Carbonation vs. Bacterial Growth in Naturally Carbonated Springs

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Water from the naturally carbonated springs in Soda Springs, Idaho, is commonly believed to be safe for human consumption. Using samples from a variety of carbonated and non-carbonated springs, this investigation explored the relationship between natural carbonation and bacterial growth. Samples were collected by filling and capping vacuum sealed collection bottles in complete submersion. 1000 microliter and 500 microliter volumes were streaked onto LB nutrient agar and HPC agar plates and incubated for 24 hours at 37 degrees Celsius. Each plate was analyzed for colony number and type through eye level identification and microscope stains. Data was analyzed with a variety of 2 sample t tests. Compared to the natural springs, the carbonated springs overall cultured and average of 26.33 fewer bacterial colonies, a difference that was proven to be statistically significant, generating a p-value of 0.031. When comparing individual bacterial types observed, carbonated springs had far less ‘everyday’ bacteria such as B. subtilis and E. coli, while having higher concentrations of bacteria more fit for extreme environments, such as strains of iron oxidizing bacteria. This experiment showed a conclusive difference between the normal flora of carbonated and non-carbonated springs. The bacterial strains that were present in the carbonated water have been proven safe for human consumption, while many of the bacteria present in the non-carbonated water, such as E. coli, are well documented to be harmful when consumed.

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