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Bio 1520

Lab 2 Report

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**Antibiotic and Mouthwash Effects on Bacterial Growth in High Temperature Setting**

**Abstract**

We hypothesize that Penicillin, mouthwash, and Tetracycline will inhibit bacterial growth when grown in agar solution at 42°C. The purpose of this study is to determine what and how environmental conditions effect bacterial growth in a high temperature situation because this can apply to better understand antibiotic treatment in humans with fever temperatures. The approach taken to address the hypothesis was that we conducted five different trials where we cultured bacteria on agar plates at 42°C which the plates separated into four different sections and a different disk was placed in each sector. The disks represented each treatment and included Penicillin, mouthwash, Tetracycline, and water (control). The statistical analysis we used was a ANOVA test and the results were found to be significant (p **≈** 1.0E-5, α = 0.05) and this indicated that there was a statistical difference between the means of the different treatment groups. Then further t-tests were conducted between the control group and treatments and it was found that Tetracycline (p **≈** 1.0E-4, α = 0.05) and mouthwash (p **≈** 1.0E-4, α = 0.05) were statistically significant. In conclusion, Tetracycline and mouthwash confirmed our initial hypothesis and did inhibit bacterial growth while Penicillin failed to reject the null hypothesis. These results matter because if a human with a fever were to take an antibiotic for a bacterial infection it would be more effective to take Tetracycline and if there was an bacterial growth in a mouth, mouthwash would prove to be effective.

**Methods**

The experiment conducted was testing the effect of different environmental treatments on bacterial growth and the purpose was what and how environmental conditions effect bacterial growth in a high temperature situation to better understand antibiotic response on bacteria. The first step was spreading 100μl of *E. Coli* using sterilized beads on an agar plate. Then the plate was separated into four equal sectors and an antibiotic disks or sterile disks then pipette 50μl of mouthwash or water (control). This process was repeated five times and all agar plates were incubated at 42°C. After one week of incubation areas of inhibition were measured using digital calipers and the distance measured was the largest diameter between two sides of the circle. Then an ANOVA test was conducted on all groups and was found to be statistically (p **≈** 1.0E-5, α = 0.05), and to further understand which treatments were significant three t-tests were conducted (treatments vs control group) and it was found that Tetracycline (p **≈** 1.0E-4, α = 0.05) and mouthwash (p **≈** 1.0E-4, α = 0.05) were statistically significant. Penicillin failied to reject the null hypothesis because it perfectly matched the control group.

**Figures**

***Figure 1. Size of Zone of Inhibition*** *Above is a bar graph of means of the three treatment groups and control (Water), and ANOVA found a statistical difference between the groups (p ≈ 1.0E-5, α = 0.05). Data was collected by culturing E. Coli on agar plates with with different treatment disks and measured the zone of inhibition after a week.*

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