

Scientific Air Solutions



airPHX Companies
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June 21, 2020

Pre and In-Treatment Air and Surface Report – [REDACTED], [REDACTED] VA

A. Summary – Air Samples

Pre-treatment and in-treatment air samples results are given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m ³)	Range	Standard Deviation	% Reduction
05/22/2020	Pre	15	Various	691	300/1,100	239.9	-
06/15/2020	In			69	0/133	37.4	90.0
05/22/2020	Pre	4	Exterior	1,783	1,667/1,933	98.6	-
06/15/2020	In			1,967	1,900/2,100	81.6	+ 9.4

Background

All air samples were taken via the MB-1 air sampler, 30 liters per sample throughout the various locations given above with results normalized to colony forming units per cubic meter of air (cfu/m³).

Given below are airborne organisms found in the above locations for this 05/22/2020 **pre-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	3,100	<i>Cladosporium sphaerospermum</i>	970
<i>Penicillium brevicompactum</i>	1,740	<i>Ulocladium chartarum</i>	843
<i>Aspergillus fumigatus</i>	1,290	<i>Absidia spp</i>	715
<i>Penicillium purpurogenum</i>	1,015	<i>Firmicutes spp</i>	620

Noted below are airborne organisms found in the above locations for the 06/15/2020 **in-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	435	<i>Cladosporium sphaerospermum</i>	< 5
<i>Penicillium brevicompactum</i>	297	<i>Ulocladium chartarum</i>	< 5
<i>Aspergillus fumigatus</i>	175	<i>Absidia spp</i>	< 5
<i>Penicillium purpurogenum</i>	126	<i>Firmicutes spp</i>	< 5

05/22/2020 – Pre-treatment bioburden is considerably > 300 cfu/m³ which is **not acceptable** and needs corrective action

06/15/2020 - In-treatment results for the various locations now show a **90% decrease** from the pre-treatment samples and now are < 100 cfu/m³ and is considered **clean and acceptable**

Observations

The exterior air samples ranged from **1,667** to **2,100 cfu/m³** and reveals that most of the bioburden is attributed to the outside air. Even with a **+ 9.4% increase** in the exterior air bioburden the airPHX unit is having a noticeable impact on reducing the internal bioburden.

Target Air Quality

Air quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 100 cfu/m³ is considered **clean and acceptable**.
- 100 to 300 cfu/m³ is **marginal**, further efforts needed.
- > 300 cfu/m³ is **not acceptable** and needs corrective action.

In most cases, air quality < **100 cfu/m³** has shown a decrease in the overall bioburden and odors.



Predominant Microorganisms

Although the predominant organisms noted in this report are fungi, previous testing results show bacteria, viruses and protozoa are eliminated as effectively as fungi. The reactive oxygen species (ROS) generated is effective on gram +, gram – bacteria, protozoa, spores and viruses.

B. Summary – Surface Contact Swabs

Pre-treatment and in-treatment surface (swab) samples results are given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/cm ²)	Range	Standard Deviation	% Reduction
05/22/2020	Pre	10	Various	39.7	12.5/79.5	16.8	-
06/15/2020	In			2.3	0.9/5.1	1.4	94.2
05/22/2020	Pre	1	Negative Control	0	0/0	-	-
06/15/2020	In			0	0/0	-	-

05/22/2020 – Pre-treatment contact swab results from the various locations were considerably > 10 cfu/cm² which is considered **not acceptable** and needs corrective action.

06/15/2020 - In-treatment contact swab results reveal a **94.2% reduction** from the previous-treatment samples from the same locations and are now < 5 cfu/cm² which is considered **clean and acceptable**.

Target Contact Surface Quality

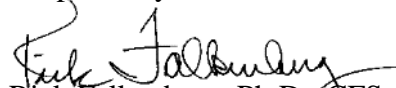
Contact surface quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 5 cfu/cm² is considered **clean and acceptable**.
- 5 to 10 cfu/cm² is considered **marginal**.
- > 10 cfu/cm² is considered **not acceptable** and needs corrective action.

In most cases, surface swabs < **5 cfu/cm²** has shown a decrease in the overall bioburden and odors.

Please contact me if there are questions or if further information is needed.

Respectfully submitted,


Rick Falkenberg, Ph.D., CFS
Senior Principal Scientist

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Table #1

██████████, ██████████ VA
06/15/2020 - In-treatment Air Sample Results - CFU/m³

06/15/2020 - In-treatment, ██████████						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
2868	Ctrl	Unopened	0	0	0	0
2872	1	New additional restaurant area	30	2	2	67
2864	2	Next to ADA table	30	0	0	0
2860	3	Existing restarunt	30	1	1	33
2856	4	New additional restaurant area	30	4	4	133
2852	5	Existing restarunt	30	3	3	100
2848	6	Existing restarunt	30	2	2	67
2844	7	Counter	30	2	2	67
2840	8	Counter	30	3	3	100
2836	9	West of display area	30	1	1	33
3550	10	Restroom entrance	30	4	4	133
3554	11	Back entrance	30	2	2	67
3558	12	South of display area	30	2	2	67
3546	13	South west of display area	30	1	1	33
3542	14	Outside dishwasher	30	1	1	33
3538	15	Outside ADA restroom	30	3	3	100
3534	1	Exterior	30	50	57	1,900
3530	2	Exterior	30	55	63	2,100
3526	3	Exterior	30	50	57	1,900
3522	4	Exterior	30	52	59	1,967

Avg 69 High 133
Low 0 SD 37.4

Avg 1,967 High 2,100
Low 1,900 SD 81.6

Total Adjusted Raw Count 27
Total CFU/m³ 1,033

Table #1, continued

██████████, ██████████ VA
05/22/2020 - Pre-treatment Air Sample Results - CFU/m³

05/22/2020 - Pre-treatment, ██████████						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
995	Ctrl	Unopened	0	0	0	0
994	1	New additional restaurant area	30	28	30	1,000
1036	2	Next to ADA table	30	22	16	533
1035	3	Existing restarunt	30	34	23	767
1034	4	New additional restaurant area	30	28	12	400
1037	5	Existing restarunt	30	25	16	533
1038	6	Existing restarunt	30	21	10	333
1039	7	Counter	30	18	16	533
1040	8	Counter	30	24	25	833
1041	9	West of display area	30	21	22	733
1042	10	Restroom entrance	30	26	28	933
1043	11	Back entrance	30	31	33	1,100
997	12	South of display area	30	26	28	933
996	13	South west of display area	30	21	9	300
998	14	Outside dishwasher	30	18	19	633
999	15	Outside ADA restroom	30	23	24	800
1000	1	Exterior	30	48	54	1,800
1001	2	Exterior	30	51	58	1,933
1002	3	Exterior	30	46	52	1,733
1003	4	Exterior	30	45	50	1,667

Avg 691 High 1,100
Low 300 SD 239.9

Avg 1,783 High 1,933
Low 1,667 SD 98.6

Total Adjusted Raw Count 268
Total CFU/m³ 10,367

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Table #2

06/15/2020 - In-treatment Surface Sample Results – CFU/cm²

06/15/2020 - In-treatment					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	End of counter	10x10x10	450	4.5
Surface	2	End of bar	10x10x10	100	1.0
Surface	3	Door handle	10x10x10	250	2.5
Surface	4	Cash register touch screen	10x10x10	510	5.1
Surface	5	Stainless counter under napkins	10x10x10	355	3.6
Surface	6	Customer order touch screen	10x10x10	125	1.3
Surface	7	Steel table next to small sink	10x10x10	135	1.4
Surface	8	Counter next to slicer	10x10x10	150	1.5
Surface	9	Front of dishwasher	10x10x10	175	1.8
Surface	10	Top of cooler	10x10x10	90	0.9
				Avg	2.3
				Min	0.9
				Max	5.1
				SD	1.44
				Total Adjusted Raw Count	
				2,340	
				Total CFU/cm ²	
				23	

Table #2, continued

05/22/2020 - Pre-treatment Surface Sample Results – CFU/cm²

05/22/2020 - Pre-treatment					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	End of counter	10x10x10	3,200	32.0
Surface	2	End of bar	10x10x10	2,900	29.0
Surface	3	Door handle	10x10x10	5,250	52.5
Surface	4	Cash register touch screen	10x10x10	7,950	79.5
Surface	5	Stainless counter under napkins	10x10x10	4,750	47.5
Surface	6	Customer order touch screen	10x10x10	3,455	34.6
Surface	7	Steel table next to small sink	10x10x10	3,050	30.5
Surface	8	Counter next to slicer	10x10x10	3,950	39.5
Surface	9	Front of dishwasher	10x10x10	3,980	39.8
Surface	10	Top of cooler	10x10x10	1,250	12.5
				Avg	39.7
				Min	12.5
				Max	79.5
				SD	16.83
				Total Adjusted Raw Count	
				39,735	
				Total CFU/cm ²	
				397	



Table #3
 [REDACTED], [REDACTED] VA
 06/15/2020 - In-treatment Air Sample Pictures

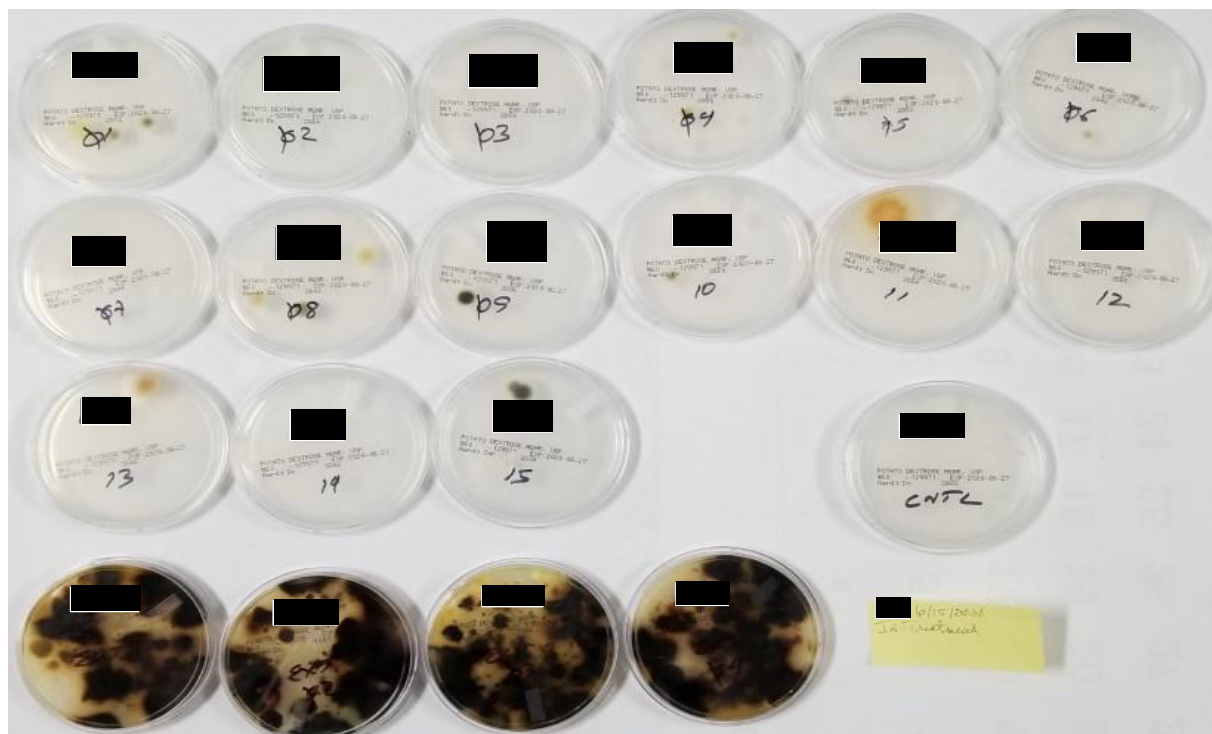


Table #3, continued
 [REDACTED], [REDACTED] VA
 05/22/2020 - Pre-treatment Air Sample Pictures

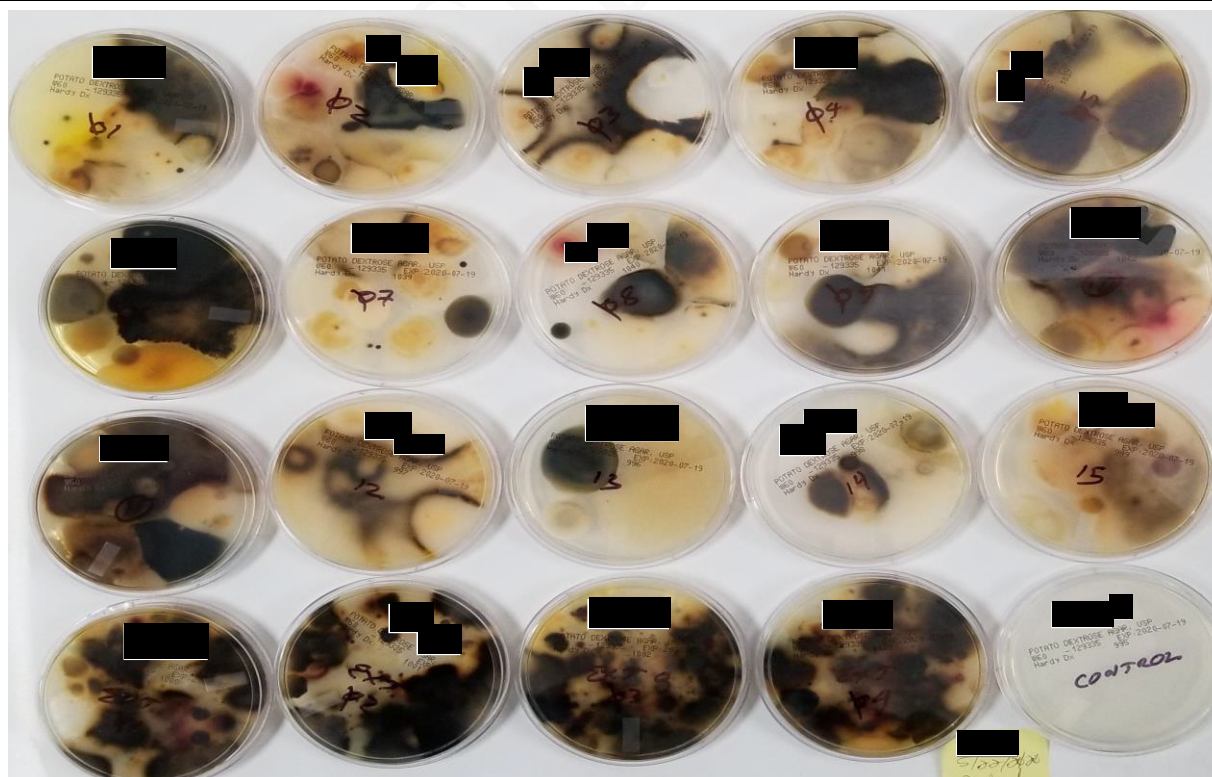




Table #4

06/15/2020 In-treatment and 05/22/2020 Pre-treatment Air/Surface Swab Locations

