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Food preservation, since ancient times, played a central role in the survival of mankind enhancing the safety and stability of different foodstuffs. Traditional techniques used to prevent food deterioration in the past such as salting, drying, fermentation, and heating prevail in the modern food industry. The knowledge about the main causes of deterioration has increased substantially since then and losses due to spoilage and food contamination were reduced.

The knowledge about the composition, origin, pH, water activity (a_w) of food and storage conditions (e.g. temperature, atmosphere, and pressure) along with the information about the characteristics of most prevalent and resistant microorganism predicts the composition of microflora during processing and storage. From this scenario, the adequate use of technology (such as pasteurization and sterilization), hygienic strategies (e.g. good hygiene practices and good manufacture practices), and traceability (prevent and reduce the distribution of unsafe and poor quality food) can prevent and delay the colonization of spoilage and pathogenic microorganisms in foodstuff.

However, food remains susceptible to spoilage and contamination of pathogenic microorganisms throughout the food chain, retail shops, restaurants, and house of consumers. The damage from spoilage and contaminated food affects the food industry (economic loss, damage to reputation, and punishment according to local law) and consumers. The spoilage of foods by microbial activity involves many complex mechanisms wherein the acceptance of sensory attributes decay and consumers reject the food. The presence of visible growth as slime and colonies changes in texture due to degradation of proteins/carbohydrates/lipids, and the perception of off-odors and off-flavors may indicate spoilage by microorganisms (e.g., bacteria and molds).

On the other hand, the development, the cross-contamination, and toxin production of

pathogenic microorganisms impair the safety of food and impose a risk to the health of consumers. The ingestion and colonization of pathogen microorganisms in the human digestive tract usually cause gastroenteritis, which is a condition characterized by diarrhea, intestinal cramps, nausea, vomiting, and fever. The estimation of foodborne diseases in the world is complex but international, national, and local efforts have been made to estimate the burden of foodborne diseases worldwide. The main agents involved in gastroenteritis are bacteria, although parasites, virus, yeasts, and molds are under-recognized causes of gastroenteritis and they have been becoming more frequent in last decade

This article is focusing on the characteristics of the main microorganisms (bacteria, yeasts, molds, virus, and parasites) involved in food spoilage or contamination as known and their recently discovered species, defects, and alterations in foodstuff, most common food associated with each foodborne disease, resistance to thermal processing, occurrence in different countries, outbreaks, and associated symptoms.

Adapted from:

Title: Main Groups of Microorganisms of Relevance for Food Safety and Stability: General Aspects

and Overall Description.

Authors: Jose M. Lorenzo, Paulo E. Munekata, Ruben Dominguez, Mirian Pateiro, Jorge A. Saraiva and Daniel Franco

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