



## Food microbiologists: Who are they? What do they do?

Words by Dr Dipon Sarkar

When you think about a food microbiologist, what is the image that comes to mind? Is it a person in a lab coat staring down a microscope, or looking at a Petri dish with questionable microscopic organisms isolated from our food? Even though this traditional image of the food microbiologist still rings true, the role has evolved and is no longer restricted to lab coats and Petri dishes. Nowadays, there are also food microbiologists working exclusively to develop computer models to assess product safety, or developing a machine learning algorithm to detect food spoilage, or working with humans and data to develop industry guidelines and government regulations.

So, what is food microbiology? It is a branch of microbiology that focuses on the study of microorganisms such as bacteria, fungi, yeasts, viruses and parasites in the context of food production, processing and consumption. The primary focus of a food microbiologist's work is to understand the interactions between food products and microorganisms that are either naturally present in foods, accidentally contaminate the food, or are intentionally inoculated in the food to enhance its characteristics.

The pathway to becoming a food microbiologist begins with building a strong educational foundation. This can be achieved through a bachelor degree with courses focusing on biology, microbiology, food science and chemistry, and these foundations

can be further developed through advanced degrees. This is followed by gaining work experience, understanding the regulatory framework, and furthering your skills through professional certifications and targeted on-the-job learning.

Food microbiologists may find work in:

- Food and beverage companies
- Food ingredient suppliers
- Analytical laboratories
- Academic research and teaching
- Private research companies
- Government agencies and regulatory bodies
- International food agencies, such as WHO.

Some of the functions food microbiologists might be involved in are:

**Microbial analysis:** This involves the identification and quantification of microorganisms in food products using a range of laboratory techniques, thus playing a pivotal role in maintaining the safety and quality of raw materials, ingredients and finished food products.

**Research and innovation:** Advancing knowledge in food microbiology is a core responsibility. This research leads to improved food safety practices, novel preservation methods and a deeper understanding of microbial interactions.

**Regulatory compliance:** Food microbiologists often work with government agencies and regulatory bodies to establish and enforce food safety standards and regulations.

**Fermentation:** Food microbiologists study fermentation processes used

in the production of various foods such as cheese, yogurt, bread, and using precision fermentation to create novel ingredients, food products and proteins. They manage and optimise these processes for desirable product characteristics.

**Microbial risk analysis:** Conducting risk assessments and developing risk assessment models helps estimate the likelihood of foodborne illness outbreaks due to specific pathogens, helping regulatory agencies and food producers make informed decisions to mitigate risks.

**Food safety management:**

Participating and developing food safety plans and HACCP plans to identify and control potential hazards in food production processes.

These are just some of the areas that a food microbiologist can work in. Nowadays, when cross-functional collaboration is encouraged, if not actively practiced, a food microbiologist may not be restricted to just one of these realms. Thus, you may find an academic professor doing research with food manufacturing companies while also providing expert advice on government regulations. Or you may find an industry R&D professional, holding an academic position in a university while teaching students and mentoring researchers.

In summary, through involvement in academia, regulatory bodies and industries, food microbiologists play a vital role in ensuring the food we consume is both safe to eat and of high quality. Their multidisciplinary expertise in microbiology, food safety and quality assurance has a profound impact on public health, consumer confidence and the success of food companies worldwide.

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