

# NSF Study: Efficacy of an Ozone-Generating Whole-Shoe Disinfection Device at Three Time Points

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An efficacy study was performed using a UV-C and Ozone-generating device, the PathO3Gen Solutions™ Footwear Sanitizing Station, against *Escherichia coli* ( *E. Coli*), *Pseudomonas aeruginosa*, *Methicillin-resistant Staphylococcus aureus*( *MRSA Super bug*), *Vancomycin-resistant Enterococcus faecalis* (*VRE*), *Carbapenem-resistant Klebsiella pneumoniae*, *Candida Auris*, *Aspergillus brasiliensis*, and *Clostridioides difficile* (*C. diff*). And log and percent reduction were quantified for each microorganism at three exposure times: 6, 8, and 10 seconds.

The main motivation of this study was to find the effectiveness of the patented UV-C and Ozone device to destroy eight of the most common / severe bacterial, fungi, spore infections that affect healthcare facilities and spread over surfaces such as floors. Three different time intervals were tested to find the effectivity at each interval.

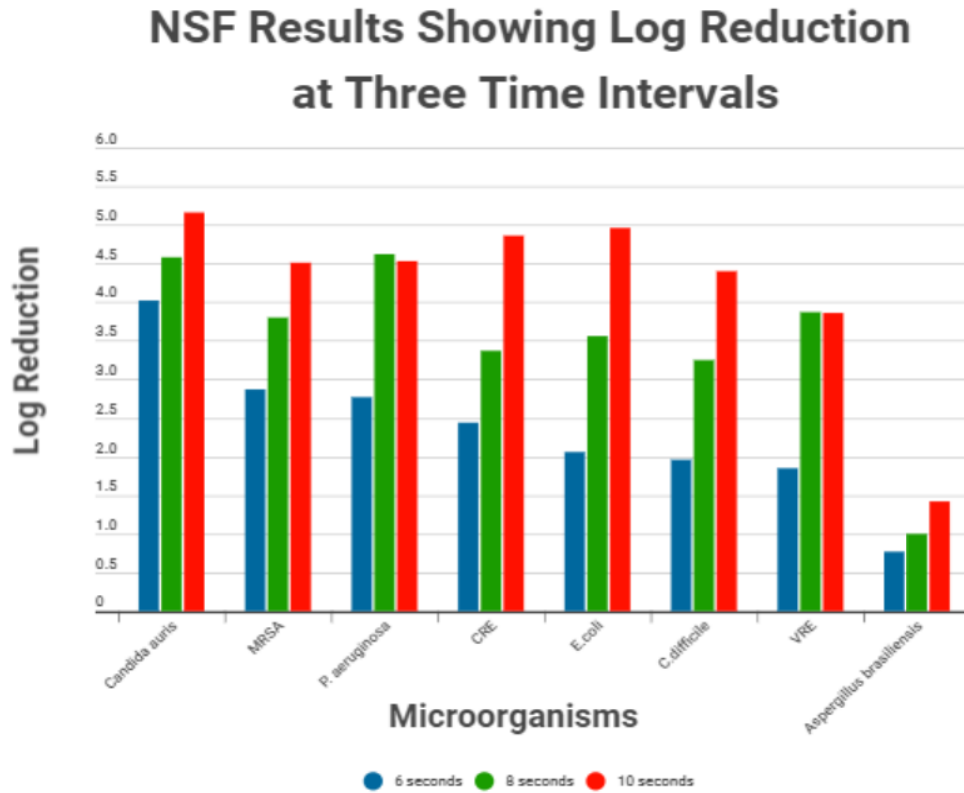
Each microorganism was individually inoculated on separate petri dishes and incubated at appropriate temperatures for a specific time period to allow for grow and colonization. Control samples were taken as well for all.

After the preparation of the microorganisms, a shoe sole (hard rubber substitute) was inoculated with the bacteria and then placed onto the sterilized foot sanitizing station and a 150lbs volunteer on top of the shoe with a sterile barrier between them. The shoe and volunteer remained on the sanitizing station for each designated testing time period, 6,8, and 10 seconds. Three tests were completed per microorganism, and time period. From the hard rubber substitutes inoculated with bacteria, two samples were taken from the shoe and placed in a petri dish and incubated for the appropriate lengths of time at specific temperatures.

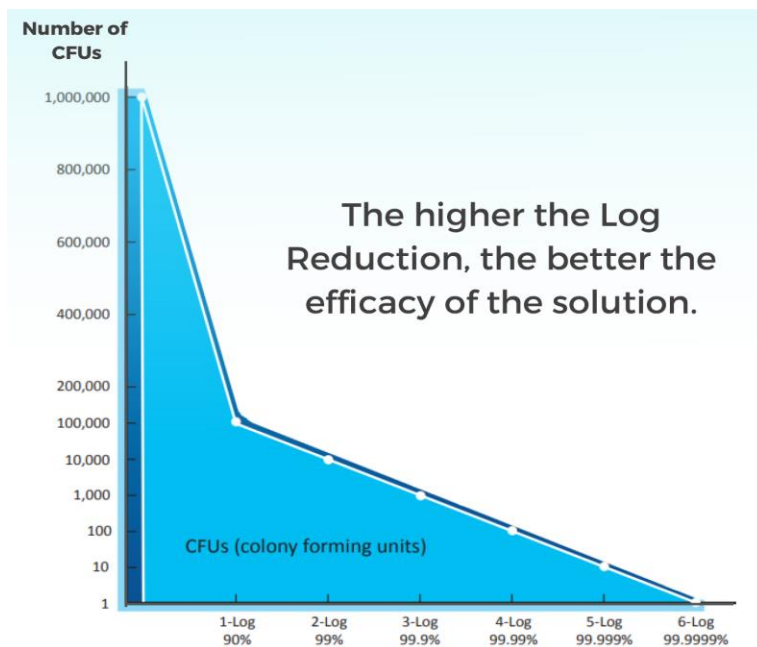
After incubation the viable microorganism colonies were counted, and data recorded. From the sample and control dishes, log percent reductions were calculated.

The results from this study showed that for every type of bacteria, fungi, and spore tested, a reduction of at least 90% was seen. Meaning that from the viable bacteria which infected the sole of a shoe, the FSS was able to destroy, at its lowest time interval and toughest organism, 90% of the microorganism. It kills *Candida Arius* at 5.16 log in 10 seconds which is 99.999% which is very difficult and unheard of from any other product.

The Footwear Sanitizing Station is a uniquely innovative product with UVC and Ozone patented technology that effectively kills microorganisms at the high log percentages at 6, 8, and 10 second intervals. It kills *CRE*, *VRE*, and *MRSA* at percent, two logs over industry gold standards.



**Figure 1.** The Summary bar plot of mean log reduction at each time point (in seconds) by microorganism tested.



**Figure 2.** The graph demonstrates what Log reduction is.