

A Review of the Literature on Techniques for Recovering Microorganisms from Solid Surfaces Used in the Food Industry

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Introduction

Maintaining high levels of hygiene in the food industry is paramount to ensure the safety and quality of food products. One critical aspect of this is the effective recovery of microorganisms from solid surfaces in food processing environments. Understanding and implementing appropriate recovery techniques is crucial for accurate microbial assessment and subsequent control measures. This article provides an extensive review of the literature on various techniques employed for recovering microorganisms from solid surfaces within the food industry.

Description

Microbial contamination poses a significant risk in the food industry, potentially leading to foodborne illnesses and economic losses. Effective recovery techniques enable the detection and quantification of microorganisms present on surfaces, aiding in the implementation of targeted sanitation protocols and preventive measures. Surfaces in food processing environments vary widely, including stainless steel equipment, cutting boards, conveyor belts, and flooring. Each surface type presents unique challenges for microbial recovery due to factors such as material composition, surface roughness, and the presence of organic matter [1].

Swabbing involves the use of a sterile swab moistened with a neutralizing solution to collect microbial samples from surfaces. This method is widely used due to its simplicity and adaptability to various surface types. Contact plates consist of a solid agar medium enclosed within a plastic dish. They are pressed onto a surface, allowing microorganisms to transfer onto the agar. Contact plates are advantageous for assessing microbial load over a specific area [2].

Sponges, composed of materials such as cellulose or foam, are used to wipe surfaces, facilitating the collection of a larger sample area. Sponge sampling is particularly effective on irregular or porous surfaces. Rinsing involves the application of a sterile liquid, such as buffered peptone water, to wash microorganisms from a surface. Immersion, on the other hand, entails submerging the surface in a liquid for microbial recovery. These techniques are suitable for large equipment and utensils [3].

The choice of recovery technique should be tailored to the specific surface type being sampled. For example, swabbing is effective for smooth surfaces, while sponge sampling is more suitable for irregular or porous surfaces. Different recovery methods may vary in their effectiveness for recovering

specific microbial species. For example, spore-forming bacteria may require more vigorous techniques compared to vegetative cells [4].

It is crucial to validate the chosen recovery technique to ensure its accuracy and reliability. This may involve conducting comparative studies or spike-and-recovery experiments. Selective media are designed to support the growth of specific microorganisms while inhibiting others. Incorporating selective media into recovery techniques allows for the isolation of target organisms. Sonication involves the use of ultrasonic waves to dislodge microorganisms from surfaces. This technique can be particularly effective for removing adherent cells from biofilms [5]. Enrichment involves incubating recovered samples in a nutrient-rich environment to encourage the growth of specific microorganisms. This technique is useful for recovering low levels of target pathogens.

Conclusion

The recovery of microorganisms from solid surfaces in the food industry is a critical step in ensuring food safety and quality. Various techniques, such as swabbing, contact plates, sponge sampling, and rinsing/immersion, offer distinct advantages depending on the surface type and microbial species of interest. Consideration of surface characteristics and validation of chosen techniques are essential for accurate microbial assessment. Furthermore, enhancements like the use of selective media, sonication, and enrichment cultures can further improve recovery efficacy. By employing appropriate recovery techniques, the food industry can implement targeted sanitation measures, ultimately reducing the risk of foodborne illnesses and enhancing overall consumer safety.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Banatvala, N., A. R. Magnano, M. L. Carter and T. J. Barrett, et al. "Meat grinders and molecular epidemiology: two supermarket outbreaks of *E.coli* O157: H7 infection." *J Infect Dis* 173 (1996): 480-483.
2. Beuchat, Larry R. "Ecological factors influencing survival and growth of human pathogens on raw fruits and vegetables." *Microbes Infect* 4 (2002): 413-423.
3. Berends, BR van, F. Van Napan, D. A. A. Mossel and S. A. Burt, et al. "Salmonella spp. on pork at cutting plants and at the retail level and the influence of particular risk factors." *Int J Food Microbiol* 44 (1998): 207-217.
4. Vogel, Birte Fonnesbech, Lisbeth Truelstrup Hansen, Hanne Mordhorst and Lone Gram. "The survival of *Listeria monocytogenes* during long term desiccation is facilitated by sodium chloride and organic material." *Int J Food Microbiol* 140 (2010): 192-200.
5. Hirsch, P., F. E. W. Eckhardt and R. J. Palmer Jr. "Methods for the study of rock-inhabiting microorganisms—a mini review." *J Microbiol Method* 23 (1995): 143-167.

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Received: 02 September, 2023; Manuscript No. Jfim-23-118021; Editor Assigned: 04 September, 2023, PreQC No. P-118021; Reviewed: 16 September, 2023, QC No. Q-118021; Revised: 21 September, 2023, Manuscript No. R-118021; Published: 28 September, 2023, DOI: 10.37421/2572-4134.2023.9.299

How to cite this article: Jones, Sophia. "A Review of the Literature on Techniques for Recovering Microorganisms from Solid Surfaces Used in the Food Industry." *J Food Ind Microbiol* 9 (2023): 299.