

## Microbial Community and its Vital Functions in Fermented Foods

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### DESCRIPTION

Fermentation has been an essential process in human food production for centuries, transforming raw ingredients into delicious and nutritious products. Central to this transformative process is the intricate and diverse microbial community that plays a pivotal role in creating the unique flavors, textures, and preservation of fermented foods. In this article, we will delve into the fascinating world of the microbial community and explore its crucial functions in the realm of fermented foods.

### The microbial symphony in fermentation

Fermentation is a microbial-driven process that involves the conversion of carbohydrates into organic acids, alcohols, and gases under anaerobic conditions. This transformative journey is orchestrated by a consortium of microorganisms, including bacteria, yeasts, and molds. Each microbial player brings its unique set of skills to the table, contributing to the final product's taste, aroma, and shelf life.

**Bacterial pioneers:** Lactic Acid Bacteria (LAB) are the cornerstone of many fermented foods. These bacteria, including species like *Lactobacillus* and *Bifidobacterium*, are responsible for producing lactic acid through the breakdown of sugars. Lactic acid not only imparts tanginess to foods but also acts as a natural preservative, inhibiting the growth of harmful pathogens. LAB also enhances nutrient availability and digestibility, making fermented foods more easily absorbed by our bodies.

**Yeasts:** Yeasts, such as *Saccharomyces cerevisiae*, are indispensable in the fermentation process. These microscopic fungi convert sugars into alcohol and carbon dioxide, crucial for the production of beverages like beer and wine. Moreover, yeasts contribute to the complex flavor profiles of fermented foods, releasing aromatic compounds that tantalize our taste buds.

**Molds:** In certain fermented delicacies like blue cheese, molds play a critical role. *Penicillium roqueforti*, for instance, lends blue cheese its distinctive blue veins and intense flavor. Molds not only transform the texture and appearance of foods but also produce enzymes that break down proteins and fats, enhancing the overall sensory experience.

### Functions of the microbial community

**Acidification and preservation:** One of the primary functions of the microbial community in fermented foods is the production of organic acids, primarily lactic acid. This natural acidification process creates an environment hostile to spoilage microbes, thereby preserving the food and extending its shelf life. The reduction in pH also contributes to the characteristic tangy taste of fermented products.

**Flavor development:** Microorganisms participate in complex biochemical reactions that generate a diverse range of flavor compounds. These compounds include esters, aldehydes, and ketones, which are responsible for the unique taste and aroma profiles of various fermented foods. The interplay between different microbes and their metabolic activities leads to the creation of intricate flavor profiles that differentiate one type of fermented food from another.

**Texture modification:** The microbial community influences the texture and mouthfeel of fermented foods. Enzymes produced by microbes break down proteins and starches, leading to desirable changes in consistency. For example, the production of exopolysaccharides by LAB can enhance the creaminess of yogurts and improve the stability of certain sauces.

**Nutrient enhancement:** Through enzymatic activities, microorganisms in fermented foods increase the bioavailability of nutrients. This process can make minerals and vitamins more easily absorbed by the human body, contributing to the overall nutritional value of the final product.

**Health benefits:** Some fermented foods offer potential health benefits beyond their nutritional value. Probiotics, live microorganisms with beneficial effects on human health, are present in certain fermented products. These probiotics can contribute to gut health by promoting a balanced gut microbiota and supporting digestion.

### CONCLUSION

The microbial community in fermented foods is akin to a symphony of microscopic species, each contributing its unique notes to create a dulcet and flavourful end product. From

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bacteria's acidification and preservation prowess to yeasts' flavor-enhancing capabilities and molds role in transformation, these

microorganisms play diverse and vital roles. Besides microbes in fermentation offer several health benefits to humans.