

## NON-GLP STUDY REPORT

### STUDY TITLE

Quantitative Evaluation of Air Treatment Efficacy Against Airborne  
Fungi in a Large Indoor Space

### **Test Organism(s):**

*Cladosporium cladosporioides* (ATCC 16022)

### PRODUCT IDENTITY

VigorOx Liquid Sanitizer and Disinfectant  
Lot 17622C1420

### TEST DEVICE IDENTITY

V2 Fog Tank, Serial Number 2219

### AUTHOR

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Senior Virologist

### STUDY COMPLETION DATE

August 31, 2023

### PERFORMING LABORATORY

Element Materials Technology Eagan  
1285 Corporate Center Drive, Suite 110  
Eagan, MN 55121

### SPONSOR

Pure Maintenance LLC  
334 Marshall Way, Suite D  
Layton, UT 84041

### SPONSOR REPRESENTATIVE

Keller and Heckman LLP  
1001 G Street NW, Suite 500 West  
Washington, DC 20001

### PROJECT NUMBER

A37949

This study was not performed under  
EPA Good Laboratory Practice Regulations  
(40 CFR Part 160)

## STUDY REPORT

### GENERAL STUDY INFORMATION

**Study Title:** Quantitative Evaluation of Air Treatment Efficacy Against Airborne Fungi in a Large Indoor Space

**Project Number:** A37949

**TRF Number:** PUR006013023.AIRB.2

### TEST SUBSTANCE IDENTITY

<b>Test Substance</b>	VigorOx Liquid Sanitizer and Disinfectant, Lot 17622C1420
<b>Test Substance Dilution</b>	19.2 oz/108.8 oz defined as 19.2 oz of test substance + 108.8 oz Deionized Water

### TEST PARAMETERS

<b>Delivery Mechanism</b>	V2 Fog Tank
<b>Spray Conditions</b>	Device prepared and operated by the Sponsor. Spray duration was 8 minutes 50 seconds.
<b>Sample Timepoints</b>	Time zero, 10 minutes, 30 minutes, 45 minutes
<b>Exposure Conditions (Target)</b>	18-25°C at 40-60% RH

### STUDY DATES

<b>Date Sample Received</b>	May 11, 2023 (Test Device) May 12, 2023 (Test Substance)
<b>Study Initiation Date</b>	May 17, 2023
<b>Experimental Start Date</b>	August 15, 2023
<b>Experimental End Date</b>	August 22, 2023
<b>Study Completion Date</b>	August 31, 2023

## TEST ORGANISM

Test Organism	ATCC #	Growth Medium	Incubation Parameters
<i>Cladosporium cladosporioides</i>	16022	Sabouraud Dextrose Broth	25-37°C aerobic

The test organism(s) used in this study was/were obtained from the American Type Culture Collection (ATCC), Manassas, VA.

## INOCULUM PREPARATION

Organism	<i>Cladosporium cladosporioides</i> ATCC# 16022
Target Time Zero Concentration	10 <sup>6</sup> CFU/m <sup>3</sup>
Diluent	0.85% saline
Organic Soil Load	Tri-Part Soil
Agar Plate Medium	Sabouraud Dextrose Agar

## ENVIRONMENTAL CONDITIONS

Pre-Nebulization Temperature	21.1°C (Baseline) 21.2°C (Test)
Pre-Nebulization Humidity	52.4% (Baseline) 55.1% (Test)
Post-Sampling Temperature	20.6°C (Baseline) 20.3°C (Test)
Post-Sampling Humidity	59.4% (Baseline) 83.0% (Test)
HVAC Status During Nebulization	OFF
HVAC Status During Treatment	OFF
Ceiling Fan Setting During Nebulization	ON
Ceiling Fan Setting During Treatment	ON

## AIR SAMPLING – BioSpot VIVAS 310™

Collection Fluid/Neutralizer	PBS
Sample Location	6' at interior wall
Replicates	1 per time point

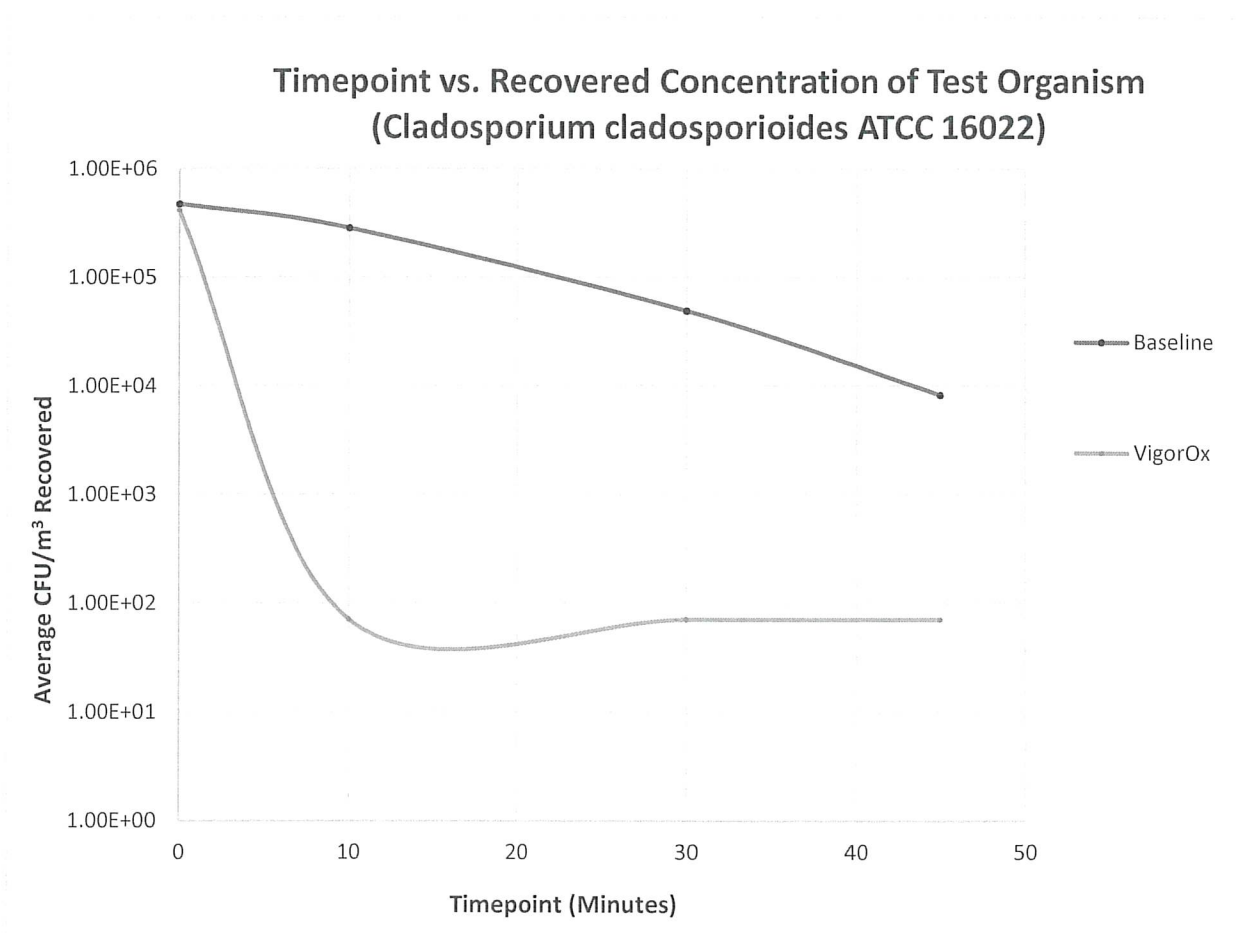
## **EXPERIMENTAL DESIGN**

Airborne organism was generated from a liquid inoculum using a Collision nebulizer and introduced into the containment lab at a target concentration of  $10^6$  CFU/m<sup>3</sup>. The organism was exposed to the test substance using the Sponsor supplied device V2 Fog Tank for the specified exposure time of 8 minutes 50 seconds. Following exposure, air samples were collected in neutralization fluid and analyzed for survivors. Log reductions are based on time zero value and normalized to account for natural decay of the organism in air. Appropriate neutralization confirmation, background contamination, organism purity, inoculum count, organic soil sterility and neutralization subculture medium sterility controls were performed.

Per Sponsor's direction, the study was not required to be conducted under U.S. EPA 40 CFR Part 160 or U.S. FDA 21 CFR Part 58.

## **STUDY RESULTS**

**TABLE 1: RESULTS SUMMARY**





**TABLE 2: CONTROL RESULTS**

The following results from controls confirmed study validity:

Type of Control	Results
	<i>Cladosporium cladosporioides</i> (ATCC 16022)
Purity Control	Pure
Inoculum Count	1.68 x 10 <sup>7</sup> CFU/mL
Neutralizing Subculture Medium Sterility Control	No Growth
Background Contamination Control	No Growth
Organism Preparation Diluent Sterility Control	No Growth

**TABLE 3: NEUTRALIZATION CONFIRMATION CONTROL RESULTS**

Test Substance	Test Organism	Neutralization Confirmation (CFU)		Percent Recovery	Pass/Fail ≥50%)
		Numbers Control	Results		
VigorOx Liquid Sanitizer and Disinfectant, applied using the V2 Fog Tank	<i>Cladosporium cladosporioides</i> (ATCC 16022)	133	147	111%	Pass

CFU = Colony Forming Unit

**TABLE 4: BASELINE RESULTS**

Organism	Timepoint	CFU/m <sup>3</sup>	Log/m <sup>3</sup>	Log <sub>10</sub> Decay vs. Time Zero
<i>Cladosporium cladosporioides</i> (ATCC 16022)	<b>Time Zero</b>	4.75E+05	5.68	NA
	<b>10 minutes</b>	2.85E+05	5.45	0.22
	<b>30 minutes</b>	4.95E+04	4.69	0.98
	<b>45 minutes</b>	8.29E+03	3.92	1.76

CFU = Colony Forming Unit

TABLE 5: TEST RESULTS

Organism	Timepoint	Average CFU/m <sup>3</sup>	Average Log/m <sup>3</sup>	Log <sub>10</sub> Reduction vs. Time Zero	Normalized Log <sub>10</sub> Reduction
<i>Cladosporium cladosporioides</i> (ATCC 16022)	Time Zero	4.15E+05	5.62	N/A	
	10 minutes	* 7.14E+01	1.85	3.76	3.54
	30 minutes	* 7.14E+01	1.85	3.76	2.78
	45 minutes	* 7.14E+01	1.85	3.76	2.01

\*No organism recovered. Represents test Limit of Detection.

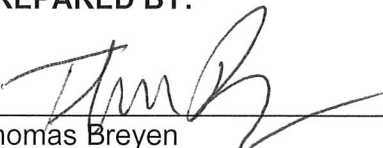
### CONTROL RESULTS

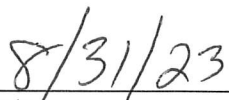
The results of controls performed for neutralization confirmation, background contamination, organism purity, inoculum count, organism preparation diluent sterility, and neutralization subculture medium sterility were all acceptable.

### CONCLUSION

VigorOx Liquid Sanitizer and Disinfectant (17622C1420) diluted 19.2 oz/108.8 oz defined as 19.2 oz of test substance + 108.8 oz sterile deionized water, applied using the V2 Fog Tank demonstrated a 3.54 log<sub>10</sub> reduction of *Cladosporium cladosporioides* (ATCC 16022) following a 10 minute exposure time when compared to the corresponding baseline result in the presence of a Tri-Part soil organic soil load.

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 Date

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