Bacterial Acoustic: Investigating the Impact of White Noise on the Growth of E. coli

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This research project investigates the influence of white noise frequencies on the growth of E. coli bacteria within the audible range of 14,500-15,000 Hertz (Hz). White noise, characterized by uniform intensity across all frequencies between 20-20,000 Hz, is known to mask disruptive environmental sounds. However, its potential impact on biological systems, particularly bacterial growth, remains an unexplored area. The experimental procedures involved the construction of a soundproof foam box housing a Bluetooth speaker. E. coli K12 bacterial dilution was prepared using a 0.9 saline solution, following the 0.5 McFarland standard. Colonies of E. coli were combined with 2 mL of saline solution, and 20 micro-liters of the resulting bacterial dilution were plated onto Mueller-Hinton agar. The agar plates with microorganisms were placed inside the soundproof box and exposed to white noise frequencies for 20 minutes and 24 hours at 37°C in an incubator. The results, quantified and analyzed using the ImageJ program, revealed a negative correlation between white noise frequency and E. coli growth inhibition. The higher the white sound frequency the lower the number of E. coli colonies. These findings contribute to the understanding of the impact of sound frequencies on microbial growth, opening avenues for further exploration in the fields of environmental microbiology and noise pollution studies.

Awards Won:

University of Arizona: Renewal Tuition Scholarship
Arizona State University: Arizona State University ISEF Scholarship (valued at up to $58,000 each)
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