

Title Production of a food ingredient with antimicrobial activity useful in the biopreservation of minimally processed vegetables

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Abstract

The demand of minimally processed vegetables (MPV) is continually increasing. It represents a challenge for researches to make the vegetables stable and safe. The MPV retain much of their indigenous micro flora after minimal processing such as *Listeria monocytogenes*. Based on the characteristics of this microorganism, the FDA maintains a policy of "zero tolerance" for *Listeria monocytogenes* in ready to eat food. Preservation strategies based on multiple hurdle systems to control *Listeria monocytogenes* include the potential addition of bacteriocins to foods. Our main objective was to obtain a food ingredient containing bacteriocins, produced during the growth of *Lactococcus lactis* UQ2 on sweet whey as alternative culture medium, and use of this ingredient to inhibit *L. monocytogenes* in a MP lettuce salad. The activities of the cell free extracts (CFE) and of the powdered ingredient were tested by the well diffusion assay. The minimal inhibitory concentration (MIC) of the ingredient versus *L. monocytogenes* was determined conducting an inhibitory kinetics. The ingredient was added by dipping the lettuce in a solution having its MIC, and the samples were packed and stored at 4°C and 37°C, sampling at time intervals to check inhibition. The CFE activity was 12,800 AU/mL, and it was fully recovered after spray drying (1,031,090 AU/g). The inhibitory kinetics of the dry ingredient (273,066 AU/mL) versus *L. monocytogenes* in Soy Trypticasein Broth is shown in the figure. The MIC of the ingredient was 409,600 AU/mL. Application of bacteriocins in combination with traditional methods of preservation could be effective in controlling pathogenic bacteria such as *L. monocytogenes* in MPV. Bacteriocins in combination with advanced technologies such as pulsed electric fields or high hydrostatic pressure could lead to replacement of chemical preservatives, or may permit less severe thermal processing, while still maintaining the safety and quality of foods.