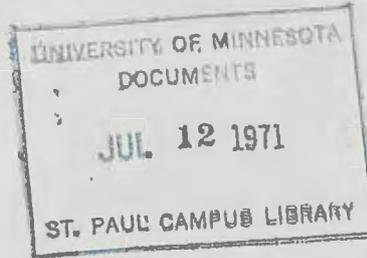
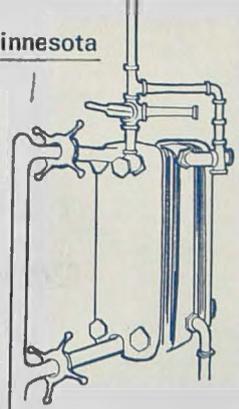


2

3

MINNESOTA DAIRY PRODUCTS PROCESSOR



By V. S. Packard
 Extension Specialist Dairy Products

July 1971 No. 43

FOOD ADDITIVES

The question of additives for milk and dairy products has been raised, and a few words in this regard might help clarify some of the hazy aspects.

DEFINITION

The Food Protection Committee⁽¹⁾ defines a food additive as a "substance or mixture of substances, other than a basic foodstuff, that is present in foods as a result of any aspect of production, processing, storage, or packaging. The term does not include chance contaminants."

The Food Additives Amendment to the Federal Food, Drug and Cosmetic Act broadens the definition to include chance contaminants except pesticides, color additives, and certain compounds having special sanction (all of which are covered under other laws).

In a sense then, there are "intentional" additives and "unintentional" additives. In the foregoing discussion, we will concern ourselves with the former, those compounds added purposely for some specific food function.

FOOD ADDITIVES AMENDMENT

The Food Additives Amendment of 1958 provides that any substance added to food must have been proven safe by the manufacturer before it is offered for sale. It permits the use of food chemicals which improve the food and advance food technology when they are safe at the level of intended use.

The law, then, recognizes the need for food additives in certain food products. It also requires "proof" of safety. Both the burden of proof and the cost of research to validate safety must be borne by the manufacturer.

SOURCES OF ADDITIVES

"Where do additives come from?" is a question frequently asked by a public sensitized to environmental pollution and food product contamination. In effect, there are two general sources. Additives are either found naturally occurring (in plants, shrubs, trees, animals, etc.) or they are synthesized chemically in the laboratory. Some naturally occurring compounds can be synthesized in the laboratory and may be synthesized for food uses if the chemical process of manufacture is cheaper than obtaining the compounds by extraction from natural sources. The synthesized chemical per se, will be identical to its natural counterpart. Take ascorbic acid (vitamin C) for example. Ascorbic acid is found in citrus fruits, tomatoes, potatoes, and cabbage, among other sources. It may also be synthesized in the laboratory. Once formed, "laboratory" ascorbic acid is the same compound as natural ascorbic acid.

FUNCTIONS OF ADDITIVES

Additives added purposely to foods have several functions. They may:

(1) Enhance the nutritive value. Vitamins are often added to food products to bolster their nutritive value. Since skimmilk is naturally low in the fat soluble vitamins A and D, we often "fortify" skimmilk with these vitamins. They are in every sense additives. When a food product is known to be low in some basic human nutrient, a processor may choose to "fortify" his product.

(2) Enhance sensory value (flavor, aroma, texture, and/or appearance). We add salt to butter primarily to enhance the flavor. To this extent salt is an additive. Salt also helps preserve butter by inhibiting bacterial growth. So salt actually performs two functions.

Most dairy products are "defined" by law. Butter is defined, but in the definition the clauses "with or without added salt" and "with or without coloring" are included to permit use of salt and coloring--but nothing else.

Although the amount used is small, the number of flavor additives make up nearly two-thirds of all additives. (2)

In 1960 coloring compounds were brought under one control by the Color Additives Amendment. Under both the Color Additives and Food Additives Amendments, no substance is allowed for use in foods which "is found to induce cancer in man or animals." This is a part of the "safety" considerations that additives must meet.

In the dairy industry texture additives are most common in ice cream. A variety of stabilizers and emulsifiers may be added in very small amounts to provide a smooth texture and/or "dry" or "wet" appearance. Buttermilk solids are rich in lecithin, an emulsifier which could be extracted and "added back" to ice cream, but which is added naturally when buttermilk solids are formulated into ice cream mix.

Among the stabilizer additives used in ice cream are guar gum (found in the seed of a leguminous plant), gum arabic (a tree exudate), alginates (derived from sea weed), and gelatin (animal protein). Stabilizer gums are also used in chocolate drinks (to add "body"), in yogurt (also for "body" and to prevent separation of ingredients) in cottage cheese, cream cheese, cheese spread, whipped cream, and whipped cream topping.

(3) Aid processing - Some of the emulsifiers and stabilizers mentioned above function as an aid to processing. There are other, different processing aids used in grain production. Surface active agents are sometimes used as "processing aids."

(4) Preserve or maintain freshness. A large number of additives are used in a variety of foods to retard chemical and/or microbial breakdown. For the most part, such compounds are not allowed for use in "defined" dairy products. They are used widely, however, in nondairy food products.

The most common antioxidants (compounds that retard oxidative spoilage) are BHA (butylated hydroxyanisole) and BHT (butylated hydroxytoluene). There are many other antioxidants. Antioxidants are used in beverages, in dessert dry mixes, in dry breakfast cereals, potato flakes, enriched rice, and unsmoked dry sausage.

Mold and fungus inhibitors include sodium benzoate (used in margarine), sodium propionate, and sorbic acid. Citric acid (found in citrus fruits) is used as an acidulant (acid promoter) and also has some ability to inhibit bacterial growth. Citric acid is used in processed cheese manufacture. Acetic acid, which is found in vinegar, is effective against some salmonella and staphylococci organisms.

Some "preservative" compounds are applied to coatings and films used in packaging, to inhibit microbial growth. Additives have many and varied uses.

SUMMARY

"Additives" is a big topic when all aspects are considered. But additives and their uses are not mysterious, perverse, or ill-intentioned. These compounds, and there are literally thousands, have specific functions, and some, at least, are as common as the food we eat.

REFERENCES

- (1) Food Protection Committee, Principles and Procedures for Evaluating the Safety of Food Additives. NAS-NRC Publ. No. 750, 1959.
- (2) Chemical Rubber Company. Handbook of Food Additives, edited by Thomas E. Furia, Published by The Chemical Rubber Company. 1968.

SANITARIANS CONFERENCE

The dates are set. The Sanitarians Conference this year will be held on September 16-17. All are invited, and we welcome your attendance. The program and other information will be forthcoming later. We hope to see you there.

Agricultural Extension Service
Institute of Agriculture
University of Minnesota
St. Paul, Minnesota 55101

Roland H. Abraham, Director

Cooperative Agricultural Extension Work
Acts of May 8 and June 30, 1914

OFFICIAL BUSINESS

875--7/71

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE

VERNERS VITINS A-II
ST PAUL CAMPUS LIBRARY
ST PAUL CAMPUS U OF M
ST PAUL MN 55101