



Bacterial Allies: A Biotechnological Expedition against Post-Harvest Food Waste

Zilan Fan*

Department of Food Waste, Sapienza University of Rome, Rome, Italy

DESCRIPTION

In the global battle against hunger and food insecurity, one often overlooked aspect is post-harvest food loss. According to the Food and Agriculture Organization (FAO), approximately one-third of all food produced for human consumption is lost or wasted each year. This not only exacerbates food scarcity but also places immense strain on the environment and agricultural resources. In recent years, a potential avenue for addressing this issue has emerged through the application of microbiome-based biotechnology. The microbiome refers to the diverse community of microorganisms, including bacteria, fungi, and viruses, that inhabit a particular environment. In the context of agriculture, the plant microbiome plays a significant role in supporting plant health and enhancing resistance to diseases. Harnessing the potential of these microbial communities post-harvest has become a focal point for researchers and biotechnologists seeking sustainable solutions to reduce food loss.

Understanding the challenges of post-harvest food loss

Post-harvest food loss occurs during the storage, transportation, and processing of harvested crops. Microbial spoilage, pathogenic contamination, and environmental stress are key contributors to this issue. Traditional methods of addressing post-harvest losses involve the use of chemical preservatives, refrigeration, and controlled atmospheres. However, these methods often come with environmental and health concerns, prompting the need for alternative, microbiome-based strategies.

Microbiome-based biotechnology

Microbiome-based biotechnology leverages the power of beneficial microorganisms to combat post-harvest food loss. Here are several ways in which this innovative approach is making strides:

Biocontrol agents: Certain bacteria and fungi have demonstrated the ability to act as biocontrol agents, suppressing the growth of harmful pathogens responsible for food spoilage.

By applying these beneficial microorganisms to harvested crops, it is possible to create a protective barrier against spoilage and extend the shelf life of produce.

Probiotics for plants: Similar to the concept of probiotics in the human gut, probiotics for plants involve the application of beneficial microbes to enhance the overall health and resilience of crops. These microbes can promote nutrient uptake, improve stress tolerance, and fortify plants against diseases, thereby reducing post-harvest losses.

Microbial consortia: Researchers are exploring the use of microbial consortia, which involve the strategic combination of multiple beneficial microorganisms. This synergistic approach aims to address a broader spectrum of challenges, offering a more comprehensive solution to post-harvest food loss.

Post-harvest treatments: Microbiome-based treatments applied after harvest, such as biofilms or sprays containing beneficial microorganisms, can create a protective shield around fruits and vegetables. This shield helps prevent the invasion of spoilage-causing microbes and preserves the quality of the produce.

While microbiome-based biotechnology holds potential, several challenges must be addressed for widespread adoption. Standardization of application methods, scalability, and regulatory considerations are critical factors that require attention. Additionally, research efforts should continue to explore the diversity of microbial communities and their specific interactions with different crops. The future of microbiome-based biotechnology in reducing post-harvest food loss looks promising. As technology advances, the development of adjusted microbial solutions for specific crops and environmental conditions will likely become more sophisticated, offering farmers sustainable and effective tools to minimize food loss. Addressing post-harvest food loss is a significant step towards achieving global food security and sustainability. Microbiome-based biotechnology represents a cutting-edge approach that harnesses the power of nature to combat the challenges associated with food spoilage. As research in this field advances, integrating microbiome-based solutions into mainstream agricultural practices has the potential to revolutionize the way we handle, store, and transport harvested crops, ultimately contributing to a more resilient and sustainable food supply chain.

Correspondence to: Zilan Fan, Department of Food Waste, Sapienza University of Rome, Rome, Italy, E-mail: fanzilan78@gmail.com

Received: 27-Nov-2023, Manuscript No. JFPT-23-24445; **Editor assigned:** 30-Nov-2023, PreQC No. JFPT-23-24445 (PQ); **Reviewed:** 14-Dec-2023, QC No. JFPT-23-24445; **Revised:** 21-Dec-2023, Manuscript No. JFPT-23-24445 (R); **Published:** 28-Dec-2023, DOI: 10.35248/2157-7110.23.14.1075

Citation: Fan Z (2023) Bacterial Allies: A Biotechnological Expedition against Post-Harvest Food Waste. J Food Process Technol. 14:1075.

Copyright: © 2023 Fan Z. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.