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Mini Review

Food Preservation: Techniques and Importance for Food Security

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INTRODUCTION

Food preservation refers to the process of treating and handling food to prevent spoilage, extend shelf life, and maintain its nutritional value, flavor, and texture. It is a critical practice in both developing and developed countries, as it ensures that food can be stored, transported, and consumed safely over an extended period. Preservation techniques are essential not only for minimizing food waste but also for maintaining food security, particularly as global populations rise and the demand for food grows. From traditional methods like salting and drying to modern technologies like refrigeration and freezing, food preservation has played an integral role in shaping the way we eat and distribute food. Food spoilage occurs due to a variety of factors, including the growth of microorganisms such as bacteria, yeasts, and molds, as well as enzymatic reactions that degrade food over time. Inadequate preservation can lead to foodborne illnesses, nutrient loss, and a significant reduction in food availability. For example, without proper preservation, perishable foods like fruits, vegetables, meat, and dairy products can spoil within a matter of days, resulting in large amounts of food being discarded (Adejumo & Raji ,2007 & Adeyeye, 2017).

With the global population projected to reach nearly 10 billion by 2050, food preservation becomes even more important. It helps to reduce food waste, ensures that people have access to nutritious foods year-round, and enables the transportation of food across long distances, thus increasing the efficiency of global food supply chains. Furthermore, food preservation techniques are increasingly being explored as part of the effort to combat food insecurity and malnutrition, especially in areas where fresh food is difficult to obtain due to geographic or economic constraints. Before the advent of modern technologies, various traditional methods were used to preserve food. These techniques, many of which are still in use today, rely on natural processes to inhibit spoilage and maintain food quality. Drying is one of the oldest and most widely used methods of food preservation. By removing moisture from food, drying inhibits the growth of spoilage-causing microorganisms (Akerele , et al ., 2013 & Babatunde , et at ., 2005).

It is commonly used for fruits (like raisins and apricots), vegetables (like tomatoes and peas), meats (jerky), and fish. Dehydration can be achieved using sunlight, air, or heat, and it allows food to be stored for months or even years without refrigeration. Salting is another traditional preservation method. The salt draws moisture out of the food, creating an environment that is inhospitable to bacteria and molds. Salting is commonly used for preserving meats and fish, as well as for vegetables such as cucumbers (pickling). In curing, salt is combined with other substances like nitrates to prevent spoilage and enhance flavor. Fermentation is a natural preservation method that uses beneficial microorganisms, like bacteria or yeasts, to ferment sugars in food, producing acids or alcohols that inhibit the growth of harmful pathogens. Fermented foods, such as yogurt, sauerkraut, kimchi, and pickles, have not only been preserved but often gain unique flavors and nutritional benefits, like probiotics, during the fermentation process (Costa, 2015 & Dong , et al., 2019).

Smoking involves exposing food to smoke from burning wood or other materials, which imparts flavor and preserves food. This method is commonly used for meats, fish, and cheese. The combination of heat, drying, and smoke creates an environment that reduces microbial activity, extending shelf life. As technology has advanced, so too have food

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preservation methods. Modern techniques have made it possible to preserve food more effectively and on a larger scale, addressing the challenges of global food distribution. One of the most common and effective methods of food preservation today is refrigeration, which slows down the growth of bacteria, molds, and yeasts, keeping food fresh for longer. Freezing, on the other hand, freezes the water content of food, effectively halting the activity of spoilage-causing microorganisms. Both methods are used to preserve a wide range of foods, from fruits and vegetables to meat, dairy, and ready-to-eat meals. Advances in freezing technology, such as blast freezing, help to preserve the texture and nutritional value of food (Madadlou , et al ., 2014 & Pera-Titus , et al ., 2015).

Canning involves placing food in airtight containers, usually glass jars or metal cans, and then heating them to kill harmful microorganisms. The sealed containers prevent the entry of new bacteria, allowing the food to remain safe and fresh for months or even years. Canning is used for preserving fruits, vegetables, sauces, soups, and meats, and it is a common method in both household kitchens and large-scale food production. Pasteurization is the process of heating food to a specific temperature for a set period to kill harmful microorganisms without compromising the food's nutritional content. It is commonly used for dairy products, juices, and canned goods. Pasteurization extends shelf life while ensuring food safety, reducing the risk of foodborne illnesses. Vacuum sealing involves removing air from food packaging, creating a vacuum that prevents the growth of bacteria and molds. It is used to preserve a wide range of foods, including meats, vegetables, and dry goods. When combined with refrigeration or freezing, vacuum-sealed foods can last much longer than those stored in regular packaging (Piradashvili , et al ., 2016 & Xin & Skrydstrup 2019).

CONCLUSION

Food preservation is an essential aspect of modern food systems that ensures food safety, reduces waste, and supports global food security. From traditional methods like drying and fermentation to advanced technologies like refrigeration and vacuum sealing, food preservation techniques play a vital role in maintaining the quality and safety of food for long periods. As the world faces growing challenges related to food production, climate change, and population growth, continued innovation in food preservation will be crucial to ensuring that nutritious food is available to people worldwide. By embracing both traditional and modern preservation methods, we can create a more sustainable, efficient, and resilient food system that can meet the needs of future generations.

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