Abstract

Approximately 1 million people die annually due to drinking contaminated water, making water sanitation a pressing global issue (CDC, 2020). Water may become contaminated with harmful pathogens, such as Escherichia coli, when the sewage infrastructure in a community is inadequate. The Solar Powered UV-C LED Water Sterilizer is a viable option for water sterilization in communities lacking water services due to its high efficacy rate and reusability.

For experimentation, water was collected from a nearby pond because of the naturally occurring microorganisms in open bodies of water. Once collected, the water was cycled through the Solar Powered UV-C LED Water Sterilizer. Afterward, the treated and untreated pond water was tested for coliforms and Escherichia coli using the Quanti-Tray system. After 24 hours of incubation, the water treated by the Solar Powered UV-C LED Water Sterilizer showed a significant decrease in coliforms and lower turbidity compared to the untreated water. These findings propose that the Solar Powered UV-C LED water sterilizer cleaned and sterilized water so that it may be potable. In the future, the Solar Powered UV-C LED Water Sterilizer may be utilized in communities that lack traditional water services, and components of the device can be replaced with more sustainable options to reduce overall cost and environmental impact.

Keywords: Mobile water sterilization, Solar-powered UV-C LED technology, UV-C LED water sterilizer, Sustainable water purification