CASPR Technology Evaluation at Dallas area school
Test Report

Test Period:

August 4-12, 2020

Date of the Report

August 12, 2020

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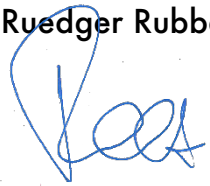

Background and Rationale

The COVID-19 pandemic has underscored the need to reduce pathogens in the air and on surfaces of public spaces. While regular air exchange dilutes pathogen concentrations and filters reduce airborne bio burden, CASPR's unique and innovative active disinfecting technology continuously treats air and surfaces to eliminate pathogens.

CASPR uses a photocatalytic processes to generate powerful oxidizers, including gaseous hydrogen peroxide, H_2O_2 from molecular oxygen and humidity of the

ambient air. CASPR releases low concentrations of such oxidizers into the room environment where they decompose pathogens in the air and on surfaces. The concentrations of these oxidizers are highly effective at reducing the bio burden, yet safe for people, animals and plants.

Microbiology testing of air and surfaces was performed comparatively between rooms with and without CASPR Compact (Picture 1) to evidence the efficacy of CASPR technology in real-world conditions.

Picture 1: CASPR Compact

Methodology

The testing took place at a Dallas are school where two rear second floor bathrooms were select for comparative evaluation. The approx. 156 square foot woman's bathroom was designated as the "control" bathroom and was not given a CASPR unit (No CASPR). The approx. 182 square foot men's bathroom was designated as the "treated" bathroom (CASPR)., where a CASPR Compact unit was installed on August 4, 2020. The unit ran continuously on a medium setting and the bathrooms were publicly available and used during the testing period. After 8 days, on August 12, 2020 surface and air tests were performed. Surface testing was performed on various surfaces in the bathrooms. The swabs (UltraSnap Surface ATP Test, Hygiena, Camarillo, CA) were evaluated with respect to the amount of accumulated adenosine triphosphate (ATP). Active air monitoring was performed using a microbial air sampler (SAS Super 100, International pbi Spa, Milan, Italy) that forces a predefined volume of air onto a plate containing culture media (Tryptic Soy Agar (TSA), USP, 15x100mm plates, Eurofins Microbiology Labs, De Soto, Texas), for aerobic bacterial counts. The incubation and the CFU counting of the plates from the active air sampling was performed by an independent accredited microbiology laboratory (Eurofins Microbiology Labs, De Soto, Texas).

Results

Active Air Sampling

At day 8, five air samples were taken and after incubation, the counts of bacterial colony forming units (CFUs) were normalized to CFUs per liter of air (CFU/L), then averaged. The sampling in the women's bathroom, i.e. the "control" site with No CASPR treatment, showed an average count of 0.1034 CFUs/L, while

the sampling in the men's bathroom, i.e. the CASPR "treatment" site, showed an average count of 0.0308 CFUs/L, yielding a 70.2% (seventy percent) reduction in aerobic bacterial burden (Figure 1). One-way analysis of variance (ANOVA) was performed yielding a p-value of 0.0315, demonstrating a statistically significant decrease in the measured results.

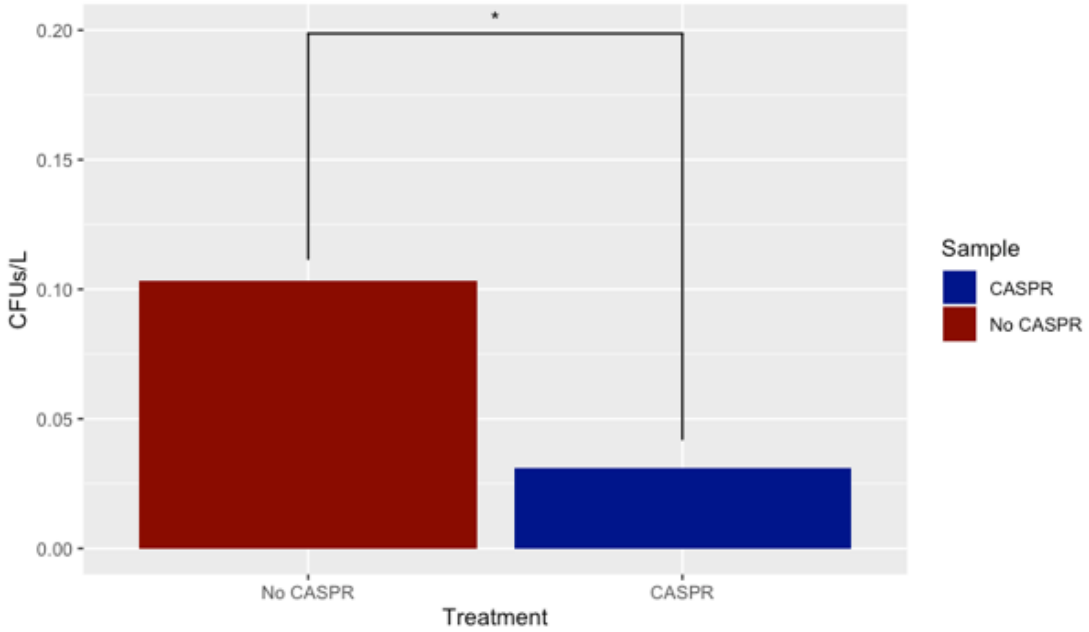

Figure 1: CFUs per liter in air at day 8, No CASPR "control" site, women's restroom
vs. CASPR "treatment" site, men's restroom shows significant reduction of 70%

ATP Testing of Surfaces

At day 8, ATP testing was performed taking measurements of bacterial growth with an ATP luminometer. Surface swabbing samples were collected at the same three sites in the women's bathroom, i.e. the "control" site with No CASPR treatment, and in the men's bathroom, i.e. the CASPR "treatment" site, as shown in Table 1 and Figure 2. A control measurement was taken on a surface disinfected with sterile wipes. Results yielded at least a 97% reduction in surface bacteria burden at all three sites.

Site	No CASPR	CASPR	% Reduction
Toilet Back	167	5	97
Inside Stall	594	4	99
Inside Door	525	6	99

Disinfected Control Surface	4

Table 1: Relative light units (RLU) of ATP surface tests at day 8, No CASPR "control"
site, women's restroom vs. CASPR "treatment" site, men's restroom

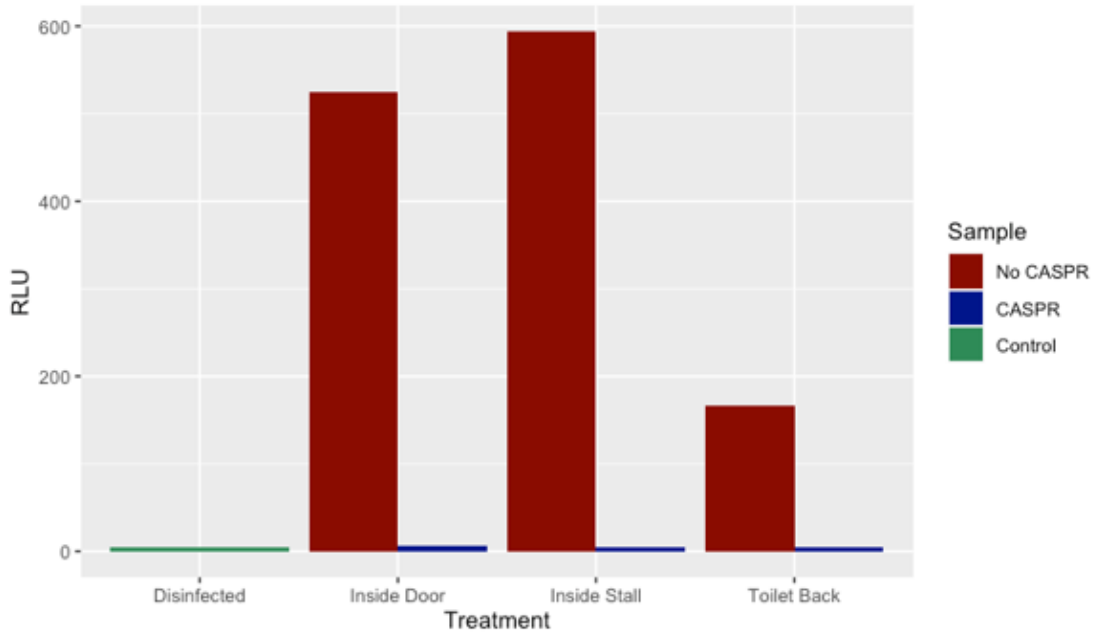

Figure 2: Relative light units (RLU) of ATP surface tests at day 8, No CASPR "control"
site, women's restroom vs. CASPR "treatment" site, men's restroom

Conclusion

The continuous use of CASPR Compact in the treated restroom reduced the bio burden by 70% in the air and 97+% on surfaces relative to the control bathroom.

Glossary of Terms

Ultrasnap swabs – UltraSnap uses the world's first liquid-stable reagent in place of the freeze-dried enzymes used in other ATP sampling devices. This provides better accuracy, longer-lasting signal strength, and more reproducible results.

Adenosine Triphosphate (ATP) – an energy carrying molecule found in the cells of all living things. ATP captures chemical energy obtained from the breakdown of food molecules and releases it to fuel other cellular processes.

ATP luminometer - an instrument that measures weak emissions of visible light coming from a sample by means of a photomultiplier tube. Luminometers are very sensitive devices that are used to measure very small amounts of light, sometimes only a handful of photons.

SystemSURE Plus ATP Luminometer - The industry standard luminometer hygiene monitoring system used to determine the cleaning efficiency and hygienic status of surfaces and water. The SystemSURE Plus ATP luminometer is designed with state of the art electronics, upgraded software and improved functionality making it extremely sensitive and the industry standard for all environmental testing companies. Used with Ultrasnap surface swabs the SystemSure Plus measures ATP's, the universal molecule found in all animal, plant, bacterial, yeast and mold cells.

SAS Super 100 Air Sampler - The industry leader for 30+ years, the SAS Super 100 air sampler is the top choice of the world's leading pharmaceutical and food companies, as well as numerous governments and regulatory agencies around the world for detection of microbial contamination and air quality testing. Featuring a powerful, high volume air flow of 100 liters per minute, the Super 100 is best in class and the perfect microbial air sampler for air sampling needs in a cleanroom, hospital, or place of research.

Tryptic Soy Agar - a general growth medium used for the isolation and cultivation of microorganisms.

CFU – colony forming unit. The number of visible CFUs present on an agar plate determines how much bio burden is present at the testing site.

Eurofins Microbiology Labs - Founded in 1987, Eurofins Lab is an international accredited lab providing in depth and innovative testing services and product tools to support researchers worldwide.

CFU Per Liter (CFU/L) – colony forming units per liter of air pulled into the SAS Super 100 air sampler and forced to pass by the internal trypic soy agar plates.

One-way analysis of variance (ANOVA) - In statistics, one-way analysis of variance (abbreviated ANOVA) is a technique that can be used to compare results of two or more samples.

P-value – A p-value gives you the probability that the difference between measurements of your control group and treatment group is due to randomness (instead of the treatment you applied): it's a measure of statistical significance. P-values below 0.05 (5%) are said to be sufficiently low to prove a cause-effect relationship. The lower the p-value, the better the results.

Relative Light Units (RLU) - ATP systems use relative light units (RLU) as the unit of measure for adenosine triphosphate (ATP). The greater the ATP, the higher the reading of RLU's.

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