

**Title: EFFECT OF INULIN AND SUCROSE ON GROWTH AND BACTERIOCIN PRODUCTION BY *Pediococcus pentosaceus***

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**Abstract:**

*Pediococcus pentosaceus* is a lactic acid bacterium with probiotic properties. Inulin is a prebiotic and prebiotics are carbohydrates non-digestible by human gastrointestinal tract and they stimulate growth or activity of gastrointestinal microbiota, providing benefits to human health. Sucrose is a disaccharide fermented by lactic acid bacteria. Some studies have demonstrated the ability of inulin and sucrose as carbon alternative sources, as well as promoting the growth of lactic acid bacteria. In the inulin application, it becomes increasingly important to study the interactions between these lactic acid bacteria and fibers considered prebiotic during the fermentation process in order to increase the production of high-value biomolecules such as bacteriocins. Bacteriocins are peptides produced by various species of bacteria and exhibit antimicrobial properties. Those that are produced by lactic acid bacteria have a great interest in food and pharmaceutical industry. In this context, the aim of this study was to evaluate the supplementation effect of the prebiotic inulin and the sucrose on growth and bacteriocin (pediocin) production by *P. pentosaceus*. The study was carried out with *P. pentosaceus* ATCC 43200. It was grown in MRS broth with 20g/L of dextrose pH 6.0-6.5 (control 1) and pH 5.0 (control 2). To evaluate the growth and bacteriocin production, this strain was cultivated under agitation (100 rpm) at 30°C in MRS pH 5.0 supplemented with 1% of inulin and sucrose. Samples were harvested every 2 hours for analysis of cell growth (dry weight), pH, lactate and bacteriocin production. As bioindicator strains, were used *Listeria monocytogenes* 101 and *Escherichia coli* ATCC 25922. As a result, *P. pentosaceus* grown with dextrose (controls 1-2) showed the higher dry weight (2.61 g/L and 2.51g/L, respectively). When it was cultivated in supplemented broth pH 5.0, the dry weight was not greater than 1.81 g/L. Control 1 produced higher concentration of lactate (11.08 g/L) and the lactate production justifying the decreasing in pH broth. The best inhibition zones were produced when the *P. pentosaceus* ATCC 43200 was cultivated in supplemented broth and *E. coli* showed the greater inhibition zone (26.38 mm). As a conclusion, to improve the bacteriocin inhibition effect, *P. pentosaceus* ATCC 43200 should be grown in supplemented broth with more carbon source, as inulin and sucrose.

**Keywords:** Lactic acid bacteria, *Pediococcus pentosaceus*, bacteriocin, prebiotic, probiotic

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