

RGF[®] Environmental Group Study: REME HALO[®] Inactivates SARS-CoV-2 by 99.9%

**Proprietary PHI- Cell[®] Technology Eliminates the Need for Virus Particles
to Travel through HVAC or Air Purification Systems**

Port of Palm Beach, Florida (October 26, 2020) – RGF[®] Environmental Group, Inc., a leading environmental design and manufacturing company, has released the results of a third-party study that reveal REME HALO[®] efficacy of 99.9% against the SARS-CoV-2 virus, commonly known as the coronavirus 2019 or COVID-19.

Commencing in March 2020, the study was overseen by Dr. James Marsden, Executive Director of Science and Technology at RGF. “The study results show the REME HALO[®] to be effective in combating the COVID-19 virus and a valuable solution to immediately improve the Indoor Air Quality of residential and commercial spaces and protect occupants against exposure to the SARS-CoV-2 virus.” The studies are ongoing.

The independent third-party study focused on the inactivation of SARS-CoV-2 using RGF’s proprietary REME HALO[®] product with PHI- Cell[®] technology. The testing, performed at the Innovative Bioanalysis Laboratories in Cypress, Calif., looked at neutralizing the virus within the occupied space in the air and on surfaces.

“In our New Normal, the public deserves the confidence of Indoor Air Quality solutions that are backed by science. This study proves the efficacy of one of our flagship products,” said Ron Fink, CEO, RGF[®] Environmental Group, Inc. “From restaurants to schools and places of business, RGF’s REME HALO[®] is a tested and proven solution that provides the peace of mind needed to get America back to work.”

The test procedure used the SARS-CoV-2 virus inside a large chamber (1,280 cu. ft.) representing a real-world air-conditioned office or home. The virus was nebulized into the space simulating a sneeze or cough from an infected person. With the



Figure 1: Dr. James Marsden, Executive Director of Science and Technology

Testing summary: 99.9% inactivation of the SARS-CoV-2 virus

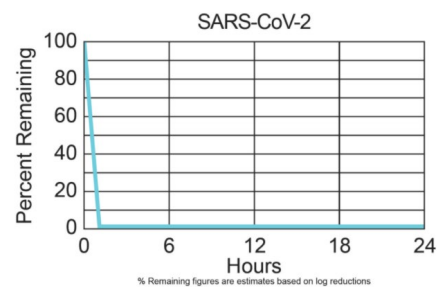


Figure 2: Testing Summary: 99.9% Inactivation of the SARS-CoV-2 utilizing REME HALO[®].

REME HALO® operating inside the chamber the virus was reduced on contact, resulting in a 99.9% reduction of the virus within the simulated real-world space.

The REME HALO® active air purification system testing showed the SARS-CoV-2 virus was significantly neutralized within the occupied space on airborne virus, reducing the risk of person-to-person infection by respiratory particles and aerosols. The REME HALO® is an “active” solution that neutralizes SARS-CoV-2 within the occupied space, eliminating the need for virus particles to travel through the HVAC system filters or UV air purification system.

DISCLAIMER: The summary and any comments herein are based on the results from an independent laboratory study performed under controlled conditions and are not in any way medical claims. The product(s) and technologies described are not medical devices and are not intended to diagnose, treat, cure, or prevent any disease, virus or illness.



Scan the QR code with your smartphone to view the SARS-CoV-2 test results video with Dr. Marsden or visit this link: <https://www.rgf.com/rgf-environmental-group-study-reme-halo-inactivates-sars-cov-2-by-99-9/>

For more information on testing, please contact Dr. James Marsden at Dr.IAQ@rgf.com.

About RGF Environmental Group, Inc.

RGF manufactures over 500 environmental products and has a 35+ year history of providing the world with the safest air, water and food without the use of chemicals. RGF is an ISO 9001:2015 certified research and innovation company, holding numerous patents for wastewater treatment systems, air purifying devices, and food sanitation systems. Situated in the heart of the Port of Palm Beach Enterprise Zone, RGF Headquarters span 9 acres, with 130,000 square feet of manufacturing, warehouse and office facilities. RGF has recently upgraded its facilities, creating an increased vertical approach to manufacturing, further allowing the company to provide the highest quality and best-engineered products on the market. For more information, visit RGF.com.

Element Air is Different from Carbon Filtration Systems



Element Air

Active Filtration

Element Air actively neutralizes microbials and odor through a process called Photohydroionization (PHI). PHI utilizes a broad-spectrum, high intensity UV light targeted on hydrated quad-metallic catalyst surface. The UV light reacts produce an advanced oxidation plasma consisting of hydro-peroxides, super oxide ions, and hydroxide ions.

HEPA Filter

Passive Filtration

The HEPA filter reduces up to 99.97% of airborne particulates without impacting airflow, static pressure or unit sizing. The HEPA 350 filters can treat an area of approximately 2,500 square feet. This whisper-quiet air filtration system is efficient in removing particles greater than .3 microns in size.

Carbon Filter

Passive Filtration

This mode is a VOC canister with a carbon filter. The filter contains 1,705,000 m³ of absorbent surface area for capturing and scrubbing chemicals. The carbon filter is housed in the Element Air HEPA 350.

Results from the Field

The research project for each cultivation facility was validated by a third-party laboratory⁽¹⁾ via air sampling and testing. We measured change(s) in microbials and odors associated with late flower terpene production.

Warehouse Cultivation

Issue

The cultivation facility is located within an office and industrial park, as such, odor control is a top priority.

Results

- Within 20 hours of equipment installation, 85% reduction in total volatile organic compounds.
- Element Air HEPA filter provided 99.97% particulate filtration to remove microbials and particulates.
- The Element Air carbon filter filtered odors from the air

Greenhouse Cultivation

Issue

The carbon odor absorbing devices were installed in late 2016. After two years, new complaints of odors were received.

Results

- Within 24 hours of equipment installation, 60% reduction in unwanted pathogens and odors.
- 50% and 60% reduction of mold and bacteria (respectively).
- Element Air HEPA filter provided 99.97% particulate filtration to remove microbials and particulates.

THE RESULTS



THIRD-PARTY LABORATORY RESULTS

In April 2019, testing of the air purification and odor control protocols commenced at Skinny Pineapple. As a result of using the Element Air and RGF technologies, Skinny Pineapple experienced a dramatic lowering of unwanted airborne VOCs.

Confirmed by a third-party laboratory via air sampling and testing, the report reflected an 85% reduction in total volatile organic compounds over a 20-hour period. Specifically, these common cannabis terpenes were systematically reduced: Alpha-Pinene was reduced 100%; beta-Myrcene was reduced 82%; and D-Limonene was reduced 87% over the same 20-hour period.

Additionally, the Element Air HEPA provided 99.97% particulate filtration to remove microbials and particulates. The Element Air Carbon provided additional protection, filtering out even more VOCs from the air.

SAMPLE	TIME AFTER RGF UNITS STARTUP (hr)	ALPHA-PINENE (ug/m3)	BETA-MYRCENE (ug/m3)	D-LIMONENE (ug/m3)	TOTAL VOCs FROM LIBRARY SEARCH (ug/m3)
1	0	16	370	120	590
2	1	15	370	120	590
3	2	14	310	100	490
4	19	5.8	78	0	110
5	20	0	66	16	87
	Percent Reduction	100%	82%	87%	85%

All air samples were collected using stainless-steel canisters under a vacuum. The cannisters were then analyzed by a nationally accredited lab with Gas Chromatography/Mass Spectrometry (GC/MS).

THE TEST



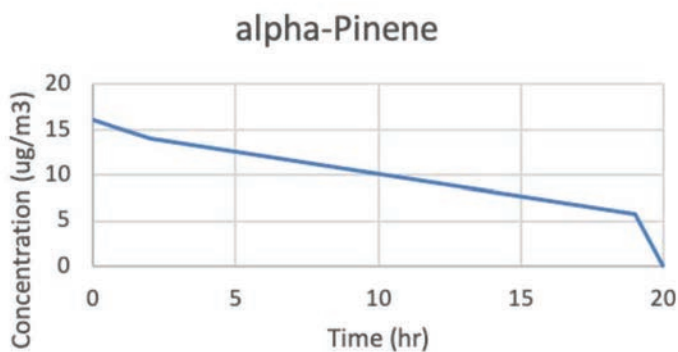
TESTING FOR MICROBIALS, PARTICULATES, AND VOLATILE ORGANIC COMPOUNDS (VOCs)

In March 2019 at the recommendation of urban-gro, Inc., Skinny Pineapple installed a combination Element Air PHI + Wall Mount Tower + RGF HEPA Filter + Element Air Carbon Filter system. This combined solution—dubbed the “Trifecta of Microbial and VOC/Odor Purification”—helps mitigate microbes and VOCs and promotes odor control.

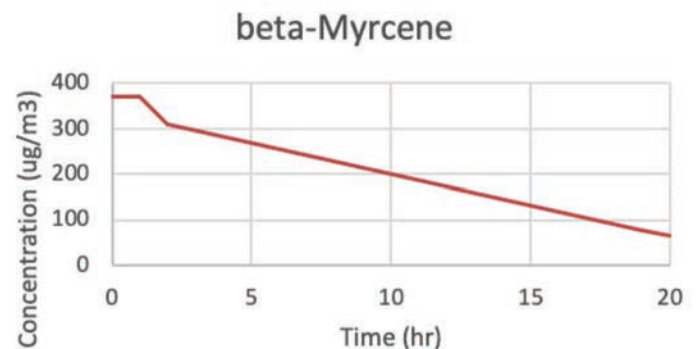
Prior to installation, the urban-gro and Element Air team established a baseline of VOCs present in the test room measuring 26 feet by 32 feet by 22 Feet. The test room includes 130 plants / 25 1000 watt lights and utilizes a five-ton HVAC Roof unit feeding directly into room.

Element Air and RGF utilized three core technologies (Advanced Oxidation, HEPA, and Activated Carbon) in tandem to achieve the best results possible. The Element Air Tower provided advanced oxidation as the primary defense against VOCs, microbes, and pathogens.

THE DATA

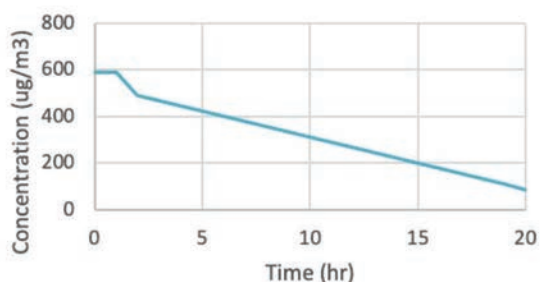


Alpha-Pinene was reduced 100%



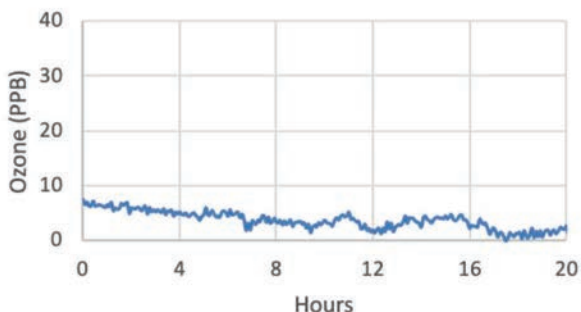
Beta-Myrcene was reduced 82%

Total Volatile Organic Compounds from Library Search



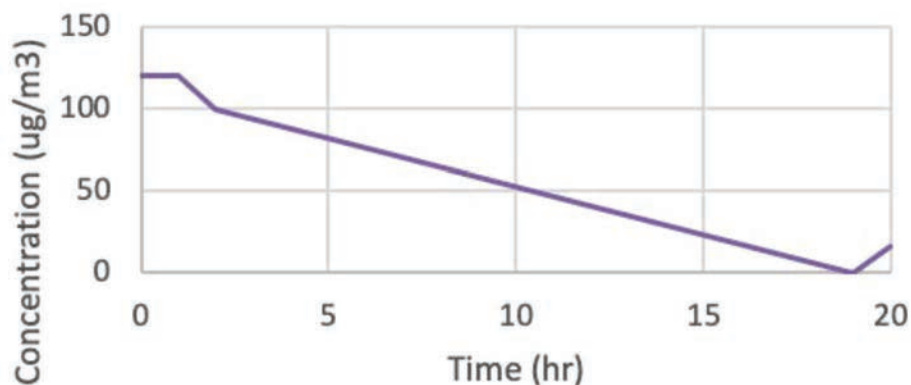
85% reduction in total VOCs over a 20-hour period

Ozone Level in Flowering Room



Ozone levels remained below 5 ppb over most of the 20 hrs which equates to statistically negligible.

D-Limonene



D-Limonene was reduced 87%

CONCLUSION



STUDY CONCLUSION

As confirmed by the test results, Skinny Pineapple successfully reduced airborne VOCs, microbials, particulates, and odor. According to head cultivator, John Billings, "using the Element Air solution as a part of my overall integrated pest management (IPM) program has been effective in optimizing my grow environment. urban-gro's IPM program evolves over time to keep up with changing regulations and pest practices, ensuring effective and compliant pest mitigation."

For more information on Element Air, urban-gro, or to request a copy of the test results, please email marketing@urban-gro.com.



FOR IMMEDIATE RELEASE

RGF® Environmental Group Releases Industry's First Test Evaluating Aerosolized SARS-CoV-2 Viral Reductions **Directly in the Air: PHI-PKG14 PHI-CELL® Proven to Inactivate 99.96% of **Airborne** SARS-CoV-2 within Simulated Air-Conditioned Space**

- *First and only commercial product validated by third-party testing to confirm actual airborne inactivation of 99.96% SARS-CoV-2 virus particles and aerosols*
- *PHI-PKG14 PHI-CELL® product with Photohydroionization® technology is uniquely designed for and easily installed in HVAC systems up to 250 tons*
- *Proprietary Active Air Purification technology eliminates the need for virus particles to travel through HVAC or Air Purification Systems*

Port of Palm Beach, Fla (March 1, 2021) – RGF® Environmental Group, Inc., [a leading environmental design and manufacturing company](#), has released the results of a third-party test that proves the [PHI-PKG14 PHI-CELL® product with Photohydroionization® technology](#) inactivates greater than 99.96% of airborne SARS-CoV-2 virus. The report is the first-of-its-kind to test for viral reductions occurring within the actual air. Utilizing a direct air sampling method rather than surface or in-duct measurements, researchers analyzed the efficacy of neutralizing airborne SARS-CoV-2.

SARS-CoV-2, commonly known as coronavirus, is the virus that causes COVID-19. Given the CDC's determination that SARS-COV-2 is an airborne virus, meaning it spreads from person-to-person via aerosols and respiratory particles, the airborne test results are important for homeowners and commercial building owners and operators seeking a solution to combat the airborne SARS-COV-2 virus within their occupied spaces.

"Virus particles or aerosols are produced when an infected person coughs, sneezes or talks. The aerosols are then carried through the air from the infected person to others and can stay airborne within the occupied space for a period ranging from a few seconds up to several hours," noted Dr. James Marsden, Executive Director of Science & Technology at RGF® Environmental Group. "Because the PHI-PKG14 PHI-CELL® technology is designed for installation within HVAC systems, the technology represents a versatile solution for residential and commercial buildings around the world."

"RGF's PHI-PKG14 PHI-CELL® is currently the only third-party tested indoor air quality solution that is proven 99.96% effective against the actual airborne SARS-CoV-2 virus," said Ron Fink, CEO, RGF® Environmental Group, Inc. "The rigorous research, development and testing of the PHI-PKG14 PHI-CELL® is another example of RGF's commitment to providing the world with the cleanest, safest air."

Airborne SARS-CoV-2: Testing Protocols and Results

As an industry leader committed to the highest standards for product testing, RGF® Environmental Group funded an independent, third-party study with Innovative Bioanalysis in Costa Mesa, California. RGF's airborne test procedure used the SARS-CoV-2 virus inside a large chamber (1,280 cu. ft.) representing a real-world air-conditioned office or room. The virus was nebulized as a fine spray into the space with a

cross directional air flow. The objective was to simulate the conditions that occur when a sneeze or cough from an infected person introduces the airborne virus in an environment that is being continuously treated with a PHI-PKG14 PHI-CELL®. Aerosolization of the virus was repeated at 15 min intervals for an hour and at 3 hours with airborne samples collected at four locations within the test chamber.

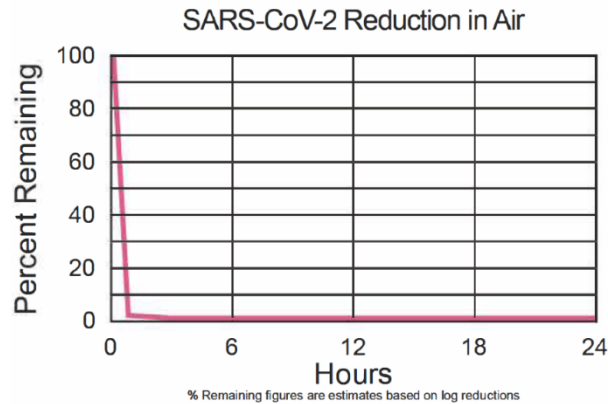


Figure 1: Innovative Bioanalysis Test Summary - PHI-PKG14 PHI-CELL® product with Photohydroionization® resulted in greater than 99.96% inactivation of the SARS-CoV-2 virus within the occupied space based on a direct air-sampling method

Key findings of the test indicate:

- The PHI-PKG active air purification system showed a greater than 99.96% neutralization of airborne SARS-CoV-2 virus particles and aerosols within the testing chamber.
- Due to the efficacy of neutralizing airborne SARS-CoV-2 virus particles and aerosols, the test indicated a significant reduction of respiratory particles and aerosols through the air in an occupied space.
- The PHI-PKG14 PHI-CELL® is actively treating air inside the occupied space, eliminating the need for virus particles to travel through the HVAC system filters or UV air purification system.

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