# Silver Armor Against Bacteria: A Battle of Antimicrobial Effectiveness

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For many farmers, finding efficient ways to fight infection strengthens their business and saves their crops. Florida's climate makes agriculture especially susceptible to disease or the elements. Thus, I set out to explore if a traditional at-home remedy, colloidal silver, could be used as an effective inhibitor of bacterial growth, comparing effects across gram-negative and gram-positive species. I started by creating my colloidal silver, suspending silver particles in a solvent. Wiring eight nine-volt batteries, I created my colloidal silver machine. It ran an electrical current through suspended silver jewelry chains in a container of distilled water to create colloidal silver treatments. I compared these treatments to a storebought solution via the Kirby-Baur method. Petri dishes were divided into four quadrants, and a treatment-soaked square was placed in each. So, every plate had four square paper blots in them, each with differing silver. After taping the plates closed, I recorded the dimensions of Zones of Clearance (ZOC) and unexpected bacterial growth surrounding treatment squares. The experiment was replicated four times. I analyzed using one-way ANOVA with post hoc separation of means using the T-test and Tukey's HSD. The positive control solution was the most effective bactericide across all species, followed by Treatment-2, which caused ZOC in gram-negative species. The homemade 3ppm did not significantly affect bacterial suppression, while activity at 5ppm suggests that colloidal systems could produce antibacterial solutions. It was noted that a beneficial plant bacterium showed an increase in growth after Treatment-3. Improving homemade systems may provide a low-cost treatment solution against some bacteria species important to backyard agriculturists.

**Awards Won:**