

TAL 797 – Seminário

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## PHAGE PROTEINS AS SENSING MOLECULES IN THE DETECTION OF MICROBIAL CONTAMINANTS

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The use of bacteriophage-derived proteins, especially tail proteins such as tail spike and tail fiber, has emerged as a promising strategy for the rapid and specific detection of microbial contaminants. These proteins act as sensing molecules due to their high affinity and specificity for receptors present on the membrane of the target microorganism, enabling their application in biosensors aimed at microbiological control, including in the food industry. Moreover, unlike antibodies and enzymes, these proteins are usually more stable under variations in pH, temperature, and organic solvents, which favors their application in industrial environments with suboptimal conditions. They can also be produced on a large scale through heterologous expression, reducing costs and facilitating the standardization of detection systems. In the field of food safety, phage proteins have been used to detect pathogens such as *Salmonella spp.*, *Escherichia coli*, *Bacillus cereus*, and *Listeria monocytogenes*, as well as spoilage microorganisms like *Pseudomonas spp.*. Their application includes optical, electrochemical, and colorimetric biosensors, as well as systems for the capture and concentration of bacterial cells. The potential use of these proteins is further enhanced by the possibility of applying molecular engineering to improve the sensitivity and modify the specificity of these systems, or even by combining proteins to enable the simultaneous detection of different pathogens. Altogether, the use of phage proteins represents an innovative and efficient alternative for the early detection of contaminations, contributing to food quality and safety and reducing economic losses associated with microbial spoilage.

**Referências bibliográficas:**

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