Utilizing FGE To Improve Agricultural Health

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Crown gall causes great financial loss in plant nurseries, as up to 80% of plants have been lost. Crown gall is a disease that consists of tumor-like galls found in roots and trunks with a prominent bacteria known as agrobacterium tumefaciens. This project was focused on using easily obtainable ingredients, garlic, to kill crown gall bacteria found in plants. Independent variables included concentrations of garlic (g) to water (mL) & antibiotic trials, the dependent variable was the diffusion of bacteria across the plate (mm), and the hypothesis was: if fresh garlic extract is used on the plant disease agrobacterium tumefaciens, it will improve agricultural health by preventing further growth of the bacteria. The procedures consisted of creating fresh garlic extract, creating antibiotic sensi discs with FGE, creating agar plates, and testing/retrieving results via the Kirby Baur test. Penicillin, streptomycin, and erythromycin were used and compared to the garlic trials. Twelve individual t-tests were run with a 98% confidence that all trials excluding penicillin were statistically significant. An ANOVA test was also conducted, showing that no one trial performed any worse or better than another with a p-value of 4.6. The evidence was sufficient to accept the hypothesis and reject the null. To expand on this project in the future, different potential antibiotics could be used in place of garlic. Continuing the testing of garlic extract on plant diseases other than crown gall would prevent more harmful diseases from expanding on important crops that are crucial in the agriculture business.

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