



A review on food preservation techniques

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Abstract

Food preservation entails several food processing methods to keep food quality at a particular level in order to get maximum benefits and nutrition values. Growing, harvesting, processing, packing, and distribution of foods are all examples of food preservation methods. The primary goals of food preservation are to overcome inefficient agricultural planning, to develop value-added goods, and to give dietary variety. A variety of chemical and biological processes can induce food deterioration. Traditional and primitive food preservation procedures such as drying, cooling, freezing, and pasteurization have been promoted to prevent chemical and microbiological degradation. In recent years, strategies for combating these spoilages have become more advanced, evolving into a highly multidisciplinary discipline. Food goods are preserved using cutting-edge technologies such as irradiation, high-pressure technology, and hurdle technology. The mechanics, application circumstances, and advantages and downsides of several food preservation systems are presented and discussed in this review article.

Keywords: inefficient agricultural planning, food deterioration, irradiation, cutting-edge technologies

Introduction

Foods are organic compounds that are ingested for nourishment. Foods are made from plants or animals and contain moisture, protein, lipids, carbohydrates, minerals, and other organic compounds. Food spoils as a result of microbiological, chemical, or physical activity. Foods nutritional qualities, color, texture, and edibility are all subject to spoiling ^[1]. As a result, foods must be preserved in order to keep their quality for a longer length of time. Food preservation refers to the methods or strategies used to preserve internal and external elements that might cause food degradation. The primary goal of food preservation is to extend its shelf life while preserving its original nutritional qualities, color, texture, and taste.

The legacy of 'Food Preservation' may be traced back to ancient civilization, when the primitive tribe first felt the need to preserve food after hunting a large animal that could not be eaten all at once ^[2]. Understanding food preservation techniques was the first and most significant step in establishing civilization. Different societies employed nearly identical fundamental strategies to preserve food products at various eras and locales ^[3].

Traditional food preservation procedures such as freezing, drying, chilling, Pasteurization, and chemical preservation are widely employed across the world ^[3]. Scientific advances and developments are influencing the evolution of current technologies as well as the development of new ones, such as hurdle technology, high-pressure technology, and irradiation ^[5]. Food preservation processing has grown increasingly

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multidisciplinary since it comprises steps relating to food production, harvesting, processing, packing, and distribution. As a result, an integrated strategy to food preservation would be beneficial during the food production and processing stages. At the moment, the worldwide market for processed food items is worth over \$7 trillion, and it is steadily rising ^[6]. Rapid globalization and industrialization are important contributors to the development of food processing businesses in many nations ^[7]. According to an examination of the UNIDO Industrial Statistics Database (2005), food processing is an advantageous component of the manufacturing sector in developing nations, and the contribution of food processing sectors to national GDP grows with the country's national affluence ^[8].

This review article discusses the fundamentals and improvements of several simple and advanced food preservation strategies that are related to preventing food spoiling and yielding a longer shelf life. This study provides academics, technicians, and industry executives with a thorough knowledge that might be extremely beneficial in developing effective and integrated food preservation technologies and ensuring food safety.

Food preserving methods

Food preservation is the procedure or technique used to keep food from spoiling and to extend its shelf life ^[8]. The preserving methods has been in working since the ancient times. The methods are of two types as Conventional methods and Modern preserving technology.

Freezing is very easiest method. This is used to store food and reduces the development of microbes. During freezing food may loss it's more nutrition and will change its texture. This is due to enzymes present in most of product and the temperature applied. The time and rate of freezing is also a factor that affects the quality of meat. Drying is the oldest one. In this method we prevent the bacterial growth by reducing the water activity. This method is also called dehydration. Sun and wind are used for this purpose. As microorganisms may grow in moisture so by removing the moist from food is effective. Natural drying includes sun and wind. Food is also preserved by adding salts and vinegar. In this method of salting, we make unsuitable environment for microbes. Because only few microorganisms can grow in high salt.

An alternative method is high pressure processing in which we maintain the organoleptic properties. Due to high pressure microorganisms cell wall is ruptured. There for microbe's activities is deactivated. This method will not break the covalent bond in food so maintains the quality and freshness. Edible coating is applied on most of food products. This increases the public demand. This coating prevents the gases exchange, moisture transfer and oxidation process.

Modification of atmosphere in a packaging is a progress in preservation in which reduction of oxygen or carbon dioxide Increases for the extension of shelf life of food products. Different products preserve at different atmosphere that is different from normal atmosphere [8].

Edible coating is an advance technique due to its eco-friendly effects and it can easily reduce the impact of many essential oils on the product's flavor by increasing the action time of oils. It increases the shelf life of products. It also enhances the antiseptic properties on micro-organisms during coating present in food [9].

Bio preservation is a method in which by utilizing the natural microbiota we can intensify the shelf life of food products. Beneficial bacteriophages, nisin, bacteriocins and other micro-organisms are selected to control decaying of food and widely utilize in meat and dairy industries. They give different textures and flavors to food [10].

Freezing is also a preservation technique in which there is formation of ice crystals by lowering the temperature of desired product. It can maintain the quality of food for a longer period of time. This process is best method for easy handling of food and for distribution [11].

Conclusion

Safety and perishability is always concern to every food products. Safety is prevention of pathogens and toxic chemicals whereas, perishability is due to degradation of microbes and control of activity of enzymes. This always leads to increase shelf - life of food products. The one of preservation techniques is Modified atmosphere technique in which food products are kept in atmosphere that is different in composition from normal atmosphere. There are many advantages of Modified Atmosphere such as benefit of inhibiting the growth of aerobic microorganisms and oxidation reactions, preventing the drips and odour losses from foods. Thus, allowing the

longer run of food goods to consumers. Side by side, this Technique have disadvantages of cost of machineries and gases, increased pack volume that affects the transport costs, requires different atmosphere for different products, loss of packaging due to defects and improper sealing and cost of testing equipments. Due to recent advances in preservation, packaging is one of them, and maintaining the food nutritional quality and safety. There is good potential and applications for MA e.g in storing meat, poultry products, bakery goods, fruits and vegetables [10].

Another technique is Hurdle technique to achieve the multi-target by controlling microbial spoilage desired fermentation process unaffected. According this technique, A benefit of six hurdles including high temperature for processing, low temperature for storage, low water activity, acidity and redox potential. Besides, consumption effects it is also important to monitor the safety aspects during storage because the longer storage time increases the risk of microbiological hazards [13]. This review collated and examined several food mechanisms as well as applications of classic and sophisticated food preservation strategies. This article will help experts and scholars working in food processing and food safety build effective and integrated food preservation strategies.

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