

Vollara Air & Surface Pro XL



Did you know that each of us consumes more air every day than anything else in the world? It's true. We each breathe in over 3,000 gallons of air every day. And don't we all want to breathe pure, fresh air? Unfortunately the air outside can be bad, and indoors where we spend most of our time, the air can be much worse. In fact according to the Environmental Protection Agency (EPA), indoor air levels of many pollutants may be 2-5 times, and sometimes, more than 100 times higher than outdoor levels. Without some method of control, airborne contaminants can be breathed in or eventually settle on exposed surfaces. But whether you suffer from allergies or not, there is something you can do about it. Vollara Air & Surface Pro XL combines nature-based processes into one unique, proven, active technology system that helps clean the air you breathe and the surfaces you touch, without the use of ozone.



2017 Space Technology
Hall of Fame Inductee

About Indoor Air

One alarmingly simple fact to consider: if you don't use an air purifier, you are the air purifier. The EPA says the average adult breathes over 3,000 gallons of air each day and spends a significant amount of time, up to 90%, indoors. The Asthma and Allergy Foundation of America (AAFA) reports that one in four Americans currently suffer from asthma and allergies. And while the human respiratory system has several built-in defenses to prevent substances from entering the lungs, utilizing air purification to remove or reduce the amount of airborne pollution in the breathing space can potentially ease the burden of contamination in the body and help maintain overall wellness. Those common household airborne pollutants can potentially include:

- Dust which is generally comprised of dead skin, dust mites and dust mite feces, insect parts, and more.
- Smoke emanating from tobacco, wood-burning fireplaces, fuel-burning heaters, and cooking.
- Chemicals from spray cleaners, perfumed deodorizers, carpets, and other building materials.
- Various microscopic bacteria and viruses.

All of these will continue to be of concern as modern building methods and the energy efficiency improvements of retrofitting existing structures continue to seal pollutants within indoor spaces. Such buildings tend to have decreased ventilation rates, higher concentrations of indoor-emitted pollutants, and more occupants reporting health problems.

Dust Mites

It has been reported that up to 80% of U.S. homes have large dust mite infestations, which may not be surprising considering as many as 40,000 dust mites can live in a single ounce of dust. These pests are second only to pollen in causing allergic reactions, mostly from airborne dust mite feces, ranging from itchy noses and eyes to severe asthma attacks. Along with keeping a low relative humidity between 30 – 50%, one of the most obvious methods of controlling dust mites may be to just reduce the amount of dust. An air purifier that works to continuously remove particulate from the air, combined with a thorough cleaning regimen that includes vacuuming can be an effective, simple strategy to minimize the aggravations of airborne dust.

Exposed Surfaces

Contamination on surfaces isn't limited to visible dust - there are numerous other types of contaminants that generally get spread where people live. Whether from sneezing and coughing or just everyday handling, door knobs, counter tops, and almost any exposed surface can become a potential staging ground. It's also interesting to note that, by legal definition, disinfectants must be capable of reducing the level of pathogenic bacteria by 99.999% during a time frame of less than 10 minutes. Yet, as widely accepted as chemical disinfectants are, they may have little or no effect once removed from a surface due to lack of contact exposure. Because of this, some type of surface contaminant reduction between cleanings or disinfection may be desirable and beneficial as part of a regular regimen.

*These results have not been evaluated by the FDA. This product is not a medical device intended to diagnose, treat, cure, or prevent any disease. No claim with respect to contaminants is made based on these results. Field results may vary based on environmental conditions.

Vollara Air & Surface Pro XL

About ActivePure® Technology

Indoor air quality is important to sustaining your health; however, sometimes the air in your own home may be harmful to you and your loved ones. In light of the COVID-19 pandemic and instances of highly contaminated air, we understand there is an increased concern over exposure to microbes, allergens, air pollutants and VOC gases. There is good concern to be worried. Not only can allergens be an annoyance, but they may increase your chances of complications when exposed to pathogens.

Vollara has products that improve indoor air quality (IAQ) by utilizing ActivePure® Technology. What separates ActivePure® Technology from traditional air purification systems is that it not only reduces dust and stale odors, but products Powered by ActivePure® Technology have been proven to neutralize many common pathogens in the air and on surfaces in indoor environments. In fact, ActivePure® Technology is in a class above traditional techniques as it is the only air cleaning technology that not only helped to pioneer the Space Age, but has been awarded the prestigious Certified Space Technology seal by the Space Foundation – one of only 75 companies to ever receive this award.

In the post-pandemic world, our informed customers want to be safeguarded against these threats and they know that a trustworthy indoor environment starts with clean indoor air. Vollara can provide that solution and assurance you need.

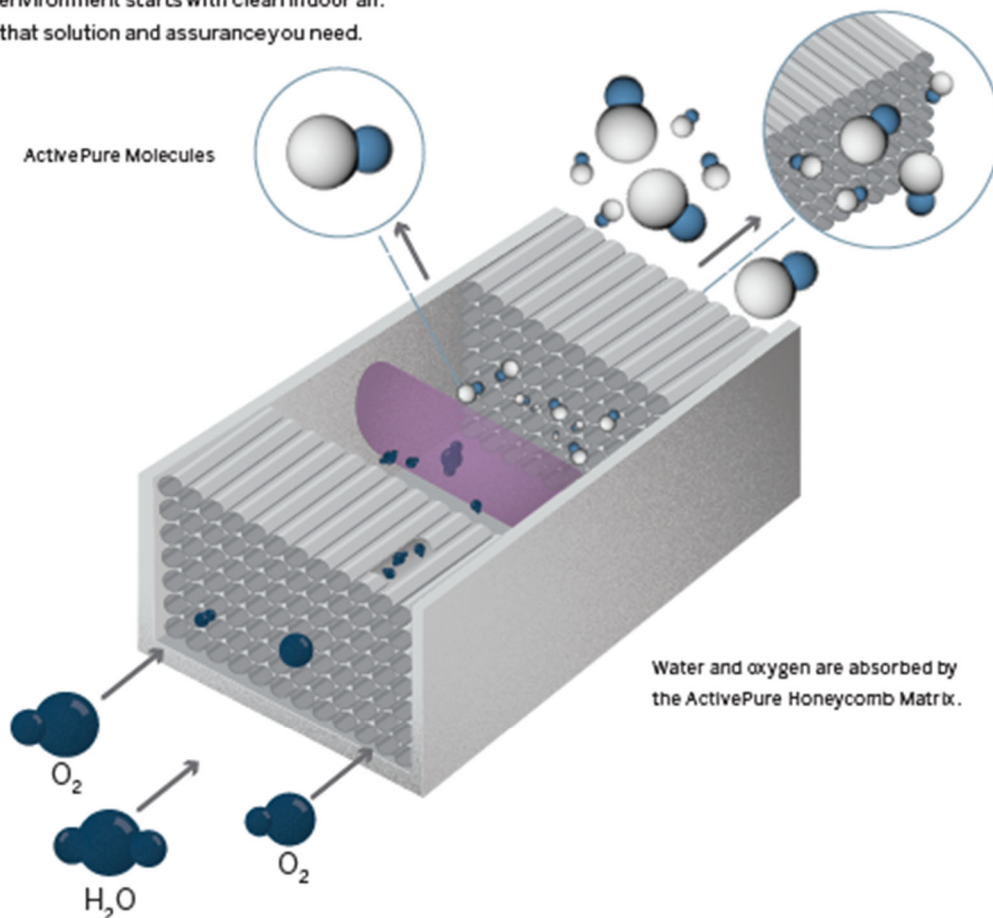
ActivePure® Technology: Bringing the Cleansing Power of the Sun Inside

In nature, the sun supplies UV radiation that breaks down O_2 (oxygen) and H_2O (water) molecules by a process called photocatalysis. This process breaks down and eradicates harmful chemicals and pathogens, creating fresh air outdoors.

ActivePure® Technology works indoors, invoking a similar method: Advanced Photocatalysis. When microscopic oxygen and water molecules enter the air purification unit, they pass through a honeycomb matrix that stimulates these molecules, creating new cleaning molecules.



As these active molecules are dispersed into the environment, they come in contact with bacteria, viruses, molds, and odor-causing contaminants, effectively neutralizing them by stripping away their protective coating at the molecular level. Within minutes of use, ActivePure® Technology can reduce up to 99.9% of pathogens in the environment, allowing you to rest easy.



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Vollara Air & Surface Pro XL

Who Should Use

Without exception, everyone breathes, so it's really a matter of having the knowledge and understanding of what else is being absorbed from the air when it is inhaled. And, unlike other purifiers, Vollara Air & Surface Pro XL controls surface contaminants that can affect your health. Vollara Air & Surface Pro XL is suitable for anyone concerned about indoor air quality and surface contaminants with the desire to provide a healthier indoor living environment using nature-based, proven technologies that are both convenient and cost effective.

Frequently Asked Questions

• How does Vollara Air & Surface Pro XL work?

Five nature-based technologies including short wave UVC light, positive and negative ionization, RF ionization, and proprietary ActivePure® Technology are combined in one system to very effectively reduce dust and particulate, smoke, odors, and surface contaminants in the indoor environment.

• What is environmental conditioning?

Because Vollara Air & Surface Pro XL treats interior exposed surfaces as well as indoor air, it doesn't fit into the category of an air purifier only. The term "environmental conditioning" more accurately describes the overall effect of the active technologies within the living area.

• Is Vollara Air & Surface Pro XL loud like a lot of air filtration machines?

The loudness of an air purifier (measured in decibels) depends on the fan operating speed, and personal noise tolerance. In some situations, a high fan setting may be somewhat more effective; however fan speed of the Vollara Air & Surface Pro XL generally can be adjusted to your preference without adversely affecting overall performance, especially when using ceiling fans or operating an HVAC system.

• How long should the Vollara Air & Surface Pro XL run?

For best results, it is recommended to continuously run the Vollara Air & Surface Pro XL. This allows constant treatment for particle removal and reduction of contaminants on surfaces.

• Where should I place Vollara Air & Surface Pro XL?

Place the Vollara Air & Surface Pro XL in your home, in as high a place as is feasible. By doing so, you'll get the most benefit from the clustering effect of ionization and maximum dispersion of ActivePure® properties of the Vollara Air & Surface Pro XL.

• What is the expected coverage?

The Vollara Air & Surface Pro XL is designed to cover up to 3,500 sq. ft. (325 m²) depending on occupant density and other factors¹. High density commercial not to exceed 750 sq. ft. (69.7m²).

• How do I know when to clean the unit?

A notification will appear on the display as a reminder to clean the rear lint screen, and to vacuum the ActivePure® Cell and top and rear grills. This is a good sign and lets you know how much the Vollara Air & Surface Pro XL is helping you and your family.

Unique Features of Vollara Air & Surface Pro XL

- The two 7-inch ActivePure Cells are larger and more powerful in helping to reduce up to 99.9% of many surface and airborne contaminants faster
 - A redesigned air tunnel with increased airflow
 - Greater Coverage Area of up to 3,500 sq. ft.
 - A True HEPA Filter for better filtration and removal of at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns
 - Both ActivePure Cells are always functioning when the unit is on, giving ActivePure purification and decontamination day and night
 - Optional ionization feature assists with particulate removal and can help in the efficiency of the HEPA filtration
 - Unit will automatically reset and function at the most recent setting when power is restored after a power failure
 - Maintenance Reminders to clean and replace filters and cells – keeps unit running efficiently and effectively
-

Warnings

- The unit should always have unrestricted airflow.
- When operating a central heating and air conditioning fan, set the coverage up to the total ventilated indoor area. Otherwise, set the coverage up to the size of the room.
- Point the unit toward the center of the room for maximum dispersion of ions.
- Do not look directly at the glowing lamp. Prolonged exposure, even to reflected UV light, can cause eye damage according to the American Conference of Governmental Industrial Hygienists (ACGIH) Standards.

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Vollara Air & Surface Pro XL

Specifications

Model	Vollara Air & Surface Pro XL 00772 Model : B1040C (ozone-free) Meets California ozone emissions limit. CARB Certified.
Technology Included	ActivePure® Technology – (2) 7" cells HEPA Filter Activated Carbon Filter Optional Ionization
Electrical	Input Voltage: 100~240 VAC; 50/60 Hz External Power Supply: DC 24 Volts; 3 Amps Max Power Consumption: 56 Watts Max.
Mechanical	Nominal Airflow Rate: 40–110 CFM Adjustable Fan Speed
Safety	Conforms to UL 867.
Weight	10.4 lbs (4.72 kg)
Dimensions	14.17" H x 11.7" W x 12" D (35.9 cm x 29.7 cm x 30.5 cm)
Operating Temperature	34° F – 100° F (-1°C – 38°C)
Noise Level	45 dB(A) (on low); 57 dB(A) (on high)
Coverage	Up to 3,500 sq. ft. (325 m²) depending on occupant density and other factors. High density commercial not to exceed 750 sq. ft. (69.7 m²).
Warranty	Limited Three Year Warranty

1. Recommended ceiling height to not exceed 10 feet. Solutions should be customized based upon a variety of factors including HVAC system capabilities and settings, air flows taking into account walls, air pressure, and doors, ambient air temperatures and humidities, variable density, known VOC concentrations, and other layers of protection.

The top of the page features a black and white photograph of a white, rectangular Vollara Air & Surface Pro XL unit sitting on a white surface. To the left of the unit is a vase with white flowers and a stack of books. The Vollara logo is overlaid on the left side of the image.

vollara®

Meet the Vollara® Air & Surface Pro XL

Greater Protection for your Indoor Air & Surfaces

THE TECHNOLOGY

The Vollara® Air & Surface Pro XL uses improved combined technologies along with our advanced ActivePure® Technology to effectively treat exposed air and surfaces and improve the quality of indoor air in spaces up to 3,500 square feet. It has been proven to reduce up to 99.9% of many common airborne and surface contaminants (list of tested pathogens can be found in “The Proof” section below).

ActivePure Technology does not replace the need to follow public health guidelines and should be used as complementary technology.

THE PROOF

In extensive unaffiliated lab testing, ActivePure® Technology has been proven to significantly reduce the following contaminants and pathogens¹:

- SARS-CoV-2
- *Staphylococcus aureus*
- *Aspergillus niger* endospores
- H1N1 Influenza
- H5N8 Influenza
- MRSA
- *Bacillus globigii*
- MS2 Bacteriophage
- *Staphylococcus epidermidis*
- PhiX-174
- *Erwinia herbicola*
- *Listeria monocytogenes*
- Murine Norovirus
- *E. coli*
- *Candida auris*
- *Botrytis cinerea*
- *Sclerotinia sclerotiorum*
- *Legionella pneumophila*
- *Aspergillus versicolor*
- *Clostridium difficile*
- *Salmonella enterica*

ENHANCED FEATURES & BENEFITS

The Vollara® Air & Surface Pro XL provides 24/7 air purification and surface decontamination. It is a proactive and effective solution for your home or business.

- The two 7-inch ActivePure Cells are larger and more powerful in helping to reduce up to 99.9% of many surface and airborne contaminants faster
- A redesigned air tunnel with increased airflow
- Greater Coverage Area of up to 3,500 sq. ft.
- A True HEPA Filter for better filtration and removal of at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns
- Both ActivePure Cells are always functioning when the unit is on, giving ActivePure purification and decontamination day and night
- Optional ionization feature assists with particulate removal and can help in the efficiency of the HEPA filtration
- Unit will automatically reset and function at the most recent setting when power is restored after a power failure
- Maintenance Reminders to clean and replace filters and cells – keeps unit running efficiently and effectively



¹View test results at
Vollara.com/scientific-proof

vollara[®]
AIR & SURFACEPRO XL

SPECIFICATIONS

Product Information	00772 (ozone-free) Model: B1040C Meets California Ozone Emissions Limit. CARB Certified.
Technology Included	ActivePure [®] Technology – (2) 7" Cells HEPA Filter Activated Carbon Filter Optional Ionization
Electrical	Input Voltage: 100 ~ 240 VAC; 50/60 Hz External Power Supply: DC 24 Volts; 3 Amps Max Power Consumption: 56 Watts Max
Mechanical	Nominal Airflow Rate: 40-110 CFM; Adjustable Fan Speed
Safety	Conforms to UL 867
Weight & Dimensions	10.4 lbs (4.72 kg) 14.17" H x 11.7" W x 12" D (35.9 cm x 29.7 cm x 30.5 cm)
Operating Temperature	34°F – 100°F (1°C – 38°C)
Sound Level	45 dB(A) (on low); 57 dB(A) (on high)
Coverage¹	Up to 3,500 sq. ft. (325 m ²) depending on occupant density and other factors. High density commercial not to exceed 750 sq. ft. (69.7 m ²).
Warranty	Limited 3 year warranty



Contact Name: Jordan Kennedy



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1. Recommended ceiling height to not exceed 10 feet. Solutions should be customized based upon a variety of factors including HVAC system capabilities and settings, air flows taking into account walls, air pressure, and doors, ambient air temperatures and humidities, variable density, known VOC concentrations, other layers of protection.

**Aerus Medical Guardian Unit Receives
FDA Clearance as a Class II Medical Device**



June 26, 2020

We are pleased to announce that the Aerus Medical Guardian with ActivePure® Technology has been cleared by the FDA as a Class II Medical Device for our Sister Company, Aerus. The Aerus Medical Guardian is the flagship product that will be marketed through the Aerus Medical business which is focused exclusively on hospitals, nursing homes, dental offices and other healthcare industry facilities. The Aerus Medical Guardian has achieved unparalleled results.

The product cleared by FDA is intended for medical purposes that is used for the reduction of staphylococcus epidermidis and erwinia herbicola bacteria, MS2 and Phi-X174 viruses and aspergillus niger fungal spores and bacillus globigii bacterial spores from the air in a temperature-controlled professional healthcare environment of 70~71°F, 40~45% RH.

ActivePure® Technology is also featured in many of our Vollara products; however, it is important to note that you **should not and must not** make any direct or implied medical claims or draw any direct correlations between this FDA Class II Medical Device designation and any of our Vollara products with ActivePure®. In the near future, we may apply for FDA Class II clearance for our Vollara Air & Surface Pro models as we are now better positioned to do so.

To once again be clear with everyone, ActivePure® has **not** been tested against the Coronavirus (COVID19) which is an RNA virus and we cannot and must not say that it kills or prevents that virus.

Protecting our families, neighbors and relatives starts with following the CDC guidelines below regarding the Coronavirus (COVID19), such as frequent handwashing and disinfecting touchpoints in our homes, like doorknobs and faucets. See;

<https://www.cdc.gov/coronavirus/2019-ncov/about/prevention-treatment.html>.

To learn more about our powerful ActivePure® Technology go to your Vollara Back Office: Click on "Resources" and then go to the "Important Links" section and click on "Vollara ActivePure® Demo".

Thank you.

A handwritten signature in black ink that reads "William J. Coyle". The signature is written in a cursive, flowing style.

William J. Coyle
Vollara



Brief Report

Advanced photohydrolysis technology demonstrates rapid inactivation of aerosolized SARS-CoV-2 and efficacy against other respiratory viral pathogens

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Key Words:

Air purification
Respiratory pathogens
Infection control
Viral aerosols

Efficient, rapid means of air decontamination are needed against widespread respiratory pathogens such as SARS-CoV-2, the virus that causes COVID-19. This study demonstrated the efficacy of advanced photohydrolysis technology in significantly reducing infectious, aerosolized SARS-CoV-2, achieving over 99% viral inactivation. Proof-of-concept assessments for respiratory syncytial virus and monkeypox virus showed similar results, suggesting broad applicability. These findings highlight the potential of the novel technology to enhance air purification and infection control strategies against multiple airborne viral pathogens.

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BACKGROUND

SARS-CoV-2, respiratory syncytial virus (RSV), and monkeypox virus (MPXV) pose major public health threats due to their modes of transmission and disproportionate impact on vulnerable populations. Aerosol transmission of SARS-CoV-2, the virus responsible for COVID-19, has been widely recognized as the primary route of infection, contributing to severe respiratory complications.^{1,2} RSV is a leading cause of bronchiolitis and pneumonia in infants and poses a significant risk to the elderly, especially those with underlying health conditions.³ MPXV, while historically associated with close contact transmission, possesses the potential for respiratory transmission and consequently has sparked new public health concerns.^{4,5}

Advanced photohydrolysis technology (APHT) was previously shown to significantly reduce microbial loads, including pathogens like methicillin-resistant *Staphylococcus aureus*, in health care settings.⁶ It operates through a unique photocatalytic process that harnesses a specialized matrix material activated by UV light. The process results in the continuous generation and delivery of a range of reactive oxygen species, including hydroxyl radicals, super oxygen ions, and hydrogen peroxide molecules, into the surrounding air where they interact with and inactivate environmental pathogens.^{6,7} Unlike conventional air purification systems that rely on passive filtration, APHT continuously reduces contamination levels in real time, providing air and surface disinfection, without requiring air to pass directly through the device.⁶ Here, we evaluated the ability of APHT to rapidly inactivate aerosolized SARS-CoV-2 and explored its effectiveness against RSV and MPXV, providing insights into applicability for improving indoor air quality and infection control.

METHODS

The SARS-CoV-2 strain USA_WA1/2020 used for this study was prepared from frozen seed stock (NR-596, BEI Resources) cultured in

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Conflicts of interest: None to report.

Vero E6 cells and harvested at 50% cytopathic effects (CPE). The RSV long strain was propagated in HEp-2 cells (ATCC VR-26) and concentrated using ultrafiltration. The MPXV strain MXV_HUG_2 was cultivated in Vero E6 cells from material provided by the World Reference Center for Emerging Viruses and Arboviruses (TVP 23377) and was harvested at 50% CPE.

SARS-CoV-2 was quantified using a TCID₅₀ assay.⁸ Briefly, low-passage Vero E6 cells were used to seed 96-well plates, and serial 1:10 dilutions of viral samples were added. Cultures were incubated for 72 hours at 37 °C with 5% CO₂, and CPE were observed microscopically to determine TCID₅₀/mL, with a lower limit of detection (LLOD) of 63 TCID₅₀/mL.

RSV and MPXV were quantified using plaque assays in HEp-2 and Vero E6 cells, respectively.⁹ Briefly, serial 10-fold dilutions of samples were incubated at 37 °C with 5% CO₂ under carboxymethyl cellulose overlay. Plates were stained with crystal violet to calculate plaque-forming units (PFU/mL), with LLODs of 10 and 4 PFU/mL for RSV and MPXV, respectively.

Two devices manufactured by ActivePure Technologies, LLC were used for each pathogen: an experimental device equipped with APHT and a control device identical in design but without the photohydrolysis technology. Aerosol runs for SARS-CoV-2 were conducted in triplicate for each device, and single runs for RSV and MPXV.

Aerosols were generated using a Biaera Aero3G control platform (Biaera Technologies, LLC) fitted with a 150-L custom-made chamber. Viral aerosols were produced using a 6-jet Collision nebulizer at 14.0 LPM. Fresh 10 mL viral suspensions (8.3×10^6 TCID₅₀/mL for SARS-CoV-2, 1×10^7 PFU/mL for RSV, and 8×10^4 PFU/mL for MPXV) were aerosolized for 15 minutes, and chamber air was sampled the last 5 minutes of aerosolization using SKC Biosamplers (SKC, Inc) at 12.5 LPM. This initial air sample was collected before the device was turned on; therefore, it gave the initial viral concentration before the device was on. Each device was turned on immediately following completion of aerosolization and collection of the initial air sample. Air samples were collected again after 1-minute with the devices on for SARS-CoV-2 and RSV, and after 5 minutes with the devices on for MPXV. The initial viral concentration and the 1-minute (for SARS-CoV-2 and RSV) or 5-minute (for MPXV) viral concentrations were used to calculate the overall reduction in viral concentration. The relative humidity was continuously monitored and ranged from 74% to 93%.

Log₁₀-fold reductions in viral concentrations were compared between the experimental and control devices using a 1-tailed paired t test, and were expressed as base-10 (log₁₀) values. Statistical significance was set at $P < .05$. Analyses were conducted using GraphPad Prism version 10.3.1.

RESULTS

Table 1 summarizes the mean log₁₀-fold reductions for SARS-CoV-2 for the experimental and control devices. The experimental device significantly reduced viral concentrations below or at the assay's LLOD of 63 TCID₅₀/mL ($1.8 \log_{10}$), reductions ranging from 2.37 to $> 2.77 \log_{10}$, corresponding to an efficiency of 99.57% to $> 99.83\%$. The control device showed a mean log reduction of $0.64 \log_{10}$ which was significantly ($P = .012$) less than that of the experimental device. The net log₁₀ reduction (difference between the experimental and control devices) ranged from 1.56 to $> 2.46 \log_{10}$, with a net efficiency of 97.37% to $> 99.65\%$; however, since no virus was detected in nearly every run using the

Table 1

Effect of APHT on log₁₀ reductions in SARS-CoV-2 viral concentrations at T = 1 min from T = 0 min (in triplicate)

Control device	Experimental device	P-value*
0.81	> 2.37	$P = .012$
0.78	2.37	
0.32	> 2.77	

APHT, advanced photohydrolysis technology; SARS, severe acute respiratory syndrome.

*P-value based on paired t test. Statistical significance at $P \leq .05$.

Table 2

Effect of APHT on log₁₀ reductions in RSV and MPXV viral concentrations at T = 1 or 5 min, respectively, from T = 0 min

Virus	Control device	Experimental device
RSV	1.16	> 3.72
MPXV	0.70	> 2.41

APHT, advanced photohydrolysis technology; MPXV, monkeypox virus; RSV, respiratory syncytial virus.

experimental device, the true percent reduction likely exceeded the calculated percentages.

Table 2 provides the log₁₀ reduction for RSV and MPXV (single aerosol runs for both pathogens). The experimental device reduced RSV concentrations below the assay's LLOD of 10 PFU/mL ($1.00 \log_{10}$), achieving a reduction $> 3.72 \log_{10}$ ($> 99.98\%$ efficiency), compared to $1.16 \log_{10}$ for the control device. The net log reduction for RSV was $> 2.56 \log_{10}$ ($> 99.72\%$ efficiency). In the case of MPXV, the experimental device reduced viral concentrations below the assay's LLOD of 4 PFU/mL ($0.60 \log_{10}$), achieving a reduction of $> 2.43 \log_{10}$ ($> 99.63\%$ efficiency), compared to $0.70 \log_{10}$ for the control. The net log reduction for MPXV was $> 1.73 \log_{10}$ ($> 98.14\%$). Similar to the SARS-CoV-2 test, the true percent reductions for RSV and MPXV likely exceeded the calculated percentages since no virus was detected after use of the experimental device.

DISCUSSION

This study demonstrates the effectiveness of APHT in rapidly reducing ($> 99.83\%$) infectious SARS-CoV-2 concentrations. The proof-of-concept studies also show its efficacy in reducing RSV and MPXV infectious titers by $> 99.98\%$ and $> 99.63\%$, respectively. These results highlight APHT's potential as a public health tool for mitigating airborne pathogens, particularly in high-risk settings such as hospitals, schools, and long-term care facilities.

CONCLUSIONS

APHT's continuous air disinfection is especially valuable in environments vulnerable to viral outbreaks, where sustained pathogen control is crucial to reducing transmission and protecting vulnerable populations. These findings are particularly relevant given the epidemiological challenges posed by airborne respiratory viruses in densely populated indoor spaces.¹⁰ APHT's ability to continuously reduce infectious viral concentrations makes it a promising adjunct to existing infection control protocols, improving air quality and lowering transmission risks for at-risk populations.

Acknowledgments

The authors would like to thank Claude P. Selitrennikoff, PhD, for his helpful suggestions and comments.

References

- Centers for Disease Control and Prevention (CDC). About COVID-19. CDC; 2024. Accessed August 21, 2024. (<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>).
- Greenhalgh T, Jimenez JL, Prather KA, Tufekci Z, Fisman D, Schooley R. Ten scientific reasons in support of airborne transmission of SARS-CoV-2. *Lancet*. 2021;397:1603–1605.
- Centers for Disease Control and Prevention (CDC). How RSV spreads. CDC; 2024. Accessed August 21, 2024. (<https://www.cdc.gov/rsv/causes/index.html>).
- World Health Organization (WHO). Mpox. WHO; 2023. Accessed August 21, 2024. (<https://www.who.int/news-room/fact-sheets/detail/mpox>).
- Beeson A, Styczynski A, Hutson CL, et al. Mpox respiratory transmission: the state of the evidence. *Lancet Microbe*. 2023;4:e277–e283.
- Trosch K, Lawrence P, Carenza A, et al. The effects of a novel, continuous disinfectant technology on methicillin-resistant *Staphylococcus aureus* (MRSA), fungi, and aerobic bacteria in 2 separate intensive care units in 2 different states: an experimental design with observed impact on health care associated infections (HAIs). *Am J Infect Control*. 2024;52:884–892.
- Selitrennikoff C, Sylvia C, Sanchez M, et al. Evaluate the safety of a novel photo-hydrolysis technology used to clean and disinfect indoor air: a murine study. *PLoS One*. 2024;19:e0307031.
- Harcourt J, Tamin A, Lu X, et al. Isolation and characterization of SARS-CoV-2 from the first US COVID-19 patient. *bioRxiv*. Preprint posted online March 7, 2020.
- Morris DR, Ansar M, Ivanciuc T, Qu Y, Casola A, Garofalo RP. Selective blockade of TNFR1 improves clinical disease and bronchoconstriction in experimental RSV infection. *Viruses*. 2020;12:1176.
- Ghosh B, Lal H, Srivastava A. Review of bioaerosols in indoor environment with special reference to sampling, analysis and control mechanisms. *Environ Int*. 2015;85:254–272.



Major Article

The effects of a novel, continuous disinfectant technology on methicillin-resistant *Staphylococcus aureus* (MRSA), fungi, and aerobic bacteria in 2 separate intensive care units in 2 different states: An experimental design with observed impact on health care associated infections (HAIs)

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Key Words:

Infection control
Epidemiology
Critical care
Preventative measures
Disease reservoirs
Healthcare-associated infections

Background: Hospitals are exposed to abundant contamination sources with limited remediation strategies. Without new countermeasures or treatments, the risk of health care-associated infections will remain high. This study explored the impact of advanced photohydrolysis continuous disinfection technology on hospital environmental bioburden.

Methods: Two acute care intensive care units in different locations (ie, Kentucky, Louisiana) during different time periods were sampled every 4 weeks for 4 months for colony-forming units (CFUs) of methicillin-resistant *Staphylococcus aureus* (MRSA) and fungi on surfaces and floors and fungi and aerobic bacteria in the air.

Results: At both sites, surface testing showed greater than 98% reduction in mean fungi and MRSA CFUs. Floor results had reductions by more than 96% for fungi and MRSA at both sites. Aerobic bacterial air and fungal CFUs had reductions up to 72% and 89%, respectively. HAIs declined 70% when postactivation data were compared to preactivation data.

Discussion: The continuous nature of advanced photohydrolysis decontamination, its ability to be used in occupied rooms, and its independence of human resources provide an innovative intervention for complex health care environments.

Conclusions: This study is on the pioneering edge of demonstrating that continuous decontamination can reduce surface, floor, and air contamination and thereby reduce the acquisition of HAIs.

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BACKGROUND

Hospital environments are affected by a multitude of factors that can cause pathogenic reservoirs to form, contributing to infection risk.¹ Not only are hospital environments exposed to abundant contamination sources,^{2–13} with limited systems to reduce contamination,^{14–17} multiple studies have shown that prevailing remediation strategies remain suboptimal. In many facilities, only 40% to 50% of required surface cleaning occurs,¹⁸ and widely observed variances persist, including the time spent cleaning, the number of wipes used, and the level of decontamination achieved.^{19–21} Emerging data also suggest the floor surfaces as additional significant reservoirs for pathogens, which can be transferred to hands through

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Availability of data and materials: All data relevant to the study are included in the article. Raw data will be made available upon reasonable request.

Conflicts of interest: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/disclosure-of-interest/ and declare no support from any organization for the submitted work, besides sponsorship from ActivePure Technologies; no financial relationships with any organizations that might have an interest in the submitted work; no other relationships or activities that could appear to have influenced the submitted work.

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