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

Lawrence, Taylor

Rademaker, Abigail

The purpose of this research was to determine whether controlled amounts of Escherichia coli, K-12 could be killed by a makeshift water filtration system and UV irradiation. Twenty four nutrient agar plates were prepared and labeled. A makeshift filter was constructed from a 2 liter bottle and coffee filters. The bottle was then filled with 200 g of pulverized charcoal, 500 g of a sand and 1 Kg of gravel. Twelve of 24 labeled plates were inoculated with the bacteria using a sterile technique. The plates were then incubated at 37° C for 24 hours. Colonies were counted and recorded. Twelve disposable culture tubes were then filled with 25 ml of distilled water and labeled 1a-12a. One loop full of bacteria was swished into each tube, following a sterile technique. Twelve additional culture tubes were labeled 1b-12b. The spiked water in tube 1a was run through the filter and allowed to drip into a 500 ml beaker for 5 minutes and distilled water was then run through the filter. The filtered water was poured into test tube 1b and placed under the UV lamp for 24 hours. After irradiation, a loop was dipped into 1b and used to streak the 1b plate, which was then incubated at 37° C for 24 hours. Colonies were again counted and recorded. This procedure was then repeated 11 more times. All tubes and plates used were covered with 10% bleach solution for 24 hours and then incinerated. In conclusion, the hypothesis that by running the infected water through the filter then exposing it to ultraviolet rays, the number of bacteria in the water would be decreased was supported by the experiment. Though the numbers in the data matched for trials 6 through 12 due to the counting method used, the decrease in the number of colonies as shown in the photos, was significant.

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