

Food Processing Technology And Stages Of Its Development

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Abstract

The article summarizes scientific information on food processing technology, which is one of the important parts of the Food industry. In addition, the article contains opinions about significant stages of developing this field.

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Food items are being processed for various reasons. Since times immemorial, grains have been dried after harvest to increase their shelf life. Initially, foods were processed primarily to improve digestibility, palatability and to ensure a continuous supply. With passage of time, improved transportation, communication and increasing industrialisation, the needs of consumers have become more diverse and there is now increasing demand for 'fresh' and 'organic' foods, 'safer and healthier' foods and foods with adequate shelf life. Consumers expect better-quality foods with retention of nutrients, many a time having specific functional properties and taste/texture/consistency, while being shelf-stable and easy to package, store and transport. This has served as a stimulus to scientists to develop methods and techniques to process foods in a manner that the food products will meet the requirements and demands of the consumers. All of us eat readymade foods. These range from biscuits, bread, pickles/papads to foods such as ready-to-eat curries, meal items, snacks, etc. Such foods are manufactured using a variety of processes and technologies. For some, simple traditional methods are still used while newer processes and technologies are employed to produce processed foods in bulk.

Research in the field of Food Technology has been conducted for decades. In 1810, development of the canning process by Nicolas Appert was a decisive event. Canning had a major impact on food preservation techniques. Later Louis Pasteur's research, in 1864, on spoilage of wine and his description of how to avoid spoilage was an early attempt to put food technology on a scientific basis. Besides wine spoilage, Pasteur conducted research on production of alcohol, vinegar, wines, beer and souring of milk. He developed 'pasteurisation' - the process of treating milk to destroy disease producing organisms. Pasteurisation was a significant advance in ensuring microbiological safety of food. Food Technology was initially used to serve military needs. In the 20th century, world wars, exploration of space and the rising demand for varied products from consumers contributed to the growth of Food Technology. Products such as instant soup mixes and ready-to-cook items including meals were developed, specially catering to needs of working women. Further, food industry was compelled to focus on nutritional concerns. Food preferences and choices changed and people started incorporating into their diet items/preparations from different regions and countries. The desire to have seasonal foods all year round increased. Food technologists made efforts to provide both safer and fresher food using new techniques. In the 21st century, food technologists are challenged to produce foods suitable for health and other changing needs of consumers.

Food technology has provided a vast variety of safe and convenient foods. In developing countries this rapidly expanding and developing field, has been helpful in improving food security and has opened avenues for employment at all levels. It has already been mentioned that food processing is a branch of manufacturing wherein raw materials are transformed into intermediate foodstuffs or edible products through the application of scientific knowledge and technology. Various processes are used to convert bulky, perishable and sometimes inedible food materials into more useful, concentrated, shelf-stable and palatable foods or potable beverages. Changes in the products often reduce preparation time for the cook. Most of the time, processing of foods adds value to the resultant product by increasing storability, portability, palatability and convenience. Professionals in the food processing need to be knowledgeable about general characteristics of raw food materials, principles of food preservation, processing factors which influence quality,

packaging, water and waste management, good manufacturing processes and sanitation procedures. Let us briefly examine the need, principles, methods and modernisation of food processing. Foods are subject to physical, chemical and biological deterioration. Food deterioration is associated with spoilage, development of off-flavors, deterioration of textures, discoloration and loss of nutritional value in varying degrees, reducing aesthetic appeal and rendering it unfit/unsafe for consumption.

A number of factors can lead to food deterioration or spoilage e.g. pests, infestation by insects, inappropriate temperatures used for processing and/or storage, excessive exposure to light and other radiations, oxygen, moisture. Food is also contaminated by micro organisms [bacteria, fungus and moulds] or chemicals such as pesticides. Food can also be spoiled due to degradation by naturally present enzymes (a specific class of protein molecules that act as biological catalysts to accelerate chemical reactions). In addition, physical and chemical changes in certain constituents of food from plant and animal sources occur soon after harvesting or slaughtering, altering the food quality. Therefore food processing and preservation are required to preserve food in edible and safe form. Methods by which food is preserved from spoiling after harvesting or slaughtering date back to prehistoric times. The oldest methods were sun drying, controlled fermentation, salting/pickling, candying, roasting, smoking, baking and using spices as preservatives. These tried and tested techniques are still used although, with the advent of industrial revolution, new methods have been developed. Food processing incorporates and unifies the general characteristics of different classes of foods and principles of food science, chemistry, food microbiology, nutrition, sensory analysis and statistics including good manufacturing practices as per regulations. Many food processing operations are designed to extend the shelf life of the food products.

The concepts associated with food processing are reducing/eliminating microbial activity and other factors that influence food spoilage. The principle micro organisms that cause food spoilage are bacteria, fungi, yeasts and moulds. Just recollect that you studied in biology how they grow typically very rapidly under congenial conditions. Factors influencing microbial growth are nutrient availability, moisture, pH, oxygen levels and the presence or absence of inhibiting substances e.g. antibiotics. The activity of enzymes inherently present in foods also depends on pH and temperature. Oxidative enzymes in fresh fruits and vegetables continue to use oxygen to metabolise, reducing the shelf life of fruits and vegetables. So the basic concepts in food processing methods to prevent food spoilage are:

1. Application of heat;
2. Removal of water moisture;
3. Lowering of temperature during storage;
4. Reduction of pH;

5. Controlling the availability of oxygen;

To sum up all facts above it should be highlighted that the food industry is a complex, global network of diverse businesses that supplies most of the food consumed by the world's population. The food industry today has become highly diversified, with manufacturing ranging from small, traditional, family-run activities that are highly labor-intensive, to large, capital-intensive and highly mechanized industrial processes. Many food industries depend almost entirely on local agriculture, produce, or fishing. It is challenging to find an inclusive way to cover all aspects of food production and sale.

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