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Study on efficiency of bacteriocin from Lactic Acid Bacteria for increasing the shelf life of fruits and vegetables

Bacteriocins are ribosomally synthesized antimicrobial peptides produced by lactic acid bacteria (LAB), with promising applications in food preservation and human health. In this study, food samples were screened for bacteriocin-producing LAB using standard microbiological methods. The isolates were characterized by Gram's staining and biochemical tests, followed by molecular identification through 16S rRNA sequencing. Among them two isolates, A1b and A7a, showed strong antibacterial activity. The isolate A7a was chosen further studies as it stronger antibacterial activity. The same was identified as Enterococcus faecium based on 16s rRNA sequencing and phylogenetic tree analysis. The Enterococcus faecium was found to be positive for bacteriocin genes (entA and entB) based on PCR analysis. The antimicrobial effect of bacteriocin extracts was further validated in food models, where treated fruits and vegetables exhibited delayed spoilage compared to untreated controls. Both isolates were able to slow down spoilage when used on fruits and vegetables, as the treated samples stayed fresh longer than untreated controls. This shows that the bacteriocin purified from LAB, especially A7a, can be used as natural preservative to keep food safe and reduce the need for artificial chemicals. The findings highlight the potential of LAB-derived bacteriocins as natural bio-preservatives, offering an eco-friendly alternative to synthetic preservatives and contributing to food safety.

Keywords: Bacteriocins, Lactic acid bacteria, Food preservation, Enterococcus faecium, Antimicrobial activity

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