

## Role of Microbiology in Food Spoilage

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The foundation of human health and food security lies in ensuring a sufficient and safe food supply. To obtain this a comprehensive study on food microbiology is essential. The term “Food Microbiology” relates to the study of microorganisms that exist, contaminate, and ultimately results in the spoilage of food. The food system encompasses all stages from farm to fork, which includes raw materials, their processing, storage, transportation, and final dispatch till it reaches the end consumer. This holistic comprehension is pivotal in addressing and minimizing microbial spoilage within the food industry.

So, here is a need to understand the meaning of food spoilage – It’s a metabolic process that causes undesirable changes in the food thereby altering its sensory characteristics further resulting it to be unacceptable or unfit for human consumption. Food spoilages caused due to micro-organisms can be classified into – Bacterial or Fungal. These microorganisms can impact the foods anytime in the food chain from raw material to processing until packaging. The microbial activity also depends upon several intrinsic factors like - water activity ( $a_w$ ) and pH and extrinsic factors such as acidity and temperature abuse. Microbial action often tends to alterations in odour, colour and texture of the food eventually making it unacceptable to human health. During the breakdown of food by bacteria acids and other waste products are generated, the acting bacteria may not be harmful, but the waste products generated in the process of breakdown may reflect some unpleasant characteristics which could pose risks to consumer health.

These micro-organisms grown in all classes of food – poultry, seafood, meats, grains, dairy products and even processed foods. Below chart represents the most common types of microbial contaminations:

<b>Microbes</b>	<b>Commonly found in</b>
Salmonella	Eggs, Poultry, Meat, Unpasteurised milk or juice, Cheese, Fruits, Nuts, Spices and Vegetables.
Novovirus	Produce, Shellfish and Ready-to-eat foods.
Campylobacter	Raw and undercooked poultry, unpasteurised milk.
E.coli	Undercooked grounded beef, Unpasteurised milk or juices, Raw fruits and vegetables, Cheese and contaminated water.
Listeria	Ready-to-eat deli meat, Hotdogs, Unpasteurised milk or juices, and raw milk cheeses.
Clostridium perfringens	Poultry, Gravies, Beef.

The multifaceted nature of the food system, coupled with the various factors driving microbial spoilage, underscores the pressing need for innovative approaches. These approaches should focus on predicting and, ideally, preventing spoilage to minimize food waste at every stage, from harvest and post-harvest to processing and the consumer level.

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