To Drink or Not to Drink: The Lysis of Escherichia coli by Ultraviolet Light through a Makeshift Filtration System, Part Two

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Purpose: A makeshift portable water filtration system was designed to test the hypothesis that it would bring levels of E.coli down to acceptable values safe for human consumption. Procedure: A dual-makeshift filter was constructed with two Contigo water bottles, a CamelBak UV All Clear lid, an activated charcoal filter pod, and PVC fittings. After the filter was fully constructed, 500ml of distilled water in the first Contigo water bottle was inoculated with E.coli (.002 mL/L). Then, the water was swabbed and a plate was streaked and incubated for 24 hours at 37 C. Next, the CamelBak UV lid was put on the bottle and turned on and left on for 60 seconds. During the 60 seconds, the experimenters oscillated the water in order to expose it all to the UV light. The UV cap was removed and the activated charcoal filter pod was screwed in place on the second Contigo bottle which was then flipped over and screwed onto the first water bottle containing the water. Then, the bottles were flipped over and the water was allowed to flow through the filter pod. After all of the water was filtered, the water was swabbed, plated, and incubated at 37 C for 24 hours. These steps were repeated for 7 trials. It was discovered that the bacteria count was too low, so the concentration of bacteria was then increased (1mL/L) and a second round of trials was performed. To further test filter accuracy, the experimenters increased the concentration of bacteria further (2mL/L) and a third round of trials was performed. In conclusion, the hypothesis that by exposing the E.coli k-12 contaminated water to ultraviolet rays, then running it through the filter pod, the number of bacteria in the water would be decreased and brought to acceptable levels for human consumption was supported.

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