INNOVATIVE BIOANALYSIS
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Conclusion

Multiple viruses (SARS-CoV-2, Influenza A, and Measles) were individually aerosolized and evaluated to determine the efficacy of the PRS induct UV-C unit. The device demonstrated a significant reduction of active pathogens after each air pass compared to natural loss rates observed in the controls. With all four decks of UV-C lamps on and a fan speed of approximately 6 m/s (Speed 7), the following reductions were observed: 99.997% SARS-CoV-2, 99.999% Influenza A, and 99.990% Measles virus. When the UV-C unit utilized one set of UV-C lamps against Measles, an average 82.66% reduction was observed. Reduction capabilities of the UV-C unit increased as more UV-C lamps were being used within the unit, as shown by the Measles air pass data.

It should be noted that the reduction levels reported for the tests with all four light decks activated represent a minimum detectable threshold level of performance due to the measured results for these cases being lower than the specific limit of quantification for each virus. Actual performance of the PRS unit exceeded the indicated performance minimum, but the extent of the additional reduction was not determinable due to the specific limits of quantification for each of the cases.

Overall, the trials demonstrated that the UV-C unit efficiently reduces viral air concentrations that pass through the unit. It should be noted that effort was made to simulate a real-life environment in the chamber while considering the precautions needed when working with a Biosafety Level 3 pathogen. Furthermore, when aerosolizing pathogens and collecting said pathogens, some variables cannot be fully accounted for, namely, placement of pathogen, collection volume, collection points, drop rate, surface saturation, viral destruction upon collection, viral destruction on nebulization, and possibly others. Every effort was made to address these constraints with the design and execution of the trials.

Table 1. Average percent reductions after three air passes observed for each viral pathogen with specifications on how many decks within the UV-C unit were active during testing.

Organism(s)	Average % Reduction
SARS-CoV-2 USA-CA1/2020 – 4 decks	99.997%
Influenza A – 4 decks	99.999%
Measles – 4 decks	99.990%
Measles – 1 deck (5 UV-C lamps)	82.66%