

Validation protocol for Efficacy of UV Sterilization using HiGN

Samples used:

1. Staphylococcus Aureus
2. Escherichia Coli
3. Pseudomonous Aeruginosa
4. Enterococci Faecalis
5. Clostridium Difficile

Method:

1. Testing completed on glass trays at different distances from the UV bulb to determine where the tray should be located to accomplish the needed level of sterilization for the marketplace.

The samples were counted on their respective coupons before the exposure and then recounted after exposure. They are reported in a log reduction format because the amount of the organism is in the hundreds of thousands. For example, some of the coupons had 1×10^5 amount of an organism which is a quantity of 100000. This means that in order to market a specific percent reduction, the following can be assumed:

Log reduction	Number of cfus	Percentage reduction	Times smaller
0 log (Log ₀)	1 000 000	0%	N/A
1 log (Log ₁)	100 000	90%	x 10
2 log (Log ₂)	10 000	99%	x 100
3 log (Log ₃)	1 000	99.9%	x 1 000
4 log (Log ₄)	100	99.99%	x 10 000
5 log (Log ₅)	10	99.999%	x 100 000
6 log (Log ₆)	1	99.9999%	x 1 000 000

Currently we tested a log reduction for 4 distances/time periods on each of the 5 organisms.

- 10 seconds Direct Exposure 1 inch from UV (On a tray)
- 10 seconds Direct Exposure 3 inch from UV (On a tray)
- 10 seconds Direct Exposure 5 inch from UV (at bottom of box)
- 10 seconds Indirect Exposure 5 inch from UV (at bottom of box)- Requires light to reflect off other surfaces
- 30 seconds Direct Exposure 1 inch from UV (On a tray)- Sanity check

Results:

We need to determine whether 99.99% is our acceptability criteria

For Staph. Aureus

- 10 seconds Direct Exposure 1 inch from UV (On a tray) – 4.1 log - 99.99%
- 10 seconds Direct Exposure 3 inch from UV (On a tray) – Not tested
- 10 seconds Direct Exposure 5 inch from UV (at bottom of box) – 3.4 Log - 99.9%
- 10 seconds Indirect Exposure 5 inch from UV (at bottom of box)- 2.1 log - 99%
- 30 seconds Direct Exposure 1 inch from UV (On a tray)- 5.5 log – 99.999%

For Escherichia Coli, Pseudomonous Aeruginosa, Enterococci Faecalis, and Clostridium Difficile there was a 4 log reduction at 1 inch and 3 inch distances. Waiting for the actual reductions at the others distances.