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Water Analysis of the Malibu Lagoon and Pacific Ocean

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Abstract

This experiment tested the waters of the Malibu Lagoon and the Pacific ocean to compare levels of E.coli. We hypothesized that greater amount of E.coli would be present in the waters of the Malibu Lagoon. Because of the runoff and pollution existing in the lagoon, we predicted that higher levels of this bacteria would be found there. This study is significant because many organisms living in these waters can be negatively effected by large levels of E.coli. We used the most probable number method to determine the amounts of bacteria. A collection of samples from three testing sites in both the lagoon and the ocean were taken, then added to a red phenol lactose broth and incubated to determine the amount of E.coli present in each of the samples. Resulting data supported our hypothesis, providing evidence that a greater amount of E.coli existed in the Malibu lagoon in comparison to the Pacific ocean.

Introduction

Previous observations and experiments regarding the waste levels in the Malibu lagoon provide evidence that wastewater treatment systems used to treat residential and commercial sewage near Malibu, California have been implicated as a possible source of fecal bacteria to Malibu Lagoon and the near-shore ocean. (Izbicki) This contamination of the water can lead to a detrimental effect on the species living in or near the environment. Our experiment addressed this problem by testing our prediction that greater amounts of E.coli exist in the Malibu lagoon in comparison to the ocean. The method used to test our hypothesis included the collection and experimentation of water samples from the Malibu lagoon and Pacific Ocean. The samples were added to a chemical broth, and incubated to determine the level of E. coli in the waters.



Description of Study Site

Our study sites were the Malibu Lagoon and Pacific Ocean adjacent to the lagoon. At each location we collected water samples from three different areas along the shore.

Materials and Methods

Our water was tested for coliform bacteria using the Most Probable Number method. To begin we filled 15 test tubes for the the 6 areas with Red Phenol Lactose Broth and placed it in the enclave to sterilize it. After obtaining water samples we added .1 mL of the water to 5 test tubes of the broth for its site, the 1 mL to 5 more for that site, and 10 mL to the last 5 test tubes prepared for the site. This process was repeated for each testing area. These tubes were placed in the enclave as well, and within 24-48 hours of their removal the tubes checked for a bubble which indicates a presence of ecoli. After these were recorded they formed a series of number which we were able to look up on a table and determine the most probable number index.

Results

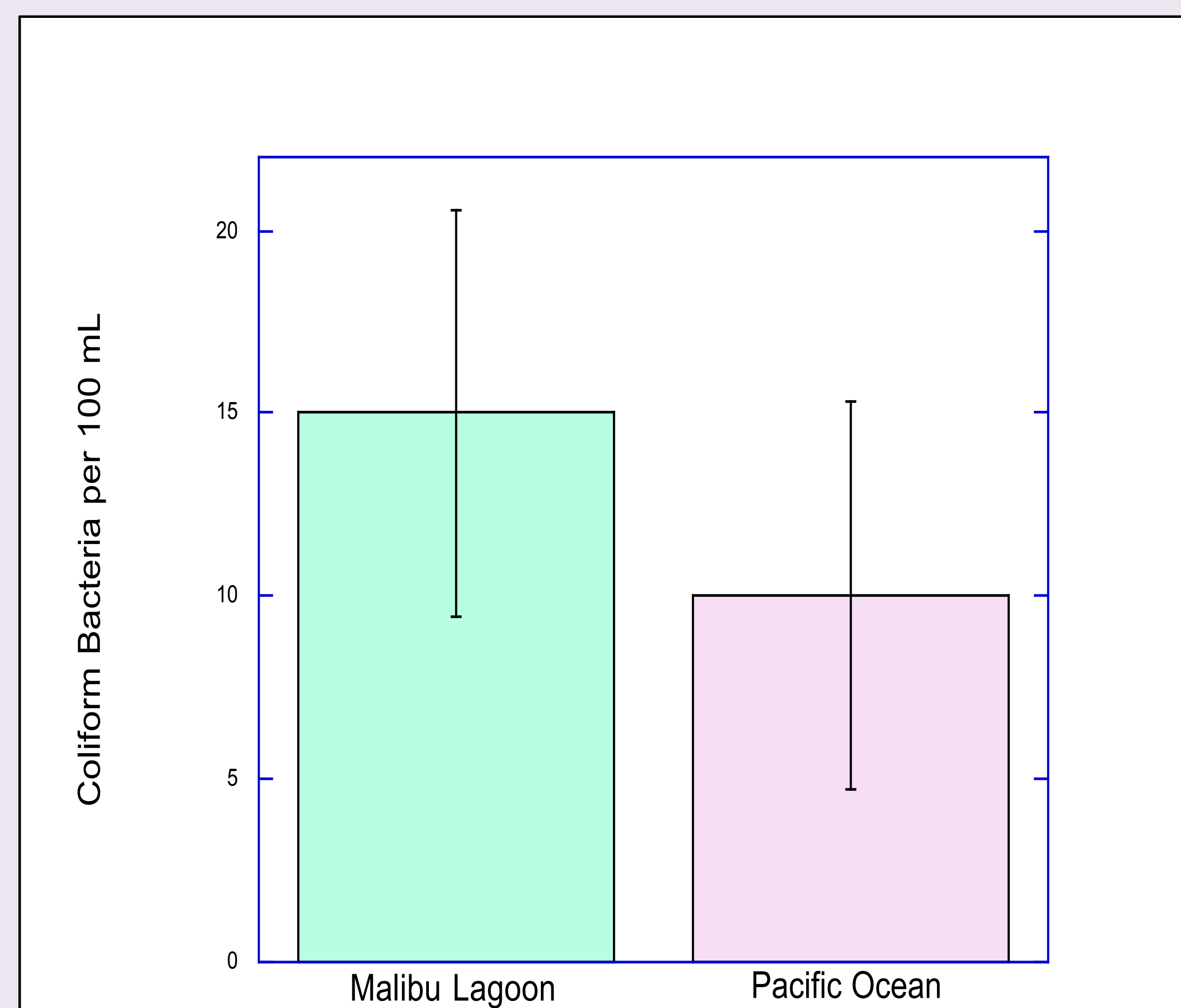


Figure 1: Coliform count per 100 mL in Malibu Lagoon and the Pacific Ocean for three sites in each. Data were collected on 14 November 2014. By the student t-test at n=3 results were not significant.

Discussion

We hypothesized that in the Malibu Lagoon we would find more E. coli and coliform bacteria. Our results supported our hypothesis in showing a trend of more E. coli in the lagoon. We can assume that these results are caused by the pollution and runoff of sewage into the lagoon as we were trying to prove. The ocean as well showed that it had a substantial amount of E. coli which we did not foresee. These results are in line with the work of Izbicki and other colleagues on his work.

Conclusion

The finding of E. Coli in the water of Malibu Lagoon has huge implications on the ecosystem that surrounds Malibu Lagoon and the inhabitants itself. The significance of our findings proves that sewage runoff has been let into the Lagoon polluting our natural resources. There is far more E. Coli in the lagoon than the ocean and this kind of pollution could really make anyone who swims in the lagoon sick and could possibly kill them. This water in Malibu Lagoon is dangerous and contaminated with E. Coli and the dumping of the sewage must stop or else the effects on the ecosystem could be devastating. We could continue our research by testing the fish and wildlife that live in and around the lagoon for E. Coli contamination to see how far the bacteria has spread.

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