

## Control strategies for microbial food spoilage.

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### Description

Spoilage bacteria are microbes that cannot be seen without a microscope. These affect foods to deteriorate and lead to unpleasant odors, textures and tastes. These have different shapes like rod-shaped bacteria and cone-shaped bacteria etc. These are single-celled organisms that make fruits and vegetables get mushy or greasy, or meaty to develop a foul odor and unpleasant taste. Microbes like yeasts, molds, and fungi are the main causes of food spoilage. They will grow on the outer surface of the food and also provide nutrients that help these organisms to grow. Microorganisms related to foods can be classified into three types: "spoilage," "pathogenic," and "useful." The factors that are responsible for food spoilage are temperature, humidity, heat, oxygen, light, and spoilage bacteria that can affect the quality of the fresh food. Food spoilage was mainly observed, when there was an unpleasant variation in the state and quality of the food. An example of food spoilage in our daily lives is the development of green fuzzy patches appearing on a piece of bread. There are various types of spoilage, such as physical spoilage and chemical spoilage. Physical spoilage is caused by the physical damage to food during harvesting, distribution, or processing.

Chemical spoilage is caused by breaking down the food, producing acids, or other waste products. Drying is one of the best food preservation techniques used from ancient days, which reduces water content and prevents bacterial growth. Refrigeration conserves food by reducing the growth and replication of microorganisms and inhibits the action of enzymes that cause food to decay. Microbes are unfit for the human consumption. To prevent food spoilage, clean the crispier surfaces frequently to reduce bacteria, and don't use storage containers and bottles without washing with soap and hot water. Food spoilage can be noticed by its appearances, such as a change in color, a change in texture, an unpleasant

odor, and an undesirable taste. It is very significant to know that, not all microorganisms are harmful to you. Some bacteria help in the digestion of food, protect against infection and maintain good health. The gut microbiome plays a vital role in your health by regulating digestion and improving immunity and many other aspects of health.

There are three types of microbes present in the gut, such as *Bacteroides*, *Prevotella*, and *Ruminococcus*. The main bacterial genus that helps in the degradation of cellulose is gram-positive *Ruminococcus* which breaks down the plant fiber into the monosaccharide glucose and leads to glycolysis. The bacteria and virus that leads to illness are *Clostridium perfringens*, *E. coli*, *Listeria*, *Norovirus*, *Campylobacter*, and *Salmonella*. Food spoilage leads to infectious diseases like whooping cough caused by *Bordetella pertussis*, Bubonic plague, TB (Tuberculosis), Malaria, Ringworm, and Athletes' foot. These microbes reach their target site in our body and attach to the target site and, once they obtain their nutrients from the host, they start replication and affect the immune system. The major bacteria associated with spoilage are *Brochothrix thermosphacta*, *Carnobacterium* spp., *Lactobacillus* spp., *Lactococcus* spp., *Leuconostoc* spp., *Pediococcus* spp., *Streptococcus* spp., *Kurthia zopfii*, and *Weissella* spp.

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