An Investigative Study on the Effect of Fibroin Protein Application on Gram-positive and Gram-negative Bacteria

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The purpose of this experiment was to test the inhibitory effect of fibroin protein on gram-positive and gram-negative bacteria. It was hypothesized that the application of 5% fibroin solution would inhibit the growth of both gram-positive and gram-negative bacteria. In order to test the hypothesis, two different methods were used. First, bacterial colony area with fibroin application versus without fibroin application was measured by using serial dilutions of E. coli and S. salivarius. Second, the zone of inhibition of 20uL fibroin disks versus the zone of inhibition by 20uL ampicillin disks as a control were compared by using E. coli, S. salivarius, and S. epidermidis broths. Using area calculation, it was found that the application of fibroin inhibited the growth of E. coli by 70.12% yet showed no visible inhibition of S. salivarius. Using the zone of inhibition, it was found that there was no observable zone of inhibition by the 20uL fibroin disks for all three types of bacteria. Fibroin inhibited the growth of E. coli in the first method due to the decreased concentration of the bacterial dilutions used. The data did not support the hypothesis, as fibroin did not inhibit the growth of gram-positive bacteria. In conclusion, fibroin inhibits the growth of low concentrations of gram-negative bacteria. Further experiments are being conducted to test the threshold of gram-negative bacterial concentration that fibroin can sufficiently inhibit.

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