

Scientific Air Solution



airPHX Companies
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October 24, 2019

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

A. Summary – Air Samples

Pre and in-treatment air samples results given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m ³)	Range	Standard Deviation	% Reduction
08/20/19	Pre	14	Various	355	167/633	140.1	-
10/10/19	In			26	0/67	25.8	92.7
08/20/19	Pre	4	Hallway and Hydro	458	267/667	177.0	-
10/10/19	In			192	100/300	79.5	58.1
08/20/19	Pre	2	Exterior	2,483	2,300/2,667	183.3	-
10/10/19	In			2,500	2,433/2,567	66.7	+ 0.7

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 the airborne organisms found in the above locations for this **pre-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	1,900	<i>Mortierella, spp</i>	638
<i>Cladosporium sphaerospermum</i>	1,150	<i>Penicillium purpurogenum</i>	582
<i>Aspergillus fumigatus</i>	955	<i>Basidiospores spp</i>	428
<i>Penicillium canescens</i>	895	<i>Absidia, spp</i>	252

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

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	412	<i>Penicillium purpurogenum</i>	< 5
<i>Aspergillus fumigatus</i>	373	<i>Firmicutes spp</i>	< 5
<i>Penicillium brevicompactum</i>	252	<i>Absidia spp</i>	< 5
<i>Penicillium purpurogenum</i>	96	<i>Ulocladium chartarum</i>	< 5

08/20/19 - Pre-treatment bioburden in the above locations are somewhat > 300 cfu/m³ which is not acceptable and needs corrective action.

10/10/19 - In-treatment results shows **92.7% decrease** in bioburden and is now < 100 cfu/m³ is considered **clean and acceptable**, per the Target Air Quality Guide.

- The hallway and hydro sampled areas are out of the direct airPHX treatment area and have seen the “halo effect” from the treatment area showing **58.1% reduction**.

Observations

The exterior air samples ranged from **2,300 to 2,667 cfu/m³** and reveals that most of the bioburden is attributed to the outside air. The airPHX units are having a noticeable impact on reducing the bioburden.

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Target Air Quality

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

- $< 100 \text{ cfu/m}^3$ is considered **clean and acceptable**.
- $100 \text{ to } 300 \text{ cfu/m}^3$ is **marginal**.
- $> 300 \text{ cfu/m}^3$ is **not acceptable** and needs corrective action.

In most cases, air quality $< 100 \text{ cfu/m}^3$ 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 and in-treatment surface (swab) samples results given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/cm ²)	Range	Standard Deviation	% Reduction
08/20/19	Pre	8	Various	97.0	41.2/165.0	38.4	-
10/10/19	In			4.2	1.9/5.5	1.27	95.7
08/20/19	Pre	1	Neg. Control	0	0/0	-	-
10/10/19	In			0	0/0	-	-

08/20/19 - Pre-treatment contact swab results from the various locations are sizeably $> 5 \text{ cfu/cm}^2$ which is considered not acceptable and needs corrective action.

10/10/19 - In-treatment results show a **95.7% reduction** from the various locations are now $< 5 \text{ cfu/cm}^2$ and considered **clean and acceptable**, per the Target Contact Swab Quality guide.

Target Contact Surface Quality

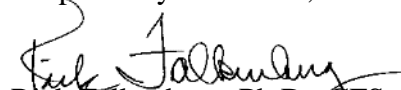
Contact surface quality scale for workplaces, public buildings, schools, and homes are as follows:

- $< 5 \text{ cfu/cm}^2$ is considered **clean and acceptable**.
- $5 \text{ to } 10 \text{ cfu/cm}^2$ is considered **marginal**.
- $> 10 \text{ cfu/cm}^2$ is considered **not acceptable** and needs corrective action.

In most cases, surface swabs $< 5 \text{ cfu/cm}^2$ 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
ATF
 10/10/19 In-treatment Air Sample Results - CFU/m³

In-treatment 10/10/2019 - ATF						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
211	Ctrl	Unopened	0	0	0	0
2403	1		30	1	1	33
2402	2		30	0	0	0
2401	3		30	0	0	0
2400	4		30	2	2	67
2399	5		30	0	0	0
2398	6		30	2	2	67
2397	7		30	0	0	0
2394	8	Just inside double doors	30	2	2	67
2395	9		30	1	1	33
2396	10	Exam	30	1	1	33
197	11		30	1	1	33
198	12		30	0	0	0
199	13		30	1	0	0
194	16	Dexa scan	30	1	1	33
192	14	Hydro	30	9	9	300
193	15	Hydro	30	7	7	233
196	17	Hallway	30	4	4	133
195	18	Hallway	30	3	3	100
2694	19	Exterior	30	62	73	2,433
3001	20	Exterior	30	65	77	2,567

Avg	26	High	67
Low	0	SD	25.8

Avg	192	High	300
Low	100	SD	79.5

Avg	2,500	High	2,567
Low	2,433	SD	66.7

Total Adjusted Raw Count	34
Total CFU/m ³	1,133

Table #1, continue
ATF
 08/20/19 Pre-treatment Air Sample Results - CFU/m³

Pre-treatment 08/20/2019 - ATF						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
211	Ctrl	Unopened	0	0	0	0
2403	1		30	6	6	200
2402	2		30	8	8	267
2401	3		30	7	7	233
2400	4		30	8	8	267
2399	5		30	6	6	200
2398	6		30	9	9	300
2397	7		30	12	12	400
2394	8	Just inside double doors	30	14	14	467
2395	9		30	18	19	633
2396	10	Exam	30	15	16	533
197	11		30	12	12	400
198	12		30	11	11	367
199	13		30	15	16	533
192	16	Dexa scan	30	5	5	167
193	14	Hydro	30	19	20	667
194	15	Hydro	30	17	18	600
196	17	Hallway	30	9	9	300
195	18	Hallway	30	8	8	267
2694	19	Exterior	30	65	80	2,667
3001	20	Exterior	30	59	69	2,300

Avg	355	High	633
Low	167	SD	140.1

Avg	458	High	667
Low	267	SD	177.0

Avg	2,483	High	2,667
Low	2,300	SD	183.3

Total Adjusted Raw Count	204
Total CFU/m ³	6,800

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Table #2
ATF
 10/10/19 In-treatment Surface Sample Results – CFU/cm²

In-treatment 10/10/2019 - ATF					
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	Taping table	10x10x10	250	2.5
Surface	2	Check-in counter	10x10x10	460	4.6
Surface	3	Exame room table	10x10x10	190	1.9
Surface	4	Training table	10x10x10	355	3.6
Surface	5	Counter	10x10x10	525	5.3
Surface	6	ATF office desk	10x10x10	510	5.1
Surface	7	Floor into hydro	10x10x10	550	5.5
Surface	8	Couch near entry	10x10x10	495	5.0

Avg 4.2 Max 5.5
 Min 1.9 SD 1.27

Total Adjusted Raw Count 3,335
 Total CFU/cm² 33

Table #2, continued
ATF
 08/20/19 Pre-treatment Surface Sample Results – CFU/cm²

Pre-treatment 08/20/2019 - ATF					
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	Taping table	10x10x10	5,545	55.5
Surface	2	Check-in counter	10x10x10	13,450	134.5
Surface	3	Exame room table	10x10x10	4,120	41.2
Surface	4	Training table	10x10x10	7,500	75.0
Surface	5	Counter	10x10x10	16,500	165.0
Surface	6	ATF office desk	10x10x10	8,750	87.5
Surface	7	Floor into hydro	10x10x10	11,500	115.0
Surface	8	Couch near entry	10x10x10	10,250	102.5

Avg 97.0 Max 165.0
 Min 41.2 SD 38.40

Total Adjusted Raw Count 77,615
 Total CFU/cm² 776



Table #3
 [REDACTED] ATF
 10/10/2019 In-treatment Air Sample Pictures

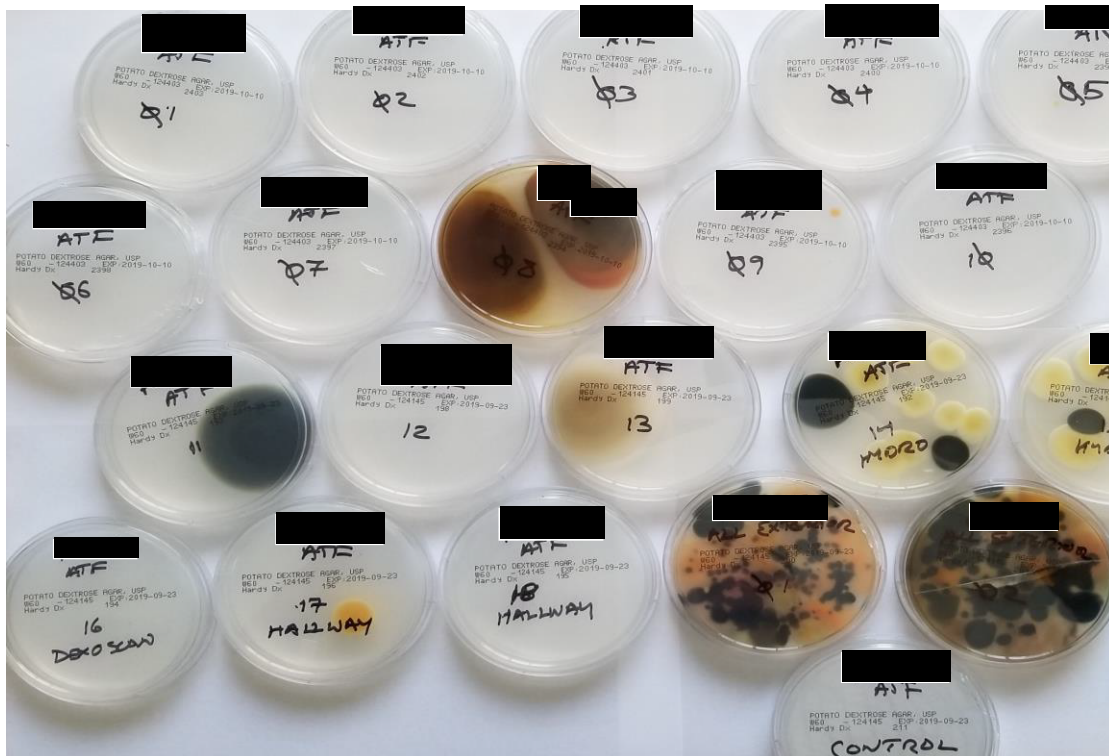
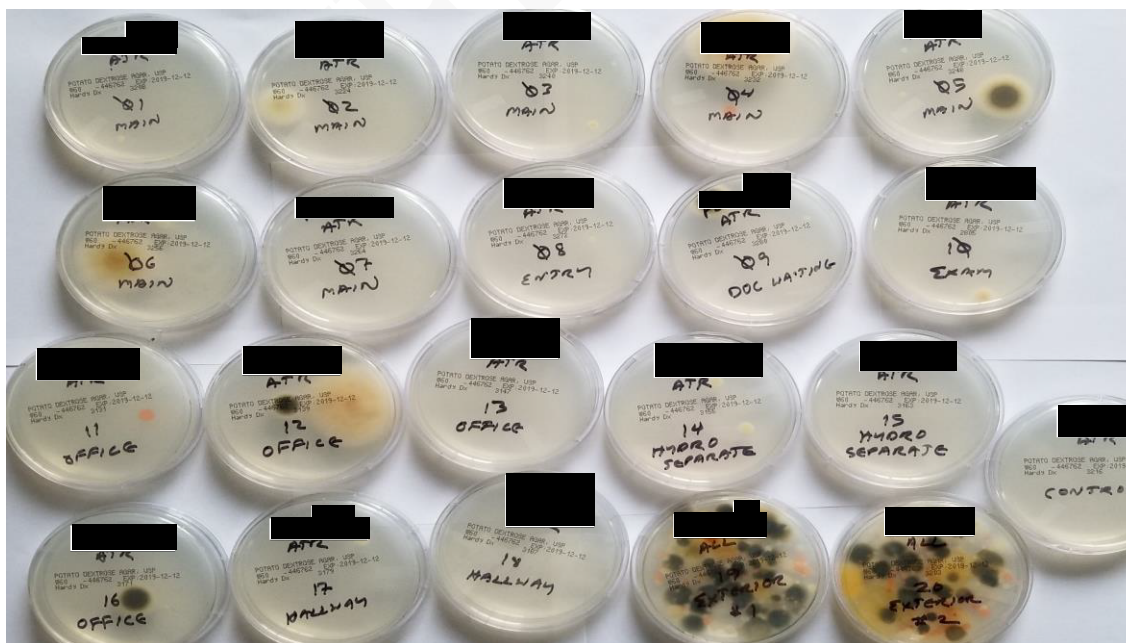


Table #3, continued
 [REDACTED] ATF
 08/20/2019 Pre-treatment Air Sample Pictures



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Table #4

ATF

10/10/19 and 08/20/19 Pre and in-treatment Air and Surface Swab Locations

