

## FOOD ADDITIVES

### Overview

Today, more than ever before, the ingredient labels of prepared food items can be perplexing. The chemical names conjure up questions about safety and purpose. Without a biochemistry degree, the consumer is resigned to place their health in the hands of a faceless manufacturer and the government agencies charged with monitoring the safety and necessity of food ingredients.

The simplified version of the U.S. FDA's definition of a food additive is a substance added to a food in order to enhance it in some way. It is either intentionally added for a specific purpose or indirectly added to the food in trace amounts for packaging, storage and/ or handling. Food packaging manufacturers must prove to the U.S. FDA that all materials coming in contact with a food are safe before their use is permitted.

Food additives continue to play a critical role in providing us with a generous supply of nutritious, safe foods year-round. Used judiciously, food additives promote food safety, maintain nutritional quality and improve the texture, taste and appearance of foods.

### 5 Common Reasons for Food Additives

Additives in foods are used for one or more of the following reasons:

1. **To maintain palatability and wholesomeness:** Preservatives retard food spoilage caused by mold, air, bacteria, fungi or yeast. Antioxidants in foods are preservatives that prevent fats and oils from becoming rancid in foods. Rancid, or oxidized fats, taste bad and may increase tumor risk. Antioxidants also prevent fresh fruits from turning brown and becoming spoiled after they are cut.
2. **To enhance flavor or impart desired color:** Low calorie sweeteners, MSG, and cloves are examples of additives that enhance product flavor. Ingredients including annatto, caramel, beet juice (natural colors) and FD&C Red No. 4 (synthetic color) are examples of color additives that impart desired color to foods.
3. **To maintain product consistency:** Without additives such as emulsifiers, your peanut butter and mayonnaise, for example, would be separated in the jar or bottle. There would be a great deal of stirring and shaking going on, and the foods would appear to be spoiled. Emulsifiers provide consistent texture. Stabilizers and thickeners, such as carrageenan and guar gum, provide a smooth and uniform texture that is desirable in products like ice cream and puddings. Anti-caking agents, such as sodium aluminosilicate, keep substances, including salt and tea, flowing freely.
4. **To provide leavening or control acidity and alkalinity:** Leavening agents, such as sodium bicarbonate, help foods rise during baking. Other additives, including fumaric acid and lactic acid, are used to alter the acidity or alkalinity of a food for better flavor and color.
5. **To improve or maintain nutritional value:** Fortification and enrichment of foods with vitamins and minerals comes under the "food additive" definition. While these 2 terms are used interchangeably, "fortification" refers to the addition of one or more nutrients either missing or present in minimal amounts in a food. Fortifying that food is intended to substantially boost the provision of that nutrient in the food. "Enrichment" refers to adding more of the nutrient already

present in a food to bring it up to a more optimal level. Flours and cereals have long been fortified with B vitamins and iron; milk and margarines have been fortified with vitamin A & D; orange juice and specialty soy milks may be fortified with calcium, and salt may have iodine added.

**\*Common Uses of Food Additives**

<b>Additive Function/ Examples</b>	<b>Foods Where Likely to be Used</b>
<b>Impart/ maintain Desired Consistency</b> Alginates, Lecithin, Mono- and Diglycerides, Methyl Cellulose, Carrageenan, Glycerine, Pectin, Guar Gum, Sodium Aluminosilicate	Baked Goods, Cake Mixes, Salad Dressings, Ice Cream, Processed Cheese, Coconut, Table Salt, Chocolate
<b>Improve/ Maintain Nutritive Value</b> Vitamins A and D, Thiamine (B <sub>1</sub> ), Niacin (B <sub>3</sub> ), Riboflavin (B <sub>2</sub> ), Pyridoxine (B <sub>6</sub> ), Folic Acid, Ascorbic Acid (C), Calcium Carbonate, Zinc Oxide, Iron	Flour, Bread, Biscuits, Breakfast Cereals, Pasta, Margarine, Milk, Iodized Salt, Gelatin Desserts
<b>Maintain Palatability and Wholesomeness</b> Propionic Acid and its Salts (sodium, potassium or calcium propionate) [which inhibit mold and fungal growth], Butylated Hydroxyanisole (BHA), Butylated Hydroxytoluene (BHT), Benzoates, Sodium Nitrite, Citric Acid	Bread, Cheese, Crackers, Frozen and Dried Fruit, Margarine, Lard, Potato Chips, Cake Mixes, Meat
<b>Produce Light Texture; Control Acidity/ Alkalinity</b> Yeast, Sodium Bicarbonate, Citric Acid, Fumaric Acid, Phosphoric Acid, Lactic Acid, Tartrates	Cakes, Cookies, Quick Breads, Crackers, Butter, Soft Drinks
<b>Enhance Flavor or Impart Desired Color</b> Cloves, Ginger, Fructose, Aspartame, Saccharin, Sucralose, FD&C Red No. 40, Monosodium Glutamate, Caramel, Annatto, Limonene, Turmeric	Spice Cake, Gingerbread, Soft Drinks, Yogurt, Soup, Confections, Baked Goods, Cheeses, Jams, Gum

\* Taken from FDA booklet "Food Additives", published in cooperation with IFIC (Food Education Foundation)

**History of Food Additive Regulations**

As early as 300 BC, there were laws which prohibited adulteration, or "doctoring"/ "contamination", of grains and salt. Beginning in 1906, a pure food law was established, called the Federal Food and Drug Act, which outlawed the sale of adulterated food and drugs in interstate commerce. In 1938, the Federal Food, Drug and Cosmetic Act (FFDCA) updated the 1906 law to reflect knowledge from medical science and food technology. In 1958, The Food Additives Amendment was made, providing the first specific regulation of food additives. The Delaney Act, introduced by Congressman James Delaney, stated that the secretary of the FDA "shall not approve for use in food any chemical additive found to induce cancer in man, or, after tests, found to induce cancer in animals". In 1959, the US FDA identified a list of 700 substances used in foods that had existing evidence of long and safe use in foods, including salt, sugar, spices and vitamins. These substances were deemed "safe" and were 'grandfathered' into a list of "Generally Recognized as Safe" (GRAS) substances that did not require the manufacturers to test and prove safety of their use. "Prior sanctioned substances," which the FDA or USDA had approved for use in foods prior to the 1958 amendment, were also allowed. Since 1959, a manufacturer who wants to market a new food additive must prove the additive to be safe, defined as "reasonable certainty," that no harm will result from the use of the additive. Note that, over

the years, all substances on the GRAS list have also been tested and scrutinized to confirm their efficacy and safety in use. The FDA also regulates what is known as “Good Manufacturing Practices”, or GMP. The GMP limit the amount of food and color additives used in foods to the minimum needed to achieve a desired effect. The regulation and oversight of food and color additives continues to be a challenge the FDA is charged with managing.

#### **How are Additives Approved?**

To use a new food or color additive in marketed foods, a manufacturer must begin by petitioning FDA for its approval. An average of 100 new food or color additive petitions is submitted to FDA each year. A majority of the petitions pertain to indirect additives used in packaging materials.

A petition must provide convincing evidence that a new additive performs as intended and that it is safe for human consumption. While absolute safety of any additive cannot be proven, FDA must determine probable long term safety, based upon the substance’s chemical properties and composition. Even when an additive is approved, strict regulations regarding quantity and method used, and types of foods it can be used on, are established. FDA must then monitor on-going research findings; it operates an Adverse Reaction Monitoring System (ARMS) to monitor and investigate all complaints submitted which might be related to foods in question. Appropriate action is taken if reported reactions represent a “real public health hazard”.

#### **Questions about Food Additives**

- 1. What is the difference between natural and artificial additives?** Many products are made from natural sources such as food coloring from beets or annatto, or additives from soybeans and corn [eg: high fructose corn syrup]. Artificial additives are substances not found in nature but able to be made with greater purity, economy, and consistency than a comparable natural product. Both natural and artificial additives can be either safe or potentially harmful.
- 2. Does Yellow Food Dye #5 cause allergic reactions?** FD&C Yellow No. 5, aka “tartrazine” is used to color beverages, dessert powders, candy, ice cream, and other foods. It may cause hives in a small segment of the population; by listing it as such, those who have any allergic reactions can avoid products containing this. Anytime the color is added to foods or taken internally, it must be listed on the label.
- 3. Where can I look to find out the substances which FDA considers to be “Generally Recognized as Safe” (GRAS)?** Check out the sites of the Center for Food Safety and Applied Nutrition (CFSAN); see <http://www.cfsan.fda.gov/~rdb/opa-gras.html>.

#### **Additional Reading & Resources**

- <http://www.foodadditivesworld.com/>
- <http://www.foodsafety.gov/~dms/eafus.html> (The GRAS list)
- <http://www.epa.gov/opp00001/regulating/laws/fqpa/>
- <http://www.cfsan.fda.gov/~dms/opa-appa.html>
- <http://www.cfsan.fda.gov/~rdb/opa-gras.html>
- <http://www.cfsan.fda.gov/~lrd/foodaddi.html>