

TITLE: THE EFFECT OF VALINE AND ASPARTIC ACID ON THE PRODUCTION OF PELGIPEPTINS

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ABSTRACT:

Paenibacillus elgii AC13 isolated from Cerrado's soil produces a family of antimicrobial lipopeptides named pelgipeptins. These lipopeptides are produced by a Nonribosomal Peptide Synthase (NRPS) and possesses nine amino acids in its primary sequence. Pelgipeptins are in fact a family of four isoforms with identical nonapeptide sequences except for the amino acid residue in the second position, which can be either a valine or isoleucine. This work aimed to identify the influence of the amendment of two amino acids to the culture medium on the production of pelgipeptins. Valine was selected as the amino acid that is present in the primary sequence of pelgipeptins and acid aspartic is an amino acid absent from its primary sequence. Each amino acid was added to a chemical defined medium in a concentration of 1 g.L⁻¹. Then 10³ spores.mL⁻¹ of *P. elgii* AC13 was inoculated and incubated at 37°C. Samples were collected at every 24 hours of culture up to 96 hours. For each sample, pelgipeptin concentration was determined in a HPLC-RP and identified by MALDI-TOF/MS. In addition, the biomass was measured by dry weight and the cell cycle observation was determined in a Neubauer chamber. The results demonstrated that cultures grown with valine completed the cell cycle in 96 h, when only spores were observed. Cultures with aspartic acid do not complete the cell cycle and formed biofilm in 72 hours. However, there are no statistic differences in cell number or biomass at 96 h of growth in either amino acid. The total pelgipeptin concentration at 96 h was 121.83 (±56.8) µg.mL⁻¹ in acid aspartic and 93.30 (±16,3) µg.mL⁻¹ in valine, with no statistic difference. Although both cultures produced similar amounts of total pelgipeptins, the culture with valine showed an increase in the production of the pelgipeptin isoforms with valine in the second position, while the culture with acid aspartic shown presented a standard production of each pelgipeptin isoforms. These results indicate that the production of a pelgipeptin isoform can be increased by adding valine as the sole amino acid in the medium.

Keywords: Non Ribossomal Synthetized Peptide production, HPLC, Amino acids

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