Mechanism of microbiological spoilage of foods and food safety.

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Abstract

Food spoilage may be defined as a process or change which renders a product undesirable or unacceptable for consumption. This complex ecological phenomenon is the outcome of the biochemical activity of microbial chemical processes which will eventually dominate according to the prevailing ecological determinants. To ensure the safety and quality of foods and beverages, the effective monitoring of the chill chain through production, transportation, distribution and storage in retail cabinets and home refrigerators is essential. Currently, a variety of different methodologies are used for assessing food spoilage, in which microbiological methods play a decisive role. Recently, the relationship between microbial growth and the chemical changes occurring during food storage has been recognized as a potential indicator which may be useful for monitoring freshness and safety. For this purpose, interesting analytical approaches have been developed for rapid and quantitative assessment of food spoilage. These are based on biosensors, sensor arrays and spectroscopy techniques in tandem with Chemometrics. Various processes have been utilized to prevent the microbiological spoilage of foods and beverages, amongst which low temperature storage and heat treatment seem to be the most effective. The application of a rich carbon dioxide atmosphere as part of a modified atmosphere packaging system is also effective in suppressing spoilage micro-organisms.

Keywords: Suspended algae, Bacterial pathogen decay, Bacterial pathogen distribution, Recreational water, Microbial risk assessment, Microbiological water quality.

Introduction

Food deterioration is defined as a process that renders a product unacceptable or undesirable for consumption and is the result of the biochemical activity of microbial populations that predominate in the product. The notion of food safety for produce is important because of its susceptibility to microbial attack and biofilms formation. Even though limited information is available, this activity has been attributed to quorum sensing. Therefore, the potential role of bacterial communication in food spoilage and food safety should be more widely elucidated. Thus, the screening of antipathogenic agents that inhibit the QS regulation of bacterial colonization and virulence factor production might represent a great promising alternative as anti-infective agents. This chapter focuses on resistance to sanitizers and disinfectants, outbreaks related to produce, QS, biofilm formation, attachments and current and emerging strategies for fresh and minimally processed produce, providing new findings concerning about food safety [1].

Food spoilage results when microbiological, chemical or physical changes occur, rendering the food product unacceptable to the consumer. Microbiological food spoilage is caused by the growth of microorganisms which produce enzymes that lead to objectionable by-products in the food. Chemical food spoilage occurs when different components in the food react with each other or with some added component which alter the food's sensory characteristics. Examples of this include: oxidation; enzymatic browning; and no enzymatic browning. Physical food spoilage results when moist foods are excessively dehydrated or dried foods absorb excessive moisture [2].

For years, safety (i.e., the exclusion or elimination of pathogens from food) has been studied separately from the prevention of spoilage. In most countries the legislation has tended to reinforce this concept. However, from a microbiological-ecological point of view the two areas cannot be distinguished. In spite of considerable efforts, microbiological safety assurance seems as remote as ever, even in advanced countries. Death, suffering, economic losses, and civil claims on behalf of victims of foodborne diseases are matched by the economic losses caused by food spoilage. A significant proportion of the loss is due to spoilage by microorganisms, resulting in final products with an inadequate shape or appearance. It has been estimated that about 25% of all foods produced globally are lost due to microbial spoilage [3].

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The food industry is continually creating new microbial habitats, either by developing new products and reformulating traditional ones, or by chance, as a result of the composition of raw materials or in production. Also, the modern consumers' preferences for fresh foods with extended shelf life and products that are free of chemical pesticides leave foods more vulnerable to spoilage, as well as increasing the diversity of spoilage species. Understanding how different properties of a food, its environment and "history," can influence the microbiota that develops in products is an important first step toward control quality and safety. The present chapter discusses the characteristics of microbial spoilage of foods with a focus on the major spoilage microorganisms and how they can be detected and monitored [4].

Food spoilage may pose economic consequences if certain precautionary and preventive measures are not performed. The food industry has adopted methods to minimize spoilage with the use of natural preservatives, novel processing systems, refrigeration, packaging material and, more recently, management systems. These techniques, however, are incapable of controlling spoilage if incoming material is not of the highest quality and handled under good sanitary conditions. In all cases, the shelf life of many foods can be extended if foods are prepared to minimize the level of bacterial contamination before final processing [5].

References

1. Archer DL. Freezing: an underutilized food safety technology? Int J Food Microbiol. 2004;90(2):127-38.
2. Bailey GN. Concepts of resource exploitation: continuity and discontinuity in palaeoeconomy. World Archaeol. 1981;13(1):1-5.
3. Barnosky AD, Hadly EA, Bascompte J, et al. Approaching a state shift in Earth's biosphere. Nature. 2012;486(7401):52-8.
4. Billing J, Sherman PW. Antimicrobial functions of spices: why some like it hot. The Quarterly Review Biol. 1998;73(1):3-49.
5. Bower CK, Daeschel MA. Resistance responses of microorganisms in food environments. International J food Microbiol. 1999;50(1-2):33-44.

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