# Preventing Surgical Site Infections: Designing a Novel Post-Surgical Treatment Using Silver Nitrate and Ayurvedic Extracts in Combination With DNA Sequence Analysis

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Surgical Site Infections are infections that occur after a patient underwent a major surgical procedure. Those who contract them experience a decreased quality of life and an increased economic burden. This project seeks to develop an effective antibacterial treatment to reduce Staphylococcus epidermidis growth on surgical sites using components that are easily accessible and affordable. Antibacterial substances 0.005 M Silver Nitrate, T. bellirica, and E. officinalis were tested individually, then combined. Testing was conducted by setting the petri dishes with agar gel and gauze, pouring the treatments in, and inoculating them with bacteria. The plates were sealed and incubated for 120 hours. The amounts tested for E. officinalis and T. bellirica were 0.25, 0.75, 1.25, 1.75, and 2.25 grams and those tested for 0.005 M Silver Nitrate were the same values but in milliliters. The data was collected by measuring the area of bacterial growth and results were run through an ANOVA and Tukey HSD test. Although the first method testing the impact of gauze had no significance ($p>0.01$), the second and third method testing individual and combination treatments did (both $p<0.01$), suggesting that a treatment using a combination of T. bellirica and silver nitrate can be used to prevent bacterial growth. In addition, a DNA Sequence Analysis was completed to determine percent similarities and amino acid frequencies between S. aureus and S. epidermidis strands to help determine other factors for the prevention of bacterial biofilm formation.

**Awards Won:**