Biopeptides from Milk Fermented by *Limosilactobacillus fermentum* (LBF 433): A Peptidomic Study

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Peptidomics of food-derived biopeptides explores compounds generated during food hydrolysis, highlighting protease-mediated hydrolysis by lactic acid bacteria as a cost-effective and efficient method for producing bioactive peptides. This study describes the peptidomics of peptides from whole milk fermentation by *Limosilactobacillus fermentum* (LBF 433), identified using nanoLC-MS/MS and analyzed with *in silico* prediction tools. A total of 232 peptides were identified, averaging 13.56 residues and a molecular mass of 1544.18 Da. The analysis revealed an average isoelectric point of 7.1 and a net charge of 0.894 at pH 7.0. In terms of composition, the peptides averaged 2.60 aliphatic, 1.71 aromatic, 5.66 non-polar, 4.49 polar, and 2.77 charged residues. The average hydrophobicity percentage was 42.23%, and 56.03% of the peptides showed good water solubility. The acid-base profile indicated 61.63% were basic, 13.36% acidic, and 25% neutral. These findings suggest that the peptides are stable in acidic environments, such as the gastrointestinal tract, due to their average molecular mass and low isoelectric point. The positive net charge at neutral pH and presence of basic amino acids suggest antimicrobial potential. Hydrophobic residues favor interactions with membranes, implying immunomodulatory and anti-inflammatory effects, making these peptides suitable for nutraceutical and pharmaceutical applications.

Keywords: Bioactivity; Anti-inflammatory; Immunomodulatory; Biotechnology