The Effect of Magnetic Carbon Nanotubes on the Oil Degrading Ability, Vitality, and Gene Mutations of A. borkumensis

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Oil spills are major threats to the ocean and marine life, and they release massive amounts of oil. Oil dispersants are chemicals that break down oil into smaller droplets to make it easier for the A. borkumensis bacteria in the water to degrade oil. However, the project done last year showed that bacteria exposed to dispersants had a lower colony count and oil-eating ability than bacteria exposed to carbon nanotubes (CNTs). This year, it was hypothesized that CNTs that were magnetized (MCNTs) for easier removal from the water would have no significant difference in the colony count and oil-eating ability of the A. borkumensis than CNTs that were not magnetized. There were three tanks and nine test tubes in each group (CNTs, MCNTs, and control). The MCNTs were made by the silanization of hematite particles with the CNTs using ultrasonication and vacuum filtration. The fdx P450-1 gene was also sequenced for all groups to see if there would be any difference in the sequence between the groups. This gene is being sequenced because it is one of the genes that codes for the enzyme that breaks down oil. The colony count and decrease in test tube oil levels for both the CNT and MCNT groups were significantly higher than the control group. The t-test performed also showed that there was no significant difference between the colony count and test tube oil level data collected for the MCNT and CNT group (t-value of 0.2855 < 2.228; t-value of 0.4472 < 2.120). This means that the MCNTs are just as effective as the CNTs in allowing the bacteria to eat more oil, and they are also easier to remove due to being magnetic.

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