Session AES-P-202 - AES02 Friday Food Systems & Food Fermentations Microbiology

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Solutes and pH Modulate the Antimicrobial Action of Rhamnolipids against Listeria Monocytogenes Biofilms

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Disclosures

M.Nitschke: None. **T.Passos:** n/a.

Abstract

The presence of ***Listeria monocytogenes*** in food is of great concern for public health once it can cause listeriosis, a foodborne disease with a high mortality rate. The notable ability of ***L. monocytogenes*** to adapt under stressful conditions together with their capacity to establish biofilms, is responsible for their persistence in food environments and subsequent contamination of products. To ensure safety, food processors constantly seek new strategies to effectively control ***L. monocytogenes.*** Microbial-derived surfactants such as rhamnolipids (RL), are considered green and sustainable alternatives to synthetics, furthermore, they have demonstrated potential for controlling several pathogens. Since food environments are typically exposed to diverse pH, solutes, temperatures, and water activity levels that may favor bacterial survival, it is crucial to consider these factors when evaluating the performance of antimicrobials. Our study focuses on the influence of pH and solutes in the antibacterial action of RL towards biofilms of ***Listeria monocytogenes***. Biofilms were established in culture media (TSYE) adjusted to different pH (5 to 8), NaCl (0 - 5%), and sucrose (0-50%) levels. The minimal biofilm inhibitory (MBIC) and minimal biofilm eradication (MBEC) concentrations of RL were determined by the peg-lid microplate method. A greater influence of the addition of solute on the antibiofilm activity of the RL was observed at pH 7.0, in which the application of the RL alone showed resistance (MBIC >2500 mg/L), whereas in the presence of sucrose and NaCl a MBIC of 39.0 mg/L was observed. At pH 5.0, the MBEC of RL was reduced from 78.1 mg/L to 9.7 mg/L and 19.5 mg/L by the addition of 5% NaCl and 50% sucrose respectively, improving the bactericidal effect of the biosurfactant. We hypothesize that the pH and solutes change the self-assembly structures of the RL molecules improving their interaction with the cells within the biofilm. These findings offer valuable information for developing RL-based innovative methods to control ***L. monocytogenes*** biofilms in food environments.