



Fungal Analysis Laboratory Report

Prepared For

JANE SMITH

Job No. 45025

Air Care Laboratories is Atlanta's local Indoor Air Quality, AIHA-LAP accredited laboratory.



About Us

Air Care Laboratories is dedicated in providing optimal, reliable results and information assured by their qualified, trained, and experienced personnel and team of analysts. Our team here at Air Care Laboratories, is committed in being a dependable, trusted resource for the indoor air quality industry. High quality certified laboratory equipment, state-of-the-art methods and procedures are used and practiced by our laboratory personnel. The Quality Assurance and Quality Control program at Air Care Laboratory is ISO 17025 compliant and ensures that you will receive scientifically sound and defensible data. It is Air Care Laboratories objective to support and aid the investigation of our professionals and experts in the field.

About Sampling

Air Sampling using Spore Traps

Spore traps are manufactured enclosed cassettes, that are developed for quantitative analysis for the sampling of air in both indoor and outdoor environments. The amount of fungal spores, pollen and other airborne particulates captured are enumerated and measured per meter cubed in both inside and outside environments. A device with a vacuum pump is used that draws in the air and collects the potential present spores, background debris and other airborne particulates. The cassettes are either entire slides or have a cover slip inside with an adhesive medium which is used to hold and secure the spores in place. Identification and enumeration of the viable, nonviable spores and airborne particulate is performed by the use of a compound microscope.

Surface Sampling using Surface Tape Slides/ Tape

Surface tape slides are manufactured or are clear pieces of tape placed on visible mold. The tape is then mounted onto a glass slide for preparation and analysis performed by the laboratory. The analysis for this method is strictly semi quantitative. It is expected and intended to be used to identify present fungi to the genus level and to determine if the fungi is viable in its current state. Also, certain particles and background debris of interest may also be identified by this method.



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Legend

High water activity or water damage indicator
Potential airborne mycotoxins
May cause disease in some people
May cause allergies in some people
Not common indoors (primarily found outdoors)

Lab Order Number: 11664
Date Collected: May 16, 2023
Date Received: May 16, 2023
Date Analyzed: May 17, 2023
Date Reported: May 17, 2023
Lab Analyst: Marissa Kopacz

Linear Spore Trap / Surface Sample Analysis - Air cassettes analyzed according to SOP LAB-SOP-SPT-001 for the quantification of fungi spores from spore traps, and ASTM standard D7391-17. Tape slides analyzed according to SOP LAB-OP-SUR-001 and ASTM standard D7658-17 for the semi quantification and identification of fungi spores from surface tape slides.

Air Sample Results

Sample Location		Outdoor				Room				Helena's Bedroom			
Lab Sample No.		11664-1				11664-2				11664-5			
Volume Serial Sample Type Microscope		75 241214 AllergencoD 2				75 241326 AllergencoD 2				75 239861 AllergencoD 2			
Spore Identification	Notations	RAW CT	SPR/M3	% Total	IN/OUT	RAW CT	SPR/M3	% Total	IN/OUT	RAW CT	SPR/M3	% Total	IN/OUT
Chaetomium		1	45	1.8	1:1	-	-	-	-	2	90	2.3	2:1
Stachybotrys echinata		-	-	-	-	-	-	-	-	-	-	-	-
Trichoderma		-	-	-	-	-	-	-	-	-	-	-	-
Ulocladium		-	-	-	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium group		2	90	3.6	1:1	-1	0	100	0:1	24	1,076	27.6	12:1
Cladosporium		15	673	26.8	1:1	-1	0	100	0:1	6	269	6.9	0.4:1
Alternaria		-	-	-	-	-	-	-	-	2	90	2.3	2:0
Arthrinium		-	-	-	-	-	-	-	-	-	-	-	-
ascospores		2	90	3.6	1:1	-	-	-	-	1	45	1.1	0.5:1
Curvularia		-	-	-	-	-	-	-	-	-	-	-	-
Drechslera/Bipolaris group		-	-	-	-	-	-	-	-	-	-	-	-
Epicoccum		-	-	-	-	-1	0	100	0:0	1	45	1.1	1:0
Fusarium		-	-	-	-	-	-	-	-	-	-	-	-
Nigrospora		-	-	-	-	-1	0	100	0:0	1	45	1.1	1:0
Pestalotia		-	-	-	-	-	-	-	-	-	-	-	-
Pithomyces		-	-	-	-	-	-	-	-	-	-	-	-
Torula		-	-	-	-	-1	0	100	0:0	-	-	-	-
basidiospores		34	1,525	60.7	1:1	-1	0	100	0:1	42	1,884	48.3	1.24:1
smuts,Periconia,myxomycetes		1	45	1.8	1:1	-1	0	100	0:1	3	135	3.4	3:1
Helicomyces		1	45	1.8	1:1	-	-	-	-	-	-	-	-
Epicoccum species		-	-	-	-	-	-	-	-	-	-	-	-
Cladosporium species		-	-	-	-	-	-	-	-	-	-	-	-
brown unidentified		-	-	-	-	-	-	-	-	-	-	-	-
Alternaria species		-	-	-	-	-	-	-	-	-	-	-	-
Ulocladium species		-	-	-	-	-	-	-	-	-	-	-	-
Nigrospora species		-	-	-	-	-	-	-	-	-	-	-	-
Total		56	2,512	100.1	-	-7	0	700	-	82	3,678	94.1	-
Expanded Analytical Uncertainty @95% Confidence Level		-	+/- 480 spr/m3	-	-	-	+/- 0 spr/m3	-	-	-	+/- 702 spr/m3	-	-
Hyphae			-			-1	0	100	0:0	5	224	5.7	5:0
Pollen			-				-				-		
Debris Rating		2				5				4			
Analytical Sensitivity		45				45				45			
Comments						Background overloaded with skin scales and soil particles.				Background predominantly skin scales and soil particles.			



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Surface Sample Results

Sample Location		Helena's Bedroom Closet Trim		Living Room Fan	
Lab Sample No.		11664-3		11664-4	
Serial Sample Type Microscope		1790336 Tape Lift 2		1780146 Tape Lift 2	
Spore Identification	NOTATIONS	Metric	Entire Conidiophore	Metric	Entire Conidiophore
Chaetomium		-	No	-	No
Stachybotrys echinata		-	No	-	No
Trichoderma		-	No	-	No
Ulocladium		-	No	-	No
Penicillium/Aspergillus group		-	No	rare	No
Cladosporium		-	No	-	No
Alternaria		-	No	-	No
Arthrinium		-	No	-	No
ascospores		rare	No	-	No
Curvularia		-	No	-	No
Drechslera/Bipolaris group		-	No	-	No
Epicoccum		-	No	-	No
Fusarium		-	No	-	No
Nigrospora		-	No	-	No
Pestalotia		-	No	-	No
Pithomyces		-	No	-	No
Torula		-	No	rare	No
basidiospores		rare	No	-	No
smuts,Periconia,myxomycetes		rare	No	low	No
Helicomycetes		-	No	-	No
Epicoccum species		rare	No	rare	No
Cladosporium species		rare	No	rare	No
brown unidentified		rare	No	rare	No
Alternaria species		-	No	rare	No
Ulocladium species		-	No	rare	No
Nigrospora species		-	No	rare	No
Comments					

Analyzed By: Marissa Kopacz



Lab Manager: Marissa Kopacz



ANALYSIS NOTATIONS

1. Analytical Sensitivity = number of spores in one m³ per 1 raw count
2. Samples are analyzed at a minimum of 600X for 30% of the trace and a minimum of 300X for 100% of the trace.
3. An asterisk (*) next to a spore type denotes that spore type was counted at a minimum of 300X during a 100% analysis of the trace
4. Trace: area on the medium where spores and debris have been deposited during collection.
5. Measurement Uncertainty also known as the amount of error calculated for an analysis. It is expressed as a quantitative amount +/- from the number reported.
6. In the case of spore trap analysis it is the +/- % of the total spores / m³. The Expanded Measurement of Uncertainty based upon accumulated analyses from the year 2022 is +/- 19.1% spores/m³ @95% confidence.

ADDITIONAL INFORMATION FOR SPORE TRAPS

1. **Overloaded trace:**
May obscure fungi spores and provide questionable results. This type of trace is only scanned for spores that may be laying on top of the debris or to the side of the trace. The air should be scrubbed and retested for more reliable results. This amount of particulate background is a respiratory risk.
2. **Trace too Overloaded for Analysis:**
When debris is piled on top of other debris, the trace can not be analyzed. The sample must be rejected as there is no way for the laboratory to provide any sort of reliable analysis. The air should be scrubbed before another sample is submitted for analysis. This amount of debris is considered a dangerous respiratory risk.
3. **No Trace:**
There is no visible deposit of particles on the microscope slide media. This occurs most often with outside samples in cold weather, snow on the ground or during heavy rain. If any of these conditions are present, the outside sample can be gathered by standing in the open doorway to the building or home.
4. **Negative Bias**
Spores may be hidden by debris and therefore produce smaller counts than actually present.
5. Some spores have similar morphologies. ACC uses current and accepted references to classify spores and particles.
6. Due to rounding, totals may not equal 100%.
7. See ACC Fungal Glossary for each specific category, genus or spore type.
8. The results in this report are related to this order and samples only.
9. The results of this analysis pertain only to sample location(s) listed, collected on the stated date and should not be used in the interpretation of any other sample location(s).
10. This report may not be duplicated except in full, without the written consent of Air Care Companies, Inc. (ACC)

DEBRIS RATING AND SEMI-QUANTITATION TABLES

Debris Rating		
Rating	Metric	Description
1	< 5% Minimal	Reported values may be affected by particulate load.
2	5-25 % low	same as above
3	26-75% Moderate	same as above
4	76-90% High	Negative Bias is likely. The degree of bias increases with the present of the trace that is occluded.
5	> 99% Overloaded	Quantification not possible due to large negative bias. New samples should be collected at shorter time interval, or other measures taken to reduce the particulate load.

Surface Samples	
Rating	Description
None	None Detected
Rare	spores cover < 10% of area analyzed or are scattered on the slide
Low	spores cover 20%-40% of area analyzed
Moderate	spores cover 40% - 50% of area analyzed
High	spores cover > 50% of area analyzed
Entire Conidiophore	(fruiting body) refers to a complete asexual or sexual fungal structure. It is indicative of current fungal growth.

Epicoccum



Grows well on general fungal media, although sporulation may be strain dependent. Colonies typically have orange reverse pigment. Intact spores are distinctive. Young spores or spore fragments may be confused with Ulocladium, Stemphylium or possibly Alternaria. Commonly found in outdoor air. Growth indoors can occur on many different substrates including paper, textiles, and insects.

Allergenic Potential: Type I allergies (hay fever, asthma).

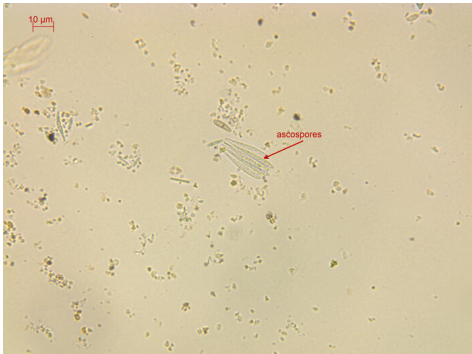
Potential Toxins Produced: Flavipin, epicorazine A & B, indole-3-acetonitrile.

Cladosporium species



Cladosporium is a fungus known as a mold. It is found worldwide, and often makes up about 50% of airborne spores.

ascospores



Ascospores are the result of sexual reproduction and produced in a saclike structure called an ascus. All ascospores belong to members of the Phylum Ascomycota, which encompasses a plethora of genera worldwide.

Allergenic Potential: Depends on genus and species

basidiospores



Basidiospores are the result of sexual reproduction and formed on a structure called the basidium. Basidiospores belong to the members of the Phylum Basidiomycota, which includes mushrooms, shelf fungi, rusts, and smuts.

Allergenic Potential: Type I allergies (hay fever, asthma) & Type III (hypersensitivity pneumonitis)

Potential Toxins Produced: Amanitins, monomethyl-hydrazine, muscarine, ibotenic acid, psilocybin.

smuts, Periconia, myxomycetes



Smut fungi belong to the order Ustilaginales and there are about 4000 known species. The myxomycetes have an interesting life cycle which includes a wet spore phase and a dry spore phase. When conditions are favorable, they move about like amoebae, resembling primitive animals. When conditions are not favorable they form a resting body (sclerotium) with dry, airborne spores. The myxomycetes are not considered to be true fungi. Periconia colonial morphology is similar to Cladosporium and is infrequently isolated in culture. Smut teliospores cannot easily be distinguished from the myxomycetes and certain species of Periconia. They are reported in the "round, brown" spore category: "Smuts, Periconia, myxomycetes."

Allergenic Potential: Type I allergies (hay fever, asthma).

Potential Toxins Produced: None currently known.

Penicillium/Aspergillus group



Aspergillus is the second most common opportunistic pathogen following Candida. Penicillium is one of the most common genera of fungi. Free spores of Penicillium are indistinguishable from Aspergillus and other genera with small round to oval colorless or slightly pigmented spores. Widespread. Commonly found in house dust. Grows in water damaged buildings on wallpaper, wallpaper glue, decaying fabrics, moist chipboards, and behind paint. Colonies are usually shades of blue, green, and white.

Allergenic Potential: Allergic bronchopulmonary aspergillosis (ABPA) which is common in asthmatic and cystic fibrosis patients, Aspergillus sinusitis, Invasive aspergillosis in immunocompromised patients Type I (hay fever, asthma), Type III (hypersensitivity)

Potential Toxins Produced: Aspergillus: 3-Nitropropionic acid, 5-metoxystermatocystin, Aflatoxin B1, B2, Aflatoxin G1, G2, Aflatoxin M1, M2, Aflatoxin P1, Aflatoxin Q1, Aflatoxins, Aflatrem (alkaloid), Aflatrem (indole alkaloid), Aflavinin, Ascalidol, Aspergillilic acid, Aspergillomarasmin, Aspertoxin, Asteltoxin, Austamid, Austdiol, Austins, Austocystins, Avenaciolide, Brevianamide A, Candidulin, Citreoviridin., Citrinin, Clavatul, Cyclopiazonic acid, Cyclopiazonic acid, Cyclophalanin E, Emodin, Fumagillin, Fumigaclavine A, Fumigatin, Fumitremorgens, Fumitremorgin A, Gliotoxin, Griseofulvin, Helvolic acid, Kojic acid, Kotanin, Malformins, Naphtopyrones, Neoaspergillilic acid, Nidulin, Nidulotoxin, Nigragillin, Ochratoxin A, Ochratoxin B, Ochratoxin C, Ochratoxins β, Ochratoxins α, Ochratoxins (A,B,C.α, β.), Orlandin, Oryzacin, Paspaline, Patulin, Penicillilic acid, Phthioic acid, Secalonic acid A, B, D and F, Sphingofungins, Spinulosin, Sterigmatocystin, Terphenyllin, Terredional, Terreic acid, Terrein, Terretinin, Terretinin, Territrem A, Tryptoquivalines, Verruculogen, Versicolorin A, Viomellein, Viriditoxin, Xanthocillin, Xanthomegnin, β-nitropropionic acid

Penicillium: Citrinin, Citreoviridin, Cyclopiazonic acid, Fumitremorgen B, Grisiofulvin, Janthitrem, Mycophenolic acid, Paxilline, Penitrem A, Penicillilic acid, Ochratoxins, Roquefortine C, Secalonic acid D, Verruculogen, Verrucosidin, Viomellein, Viridicatumtoxin, Xanthomegnin,

Thank You



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