

Sustainable Water Purification System with UV Irradiation

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There are nearly a billion people worldwide who do not have access to clean water and this lack of access has led to nearly 3.4 million deaths annually. This project attempted to determine an economical, effective, and renewable water purification method. UV water purification systems are currently being used in developed nations as a safeguard for water treatment after chlorination. The experimentation was conducted using a novel two-step ultraviolet (UV) water irradiation system. The first UV source purifies incoming contaminated water, while the second UV source pre-treats the transportation vessel the purified water flows into. The sustainable operating system is very economical as solar cells and a backup battery power the device. The apparatus is self-sustaining as it contains no chemicals or filters that need replacing. The device requires little maintenance as it is contained in a closed system and has no moving parts. The prototype apparatus purifies 3 gallons of water per minute as well as sterilizes the vessel that the sample was carried in. Ten water sources were tested from a variety of sources. Several Trypticase Soy Agar (TSA) agar dishes were inoculated with raw samples while others were inoculated with treated samples. After results were gathered and assessed, it was found that the testing apparatus was able to make all sources safe for human consumption with no outlying results. This apparatus has the potential to save millions of lives by making clean water more accessible to people in an economical, effective, and renewable manner.

Awards Won:

Fourth Award of \$500