The Use of Different Concentrations of Tannic Acid Powder, St. Louis River Water, and Non-resistant Staphylococcus aureus on the Bioremediation of Motor Oil Contaminated Aquatic Systems

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The question was: What effect do different concentrations of tannic acid powder, St. Louis River water, and non-resistant Staphylococcus aureus have on bacterial growth and biofilm development, to bioremediate aquatic systems contaminated with motor oil? The Hypothesis was: If Staphylococcus aureus and different concentrations of tannic acid powder and St. Louis River water were incubated with motor oil, then S. aureus biofilm development would be enhanced, improving remediation of motor oil. Different concentrations of river water, S. aureus broth, and motor oil were pipetted into well plates, ten microliters of S. aureus broth was added to three of six trials. This was repeated adding different concentrations of motor oil (50, 25, 10, 5, 1, 0.5, 0.1 and 0% motor oil). Also, tannic acid powder concentrations of 0, 0.0001, 0.001, 0.01, 0.1, and 1 gram per 50 milliliters (ml) of distilled water were made. Each dilution was pipetted into 12 wells for each concentration, eight of which had S. aureus and four without. This setup was repeated adding one milliliter of 0.05g/L of motor oil. The hypothesis was partially supported. The different concentrations of St. Louis River water increased biofilm development when compared to overall free-floating bacterial growth, until the 100 percent river water concentration, where the optical density of S. aureus biofilm significantly decreased. The tannic acid powder test became contaminated. Also, the presence of motor oil did significantly increase biofilm development at all concentrations, improving possible bioremediation of motor oil in aquatic systems.

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