



Role of Additives in Fruits and Vegetable Processing

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Article History

Received: 8. 05.2022

Revised: 15. 05.2022

Accepted: 21. 05.2022

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INTRODUCTION

Many compounds are added to foods for their useful properties and many of these ingredients can also be found naturally in particular foods. When employed in processed foods, however, these compounds are referred to as "food additives." Food additives are compounds that are not generally ingested in food and have no nutritional value, but are added to food to improve freshness, quality, sensory or as a processing help in food manufacturing (Chinaza *et al.*, 2019). The term "food additives" is commonly used nowadays, however its use dates back to ancient times, most likely considerably older than the hunter-gatherer era. Despite the fact that food additives help all sectors of the food industry, including manufacturers, retailers, and consumers, their use must be done with utmost caution. The majority of additives are synthetic substances. To ensure that processed food remains safe and in good condition throughout its journey from factories or industrial kitchens to warehouses and stores, and eventually to customers, additives are required. Due to the negative consequences of some chemicals, today's consumers are turning to natural components and bio-based additives.

Historical Background:

Additives have been in use in foods for centuries. The Egyptians coloured their food with saffron in 1500 BC. Salt has been in use as a preservative. Salt preserves by lowering the water activity (aw) of meats and other foods as well as inhibits the growth of bacteria. Earlier Preservatives which were used Sulphur dioxide, Sodium nitrite and Turmeric. Some food additives have been under use for centuries, e.g., preserving foods by pickling with vinegar, brining or salting, as with bacon, preserving marmalade by adding sugar or using sulphur dioxide as in wines.

Romans added alum to bread to make it white. When meats are smoked as means of preserving them, compounds such as butyl gallate and butylated hydroxyl anisole (BHA) are formed and provide both bacteriostatic and antioxidant effects. Pickling, which involves addition of acids such as vinegar, lowers pH of foods to levels capable of retarding the growth of bacteria. Some herbs and spices, such as cinnamon, chili pepper, and curry, contain antioxidants and may offer bactericidal effects and used as food additives. The earliest preservatives included sulphur dioxide (E220), acetic acid (E260), and sodium nitrite (E250), while turmeric (E100) and carmine (E120) were among the first colours (Awuchi *et al.*, 2020).

Classification of food additives :

Acids: Food acids are added to make flavors “sharper”, and also act as preservatives and antioxidants. Common food acids include vinegar, citric acid, tartaric acid, malic acid, fumaric acid, and lactic acid.

Acidity regulators: Acidity regulators are used to change or otherwise control the acidity and alkalinity of foods.

Anticaking agents: Anticaking agents keep powders such as milk powder from caking or sticking.

Antifoaming agents: Antifoaming agents reduce or prevent foaming in foods

Antioxidants: Antioxidants such as vitamin C act as preservatives by inhibiting the effects of oxygen on food, and can be beneficial to health.

Bulking agents: Bulking agents such as starch are additives that increase the bulk of a food without affecting its nutritional value.

Food coloring: Colorings are added to food to replace colors lost during preparation, or to make food look more attractive and appealing.

Color retention agents: In contrast to colorings, color retention agents are used to preserve a food’s existing color.

Emulsifiers: Emulsifiers allow water and oil to remain mixed together in an emulsion, as in mayonnaise, ice cream, and homogenized milk.

Flavors: Flavors are additives that give food a particular taste or smell, and may be derived from natural ingredients or created artificially.

Flavor enhancers: Flavor enhancers enhance a food’s existing flavors. They may be extracted from natural sources (through distillation, solvent extraction, maceration, among other methods) or created artificially.

Flour treatment agents: Flour treatment agents are added to flour to improve its color or its use in baking.

Glazing agents: Glazing agents provide a shiny appearance or protective coating to foods.

Humectants: Humectants prevent foods from drying out.

Stabilizers: Stabilizers, thickeners and gelling agents, like agar or pectin (used in jam for example) give foods a firmer texture. While they are not true emulsifiers, they help to stabilize emulsions.

Sweeteners: Sweeteners are added to foods for flavoring. Sweeteners other than sugar are added to keep the food energy (calories) low, or because they have beneficial effects for diabetes mellitus and tooth decay and diarrhea.

Thickeners: Thickeners are substances which, when added to the mixture, increase its viscosity without substantially modifying its other properties (Abdulmumeen *et al.*, 2012).

More than 3000 additives and preservatives are available in the market, which are used as antioxidants and antimicrobial agents. Salt and sugar are the most commonly used additives. Some of the commonly used food additives and preservatives are aluminum silicate, amino acid compounds, ammonium carbonates, sodium nitrate, propyl gallate, butylated hydroxyl toluene (BHT), butylated hydroxyanisole (BHA), monosodium glutamate, white sugar, potassium bromate, potassium sorbate, sodium benzoate, etc.

Commonly used Food additives :

Citric acid is a natural compound found in citrus fruits. It is also the by-product of digestive processes in the human body. Citric acid is used in food as an acidity regulator, preservative, and flavour enhancer.

Monosodium glutamate is the most widespread flavour enhancer. It is even considered to be one of the five basic tastes (umami). Glutamic acid and its (magnesium, potassium, and calcium) salts lend a meaty flavour to products.

Sodium nitrate :It is a salty and white or yellowish crystalline powder, obtained by the chemical processing of nitric acid or some lyes and gases. This additive is generally used in the meat industry to inhibit botulinum toxin and *Staphylococcus aureus* bacteria, slow down fat rancidification, maintain the pink red colour of meat and provide meat with a specific flavour.

Tocopherols are commonly known as vitamin E, insoluble in water and soluble in fats. It is used as a preservative, stabiliser, and potent antioxidant in such products as oils, margarines, desserts, meat products, and alcoholic beverages (Badora *et al.*, 2019)

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 improve nutritional value of foods and improve their taste, texture, consistency. 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, and/or enhance flavor or impart desired color or colour.

REFERENCES

Alpana Deshpande and Bhagyashree Deshpande (2017). Food additives and preservation. *Indian Journal of Science Research* **2** :219-225.

Abdulmumeen H A. (2012). Food its preservatives, additives and applications. *International Journal of Chemical and Biochemical Sciences* **1**: 36-45.

Abeyasinghe C P and Illeperuma C K. (2006). Formulation of an MSG (Monosodium Glutamate) free instant vegetable soup mix. *Journal of National Science Foundation* **2**: 91-95.

Augustin M A, Riley M, Stockmann R and Cobiac L. (2016). Role of Food processing in food and nutrition security. *Trends in Food Science and Technology* **56** : 115-125.

Awuchi G C, Twinomuhweri H, Igwe V S and Amagwula F O. (2020). Food additives and Food Preservatives for domestic and industrial food applications. *Journal of Animal health* **1**: 2709- 17.

Badora A, Bawolska K, Strawska J K and Domanska J. (2019). Food additives in food products: A case study. Nutrition in Health and Disease. Our challenge and forthcoming time, London. 161p.

Damodaran and Parkin K L. (2017). Minor Food additive. Introduction to Food chemistry. 5th ed. Taylor and Francis group. New York. 689p.

Donald R S, Ordovas J and Schnakenberg D. (2014). Food processing and health. *The American Journal of Clinical Nutrition* **6** : 1525- 42.

Hamid A A, Risikat A N and Sururah A R. (2012). Food its preservatives, additives and applications. *International Journal of Chemical and Biochemical Sciences* **1**:36-47.

Karunaratne D N and Pamunuwa G K. (2017). Food additives. Introduction to Food additives. *Chemical and Pharmaceutical Research* **10**: 5772-84.

Neelam M and Mishra S. (2018). Effects of Food additives and preservatives and shelf life of the processed food. *Asian*

Journal of Science and Technology

10: 8910-12.

Pasca C, Coorian A and Socaci B. (2018). Risk and benefits of Food additives. *Animal Science and Biotechnology* **2**:1843-62.

Wang X, Ma Z, Li Xiaoping, Liu L, Yin X, Zhang K, Liu Yu and Hu X. (2018). Food additive and technologies used in Chinese traditional staple foods. *Chemical and Biological Technologies in Agriculture* **5**:1.