In vitro study of probiotic Lactobacillus helveticus: Antibacterial effects on Porphyromonas gingivalis

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Abstract

Probiotics are gaining attention for their benefits as a supplement to improve oral health. This study aimed to evaluate the antibacterial effect of the probiotic Lactobacillus helveticus against Porphyromonas gingivalis, a significant pathogen in periodontal diseases. Antibacterial susceptibility was assessed using the well diffusion assay, with 0.12% chlorhexidine (CHX) served as the positive control. Biofilm biomass was evaluated using crystal violet staining. Cell viability in P. gingivalis treated with L. helveticus was determined using the LIVE/DEAD Baclight bacterial assay via fluorescence microscopy. Ultra-morphological alterations in these cells were further examined using Field Emission Scanning Electron Microscopy. The results indicated that L. helveticus significantly reduced the growth of P. gingivalis. The highest concentration of 10^9 cells/mL achieved the most substantial inhibition in the well diffusion assay, followed by concentrations of 10^8 cells/mL

and 10^7 cells/mL, which demonstrated a clear dose-dependent response. Furthermore, biofilms of P. gingivalis treated with L. helveticus exhibited a notable biomass reduction of up to 85% at the highest concentrations. LIVE/DEAD staining confirmed a decreased in cell viability among the treated populations, while FESEM analysis revealed morphological disruptions in P. gingivalis cells treated with L. helveticus. These findings suggest that L. helveticus has a potent antibacterial effect against P. gingivalis, highlighting the need for further research to identify the optimal probiotic strategies that could enhance periodontal health.

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