

Control of Staphylococcus aureus in Meat System by in situ and ex situ Bacteriocins from Lactobacillus sakei and Pediococcus spp.

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Abstract : The present study consisted of an applied test in meat system to assess the effectiveness of three bio agents bacteriocinproducing strains: Lm24: Lactobacillus sakei, Lm14 and Lm25: Pediococcus spp. Two tests were carried out: The ex-situ test was intended for three batches added with crude bacteriocin solutions at 12.48 AU/ml for Lm25 and 8.4 AU/ml for Lm14 and Lm24. However, the in situ one consisted of four batches; three of them inoculated with one bacteriocinogenic Lm25, Lm14, Lm24, respectively. The fourth one was used in mixture: Lm14+m24 at approximately of 107 CFU/ml. The two used tests were done in the presence of the pathogen St. aureus ATCC 6538, as a test strain at 103 CFU/ml. Another batch served as a positive or a negative control was used too. The incubation was performed at 7°C. Total viable counts, staphylococci and lactic acid bacteria, at the beginning and at selected times with interval of three days were enumerated. Physicochemical determinations (except for in situ test): pH, dry mater, sugars, fat and total protein, at the beginning and at end of the experiment, were done, according to the international norms. Our results confirmed the ex situ effectiveness. Furthermore, the batches affected negatively the total microbial load over the incubation days, and showed a significant regression in staphylococcal load at day seven, for Lm14, Lm24, and Lm25 of 0.73, 2.11, and 2.4 log units. It should be noticed that, at the last day of culture, staphylococcal load was nil for the three batches. In the in situ test, the cultures displayed less inhibitory attitude and recorded a decrease in staphylococcal load, for Lm14, Lm24, Lm25, Lm14+m24 of 0.73, 0.20, 0.86, 0.032 log units. Therefore, physicochemical analysis for Lm14, Lm24, Lm25, Lm14+m24 showed an increase in pH from 5.50 to 5.77, 6.18, 5.96, 7.22, a decrease in dry mater from 7.30% to 7.05%, 6.87%, 6.32%, 6.00%. This result reflects the decrease in fat ranging from 1.53% to 1.49%, 1.07%, 0.99%, 0.87%; and total protein from 6.18% to 5.25%, 5.56%, 5.37%, 5.5%. This study suggests that the use of selected strains as Lm25 could lead to the best results and would help in preserving and extending the shelf life of lamb meat.

Keywords : biocontrol, in situ, ex situ, meat system, St. aureus, Lactobacillus sakei, Pediococcus spp.

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