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Effect of Probiotics and Probiotic Cell-Free Supernatants on Staphylococcus epidermidis Biofilm Growth

Staphylococcus epidermidis (S.epidermidis) is an opportunistic pathogen normally found on human skin. S. epidermidis can form a biofilm under favorable conditions. Biofilms protect the bacteria from antibiotics making them difficult to eradicate. Recently, there has been interest in the use of probiotic bacteria as an antimicrobial agent against biofilm growth. Probiotics are considered nonpathogenic “good bacteria” and can have beneficial effects against harmful bacteria. The purpose of this research was to investigate the potential inhibitory effects of two probiotics—Lactobacillus acidophilus (L. acidophilus) and Streptococcus salivarius (S. salivarius)—against S. epidermidis biofilm growth. Probiotic cells were incubated with S. epidermidis cells under conditions favorable for biofilm growth. L. acidophilus and S. salivarius were combined in a co-culture with S. epidermidis and biofilm production was assayed. The same procedure was repeated with probiotic cell-free supernatants to determine if the

probiotics were creating an environment unsuitable for biofilm adhesion. Biofilm growth was quantified through staining and absorbance measurements. S. salivarius cells appeared to reduce S. epidermidis biofilm growth compared to the positive control (S. epidermidis and media), whereas the L. acidophilus cells enhanced biofilm growth. The cell mixture (L. acidophilus and S. salivarius) also appeared to enhance biofilm growth, but to a lesser extent than L. acidophilus alone. The L. acidophilus cell-free supernatants and supernatant mixture both enhanced S. epidermidis biofilm growth. S. salivarius cell free supernatants did not inhibit biofilm growth. Further research should be done regarding the enhancement of S. epidermidis biofilm growth by L. acidophilus to better understand how these bacteria interact, as this finding contradicts current literature. L. acidophilus could possibly be utilized to grow stronger and more visible S. epidermidis biofilms in research.

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