

TITLE: ANTI-LISTERIAL EFFECT OF A BACTERIOCIN-LIKE SUBSTANCE PRODUCED BY *Bacillus amyloliquefaciens*

AUTHORS: BENITEZ, L.B.¹; DE SOUZA, M.P.¹; BRANDELLI, A.²

INSTITUTIONS: ¹UNIVERSIDADE DE SANTA CRUZ DO SUL, UNISC, SANTA CRUZ DO SUL, RS (AVENIDA INDEPENDÊNCIA, 2293, CEP 96816-501, SANTA CRUZ DO SUL – RS, BRAZIL); ²UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL, UFRGS, PORTO ALEGRE, RS (ICTA, CAMPUS DO VALE)

Production of antimicrobial peptides is known as a widespread strategy used by microorganisms to combat other microorganisms. The mode of action of antimicrobial peptides is diverse and their antimicrobial effect can occur by permeabilization of the cell membrane of the target cells. The *Bacillus* genus has several species of industrial importance and has a historical of safe use in foods. *Bacillus amyloliquefaciens* LBM 5506 produce a bacteriocin-like substance (BLS) with inhibitory activity against pathogenic and food spoilage bacteria. The aim of this work was to investigate the effect and the mode of action of the antimicrobial peptide LBM 5006, and to evaluate its potential use as antimicrobial to prevent the proliferation of *Listeria monocytogenes* ATCC 7644, a foodborne pathogen. To assess the effect of the BLS on the growth of bacteria the substance (final concentration 1600 AU mL⁻¹) was added to culture of indicator strain after 4,5 h of cultivation, and measured by turbidity and number of viable cell at 2 h intervals. Minimal Inhibitory Concentration (MIC), Minimal Bactericidal Concentration (MBC) and screening for hemolytic activity of the BLS were evaluated. The bacteriocin treated and non-treated cells of *L. monocytogenes* were prepared to scanning electron microscopy (SEM). Exposure of cell suspensions of *L. monocytogenes* to the BLS caused extensive cell viability loss and reduction in optical density (4 log cycles) associated with cell lysis. The MIC was determined as 400 AU mL⁻¹, whereas a dose of 3200 AU mL⁻¹ was needed to achieve a bactericidal effect (MBC). The hemolytic activity was assayed on sheep blood agar and negative reactions were observed. Scanning electron microscopy showed changes in cell morphology and topography associated with the damages inflicted in the cell envelope. The BLS was bacteriolytic and bactericidal to *L. monocytogenes*. Understanding the mechanism of action of bacteriocin is important because it allows its effective use as an antimicrobial. The bacteriocin LBM 5006 produced by *B. amyloliquefaciens* may represent a novel antimicrobial compound with potential applications in food safety.

Keywords: Bacteriocin, *Bacillus amyloliquefaciens*, *Listeria monocytogenes*

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