

Does Calcium Chloride Aid in Biofilm Formation of *Elizabethkingia meningoseptica*?

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Abstract

It was hypothesized that calcium chloride would aid *Elizabethkingia meningoseptica* biofilm growth. To test this hypothesis, *Elizabethkingia meningoseptica* was grown in varying concentrations of calcium chloride and compared to *E. coli* grown in the same concentrations of calcium chloride. As the concentration of calcium chloride increased, the biofilm growth of *Elizabethkingia meningoseptica* increased significantly.

Introduction

A community of microbes that are embedded in an organic matrix and attached to a physical surface is a biofilm. Biofilms are produced to enhance antibiotic resistance, protect the cells, and develop nutrient concentration. Members of *Elizabethkingia* are aerobic, non-motile, Gram-negative rods displaying a yellow or no pigmentation. Within their family of Flavobacteriaceae, only *Elizabethkingia meningoseptica* and *E. miricola* have been identified. *Elizabethkingia meningoseptica* infections typically occur within immunocompromised and post-operative patients. The bacteria has been found on medical devices ranging from respirators, vaporizer, and artificial ventilation tubing. *Elizabethkingia meningoseptica* can also be found in eutrophic lakes, soil, freshwater sources, and spent nuclear fuel pools. Many of the environmental species of *Elizabethkingia* have not been studied and some are represented only in culture collections.

Discussion

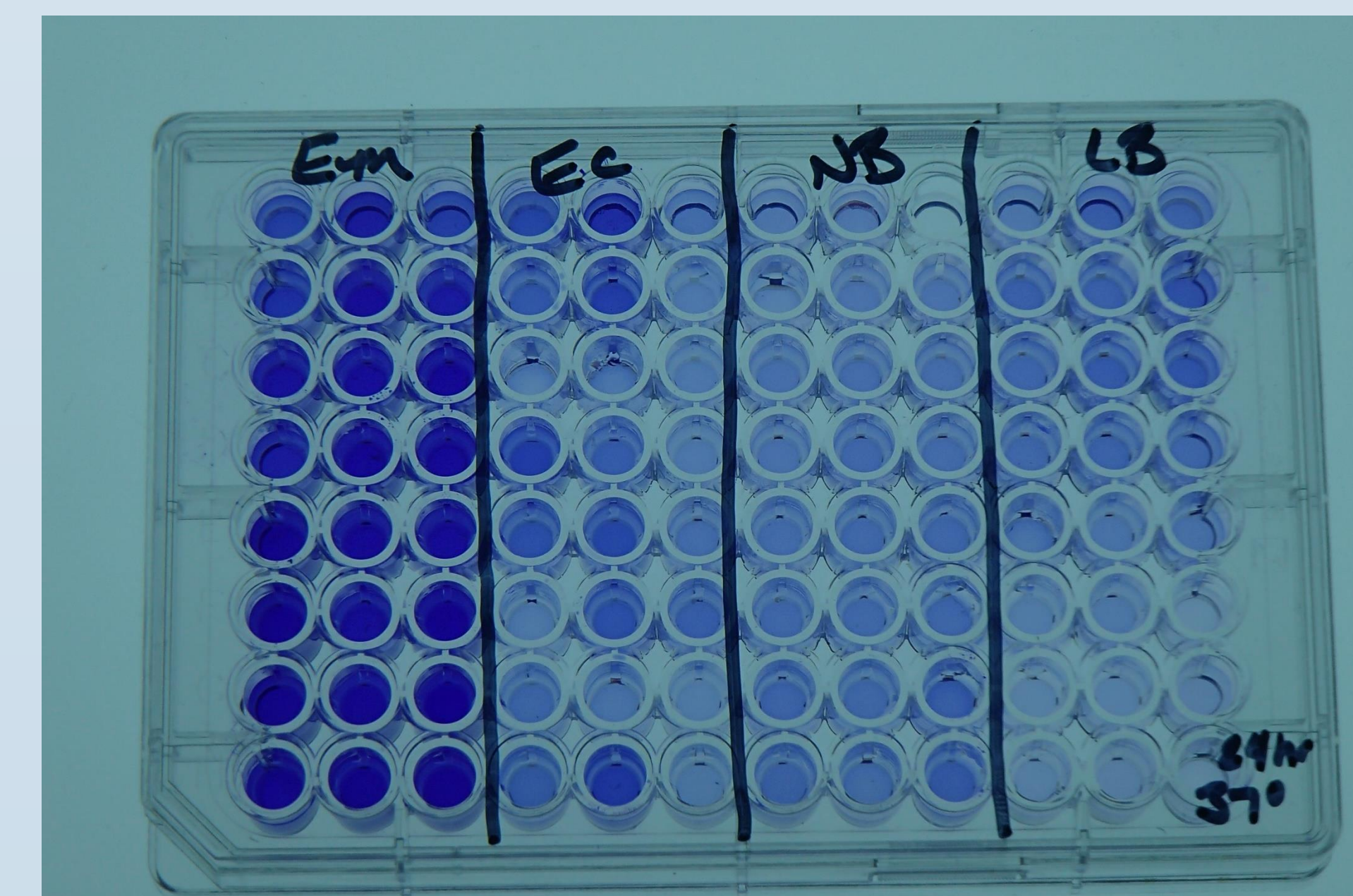
As shown in the results, calcium chloride does seem to aid in the growth of biofilms. When compared to the results from *E. coli* DH5-alpha, *Elizabethkingia meningoseptica* had significant biofilm growth. As the concentration of calcium chloride increased, the growth of biofilms in *Elizabethkingia meningoseptica* increased significantly.

Results



Methods

Elizabethkingia meningoseptica was placed in varying concentrations of calcium chloride in a 96-well plate. The plates were labeled as shown in the picture. *E. coli* and two nutrient broths acted as controls. The bacteria was allowed to grow for either 24 or 48 hours in a 30° or 37° incubator. After growing for the allotted time, the bacteria was inserted into a 60° incubator to ensure that the bacteria were no longer active. The bacteria was stained with crystal violet and then washed two times with water. All water and excess cells were pipetted off after washing. Ethanol was then added to each well and allowed to sit for ten minutes. After the ethanol had dissolved the crystal violet, the plates were inserted into a plate reader.



Future Research

To further test our hypothesis, higher concentrations of calcium chloride could be tested along with other solutions that may affect biofilm growth. Further research could also be conducted on proteins within *Elizabethkingia meningoseptica* and other bacteria. These proteins could be compared and tested to find similarities in biofilm growth or other functions.

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References

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