

The Effects of Plant Derived Compounds Protocatechuic Acid and Physcion on Bacterial Activity

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Investigation into plant compounds as potential antimicrobial agents is increasingly important in the face of emergent and resistant diseases. Protocatechuic Acid, derived from *Hibiscus sabdariffa*, and Physcion, from *Rheum emodi* (Chinese Rhubarb), are both used in traditional Asian medicine and have shown promising antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* bacteria (Liu, Tsao, & Yin, 2005; Babu et al., 2003; Basu, Ghosh, & Hazra, 2005). Antimicrobial effectiveness of Protocatechuic Acid (PCA) and Physcion against *S. aureus*, *E. coli*, *E. Coli* 0157:H7, and Methicillin Resistant *S. Aureus* (MRSA) was compared as a measure of antimicrobial effectiveness across bacterial strains with different survival mechanisms.

Antimicrobial sensitivity was determined by the use of the disk diffusion method on Mueller Hinton agar. Bacterial cultures for each strain were cultured, and morphologically similar colonies were isolated, then grown in Tryptic Soy Broth to ensure purity of the organisms being used to determine sensitivity. Control and experimental group solutions were prepared as follows using sterile deionized water: Protocatechuic Acid in 4.8% DMSO with a final concentration of 0.8 mg/mL, Physcion in 16% DMSO with a final concentration of 0.2 mg/mL, 4.8% DMSO, and 16% DMSO. There are no published standards on the zones of inhibition for these compounds against various bacteria, so the significance of the resulting data was determined by statistical ANOVA.

From comparison of the zones of inhibition for experimental and control groups, neither Protocatechuic Acid or Physcion had a significant effect on bacterial growth, with a p-value of >0.05 . Since prior studies on the antibacterial effects of Protocatechuic Acid and Physcion have shown antibacterial effects at equal concentrations as those used in this experiment, these findings were unexpected. The results may be limited by improper or impure material choices, or by variance in bacterial activity in different solvents. Although the null hypothesis that there were no differences between each group was supported in this experiment, further investigation is warranted given the results of prior studies, and the need for new and improved ways to inhibit bacterial growth and develop antibiotics.