



UC Irvine: Indigenous Bacterial Growth Study

Executive Summary

University of California, Irvine

For Bio-Organic Catalyst

BOC's bio-organic catalyst based products cause naturally occurring nonpathogenic (harmless) bacteria to grow rapidly, while not affecting the growth of pathogenic (harmful) bacteria.



The following studies were performed at the University of California, Irvine. Figure 1: Demonstrates that Bio-Organic Catalyst does not contribute to the growth of pathogenic (harmful) bacteria. In the researcher's conclusion, BOC did not have a significant impact on E. Coli cell growth.

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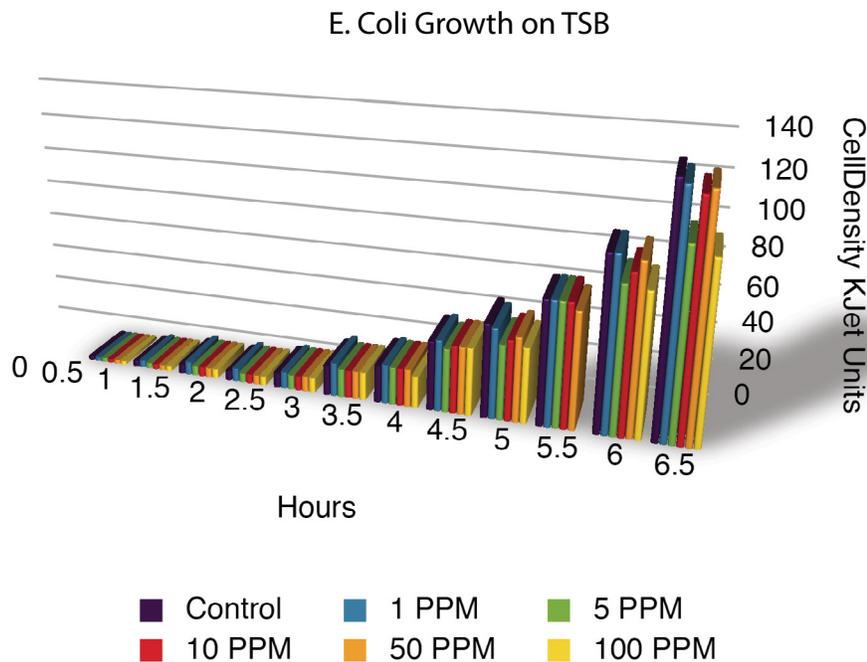


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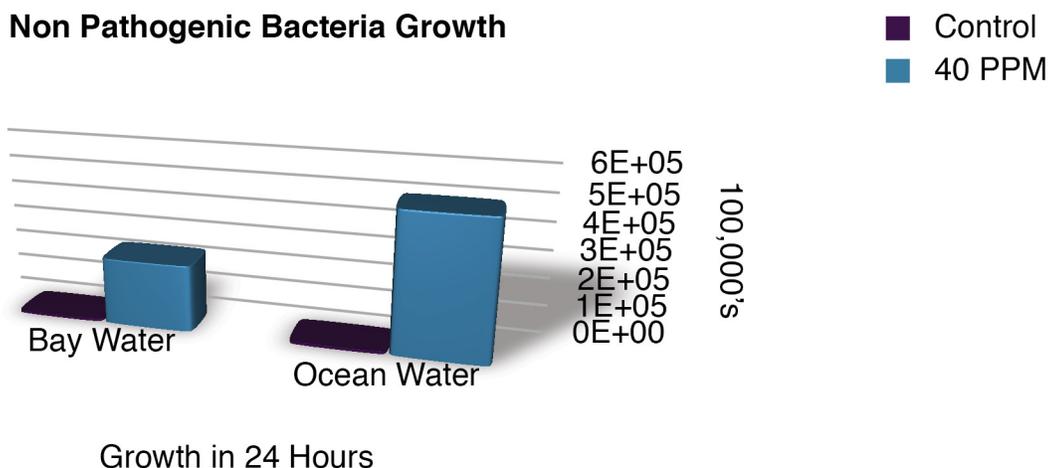


Figure 2: Demonstrates Bio-Organic Catalyst's ability to proliferate non-pathogenic (harmless) bacteria in bay water and ocean water in a 24 hour period of time. These bacteria are the same bacteria required by Nature to biodegrade organic petroleum products back to their individual parts before they formed to become petroleum.

Bacterial Growth Study Summary

Clearly these graphic displays of BOC's ability to clean, along with the catalytic reactions caused by BOC's bio-organic catalyst based product, clearly lead on to the conclusion as its effectiveness as a surface cleaning agent. It also does not cause harmful bacteria to grow, and enhances Nature's harmless bacteria to begin biodegrading petroleum.

E.coli Growth Curve On TSB

This experiment was done to show the toxicity of BOC to bacteria. Several replicate flasks were prepared with sterile growth medium. The medium used was Trypticase-Soy broth (TSB), this is a rich medium ideal for the cultivation of E.coli. When the broth is inoculated with E.coli, the number of E.coli cells in the broth increases. If there is a substance toxic to E.coli present in the broth, the number of cells will not increase as rapidly or not increase at all.

The growth of E.coli in TSB amended with different concentrations of BOC was measured. The BOC concentrations used were: 0, 1, 5, 10, 50, and 100 ppm (v/v). The density of cells in the broth was measured periodically with a Klet meter.



Cell density as Klet Units (KU) is proportional to the number of cells present in the broth.

The attached chart shows the result of the experiment. The plots are typical of the early stage of logarithmic cell growth in all cases. Also, none of the plots are significantly different from one another. None of the concentrations of BOC had a significant impact on E.coli cell growth.

Growth Response Of Natural Marine Bacteria To Bio-Organic Catalyst

This experiment was done to show any toxicity that BOC might have to seawater bacteria. The seawater sample was tested for total heterotrophic plate count (HPC) after it was collected. The sample was then split into several flasks with BOC concentrations of 0, 50, 100, 500, 1000 ppm v/v. The flasks were incubated for 24 hours on a shaker at room temperature. After the incubation period the water samples were tested for heterotrophic plate count (HPC). The results are represented on the bar graph. Adding any amount of BOC up to 1000 ppm v/v results in a large increase (approximately 2 orders of magnitude) in HPC over that if no BOC is added.

Each sample was divided into four 500 ml flasks, 250 ml per flask. One flask of each water sample was amended with BOC @ 40 ppm. After 24 hours incubation shaking at room temperature, each flask was plated on sea water medium to determine the number of bacteria present in each flask.

	Bay Water	Ocean Water
No Bio-Organic Catalyst	2.1 x 10 ⁶ CFU/ml	3 x 10 ³ CFU/ml
40 ppm Bio-Organic Catalyst	2.7 x 10 ⁵ CFU/ml	4.3 x 10 ⁵ CFU/ml

It is apparent that at 40 ppm, Bio-Organic Catalyst is not toxic to marine bacteria and in fact promotes growth. This data shows that 40 ppm of Bio-Organic Catalyst in natural marine water causes over a 100 fold increase in the number of heterotrophic bacteria.