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Effect of food additives fed by a large industrialized food system

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Abstract

Food additives preserve the freshness and appeal of food between the times it is manufactured and when it finally reaches the market. Additives may also improve nutritional value of foods and improve their taste , texture, consistency or color. FAO(Food and Agriculture Organization) regulates require evidence that each substance is safe at its intended levels of use before it may be added to foods. So, the effect and cause of these substances are discussed in this article.

Keywords: Food additives, pesticides, pressor amines, gossypol, erucic acid, tangeretin and safrole

Introduction

The nations are fed by a large, industrialized food system. However, this giant food system could not have surmounted the overwhelming challenges of mass food production, processing, storage, cleansing, handling, transporting, refining, cooking, mixing, heating, and packaging without extensive use of chemical additives.

Food additives are substances added to food to preserve flavor or enhance its taste and appearance. Some additives have been used for centuries; with the advent of processed foods in the second half of the 20th century, many more additives have been introduced, of both natural and artificial origin.

Numbering

To regulate these additives, and inform consumers, each additive is assigned a unique number, termed as E numbers which is used in Europe for all approved additives. This numbering scheme has now been adopted and extended by the Codex Alimentarius Commission to internationally identify all additives, regardless of whether they are approved for use.

E numbers are all prefixed by E, but countries outside Europe use only the numbers, whether the additive is approved in Europe or not. For example, acetic acid is written as E260 on products sold in Europe, but is simply known as additive 260 in some countries. Additive 103, alkanet, is not approved for use in Europe so does not have an E number, although it is approved for use in Australia and New Zealand. Since 1987, Australia has an approved system of labeling for additives in packaged foods. Each food additive has to be named or numbered. The numbers are the same as in Europe, but without the prefix E.

The United States Food and Drug Administration. lists these items as generally recognized as safe or GRAS; they are listed under both their Chemical Abstract Services number and Fukda regulation under the US Code of Federal Regulation.

Types of food additives

- Direct or intentional: These are added deliberately to perform specific functions. These include flavors, flavor enhancers, preservatives, emulsifiers, artificial sweeteners, vitamins, colors, anticaking compounds antifoaming agents etc.
- Indirect or incidental: These are present in food in traces as a result of some phases of production, processing storage or packaging. These include residues of fertilizers, pesticides , heavy metals and other toxins that migrate.
- Naturally occurring: These result from processing conditions, metabolic reactions and unanticipated chemical combinations. These include safrole and related compounds and contaminants such as aflatoxins, etc.

Direct additives may be synthesized or derived from natural sources. For instance, the lecithin used in bread is extracted from soyabean and corn.Vanillin, the flavoring agent is synthesized. The vitamins are man- made .

Indirect additives include in addition to residues of agricultural chemicals like fertilizers, pesticides, feed adjuvants, drugs, traces of heavy metals from pipes (as lead) machinery, metabolic and ceramic vessels and other utensils. The major food packing material like glass, metal, paper, plastics and regenerated cellulose containing about 5000 chemicals may also contaminate foods by contact.

There are several factors that ecourage the development and use of food additives. These are population, urbinisation, labour cost, public health concern, special diets, convenience foods, fresh foods year round, and flavouring, ethnic and snack foods.

Functions of Food Additives

The use of food additives does the following:

a) Makes possible increased agricultural yields through increasing feed utilization in livestock.
b) It facilitates handling, distribution and preparation of foodstuffs.
c) Controls chemical , physical and microbiological changes so as to preserve quality over extended time.
d) Facilitates modification and synthesis of food contents to meet special dietary needs and to offer many novelty and convenience foods.
e) Improves sensory and nutritive properties.

Health hazards of food additives.

Food additives do potential harm of serious concern. Possible effects include carcinogenesis, tumerogenesis, teratogenesis and mutagenesis. Many asthma, utricaria and other allergic reactions may also be attributed to food additives.

Pesticides produce toxic effects and some of these pesticides like organophosphate insecticides, fungicides, herbicides and fumigants cause serious health hazards .Organophosphates in man cause headache, giddiness, nervousness, blurred vision, nausea, cramps, diarrhea, chest discomfort, sweating, muscle twitches, convulsions and coma. Herbicides cause throat irritation and reproductive failure in some animals.

Trace elements as mercury selenium, lead, tin cadmium, aluminium, arsenic, fluoride and iodide have been shown to elicit toxic effects in animals including man.

Packaging contaminants as glass, metal, paper , plastics and regenerated cellulose are also toxic to animal and man.

Naturally occurring food additives like citral, pressor amines, gossypol, erucic acid, tangeretin and safrole also produced adverse effects .Citral may cause damage to the vascular endothelia when fed to animals. Pressor amines cause marked increase in blood pressure in mammals. Gossypol caused loss of appetite, weight loss hypoprothrombinemia, and hair discolouration, lowering of hemoglobin, RBC count and serum protein, edema of lung and heart, degenerative changes in liver and spleen, haemorrhages of liver, small intestine and stomach in chickens. Safrole in rats caused liver tumours and liver damage.

Psychoactive substances like caffeine, theophylline and theobromine may affect the central nervous system. Caffeine is present in tea, coffee and cocoa. Scopolamine, a belladonna alkaloid also produces central stimulation. Nicotine is also toxic in larger doses.

Antivitamins also interfere with intestinal absorption and may cause other toxic effects.

Vitamins may also produce several serious health hazards if taken in larger amounts. Vitamin A, D, K,C E niacin, folic acid and thiamin may cause different kinds of disorders including serious neurologic damage.

Flavouring enhancers as monosodium glutamate (MSG) is responsible for the Chinese Restaurant Syndrome a burning sensation in the back of neck spreading to forearms to the anterior tightness and subdermal discomfort. Different types of colorants have also been found to produce toxic effects.

Conclusion

Food additives preserve the freshness and appeal of food between the times it is manufactured and when it finally reaches the market. Additives may also improve nutritional value of foods and improve their taste , texture, consistency or color. All food additives approved for use in the United States are carefully regulated by federal authorities to ensure that foods are safe to eat and are accurately labeled. Food additives may be incorporated in foods to maintain product consistency, improve or maintain nutritional value, maintain palatability and wholesomeness provide leavening or control acidity/ alkalinity / or enhance flavor or impart desired colour.

FAO(Food and Agriculture Organization) regulates require evidence that each substance is safe at its intended levels of use before it may be added to foods. FAO law prohibits the use of any additives that has been found to cause cancer in humans or animals .Some additives like boric acid , citric acid and sodium metasulphite showed mitotoxicity and genotoxicity having potential risks for human health. Thus, all food additives are subject to ongoing safety review as scientific understanding and methods of testing continue to improve.

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