XII CONGRESO ARGENTINO DE MICROBIOLOGIA GENERAL

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San Miguel de Tucumán | ARGENTINA

SAMIGE

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MM-018

STUDY OF THE SYNERGIC INTERACTION EFFECT BETWEEN NISIN AND THE *Shigella flexneri* 2'S ANTIMICROBIAL PEPTIDE, ON FOODBORNE BACTERIAL PATHOGENS.

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Bacteriocins are antimicrobial peptides that have antagonistic effects against other organisms. Nisin is the most studied bacteriocin able to inhibit a broad spectrum of food spoilage. *Shigella flexneri* 2 AC172 produce a bacteriocin like peptide that displays antimicrobial activity against *E. coli* AB1133. In this work we evaluated the synergistic effect produced by the combination of nisin with cell-free supernatant of *Shigella flexneri* 2 AC172 on the sensitive growth. The antimicrobial activity of these peptides, alone or in combination, against foodborne bacterial pathogens was determined by the minimal inhibitory concentration (MIC) method, followed by the optical density determination at 600 nm, using a microplate reader. For these purpose, a 96-well microplate containing serial double dilutions of nisin, the cell-free supernatant of *Shigella flexneri* 2 AC172 or different nisin/cell-free supernatant amount combination, were inoculated with a sensitive bacterial suspension containing 104–105 CFU/ml, and incubated for 24 h at 37°C. The MIC values were used to determinate the Fractional inhibitory concentration (FIC) and the FIC index (FICI), which finally defined the synergistic effect exert by them. These natural antimicrobial combinations represent a useful biotechnological strategy applicable to preservation of the food industry, in order to combat foodborne pathogens that can affect the human health.

MM-019

BIOFILM PRODUCING LACTIC ACID BACTERIA AS AN ALTERNATIVE TO CONTROL FOOD CONTAMINATIONS

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Biofilms are complex structures of microorganisms that colonize various biotic or abiotic surfaces. These organized communities are formed by bacteria embedded in a highly hydrated extracellular matrix that is composed mainly of polysaccharides, proteins, DNA and other substances. Several bacterial surface structures are necessary for this surface adhesion and an environment that favors the formation of biofilm against planktonic growth is required. The presence of biofilms is common in food industry and represents a concern because bacteria can adhere to almost any type of surface, such as plastic, metal, glass, soil particles and wood. Lactic bacteria are generally recognized as safe (GRAS) and could be an alternative for the biocontrol of pathogenic microorganisms biofilms forming in the food production chain. Use of probiotic biofilms can be an alternative approach for reducing the formation of pathogenic biofilms in food industries. The objective of this work was to study the biofilm production of lactic acid bacteria in different substrates and in different surfaces such as plastic, glass and stainless steel, commonly used in food industry. Biofilm formation was measured by violet crystal and plaque counts of seven strains of lactobacilli: *Lb. kefiri* CIDCA 83113, CIDCA 8321, CIDCA 8344 and CIDCA 5818, *Lb. plantarum* CIDCA 83114 and CIDCA 8327 and *Lb. delbrueckii subsp. lactis* CIDCA 133. These have different characteristics such as presence of S-layer, exopolysaccharide or glucan production, autoaggregation and hydrophobicity. The percentage of autoaggregation by decreasing OD at 600 nm and the percentage of hydrophobicity by partition in hexadecane and xylene (MATH method) was measured. For measurement of biofilm formation, 1 ml of medium (MRS and BHI) was inoculated with lactobacilli in 24 wells culture plates. For viable counts, the adhered bacteria were resuspended in PBS and counted in MRS agar plates. Only *Lb. kefiri* CIDCA 8321 and CIDCA 8344 strains presented a percentage of autoaggregation greater than 50%. Both strains also showed the highest hydrophobicity. None of the lactobacilli tested form biofilm in BHI medium. On the other hand, except for CIDCA 8321 strain that did not develop biofilm on any probed condition, the lactobacilli can form biofilm in MRS medium. The lowest biofilm production was observed in plastic, whereas in glass and stainless steel lactobacilli present high capacity of biofilm formation. It is remarkable that *Lb. plantarum* CIDCA 83114 is the one with the highest capacity for biofilm formation in the three surfaces studied, being stainless steel the most suitable surface for biofilm production. We observed that both hydrophobic and hydrophilic strains are capable of producing biofilm. We demonstrated that lactobacilli can form biofilm and this property depends on surface and growth media. This could be used as an alternative control of food pathogens