

TITLE: DISCONTINUOUS FERMENTATION PROCESS BY PROBIOTIC BACTERIUM TO PRODUCE ANTIMICROBIAL PEPTIDE WITH POTENTIAL APPLICATION AS FOOD PRESERVATIVE

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ABSTRACT:

Chemical preservatives have been traditionally used during the manufacturing of processed products, however the continuous growing of interest of consumers for fresh and natural products makes necessary to search for alternative compounds. Food industries have been widely using lactic acid bacteria (LAB) as natural preservatives, due to their ability to produce antimicrobial peptides. Among the promising LAB, *Pediococcus pentosaceus* can be used as starter culture in food fermentations and as ingredient for probiotic foods, contributing to the organoleptic characteristics of foods at the same time prolonging the shelf life and safety of these products. The antimicrobial peptide evaluated in this work was produced by discontinuous fermentation process (30°C, 200 rpm, anaerobiosis) by *P. pentosaceus* in MRS medium supplemented with extra nitrogen source (1.5%, w/v) to improve its activity, which was determined by agar well diffusion assay against the indicator strain *Lactobacillus sakei*. Thereafter, the peptide ID50 was also determined. *P. pentosaceus* was able to grown in MRS medium with or without nitrogen supplementation but, this extra supplement was significantly important to increase cell mass concentration in 1.5x at the end of the fermentation process (3.4 g/L) and to speed up its growth during its exponential phase of growth (generation time = 1.28 h). The antimicrobial activity against *Lactobacillus sakei*, a spoilage bacterium of fresh meat products, showed the highest sizes of inhibition halos at 24 h and 48 h of 19.20 mm and 17.30 mm, respectively. The ID50 (50% of bacteria inhibition) was obtained when this peptide produced at 24 h was diluted 50x. In this context, this antimicrobial peptide produced after fermentation by *Pediococcus pentosaceus* have shown to exert an important antimicrobial activity against *Lactobacillus sakei* suggesting the possibility to be used in future as food preservative.

Keywords: Lactic acid bacteria, *Pediococcus pentosaceus*, antimicrobial peptide, natural food preservative

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