

FOOD ADDITIVES: ROLE AND HEALTH IMPACT

Dr. Alpana Sharma

Director

M.M. P.G. College

Satikund, Kankhal, Haridwar

Email: dralpanasharma77@gmail.com

Abstract

The present study was to find out the role, characteristics and health hazards of food additives. Food additives are any substances not naturally present in food but added during its preparation and remaining in the final products. There are many types of food additives such as preservatives, color, flavor, sweeteners, emulsifiers, antioxidants, flour improvers and processing aids. The substances to be used as food additives should be of food grade and must meet the food safety and standards act. The use of these chemicals is prohibited by law in infant milk and foods, when used to cover defects or spoilage or when used to make food attractive at the cost of its safety.

Keywords

Food Additives, Preservatives, Color, Food Industries, Health Hazards.

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Dr. Alpana Sharma

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Introduction

The great bulk of the food is comprised of a chemical such as carbohydrates, fats, proteins, vitamins, minerals, water, etc. Besides the natural components of foodstuff, additional chemicals may be incorporated either directly or indirectly, during the growing, storage, or processing of food.

A food additive is defined as a substance or mixture of substances, other than abase foodstuff, which is present in a food as a result of any aspect of production, processing, storage, or packing. Food additives are all substances added (intentionally or unintentionally) to basic food products. They include anything added during the production, processing, treatment, packing, transport and storage of a food. In general, food additives are used to decrease the risk of contamination by certain microbes, maintain or improve nutritional quality, enhance appearance, increase self-life, reduce waste or contribute to convenience. Most of the time all processed food has some kind of additives.

Need for Food Additives

For centuries, man has recognized the effects of food additives and has used whatever was available marigolds for color, wood ashes for leavening, the lining of calves, stomach for cheese making, etc. They were used for effects without knowing the changes they brought about. Today, thousands of compounds are used as food additives, whose chemical identity and structure are known. They can be obtained in a very high state of purity and, when used, bring about the desired effect in foods. The use of imperative in the complex and integrated society in which we live. The areas of food production are separated from the Areas of consumption. Additives have provided protection against food spoilage during storage, transportation, distribution, or processing. Also, with the present degree of urbanization, it would be impossible to maintain food distribution without the processing and packing with which many additives are involved.

Many foods, particularly those with high moisture content, do not keep well. Fats or oily food become rancid particularly when exposed to humid air. The conservation of the quality of food against agents causing such deterioration of food requires the addition of preservatives. Additives are also used to color foods, add flavor, impart firmness, and retard or hasten chemical reactions in food. Additives are used to maintain the nutritional quality of food over 3000 different chemical compounds are used as food additives.

Characteristics of Food Additives

There are some characteristics of food additives-

- i. Preservatives- These are compulsorily used for the prevention of microbial spoilage, chemical deterioration and control of insects and rodents.
- ii. Nutritional supplements- These include vitamins, amino acids, minerals and calories.
- iii. Color modifiers-These natural coloring matter, certified food dyes and derived colors.
- iv. Flavoring agents- These may be synthetic or natural and are mainly flavor enhancers or extenders.
- v. Firming agents and maturing agents- These are mainly chemicals that affect the properties of food- colloidal properties of gels, emulsions, foams and suspensions.
- vi. Anticaking agents and waxes- These are chemicals added to control moisture.
- vii. Acids, Bases and Salts- These are commonly known chemicals added to control pH.
- viii. Ripening agents – These chemicals are added to food to control physiological functions in order to hasten the ripening process.
- ix. Miscellaneous chemicals – These are other chemicals such as gases which are used for pressure dispersing.

Functions of Food Additives

1. Food additives maintenance of nutritional quality.
2. Food additives enhancement of keeping quality or storage stability with reduction in food losses.
3. Making the food attractive and acceptable to the consumer and at the same time not leading to deception.
4. Food additives act as an essential aid in food processing.

Types of Additives

- Preservatives - Chemicals such as salt, alcohol and acetic acid have been used for several hundred years for preserving meat and vegetables and the pickling of food. These processes rely on reducing the water activity or the pH in the food to inhibit the growth of pathogenic organisms.
- Sorbic acid is used for yogurt sweets, soft drinks, frozen pizzas, desserts and fillings.
- Benzoic acid is used in jams, jellies, desserts, juices, marmalades, fruits, yoghurts and soft drinks.
- Propyl 4 – hydroxybenzoate is used in dessert sauces, fruit pulp, purees, and pickles.

- Sulfur dioxide is also used in food and vegetable products, soft drinks, beers, sausages, and dehydrated vegetables.
- Nisin is essential for cheese.
- Sodium nitrite and sodium nitrate are used in many processed meats.
- Acetic acid is used in pickles, chutneys, cheese, and sauces.
- Propionic acid etc.
- Colors- Color additives are any dye, pigments or substances that can impart color when added or applied to a food, drug, cosmetic or to the human body, color dissolves in water and is manufactured as powders, granules, liquids or the other special purpose forms. They can be used in beverages, dry mixes, baked goods, confectionery, dairy products, pet foods and a variety of other products. Processing may fade the natural colors and foods and beverages may be prepared by combining individual chemical ingredients of both natural and synthetic origin including color additives. In foods, colors are added to make the food attractive, to improve the aesthetic qualities of food, to replace the natural color destroyed during processing and to ensure batch-to-batch uniformity in processed foods.
- Flavoring agents – The flavor of most fruits and vegetables are produced by very complex mixtures of aldehydes and esters of organic alcohols and acids, with a range of essential oils with complex terpenoid structure.
A closely related group of additives are called flavor enhancers of which the best-known is monosodium glutamate.
- Sweeteners – Sweeteners are the important components of dietary food which is used to supply energy and raw material for the synthesis of other needed cell substances and body build-up. Sweeteners can be classified on the basis of sources –

A. Natural sweeteners

B. Artificial sweeteners

Food in which sugar aids preservation includes syrups and confectionary products, fondant fillings in chocolate, honey, jams, jellies, marmalades, conserves and fruits such as dates, sultanas and currants.

There are mainly sugars such as glucose, fructose, galactose, sucrose, maltose, and lactose. These are obtained from the liquefaction of starch and wheat, maize and sugarcane and beet

On the other hand, an artificial sweetener is a non-sugar and is as sweet as or sweeter than sucrose and has a pleasant taste with no aftertaste is colorless,

odorless, readily soluble, stable, functionally and economically feasible. It should be non-toxic does not promote dental cavities and is either metabolized normally or excreted from the body unchanged without contributing to any metabolic abnormalities. Artificial sweeteners are being used in place of natural sweeteners by people suffering from diabetes.

There are some artificial sweeteners

Saccharin, Aspartame, Sucralose, Cyclamate, Acesulfame-K, Tagatose, Sorbitol

- pH Control Agents – These include acids, alkalis and buffers. They not only control the pH of the food but also affected a number of food properties such as flavor, texture, cooking qualities, etc.
- Antibiotics – Antibiotics are anti-microbial agents produced naturally by a variety of microorganisms. Antibiotics are of great chemotherapeutic value in controlling pathogenic microorganisms in living animals. Their use in food preservation could lead to the development of resistant strains of organisms, thus making their medicinal use ineffective. Therefore the use of antibiotics as food preservatives is not permitted in certain countries, while some countries allow the limited use of relatively few antibiotics. These include nisin, pimaricin, chlortetracycline (aureomycin) and oxytetracycline (terracin).

Nisin is used to control the growth of spore-forming bacteria in dairy products, such as cheese and condensed milk. Nisin is non-toxic to human beings and does not lead to cross-resistance with medical antibiotics.

- Emulsifiers – Emulsifiers are a group of substances used to obtain a stable mixture of liquids that otherwise would not mix or would separate quickly. They also stabilize gas-in-liquid, and gas-in-solid mixtures. They are widely used in dairy and confectionary products to disperse tiny globules of an oil or fatty liquid in water. Emulsifying agents are also added to margarine, salad dressings, and shortenings. Peanut butter contains up to 10 % emulsifiers.
- Antioxidants – An antioxidant is a substance added to fats and fat-containing substances to retard oxidation and thereby prolong their wholesomeness, palatability and sometimes, keeping time. An antioxidant should not contribute an objectionable odor, flavor or color to the fat or the food in which it is present. It should be effective in low concentration and be fat soluble.

- Leavening agents – Leavening agents produce light fluffy baked goods. Originally, yeast was used almost exclusively to leaven baked products. It is still an important leavening agent in bread making. When yeast is used in ammonium, salts are added to the dough to provide a ready source of nitrogen for yeast growth. Phosphate salts (sodium phosphate, calcium phosphate) are added to aid in the control of pH.

Food Safety and Additives

The practice of adding chemicals (salts, spices, herbs, vinegar and smoke) to food dates back many centuries. Although most food additives are apparently harmless. The rapidly increasing number and types of chemicals added to our food have increased concern regarding their harmfulness. Some people who strongly believe that all chemicals in food are bad for health and we always should eat only natural foods but some others who strongly believe that there is nothing to worry about regarding chemicals or food additives. Since there is no absolute proof that any chemical has harmed a human being. Food additives are safe when they consume in proper quantity.

The presence of synthetic additives does not necessarily mean that food is harmful and the fact that a food is completely natural is no guarantee of its safety. There are many different types of hazards, such as microbiological, chemical, physical, nutritional hazards and environmental hazards of all food hazards, microbiological and nutritional hazards are for greater than others, but are widely ignored. The question is the need and safety of the additive. We should consume and use a sufficient amount of food additives. The control of additives in food is being gradual, improved and tightened and testing procedures are becoming more rigorous in different economically advanced countries of the world. The laws and regulations differ in different countries.

WHO, in cooperation with the Food and Agriculture Organization of United Nations (FAO), is responsible for assessing the risk to human health from food additives. Risk assessments of food additives are conducted by an independent international expert scientific group- the Joint FAO/WHO Expert Committee on Food Additives (JECFA).

The Codex Alimentarius commission also establishes standards and guidelines on food labeling. These standards are implemented in most countries and food manufacturers are obliged to indicate which additives are in their products. WHO encourages national authorities to monitor and ensure that food additives in food and drinks produced in their countries comply with permitted uses, conditions and legislation.

Conclusion

The use of consumption of additives to preserve foods and enhance their flavors are in trend in the few years. In western countries, they consume more processed food as compared to India, they are at a considerably greater risk of side effects. Jonathan Inetianbar et al (2015) studied that food additives are organic substances that are intentionally added to food in small quantities during production or processing to improve the quantity of food. They change and stable the color, smell, and texture of food. Food additives are the basis of the modern food industry when added in the proper ratio. Food additives are among the safest chemical in food due to their low toxicity and control of use by the law.

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