of fat and can be used in baking but not frying. Used in dips, dressings, and baked goods.	Safe: When a food ingredient contains the word "fiber," its code for an isolated fiber. "Wheat fiber" and "oat hull fiber" are insoluble fibers, which may help prevent constipation but don't lower blood cholesterol or blood sugar. "Oat fiber" can be either insoluble or soluble fiber. Soluble fiber may lower blood cholesterol and blood sugar but doesn't prevent constipation.
Olestra/ Olean	Fat substitute, fat based fat replacer	Lay's light chips, Pringles light chips, tortilla chips, crackers, salty snacks. Olestra is Procter & Gamble's synthetic fat that is not absorbed as it passes through the digestive system, so it has no calories. Formerly called Sucrose Polyester, Olestra is a non-caloric artificial fat made from sucrose and fatty acids, and is stable under high heat.	Caution: Olestra can cause diarrhea and loose stools, abdominal cramps, flatulence, and other adverse effects if consumed in large quantities. 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 low-fat snacks with a full fat mouth-feel. Products made with olestra should not be called "fat free," because they contain substantial amounts of indigestible fat.
Oligofructose	Bulking agent, emulsifier, prebiotic nutritive sweetener	Frozen desserts, cookies, energy and granola bars. Oligofructose, synthesized from sucrose or extracted from chicory roots, consists of up to several dozen fructose molecules linked end to end. Like inulin and other soluble fibers, Oligofructose is digested by bacteria in the large intestine, but not by human enzymes. This slightly sweet ingredient provides less than about half as many calories per gram as fructose or other sugar.	Safe: Oligofructose promotes the growth of "good" bifidus bacteria.

Name	Function	Food Use and Comments	CSPI-Safety
Partially hydrogenated vegetable oil/ Hydrogenated vegetable oil/ Trans fat	Preservative, texturizer, fat	Fat, oil, shortening, stick margarine, crackers, fried restaurant foods, baked goods, icing, microwave popcorn. Vegetable oil, usually a liquid, can be made into a semi-solid shortening by reacting it with hydrogen. Partial hydrogenation reduces the levels of polyunsaturated oils - and also creates trans fats.	Avoid: Beginning in 2006, Nutrition Facts labels have had to list the amount of trans fat in a serving. That spurred many companies, including Frito-Lay, Kraft, ConAgra, and others, to replace most or all of the partially hydrogenated oil in almost all their products. Usually the substitutes are healthier and the total of saturated plus trans fat is no higher than it was. Foods labeled "0g trans fat" are permitted to contain 0.5g per serving, while "no trans fat" means none at all. Fully hydrogenated vegetable oil does not have any trans fat, but it also does not have any polyunsaturated oils. It is sometimes mixed (physically or chemically) with polyunsaturated liquid soybean oil to create trans-free shortening. When it is chemically combined with liquid oil, the ingredient is called Interesterified vegetable oil. Meanwhile, oil processors are trying to improve the hydrogenation process so that less trans fat forms.
Papain	Texturizer	Achieves results through enzymatic action. An enzyme that can dissolve or degrade the proteins collagen and elastin to soften meat and poultry tissue. It is derived from the tropical papaya tree and is used as a meat tenderizer.	
Paprika	Colorant; flavoring agent	To provide coloring and/or flavor to foods.	
Pectin	Stabilizer and thickener; texturizer	Richest source of pectin is lemon and orange rind; present in cell walls of all plant tissues. Used to prepare jellies and similar foods.	
Phosphates	Preservative: Moisture retention and flavor protection	Used in the curing of ham where approved additives are sodium or potassium salts of tripolyphosphate, hexametaphosphate, acid pyrophosphate, or orthophosphates, declared as "phosphates" on labels.	

Name	Function	Food Use and Comments	CSPI-Safety
Phosphoric acid/phosphates	Preervative: pH control, acidulant, chelating agent, buffer, emulsifier, nutrient, discoloration inhibitor	Baked goods, cheese, powdered foods, cured meat, soda pop, breakfast cereals, and dehydrated potatoes. Used to increase effectiveness of antioxidants in lard and shortening.	Safe: 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.
Phytosterols and phytostanols (Plant sterols or stanols)	Cholesterol-lowering additive	Margarine, fruit juice, bread, dietary supplements.	Safe: These substances are minor components of membranes in many nuts, seeds, vegetable oils, fruits, vegetables and other foods. They are chemically related to cholesterol. They are more easily incorporated into foods (other than fruit juices) when they are converted to ester forms. Then, when consumed in high doses from foods or dietary supplements, the sterol or stanol esters reduce the absorption of cholesterol from food and can lower LDL ("bad") blood cholesterol levels by 10 to 15 percent. 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.
Polydextrose	Bulking agent	Reduced-calorie salad dressing, baked goods, candies, puddings, frozen desserts	Cut back: Polydextrose is made by combining dextrose (corn sugar) with sorbitol. The result is a slightly sweet, reduced-calorie (only one calorie per gram because it is poorly digested) bulking agent. The FDA requires that if a serving of a food would likely provide more than 15 grams of polydextrose, the label should advise consumers that "Sensitive individuals may experience a laxative effect from excessive consumption of this product."

Name	Function	Food Use and Comments	CSPI-Safety
Polyphosphates	Nutritive additive; flavor improver; sequestrant; pH control	Numerous food uses	
Polysorbates	Emulsifiers; surface active agent	Polysorbates specified by numbers such as 60, 65, and 80. Variety of food uses including baking mixes, frozen custards, pickles, sherbets, ice creams, and shortening. 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.	Safe
Potassium alginate	Stabilizer and thickener; texturizer	Extracted from seaweed. Wide uses.	
Potassium bromate	Dough Strengthener, Flour treating agent/Flour improver	Employed in flour, whole wheat flour, fermented malt beverages, and to treat malt, white flour, breads and rolls	Avoid: 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.

Name	Function	Food Use and Comments	CSPI-Safety
Potassium iodide	Nutritional Additive	Added to table salt or used in mineral preparation as a source of dietary iodine.	
Potassium nitrite	Curing and pickling agent	To fix color in cured products such as meats.	
Potassium sorbate	Preservative	Inhibits mold and yeast growth in foods such as wines, sausage casings, and margarine.	
Propionic acid	Preservative	Mold inhibitor in breads and general fungicide; used in manufacture of fruit flavors.	
Propyl gallate	Antioxidant, preservative	Used in products containing oil or fat, vegetable oil, meat products, potato sticks, chicken soup base, employed in chewing gum; used to retard rancidity in frozen fresh pork sausage, and rendered fats. It can be used in combination with antioxidants such as BHA and BHT.	Avoid: 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.
Propylene glycol	Emulsifier; humectant; stabilizer and thickener; texturizer	Miscellaneous and/or general purpose additive; uses include salad dressings, ice cream, ice mil, custards, and a variety of other foods.	
Propylparaben	Preservative	Fungicide; controls mold in sausage casing; GRAS additive.	
Quinine	Flavoring	Tonic water, quinine water, bitter lemon.	Caution: Quinine is used as a bitter flavoring in tonic-type soft drinks. The sensitivity of quinine to ultraviolet light (UV) is such that it will fluoresce in direct sunlight. 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.

Name	Function	Food Use and Comments	CSPI-Safety
Rancid/ Rancidity		Oxidation/breakdown of fat that occurs naturally causing undesirable smell and taste. BHA/BHT and tocopherols are used to keep fats from becoming rancid.	
Saccharin	Nonnutritive sweetener	Special dietary foods and a variety of beverages/soft drinks; baked products; tabletop sweeteners. Saccharin (Sweet 'N Low) is 350 times sweeter than sugar and is used in diet foods or as a tabletop sugar substitute.	
Saffron	Colorant; flavoring agent	Derived from plant of western Asia and southern Europe. Used to color sausage casings, margarine, or product branding inks.	Caution: 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.
Salatrim/Benefat	Modified fat, fat-based fat replacer	Baked goods, candy. Same properties of fats. Can be used in baking but not frying. Chocolate coatings, dairy products, spreads, baked goods, confections.	Cut back: 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. 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. Salatrim is not widely used, if at all.

Name	Function	Food Use and Comments	CSPI-Safety
Salt (sodium chloride)	Flavoring, preservative formulation of acid;	Widespread use of salt in many foods. Most processed foods, cured meats, soup, snack chips, crackers, etc.	Cut back: Salt serves many purposes in foods, such as acting as a preservative, adding a salty flavor, masking bitter flavors, and fostering expected texture or other property. A diet high in sodium increases blood pressure in most people, thereby increasing the risk of heart attack and stroke. The Food and Drug Administration considers salt to be "generally recognized as safe" (GRAS), even though it recognizes that diets high in salt are a major cause of cardiovascular disease. and even though its own advisory committee.
Silicon dioxide	Anti-caking agent	Used in feed or feed components, beer production, production of special dietary foods, ink diluent for marking fruits and vegetables.	.
Sodium acetate	pH control; preservative	Miscellaneous and/or general purpose use; meat preservation.	
Sodium alginate	Stabilizer and thickener; texturizer	Extracted from seaweed; widespread food use.	
Sodium aluminum sulfate	Leavening agent	Baking powders, confectionery; sugar refining.	

Name	Function	Food Use and Comments	CSPI-Safety
Sodium benzoate/ benzoic acid	Preservative	To retard flavor reversion (i.e. margarine). Fruit juice, carbonated drinks, pickles.	<p>Caution: Manufacturers have used sodium benzoate (and its close relative benzoic acid) for a century to prevent the growth of microorganisms in acidic foods. The substances occur naturally in many plants and animals. They appear to be safe for most people, though they cause hives, asthma, or other allergic reactions in sensitive individuals. In children, sodium benzoate may adversely affect behavior (especially in children with Attention Deficit-Hyperactivity Disorder).</p> <p>Another problem occurs when sodium benzoate is used in beverages that also contain ascorbic acid (vitamin C). The two substances, in an acidic solution, can react together to form small amounts of benzene, a chemical that causes leukemia and other cancers. In the early 1990s the FDA had urged companies not to use benzoate in products that also contain ascorbic acid, but in the 2000s companies were still using that combination. A lawsuit filed in 2006 by private attorneys ultimately forced Coca-Cola, PepsiCo, and other soft-drink makers in the U.S. to reformulate affected beverages, typically fruit-flavored products.</p>
Sodium bicarbonate	Leavening agent, pH control	Separation of fatty acids and glycerol on rendered fats; neutralize excess and clean vegetables in rendered fats, soups, and curing pickles.	
Sodium Caseinate (Casein)	Binder, thickening and whitening agent.	Used as a binder in products such as frankfurters and stews, ice cream, ice milk, sherbet, coffee creamers.	Caution: 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.

Name	Function	Food Use and Comments	CSPI-Safety
Sodium citrate	PH control; curing and pickling agent; sequestrant	Evaporated milk; miscellaneous and/or general purpose food use; accelerate color fixing in baking products.	
Sodium diacetate	Preservative; sequestrant	An inhibitor of molds and rope-forming bacteria in baking products.	
Sodium Erythorbate		Is the sodium salt of erythorbic acid, a highly refined food-grade chemical closely related to vitamin C, synthesized from sugar, and used as a color fixative in preparing cured meats.	
Sodium nitrate (Chile Saltpeter)	Curing and pickling agent; preservative	Used with or without sodium nitrate in smoked, cured fish, cured meat products.	

Name	Function	Food Use and Comments	CSPI-Safety
Sodium nitrite	Curing and pickling agent; preservative	May be used with sodium nitrate in smoked, cured fish, cured meat products, and pet foods. Used alone or in conjunction with sodium nitrate as a color fixative in cured meat and poultry products (bologna, hot dogs, bacon). Helps prevent growth of <i>Clostridium botulinum</i>, which can cause botulism in humans.	<p>Avoid: 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.</p> <p>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.</p> <p>The use of nitrite and nitrate has decreased greatly over the decades, because of refrigeration and restrictions on the amounts used.</p>
Sodium propionate	Preservative	A fungicide and mold preventative in bakery products, alone or with calcium propionate.	
Sorbestrin	Fat replacer	Heat stable, liquid fat substitute composed of fatty acid esters of sorbitol (1.5 kcal/gram). In fried foods, salad dressing, mayonnaise, and baked goods.	
Sorbic acid/ Potassium sorbate	Preservative	Fungistatic agent for foods (prevents growth of molds), especially cheeses; other uses include baked goods, beverages, dried fruits, fish, jams, jellies, meats, pickled products, and wines, syrup .	Safe: Sorbic acid occurs naturally in many plants. These additives are safe.

Name	Function	Food Use and Comments	CSPI-Safety
Sorbitan monostearate	Emulsifier; stabilizer and thickener	Widespread food usage such as whipped toppings, cakes, cake mixes, confectionery, icings, frozen pudding and shortenings, also many nonfood uses.	Safe: 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	Humectant; sweetener/ sugar alcohol; stabilizer and thickener, sequestrant, maintains moisture	Occurs naturally in berries, cherries, plums, pears, and apples; a sugar alcohol. Examples of use include chewing gum, meat products, icings, dairy products, beverages (dietetic), candy, shredded coconut, and pet foods.	Cut back: 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 are safe, but large amounts may have a strong laxative effect and even cause diarrhea. The FDA requires foods "whose reasonably foreseeable consumption may result in a daily ingestion of 50 grams of sorbitol" to bear the label statement: "Excess consumption may have a laxative effect."
Starch, Modified (Food-Starch)	Thickening agent	Soup, gravy, frozen foods.	Safe: 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.
Stevia	Natural, high-potency sweetener: powdered dietary supplement		Not approved as a food additive in the US.

Name	Function	Food Use and Comments	CSPI-Safety
Sucralose/ Splenda	Nonnutritive sweetener	No-sugar-added baked goods, frozen desserts, ice creams, soft drinks, tabletop sweetener (Splenda), jams, dairy products, chewing gum, salad dressings, syrups.	Safe: Approved in the United States in 1998, sucralose — marketed as Splenda — is used in soft drinks, baked goods, ice cream, sweetener packets, and other products. Sucralose is safer than saccharin, acesulfame-K, and cyclamate, but it is often used in combination with acesulfame-K. Unlike aspartame, sucralose can be used in baked goods. Although Splenda is advertised as being "made from sugar, so it tastes like sugar", the sweetener is a synthetic chemical made by chemically reacting sugar (sucrose) with chlorine.
Sucrose (table sugar)	Nutritive sweetener; preservative	Sugar occurs naturally in some fruits and vegetables. The most widely used additive; used in beverages, baked goods, candies, jams and jellies—an endless list including meat products.	Cut back: Sucrose, ordinary table sugar, occurs naturally in fruit, sugar cane, and sugar beets. 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. Sugar and other refined sugars can promote obesity, tooth decay, and, in people with high triglycerides, heart disease.
Sugar Alcohols (isomalt, mannitol, sorbitol and xylitol)	Sweetener/ sugar alcohol	Manufactured by hydrogenating sugars and provide between 1.5 to 3 kcal per gram (compared to 4 kcal/gram for sucrose). Sugar alcohols provide a sweet taste and a cooling sensation in the mouth without contributing to tooth decay.	

Name	Function	Food Use and Comments	CSPI-Safety
Sulfites (sulfur dioxide, sodium bisulfite)	Preservative, bleaching agent	Dried fruit, wine, processed potatoes	Caution: 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. To non-sensitive individuals, sulfites are safe. If you think you may be sensitive, avoid all forms of this additive. The FDA banned the most dangerous uses of sulfites and required that wine labels list sulfite, when used.
Tagatose	Nonnutritive sweetener		Cut back: This new synthetic additive is chemically related to fructose, but is poorly absorbed by the body. That's why it yields only about one-third as many calories and why large amounts cause diarrhea, nausea, and flatulence.
Tagetes (Aztec marigold)	Colorant	For coloring foods generally, except standardized foods; used for coloring ingested and applied drugs.	
Texturizers/ Stabilizers/ Thickeners		Used in foods to help maintain uniform texture or consistency. These are substances that are commonly called binders. Examples are gelatin and carrageenan.	
Thiamin Mononitrate (Vitamin B1)			Safe
Tocopherols (vitamin E)	Antioxidant, nutritional additive	To retard rancidity in foods containing fat; used as a supplement. Protect some of the natural nutrients in food, such as vitamin A. Vitamin E occurs naturally in nuts, whole grains, and oils. Small amounts are also added to oils to keep them from going rancid.	Safe
Tragaceth gum	Stabilizer and thickener; texturizer	Derived from the plant <i>Astragalus gummifer</i> .	
Triacetin (glycerol triacetate)	Wetting agent	Beverages	

Name	Function	Food Use and Comments	CSPI-Safety
Tumeric	Colorant	Derived from rhizome of <i>Curccuma longa</i> . For use in general, except standardized foods; to color sausage casings, margarine or shortening; ink for branding or marking products.	Safe
Vanilla	Flavoring	Used in various bakery products, confectionery and beverages; natural flavoring extracted from cured, full grown unripe fruit of <i>Vanilla panifolia</i> .	
Vanillin	Flavoring and adjuvant	Widespread confectionery, beverage, and food use including ice cream, baked goods, beverages, chocolate, candy, gelatin desserts; synthetic form of vanilla.	Safe: 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.
Whey, Dried	Binder, extender	The dried form of a component of milk that remains after cheese making. Used in various meat products, such as sausage and stews.	
Yellow prussiate of soda	Anti-caking agent	Employed in salt.	
Xylitol	Sweetener/ sugar alcohol	Sugar-free chewing gum, low calorie foods.	
Z-trim	Carbohydrate based fat replacer	A modified form of insoluble fiber; is powdered and feels like fat in the mouth. Creamy properties, replaces bulk of fat, can be used in baking but not frying. Found in cheese, ground beef, chocolates, baked goods.	Cut back: Like other sugar alcohols (maltitol, mannitol, sorbitol), xylitol is not well absorbed by the body, so it has fewer calories than table sugar. Also, it does not promote tooth decay. Large amounts may have a laxative effect.

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.

Name	Function	Food Use and Comments	CSPI-Safety
Blue 1	Artificial Coloring	Beverages, candy, baked goods	Avoid: inadequately tested; suggestions of a small cancer risk
Blue 2	Artificial Coloring	Pet food, beverages, candy	Avoid: 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	Caution: Studies indicated that this additive might slightly increase the risk of cancer. No risk except when eating peel.
Green 3	Artificial Coloring	Candy, beverages	Avoid: 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		Soda pop, candy, gelatin, desserts, pastries, pet food, sausage	Caution: 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		Gelatin dessert, candy, pet food, baked goods	Caution: The second most widely used coloring causes mild allergic reactions, primarily in aspirin-sensitive persons.
Yellow 6		Beverages, sausage, baked goods, candy, gelatin	Avoid: 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.

References

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“Food Additives.” 2008. Center for Science in the Public Interest Food Safety, Food Additives. June 3, 2008

<<http://www.cspinet.org/reports/chemcuisine.htm>>

“Fact Sheets: Food Labeling” 2001. Food Safety and Inspection Service. June 3, 2008

<http://www.fsis.usda.gov/Fact_Sheets/Additives_in_Meat_&_Poultry_Products/index.asp>

Murano, Peter S. *Understanding Food Science and Technology*. California: Thomson Wadworth, 2003.

Additional References: Resources

List of food additives: <http://www.cfsan.fda.gov/~dms/eafus.html>

Food Ingredients and Colors: <http://www.cfsan.fda.gov/~dms/foodic.html>

Additives in Meat and Poultry Products: http://www.fsis.usda.gov/Fact_Sheets/Additives_in_Meat_&_Poultry_Products/index.asp

Glossary:

- **Anti-caking** and free-flowing agents are substances that keep ingredients in a powder form for ease of incorporation into formulations during product manufacture. Examples include silicates and talc.
- **Antimicrobial agents** act to inhibit the growth of bacteria, yeasts, and molds and thus function as preservatives. Examples of antimicrobial agents are sodium benzoate, fatty acid salts such as calcium propionate, sodium nitrate and nitrates, sodium chloride, sulfur dioxide, ascorbic acid, and oxidizing agents like chlorine, hydrogen peroxide and iodine.
- **Antioxidants** act to inhibit the oxidation of fats and pigments which would otherwise result in product rancidity and altered color. Sample antioxidants are BHA, BHT, propyl gallate, ascorbic acid and tocopherols.
- **Colorants, or food colors**, are added to certain foods to offset color loss due to storage or processing of foods, or to correct for natural variations in food color. The FDA approval process for certifiable additives, known as color additive certification, assures the safety, quality, consistency, and strength of a color additive prior to its use in foods. Certified color additives have special names consisting of a prefix, such as FD&C, D&C, or Ext. D&C; a color; and a number. An example is FD&C Yellow No. 6, often found in cereals, ice cream, and baked goods.
- **Curing agents** for meats contain sodium nitrate, which helps retain the pink color of cured meats, as well as acting as a preservative.
- **Dough strengtheners** are substances used to improve the machine-ability of bread dough during processing. These include emulsifiers such as SSL (sodium stearoyl lactylate), EMG (ethoxylated monoglycerides), and DATEM (diacetyl tartaric acid esters of mono- and diglycerides).
- **Emulsifiers** keep fat globules dispersed in water or water droplets dispersed in fat. These effects are important in such diverse processed food systems such as butter, frankfurters, cakes, salad dressings, and ice cream. Lecithins, monoglycerides, and diglycerides are examples of food emulsifiers. Distinct from emulsifiers are emulsifying salts, which function to enhance natural emulsifier activity in food systems such as process cheese. Sodium and potassium phosphates and citrates are examples of emulsifying salts.
- **Enzymes**, biological catalysts that occur naturally in foods, are used by the food industry for use as beneficial food additives. Examples of enzymes include pectinase, used in jelly manufacture; glucose oxidase, which prevents nonenzymatic browning in powdered egg white and removes traces of oxygen in certain beverages; and invertase, which is used in the manufacture of chocolate-covered cherries.
- **Flavorings** may be natural or synthetic and are added for flavor production or modification. Natural essential oils, the odorous components of plant extracts, are used as flavorings. Synthetic flavorings are often ester compounds, such as amyl acetate, which provides artificial banana flavoring. Flavor enhancers such as monosodium glutamate (MSG) and flavor potentiator substances identified chemically as 5'-nucleotides are used to make foods taste more delicious ("umami" effect).
- **Humectants** are substances that attract water within a food product, which may lower the products' water activity. The hygroscopic nature of the monosaccharide fructose makes it an excellent humectant for use in sweetened baked goods. Polyhydric alcohols or polyols such as glycerol (also known as glycerine), sorbitol, mannitol, and propylene glycol are also effective humectants.
- **Leavening agents** such as baking powder are used to enhance the leavening effect, rise, or "oven spring" of dough in baked products. Baking powder is a combination of baking soda (sodium bicarbonate, a base) and potassium acid tartrate (cream of tartar, an acid). The chemical reaction requires the addition of water and produces carbon dioxide gas, which is responsible for the leavening effect.

- **Nutritional additives** are included in foods such as breakfast cereals, baked goods and drinks to boost nutrient intake and provide for a more balanced diet. Vitamin D added to milk and B vitamins and the mineral iron are added to baked products. Certain foods are enriched, while others are fortified with nutrients. Enrichment denotes the addition of nutrients lost during processing in order to meet a specific standard for a food. Bread, flour and rice are examples of enriched foods. A related term, fortification, means the addition of nutrients, either absent or present in insignificant amounts. Fortification provides nutrients that are often lacking in the diet in order to prevent or correct a particular nutrient deficiency. Iodine in salt and calcium and antioxidants in orange juice are examples.
- **Nonnutritive sweeteners** are compounds that provide much greater sweet intensity per amount when compared to sucrose. The very small quantity of nonnutritive sweetener required translates into negligible calorie and nutrient contribution in a food product. Examples are aspartame, acesulfame potassium (acesulfame-k), and saccharin.
- **Nutritive sweeteners** are compounds that provide significant calories from carbohydrates in addition to a level of sweetness intensity. These include sucrose, fructose, maltose, lactose, polyhydric alcohols such as xylitol and sorbitol, as well as molasses and honey.
- **Oxidizing agents** occur in food (mainly as residuals of chlorine or iodine, for example) from application as sanitizing agents of food processing equipment. In addition, hydrogen peroxide, another oxidizing agent, is used in the dairy industry as an antimicrobial, with all residual levels removed by the addition of the enzyme catalase. Oxidizers or oxidizing agents also act as bleaching agents to whiten food material such as flour. Benzoyl peroxide and sodium hypochlorite are used to bleach starch and flour.
- **pH control** agents are acidulants, which lower food pH, and alkalis or alkaline compounds, which increase food pH. Acidulants include malic acid, tartaric acid, phosphoric acid, citric acid, and vinegar (contains acetic acid). In many cases an acidulant exerts multiple effects in addition to pH lowering, such as the enhancement of flavor and the inhibition of microorganisms. Alkaline compounds such as sodium hydroxide and potassium hydroxide are used to neutralize the excess acid developed in fermented foods in order to prevent undesirable flavor development. Sodium hydroxide is also used to modify the functionality of food starches. Sodium carbonate reduces the hardness of drinking water and the formula water, while sodium bicarbonate is a leavening component.
- **Processing aids** include not only acidulants and alkalis, but also buffers and phosphates. Buffers are added to help maintain a constant pH in a food, by balancing the hydrogen and hydroxide ions to protect its color, flavor, or some other pH sensitive characteristic. Orthophosphates, citrate, citric acid, and sodium bicarbonate can function in foods as buffers. Other food phosphates, such as polyphosphates, act to increase the water-holding capacity of meats and to stabilize emulsions.
- **Sequestrants** act to combine with metal elements, such as copper and iron, which are active in oxidation reactions. By forming complexes with them, sequestrants (also called chelating agents) inhibit the development of off-flavors and odors due to oxidation and can protect antioxidants to extend their effectiveness. Sequestrants are routinely added in metal canned food products, including beer. Common sequestrants include citric acid, polyphosphates, and EDTA (ethylenediamine tetra acetate).
- **Stabilizers and thickeners** combine with water in foods to increase product viscosity, to form gels, and to prevent product crystallization. Starch, pectin, gums (arabic, carrageenan, guar), cellulose, gelatin are commonly used to thicken such diverse products as gravies, pie fillings, dairy products, cake frostings, and puddings.
- **Surface active agent or surfactants** act as wetting agents, lubricants, dispersing agents, and emulsifiers, by affecting the surface tension of materials present in food systems. They are added to food during processing to reduce stickiness, promote mixing, improve baking properties, and either destabilize foams or promote foaming. Examples of surface active

agents are lecithin, monoglycerides, diglycerides, and polysorbate emulsifiers or surfactants, commercially known as Tweens.

Reference:

Murano, Peter S. *Understanding Food Science and Technology*. California: Thomson Wadworth, 2003.