

## A Brief Description of Food Microbiology

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### Commentary

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### DESCRIPTION

Food microbiology is the study of microorganisms that live in, manufacture, or infect food. This includes the study of microorganisms that cause food spoilage, pathogens that can cause disease (especially if food is cooked or stored incorrectly), microbes that make fermented foods like cheese, yoghurt, bread, beer, and wine, and microbes that have other useful functions, such as producing probiotics.

### Subgroups of bacteria that affect food

Important groupings of bacteria in food have been classified based on particular criteria in the research of bacteria in food. These classifications have no taxonomic relevance. Lactic acid bacteria are bacteria that create lactic acid from carbohydrates. *Lactococcus*, *Leuconostoc*, *Pediococcus*, *Lactobacillus*, and *Streptococcus thermophilus* are the most common genera. Acetic acid is produced by bacteria such as *Acetobacter aceti*. Bacteria that generate propionic acid, such as *Propionibacterium freudenreichii*, are used to ferment dairy products. *Clostridium butyricum*, for example, produces butyric acid. Extracellular proteinases are produced by proteolytic bacteria to hydrolyze proteins. Bacteria from the genera *Micrococcus*, *Staphylococcus*, *Bacillus*, *Clostridium*, *Pseudomonas*, *Alteromonas*, *Flavobacterium*, and *Alcaligenes*, as well as *Enterobacteriaceae* and *Brevibacterium*, are included in

this category. Extracellular lipases produced by lipolytic bacteria hydrolyze triglycerides. Bacteria from the genera *Micrococcus*, *Staphylococcus*, *Pseudomonas*, *Alteromonas*, and *Flavobacterium* make up this category.

Complex carbohydrates are hydrolyzed by saccharolytic bacteria. *Bacillus*, *Clostridium*, *Aeromonas*, *Pseudomonas*, and *Enterobacter* bacteria are all included in this category.

*Bacillus*, *Clostridium*, *Pediococcus*, *Streptococcus*, and *Lactobacillus* are among the thermophilic bacteria that can survive temperatures exceeding 50 degrees Celsius. Pasteurization does not kill thermophilic microorganisms, including spores. Psychrotrophic bacteria are bacteria from the genera *Alcaligenes*, *Serratia*, *Leuconostoc*, *Carnobacterium*, *Brochothrix*, *Listeria*, and *Yersinia* that thrive in frigid temperatures below 5 degrees Celsius.

Bacteria that are halotolerant may withstand salt concentrations of more than 10%. This contains several *Vibrio* and *Corynebacterium* species. Aciduric bacteria may thrive in low pH environments.

While it is less osmophilic than yeasts and moulds, osmophilic bacteria may endure a greater osmotic environment. Anaerobes are hindered by oxygen, whereas aerobes demand it. Anaerobes that are facultative may grow both with and without oxygen. Some bacteria create gases as a result of food metabolism, while others make slime as a result of polysaccharide synthesis.

Aerobic, anaerobic, flat sour, thermophilic, and sulfide-producing bacteria are the subgroups of spore-producing bacteria. Coliforms, especially faecal coliforms (*E.coli*), are employed as a sanitation indicator. This category may contain enteric pathogens, which can cause gastrointestinal illness.

### Food safety

Food microbiology is concerned with food safety. Bacteria and viruses are among the disease-causing agents and pathogens that are easily spread through food. Microbial toxins are potentially potential dietary hazards; yet, microorganisms and their products can be employed to fight pathogenic bacteria. Pathogens can be killed and inhibited by probiotic bacteria, particularly those that generate bacteriocins. Purified bacteriocins, such as nisin, can also be added to food items directly.

Finally, viruses that solely infect bacteria, known as bacteriophages, can be utilised to destroy bacterial diseases. The majority of germs and viruses are eliminated by thorough food preparation, which includes adequate cooking. However, due to additional safety concerns, contaminants' poisons may not be able to transform into non-toxic forms when the contaminated food is heated or cooked.

### Fermentation

Fermentation is one of the strategies for preserving and changing the quality of food. Yeast is used to leaven bread, brew beer, and create wine, notably *Saccharomyces cerevisiae*. Lactic acid bacteria, for example, are utilised in the production of yoghurt, cheese, spicy sauce, pickles, fermented sausages, and kimchi. These fermentations have the common function of making the food product less friendly to other microbes, such as pathogens and spoilage-causing bacteria, hence increasing the shelf life of the food. Molds are also required for some cheese kinds to mature and acquire their own characteristics.