NEW Low-Cost System Uses Novel Visual Aid to Improve the Quality and Accessibility of Water in Developing and 3rd World Countries

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The purpose of this project was to design and build a low cost, simple to use solar water pasteurization transportation system and novel visual aid, capable of inactivating E.Coli and removing heavy metals using bio-adsorbents, from materials easily accessible in developing countries. It was hypothesized that the system would: 1) successfully filter water and inactivate bacteria such as E.Coli, 2) decrease travel time, 3) use a novel visual aid to indicate when water is safe to drink, 4) incorporate natural adsorbents to remove heavy metals. Multiple filter materials were tested. Variations of color changing wax indicators, capable of multiple signaling when water is heating and when it is safe to drink were developed and tested. The system's ability to remove non-infectious E.Coli was tested in a controlled environment, using heat lamps, and in a developing country, using solar pasteurization and solar ultra violet radiation. Natural adsorbents were tested to remove heavy metals. The system was able to successfully transport water from remote places, filter water and remove 100% of E.Coli. The novel wax indicator changed color to indicate the water was heating (40 degrees Celsius) and melted traveling from one vial to another to indicate it was safe to drink (60 degrees Celsius). Natural adsorbents tested, remove up to 67% of the heavy metals. In conclusion, the use of this system could improve the quality and accessibility of water in developing countries where scarcity and contamination are considered critical issues given accelerated global warming, rapid population growth and political instability.

Awards Won:
Second Award of $2,000