



FINAL REPORT

Efficacy Study of the UVC LED HydroCap

ORDER Number
152202265

PREPARED FOR:

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Certificate of Analysis

Client: UBO-Technology, LLC

Contact: Rakesh Guduru

Project: Efficacy study of the UVC LED HydroCap

Product: HydroCap



EMSL NO: 152202265

Sample received: 03/02/2022

Report date: 04/08/2022

Challenge Bacteria: *Escherichia coli* (*E. coli*) - ATCC 25922



Experimental Summary:

The testing procedure was designed after discussions between EMSL Analytical, the testing company, and the client, UBO-Technology, LLC. The testing was conducted on the UVC LED HydroCap for its ability to kill bacteria in the contained water. The testing was conducted in our Houston Microbiology Laboratory.

Procedure:

Bacterial Inoculum Preparation

An *E. coli* stock culture was plated onto Tryptic Soy Agar with 5% sheep Blood (TSAB) and incubated at 35°C for 22 hours. Well-isolated colonies were then harvested, suspended in sterilized de-ionized water, and vortexed for 1 minute to ensure homogenization. This suspension was used to inoculate 800 mL of sterile DI water for each replicate test of the cap (Pic 1). All tests were performed in triplicate with untreated controls for comparison.



Pic 1: 800 mL of sterile DI water before inoculation (Left) and after inoculation (Right).

Efficacy Testing

The 800-mL contaminated test water was placed into the container and capped with the HydroCap then treated with UV on Pro Mode (3 minutes). During treatment the flask was swirled on a regular basis to distribute the bacteria within the flask but not splash up above the height of the UV lights. Following each replicate test, a small aliquot of water was removed and serially diluted. Each dilution was plated onto AC Petrifilm plates and incubated at 35°C for 24 hours. After incubation any recovered colonies were counted.



Experimental Results:

Table 1: Quantitative counts for *E. coli* contaminated water treated with the HydroCap.

| Test Treatments Pro Mode Treatment time = 3 minutes | <i>E. coli</i> CFU/mL | LOG | LOG Reduction | % Kill |
|--|--------------------------|------|------------------|-----------|
| Untreated Replicate 1 | 9,900,000 | 7.00 | | |
| Untreated Replicate 2 | 9,100,000 | 6.96 | | |
| Untreated Replicate 3 | 10,600,000 | 7.03 | | |
| Pro Mode Treatment, Replicate 1 | <1 | - | >7.00 | >99.99999 |
| Pro Mode Treatment, Replicate 2 | 11 | 1.04 | 5.92 | 99.9999 |
| Pro Mode Treatment, Replicate 3 | <1 | - | >7.03 | >99.99999 |
| Average kill rate in Pro Mode | | | | >99.99995 |

Conclusions:

The HydroCap significantly decreased (>99.99995%) the level of the test bacteria in the contaminated water after UV treatment on the Pro mode (3 minutes) compared to the starting untreated bacterial populations.

Signatures:

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