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Title: Investigation the effects of *Lactiplantibacillus sakei* postbiotics in aerosolized form as biopreservative in beef fillet

Abstract

This study aimed to prepare and characterize postbiotics of *Lactiplantibacillus sakei* (*L. sakei*) and to investigate its application as an anti-*Listeria* solution on beef fillets using aerosolization technique to deliver the postbiotics solution against *Listeria monocytogenes*. Postbiotics was prepared in MRS broth. The characterization of postbiotics was conducted by GC/MS and FTIR. Antioxidant properties of postbiotics were evaluated by DPPH and FRAP methods. Based on the MTT toxicity test, postbiotics were non-toxic at less than 500 mg/mL concentrations in L929 cell line. The antimicrobial test using the agar well diffusion method showed a zone of inhibition of 27.0 ± 1.2 mm. The antimicrobial properties of the postbiotics remained stable for one month at 4 and 25 °C. The effect of using postbiotics solution with different concentrations of 200 and 400 (mg/mL) by aerosolization method on the shelf life and inoculated *Listeria monocytogenes* was evaluated in beef fillet stored at 4 °C for 15 days. Treatment with postbiotics at 400 mg/mL concentration resulted in a significant reduction in the total count of mesophilic and psychrophilic population by 1.7 and 2 log CFU/g, respectively, compared to the control group. Additionally, the treatment exhibited a remarkable decrease in *L. monocytogenes* counts to 3.60 log CFU/g in beef fillets. The results of this study revealed that the postbiotics of *L. sakei* can be considered as potential antimicrobial/antioxidant additive for controlling foodborne pathogens in beef fillets to enhance meat safety and aerosolization is a promising method for developing an antimicrobial coating on meat for prolong the shelf life.

Keywords: Postbiotics, Biopreservation, Aerosolization, Beef fillet, Active packaging