

Biochemical Information



Acesulfame Potassium (Sunett)

- *Chemical formula:* $C_4H_4KNO_4S$
- *What it is:* Simple ring structure that resembles glucose
- *What it does:* Artificial sweetener to provide taste.

Aspartame

- *Chemical formula:* $C_{14}H_{18}N_2O_5$
- *What it is:* Dipeptide
- *What it does:* Low calorie artificial sweetener that provides taste.

Caffeine

- *Chemical formula:* $C_8H_{10}N_4O_2$
- *What it is:* One of the most widely used psychoactive substances in the world. Caffeine is a mild CNS stimulant with a transient effect that usually passes within a few hours but varies between individuals.
- *What it does:* Some studies have shown that caffeine may improve memory and reasoning responses on tests; other studies have shown that ingesting 3-9mg of caffeine one hour before physical activity improves endurance running and cycling in athletes. No adverse effects in humans have been documented.

Citric Acid

- *Chemical formula:* $C_6H_8O_7$
- *What it is:* Organic acid
- *What it does:* It is a precursor for the citric acid cycle (Kreb's Cycle), which is a major pathway in the cell's production of chemical energy.

Cyanocobalamin

- *Chemical formula:* $C_{63}H_{88}CoN_{14}O_{14}P$
- *What it is:* Synthetic form of Vitamin B-12
- *What it does:* Important for growth, cell reproduction, blood formation, and protein and tissue synthesis.

Folic Acid

- *Chemical formula:* $C_{19}H_{19}N_7O_6$
- *What it is:* Vitamin
- *What it does:* Required for metabolism of carbon compounds, nucleic acids, and amino acids.

Fructose

- *Chemical formula:* $C_6H_{12}O_6$
- *What it is:* Simple sugar
- *What it does:* Can be converted into a form for entry into the primary metabolic pathway in which the chemical energy of its bonds is converted into ATP, the primary "energy" molecule in the body.

Glucose

- *Chemical formula:* $C_6H_{12}O_6$
- *What it is:* Simple sugar
- *What it does:* Enters the primary metabolic pathway in which the chemical energy of its bonds is converted into ATP, the primary "energy" molecule in the body.

Sucralose (splenda)

- *Chemical formula:* $C_{12}H_{19}O_8Cl_3$
- *What it is:* Derivative of sucrose
- *What it does:* Artificial sweetener to provide taste.

Sucrose

- *Chemical formula:* $C_{12}H_{22}O_{11}$
- *What it is:* Simple sugar
- *What it does:* Can be converted into a form for entry into the primary metabolic pathway in which the chemical energy of its bonds is converted into ATP, the primary "energy" molecule in the body.

Glucuronolactone

- *Chemical formula:* $C_6H_6O_6$
- *What it is:* Simple saccharide (sugar)
- *What it does:* It is a normal human metabolic byproduct formed from glucose. Glucuronolactone is found in connective tissue in animals. Also regulates formation of glycogen. Small amounts shouldn't be harmful.

1-Glutamine

- *Chemical formula:* $C_5H_{10}N_2O_3$
- *What it is:* Amino acid
- *What it does:* Aids in muscle building and maintenance.

Inositol

- *Chemical formula:* $C_6H_6(OH)_6$
- *What it is:* A sugar that is a member of the Vitamin B complex
- *What it does:* Controls cholesterol levels and has potential antioxidant capabilities.

Niacin (nicotinic acid)

- *Chemical formula:* $C_6H_5NO_2$
- *What it is:* Water soluble vitamin
- *What it does:* Derivatives such as NADH are required for metabolism. It is said to aid in the synthesis of amino acids, the subunits of proteins. It has not been directly linked to improving athletic performance.

Niacinamide

- *Chemical formula:* $C_6H_6N_2O$
- *What it is:* Water soluble vitamin
- *What it does:* See niacin above; both are components of the coenzymes NAD and NADP, important in the redox reactions of metabolism.

Pantothenic Acid (also known as D-pantothenol)

- *Chemical formula:* $C_9H_{17}O_5N$
- *What it is:* Synthetic form of Vitamin B-5
- *What it does:* Precursor of coenzyme A. Helps you use fats and carbohydrates to make molecules used for energy. Is involved in more than 100 different metabolic pathways including energy metabolism of carbohydrates, proteins and lipids, and the synthesis of lipids, neurotransmitters, steroid hormones, porphyrins, and hemoglobin. It's found in a wide array of energy drinks and supplements, but its toxicity has not been evaluated.

Potassium sorbate

- *Chemical formula:* $C_6H_8O_2$
- *What it is:* Potassium salt of sorbic acid
- *What it does:* Used to inhibit fungal growth in foods.

Pyridoxine HCL

- *Chemical formula:* $C_8H_{11}NO_3$
- *What it is:* Synthetic form of Vitamin B-6
- *What it does:* Energy production, efficient metabolic functioning, protein digestion, as well as maintaining healthy nervous system, skin, hair and nails. The B-compound vitamins are probably the single most important set of factors needed for proper maintenance of the nervous system as well as proper functioning of the cell and its energy metabolism.

1-Taurine

- *Chemical formula:* $C_2H_7NO_3S$
- *What it is:* A non-essential amino acid
- *What it does:* Improved reaction time, concentration, and memory (not proven); essential amino acid for cats.

Water

- *Chemical formula:* H_2O
- *What it is:* A solvent for the other ingredients
- *What it does:* Essential for physiological processes.

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.

Type of Ingredient	What They Do	Common Applications
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
Sweeteners	Add sweetness with or without the extra calories	Beverages, baked goods, confections, table-top sugar, substitutes, many processed foods
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)
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
Flavor Enhancers	Enhance flavors already present in foods (without providing their own separate flavor)	Many processed foods
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
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
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
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
Leavening Agents	Promote rising of baked goods	Breads and other baked goods
Anti-caking agents	Keep powdered foods free-flowing, prevent moisture absorption	Salt, baking powder, confectioner's sugar
Humectants	Retain moisture	Shredded coconut, marshmallows, soft candies, confections
Yeast Nutrients	Promote growth of yeast	Breads and other baked goods
Dough Strengtheners and Conditioners	Produce more stable dough	Breads and other baked goods
Firming Agents	Maintain crispness and firmness	Processed fruits and vegetables
Enzyme Preparations	Modify proteins, polysaccharides and fats	Cheese, dairy products, meat
Gases	Serve as propellants, aerate, or create carbonation	Oil cooking spray, whipped cream, carbonated beverages

Names Found on Product Labels

Ascorbic acid, citric acid, sodium benzoate, calcium propionate, sodium erythorbate, sodium nitrite, calcium sorbate, potassium sorbate, BHA, BHT, EDTA, tocopherols (Vitamin E)

Sucrose (sugar), glucose, fructose, sorbitol, mannitol, corn syrup, high fructose corn syrup, saccharin, aspartame, sucralose, acesulfame potassium (acesulfame-K), neotame

FD&C Blue Nos. 1 and 2, FD&C Green No. 3, FD&C Red Nos. 3 and 40, FD&C Yellow No. 5 (tartrazine) and No. 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)

Natural flavoring, artificial flavor, and spices

Monosodium glutamate (MSG), hydrolyzed soy protein, autolyzed yeast extract, disodium guanylate or inosinate

Olestra, cellulose gel, carrageenan, polydextrose, modified food starch, microparticulated egg white protein, guar gum, xanthan gum, whey protein concentrate

Thiamine hydrochloride, riboflavin (Vitamin B2), 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)

Soy lecithin, mono- and diglycerides, egg yolks, polysorbates, sorbitan monostearate

Gelatin, pectin, guar gum, carrageenan, xanthan gum, whey

Baking soda, monocalcium phosphate, calcium carbonate

Calcium silicate, iron ammonium citrate, silicon dioxide

Glycerin, sorbitol

Calcium sulfate, ammonium phosphate

Ammonium sulfate, azodicarbonamide, L-cysteine

Calcium chloride, calcium lactate

Enzymes, lactase, papain, rennet, chymosin

Carbon dioxide, nitrous oxide

3) Improve Taste, Texture and Appearance:

Spices, natural and artificial flavors, and sweeteners are added to enhance the taste of food. Food colors maintain or improve appearance. Emulsifiers, stabilizers and thickeners give foods the texture and consistency consumers expect. Leavening agents allow baked goods to rise during baking. Some additives help control the acidity and alkalinity of foods, while other ingredients help maintain the taste and appeal of foods with reduced fat content.

What Is a Food Additive?

In its broadest sense, a food additive is any substance added to food. Legally, the term refers to "any substance the intended use of which results or may reasonably be expected to result — directly or indirectly — in its becoming a component or otherwise affecting the characteristics of any food." This definition includes any substance used in the production, processing, treatment, packaging, transportation or storage of food. The purpose of the legal definition, however, is to impose a pre-market approval requirement.

