Reducing Total Coliform Bacteria in American Samoa's GUDI Wells with UV-B Treatment

Park, Gloria (School: Pacific Horizons School)

In order to find a cost-efficient alternative method to treat Groundwater Under the Direct Influence of Surface Water (GUDI) wells, an experiment was conducted to implement an alternative water treatment method that can effectively reduce Escherichia coli and other coliform bacteria that harm drinking water in American Samoa. Chlorination is the most common method used to treat groundwater in American Samoa. However, because of its harmful effects, a safe, cost-efficient method for treating groundwater was sought. Out of the 7 total tests conducted for Well 33 and Well 66 located in Tafuna, the water samples treated with UV-B light are hypothesized to have higher quality in treating and reducing total coliform bacteria than Chlorination. Using a quanti-tray sealer, the 21 water samples were mixed with 21 colliert-18 reagents and placed into pack trays; the 21 pack trays were incubated for 18 hours and observed under a UV lamp to detect numerical counts of E. Coli using an IDEXX Quanti-Tray MPN Chart. The hypothesis was proved to be incorrect. For Well 33's Test 1 and Test 3 and Well 66's Test 2, UV-treatment was as effective in reducing total coliform as the chlorinated water samples. Both methods killed equal amounts of total coliform, which zeroed the number of contaminated water pockets. However, for Well 33's Test 2 and Wells 66's Test 1, Test 3, and Test 4, the chlorinated water samples reduced total coliform bacteria more effectively than the UV treated water samples. This meant that the chlorinated water sample's final number of contaminated water pockets were lower than that of UV's. As a result, chlorination proved to be a better groundwater treatment method for GUDI positive wells in American Samoa.

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