



University of Idaho
College of Agriculture

Current Information Series No. 535

Cooperative Extension Service
Agricultural Experiment Station

May 1980

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UNIVERSITY OF IDAHO

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FOOD ADDITIVES in the 80's

The use of food additives has become an important concern for consumers, the food industry and governmental regulatory agencies. As the population increases and more food is needed, the use of food additives to supply a safe, wholesome food supply will probably increase.

What Are Food Additives?

The Food Protection Committee of the Food and Nutrition Board (National Research Council-National Academy of Sciences) defines a food additive as "a substance or mixture of substances other than a basic foodstuff, which is present in a food as a result of any aspect of production, processing, storage or packaging." The two broad types of food additives are:

1. **Direct Additives** — substances purposely added to perform specific functions. Salt is an example of one of the oldest intentional additives. Early man used it as a preservative for meat and fish.
2. **Indirect or Incidental Additives** — substances which may be present in foods in trace quantities as a result of some phase of production, processing, storage or packaging. For example, an agricultural chemical applied during the growth of a plant might become an incidental additive. While trace quantities of the chemical may appear in the food, it performs no function in the food.

Why Are Food Additives Used?

Food additives are used primarily for three reasons: (1) consumers demand more nutritious food, (2) today's food marketing system depends upon in-

creased transportation and long-term storage and (3) new foods are being developed which require more severe processing.

The chart on the next page summarizes the major functions of additives in foods and identifies some common food additives.

How Are Food Additives Regulated?

The Federal Food and Drug Act, which was originally enacted in 1906, made illegal the adulteration of food and drugs entering into interstate commerce. This act was later modernized as the Federal Food, Drug and Cosmetic Act of 1938. The 1958 Food Additives Amendment to the Federal Food, Drug and Cosmetic Act places the burden of proof for safety of additives on industry. In other words, the company which proposes to use an additive must furnish proof to the Food and Drug Administration that the additive is safe for its intended use.

The Delaney Clause is also a part of the 1958 amendment. Sponsored by Congressman Delaney of New York, the clause reads: "No additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animals." Thus, the Delaney Clause unequivocally states that no cancer-causing substance or "carcinogen" shall be added to the food supply.

Since certain substances had been added to food or parts of food for many years and were generally recognized as safe, in 1958 scientists designated a classification for these substances. They were placed on the Generally Recognized As Safe (GRAS) list of substances that are exempt from the requirement for premarketing clearance of food additives. The idea of the GRAS list was to eliminate time-consuming and

Food Additives: Their Function and Use

Function	Commonly used examples	Foods in which these additives may be used
<u>To maintain or improve nutritional quality</u>		
<i>Enrich</i> — replace nutrients lost in processing	ascorbic acid, ferrous sulfate, potassium iodide, niacin, riboflavin, thiamine, vitamin A palmitate, vitamin D	enriched or fortified breads and cereals, macaroni products, milk, salt, margarine
<i>Fortify</i> — add nutrients that may not be present		
<u>To maintain product quality</u>		
<i>Anti-oxidants</i> — delay/prevent rancidity of fats caused by oxidation after exposure to oxygen in the air	butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), citric acid, propyl gallate, tocopherols (vitamin E), sodium nitrate	cake mixes, pudding mixes, snack foods, vegetable shortenings, ham or luncheon meats
<i>Anti-microbial preservatives</i> — prevent food spoilage from bacteria, molds and yeast	acetic acid, calcium propionate, potassium nitrate, sodium benzoate, sodium nitrite, sodium propionate, sorbic acid	bread, margarine, soft drinks, fruit juices, ham, bacon, processed cheese, table syrup
<i>Humectants</i> — retain moisture	glycerine, glycerol, glycol monostearate, propylene, sorbitol	candy, baked products
<i>Anti-caking agents</i> — prevent caking, lumping or clustering of finely powdered or crystalline substances	calcium silicate, iron-ammonium citrate, silicon dioxide, sodium silicoaluminate	salt, gelatin desserts, cake mixes, powdered sugar, baking powder, herb salts
<u>To aid in processing or preparing</u>		
<i>Emulsifiers</i> — distribute particles of one substance in another	lecithin, mono- and diglycerides, polysorbate 60, sorbitan monostearate	margarine, cake mixes, ice cream, pudding, non-dairy toppings, processed cheese, salad dressings
<i>Stabilizers, thickeners, texturizers</i> — produce a smooth uniform texture or stabilize emulsions	carboxymethyl cellulose, carrageenan, gelatin, guar gum, gum arabic, modified starch, pectin	candies, chocolate drinks, salad dressings, pudding mixes, frozen desserts
<i>Leavening agents</i> — make foods light in texture	baking powder, baking soda, yeast	bread, cakes, rolls
<i>pH control agents</i> — change or maintain acidity or alkalinity	citric acid, monosodium phosphate, sodium bicarbonate	baked products, soft drinks, powdered fruit drinks
<i>Maturing and bleaching agents, dough conditioners</i> — improve baking qualities	benzoyl peroxide, calcium bromate, hydrogen peroxide, potassium bromate	flour, cake mixes, baked goods
<u>To affect appeal characteristics</u>		
<i>Flavor enhancers</i> — increase or decrease the original taste and/or aroma	hydrolyzed vegetable protein, monosodium glutamate (MSG), yeast-malt sprout extract	canned soups, packaged dinners, baked products, salad dressings, gravies
<i>Flavors</i> — add a new or different taste	artificial flavor, benzaldehyde, herbs, spices, hydrolyzed vegetable protein, monosodium glutamate, vanillin	cake mixes, salad dressings, soft drinks, pudding, soup, fruit flavored toppings
<i>Colors</i> — give desired color to food	artificial color, carotene, carmel, cochineal, orange B, paprika, tartrazine	bakery products, soft drinks, gelatins, powdered fruit drinks, candy

costly tests on items which have been extensively used with no known harmful effect. In 1971, the government began to review 450 natural synthetic substances on the GRAS list. Since the review was started, a number of food additives have been withdrawn from the GRAS list.

Approximately 700 substances now are considered to be GRAS. Most of these are flavorings.

How Are Food Additives Approved for Use?

A research and testing program to develop a food additive and establish its safety may take several years and cost possibly millions of dollars. When a natural or synthetic chemical shows promise as a food additive, several steps must be completed before the food additive can be used commercially:

1. Toxicity studies are initiated.
 - a. Acute toxicity tests show the effects produced by the compound when a large single dose is administered to a variety of laboratory animals.
 - b. Short-term toxicity studies (about 90 days in length) usually involve feeding diets of different concentrations of the chemical to several different laboratory animals.
 - c. Long-term toxicity studies (2 years or more) show effects of lifetime consumption of the chemical and sometimes effects through 3 or 4 generations. Observations are made of growth, food consumption, general appearance, behavior, changes in offspring and mortality.
 - d. After feeding studies are completed, the lowest level having a harmful effect is determined, and the next level below that is designated the "no-effect level." This no-effect level is then divided by 100 and that level is used as the maximum dietary level. If less is needed for the desired function, no more may be used.
2. A method of analysis is developed.

- a. Scientists must have a practical method to determine the amount of the compound in the processed food.
3. A regulation is sought.
 - a. After evaluation of the scientific data about the chemical studies, the food or chemical company must file a petition with the FDA requesting a regulation providing for the safe use of the chemical.
 4. The food additive is used commercially.
 - a. After the regulation has been published in the Federal Register, the food additive may be used in accordance with the terms of the regulation.

What Can Consumers Do About Food Additives?

Consumers need to remember that they have the greatest power in the decisions about food additives because they have the power of the marketplace. Anyone concerned with food additives should:

- **Stay informed.** Read the labels to find out what is in the food you buy. The list of ingredients is always in descending order so you can determine the relative amount of each ingredient. Learn what additives do and which ones have been considered to be potentially dangerous.
- **Use your "power of the marketplace."** If you are informed, you can select foods on the basis of which characteristics — convenience, appeal, storage time — are the most important to you. It's your choice.
- **Make your views known.** Let manufacturers and your congressional representative know what you want and don't want in your food. Food additives, as do most things in life, bring certain risks and certain benefits. The consumer must ultimately decide what degree of risk is acceptable for foods that keep well and are appealing, nutritious, convenient and readily available year-round.



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