

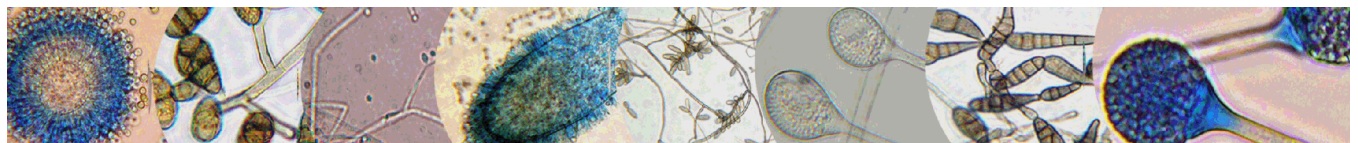


EXPANDED FUNGAL REPORT TM

Prepared Exclusively For

EMSL - BUFFALO
490 Rowley Rd
Depew, NY 14043
Phone:716-651-0030

Report Date: 8/4/2020
Project:
EMSL Order: 142002938



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EMSL Order: 142002938
Customer ID: EMSL14
Collected: 7/23/2020
Received: 8/04/2020
Analyzed: 8/04/2020

Proj:

1. Description of Analysis

Analytical Laboratory

EMSL Analytical, Inc. (EMSL) is a nationwide, full service, analytical testing laboratory network providing Asbestos, Mold, Indoor Air Quality, Microbiological, Environmental, Chemical, Forensic, Materials, Industrial Hygiene and Mechanical Testing services since 1981. Ranked as the premier independently owned environmental testing laboratory in the nation, EMSL puts analytical quality as its top priority. This quality is recognized by many well-respected federal, state and private accrediting agencies, and assured by our high quality personnel, including many Ph.D. microbiologists and mycologists.

EMSL is an independent laboratory that performed the analysis of these samples. EMSL did not conduct the sampling or site investigation for this report. The samples referenced herein were analyzed under strict quality control procedures using state-of-the-art microbiological methods. The analytical methods used and the data presented are scientifically and legally defensible.

The laboratory data is provided in compliance with ISO-IEC 17025 guidelines for the particular test(s) requested, including any associated limitations for the methods employed. These data are intended for use by professionals having knowledge of the testing methods necessary to interpret them accurately.



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Air Samples - Spore traps:

Spore traps are commercially available sampling devices that capture airborne particles on an adhesive slide. Air is pulled through the device using a vacuum pump. Spores, as well as other airborne particles, are impacted on the collection adhesive. Using spore trap collection methods has inherent limitations. These collection methods are biased towards larger spore sizes.

The analysis for total spore counts is a direct microscopic examination and does not include culturing or growing the fungi. Therefore, the results include both viable and non-viable spores. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone (i.e., *Aspergillus/Penicillium*, and others). Other spore types may lack distinguishing features that aid in their identification. These types are grouped into larger categories such as Ascospores or Basidiospores.

Fungal spores are identified and grouped by morphological characteristics including color, shape, septation, ornamentation, and fruiting structures (if present) which are compared to published mycological identification keys and texts. EMSL reports provide spore counts per cubic meter of air to three significant figures. Please note that each spore category is reported to three significant figures. Due to rounding and the application of three significant figures the sum of the individual spore numbers may not equal the total spore count on the report. EMSL does not maintain responsibility for final volume concentrations (counts/m³) since this volume is provided by the field collector and can not be verified by EMSL.

EMSL analyzes spore traps using phase contrast microscopy. There is a wide choice of collection devices (Air-O-Cell, Micro-5, Burkhard, etc.) on the market. Differences in analytical method may exist between spore trap devices.

Spore trap results are reported in spores per cubic meter of air. Due to the other airborne particles collected with the spores, EMSL reports a background particle density. Background density is an indication of overall particulate matter present on the sample (i.e. dust in the air). High background concentrations may obscure spores such as the *Penicillium/Aspergillus* group. The rating system is from 1-5 with 1 = 1 - 25% of the background obscured by material, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76% - 99%, 5 = 100% or overloaded. A background rating of 4 or higher should be regarded as a minimum count since the actual concentrations may be higher than those reported. EMSL will not be held responsible for overloading of samples. Sample volumes are left to the discretion of the company or persons conducting the fieldwork.

Skin fragment density is the percentage of skin cells making up the total background material, 1 = 1 - 25%, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76-100%. Skin fragment density is considered an indication of the general cleanliness in the area sampled. It has been estimated that up to 90% of household dust consists of dead skin cells.

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2. Analytical Results

See attached data reports and charts.

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Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

	Particle Identification	Sample Concentration (counts/m³)	Background Concentration (counts/m³)	Background Corrected (counts/m³)
Lab Sample Number 142002938-0001	Alternaria (Ulocladium)	None Detected	None Detected	Equal To Background
	Ascospores	80	440	Less than Background
Client Sample ID 1	Aspergillus/Penicillium	None Detected	None Detected	Equal To Background
	Basidiospores	80	250	Less than Background
	Bipolaris++	None Detected	None Detected	Equal To Background
	Chaetomium	None Detected	None Detected	Equal To Background
	Cladosporium	20	230	Less than Background
Location Livingroom	Curvularia	40	None Detected	40
	Epicoccum	20	None Detected	20
	Fusarium	None Detected	None Detected	Equal To Background
	Ganoderma	None Detected	None Detected	Equal To Background
Sample Volume (L) 150	Myxomycetes++	None Detected	None Detected	Equal To Background
	Pithomyces++	None Detected	None Detected	Equal To Background
	Rust	None Detected	None Detected	Equal To Background
	Scopulariopsis/Microascus	None Detected	None Detected	Equal To Background
Sample Type Inside	Stachybotrys/Memnoniella	None Detected	None Detected	Equal To Background
	Unidentifiable Spores	None Detected	None Detected	Equal To Background
	Zygomycetes	None Detected	None Detected	Equal To Background
Comments	Triadelphia	20	None Detected	20
	Total Fungi	260	920	Less than Background
	Other			
	Hyphal Fragment	None Detected	None Detected	Equal To Background
	Insect Fragment	None Detected	None Detected	Equal To Background
	Pollen	None Detected	None Detected	Equal To Background
	Analytical Sensitivity 600x:	21	counts/cubic meter	
	Analytical Sensitivity 300x *:	7*	counts/cubic meter	
	Skin Fragments:	1	1 to 4 (low to high)	
	Fibrous Particulate:	1	1 to 4 (low to high)	
Background:	1	1 to 4 (low to high); 5 (overloaded)		

No discernable field blank was submitted with this group of samples.

Christopher Goulah, Microbiology Manager
or Other Approved Signatory

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

High levels of background particulate can obscure spores and other particulates, leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.
Samples analyzed by EMSL Analytical, Inc. Depew, NY A2LA Accredited Environmental Testing Cert #2845.24

Initial report from: 08/04/2020 14:51:38

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Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

	Particle Identification	Sample Concentration (counts/m ³)	Background Concentration (counts/m ³)	Background Corrected (counts/m ³)
Lab Sample Number 142002938-0002	Alternaria (Ulocladium)	None Detected	None Detected	Equal To Background
	Ascospores	40	440	Less than Background
Client Sample ID 2	Aspergillus/Penicillium	None Detected	None Detected	Equal To Background
	Basidiospores	200	250	Less than Background
	Bipolaris++	None Detected	None Detected	Equal To Background
	Chaetomium	None Detected	None Detected	Equal To Background
Location Bathroom	Cladosporium	80	230	Less than Background
	Curvularia	80	None Detected	80
	Epicoccum	None Detected	None Detected	Equal To Background
	Fusarium	None Detected	None Detected	Equal To Background
Sample Volume (L) 150	Ganoderma	None Detected	None Detected	Equal To Background
	Myxomycetes++	None Detected	None Detected	Equal To Background
	Pithomyces++	None Detected	None Detected	Equal To Background
	Rust	None Detected	None Detected	Equal To Background
Sample Type Inside	Scopulariopsis/Microascus	None Detected	None Detected	Equal To Background
	Stachybotrys/Memnoniella	40	None Detected	40
	Unidentifiable Spores	None Detected	None Detected	Equal To Background
	Zygomycetes	None Detected	None Detected	Equal To Background
Comments	Triadelphia	40	None Detected	40
	Total Fungi	480	920	Less than Background
	Other			
	Hyphal Fragment	None Detected	None Detected	Equal To Background
	Insect Fragment	None Detected	None Detected	Equal To Background
	Pollen	None Detected	None Detected	Equal To Background
	Analytical Sensitivity 600x:	21	counts/cubic meter	
	Analytical Sensitivity 300x *:	7*	counts/cubic meter	
Skin Fragments:	2	1 to 4 (low to high)		
Fibrous Particulate:	1	1 to 4 (low to high)		
Background:	1	1 to 4 (low to high); 5 (overloaded)		

No discernable field blank was submitted with this group of samples.

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++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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	Particle Identification	Sample Concentration (counts/m³)	Background Concentration (counts/m³)	Background Corrected (counts/m³)
Lab Sample Number 142002938-0003	Alternaria (Ulocladium)	None Detected	N/A	N/A
	Ascospores	440	N/A	N/A
	Aspergillus/Penicillium	None Detected	N/A	N/A
Client Sample ID 3	Basidiospores	250	N/A	N/A
	Bipolaris++	None Detected	N/A	N/A
	Chaetomium	None Detected	N/A	N/A
	Cladosporium	230	N/A	N/A
Location Exterior	Curvularia	None Detected	N/A	N/A
	Epicoccum	None Detected	N/A	N/A
	Fusarium	None Detected	N/A	N/A
	Ganoderma	None Detected	N/A	N/A
	Myxomycetes++	None Detected	N/A	N/A
Sample Volume (L) 150	Pithomyces++	None Detected	N/A	N/A
	Rust	None Detected	N/A	N/A
	Scopulariopsis/Microascus	None Detected	N/A	N/A
	Stachybotrys/Memnoniella	None Detected	N/A	N/A
Sample Type Background	Unidentifiable Spores	None Detected	N/A	N/A
	Zygomycetes	None Detected	N/A	N/A
	Triadelphia	None Detected	N/A	N/A
Comments	Total Fungi	920	N/A	N/A
	Other			
	Hyphal Fragment	None Detected	N/A	N/A
	Insect Fragment	None Detected	N/A	N/A
	Pollen	None Detected	N/A	N/A
	Analytical Sensitivity 600x:	21	counts/cubic meter	
	Analytical Sensitivity 300x *:	7*	counts/cubic meter	
	Skin Fragments:	1	1 to 4 (low to high)	
	Fibrous Particulate:	1	1 to 4 (low to high)	
	Background:	1	1 to 4 (low to high); 5 (overloaded)	

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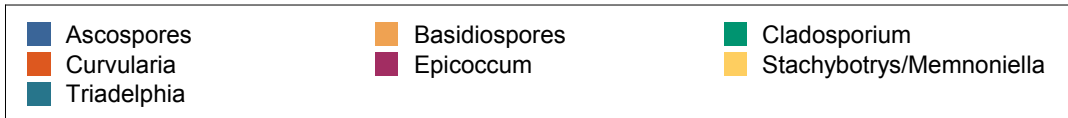
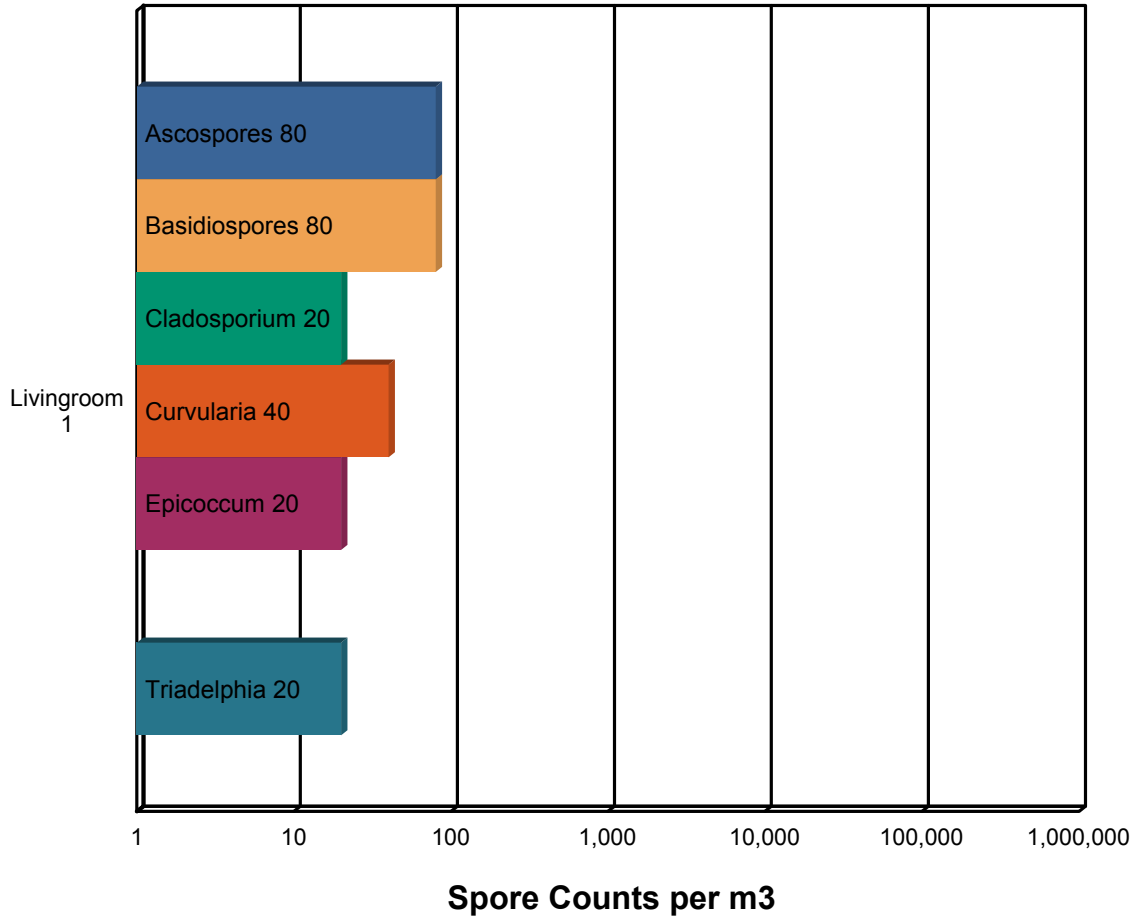
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Spore Trap Report: Total Counts



* The chart is displayed using a logarithmic scale. Bar size is not directly proportional to the number of spores.

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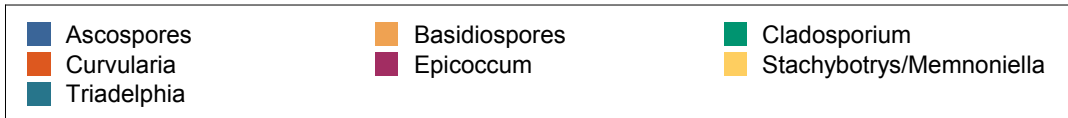
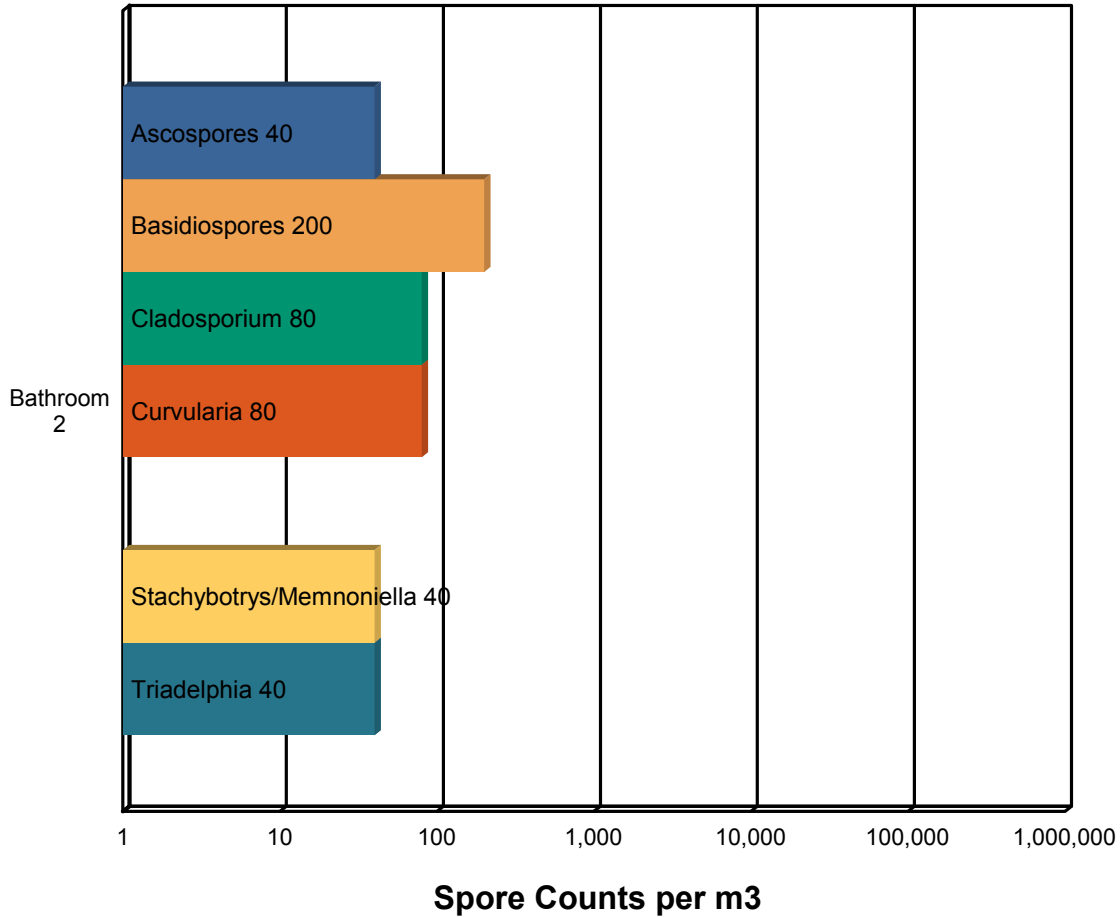
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Spore Trap Report: Total Counts



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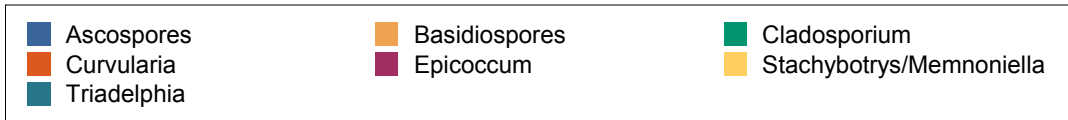
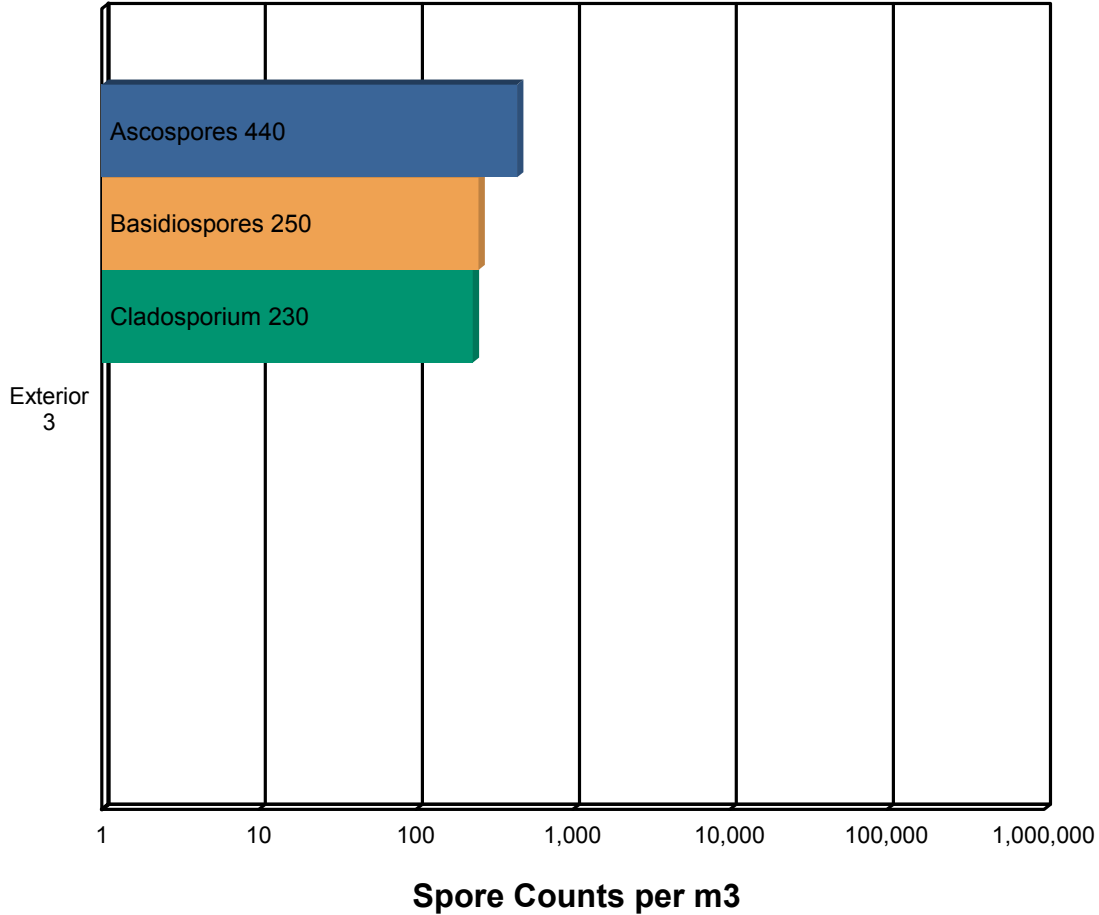
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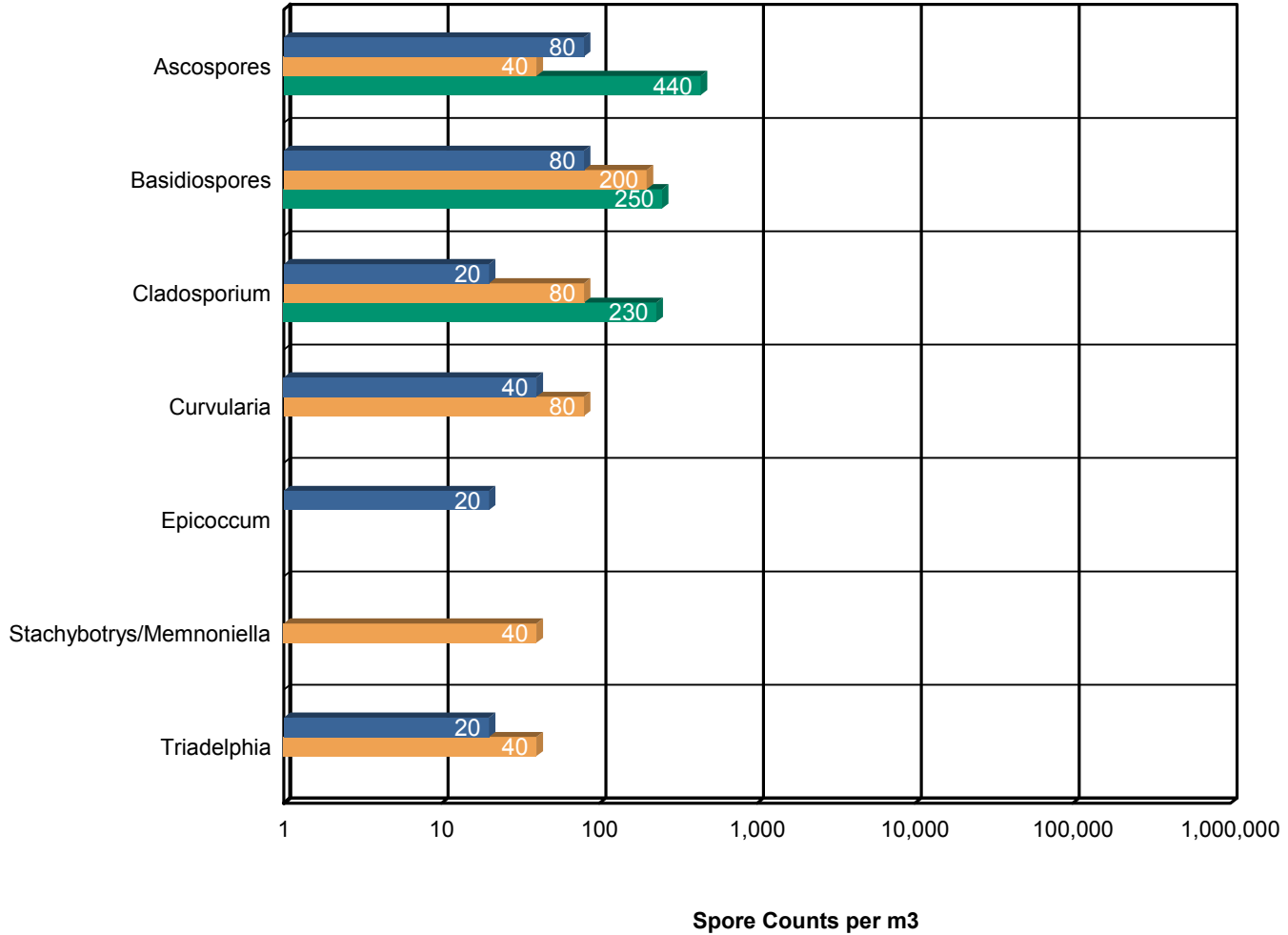
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Background Comparison Chart



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3. Understanding the Results

EMSL Analytical, Inc. is an independent laboratory, providing unbiased and scientifically valid results. These data represent only a portion of an overall IAQ investigation. Visual information and environmental conditions measured during the site assessment (humidity, moisture readings, etc.) are crucial to any final interpretation of the results. Many factors impact the final results; therefore, result interpretation should only be conducted by qualified individuals. The American Conference of Governmental Industrial Hygienists (ACGIH) has published a good reference book covering sampling and data interpretation. It is entitled, Bioaerosols: Assessment and Control, 1999.

Fungal spores are found everywhere. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the exposure level, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, pre-existing medical conditions (e.g., diabetes, cancer, or chronic lung conditions), use of immunosuppressive drugs, and concurrent exposures. These reasons make it difficult to identify dose/response relationships that are required to establish "safe" or "unsafe" levels (i.e., permissible exposure limits).

It is generally accepted in the industry that indoor fungal growth is undesirable and inappropriate, necessitating removal or other appropriate remedial actions. The New York City guidelines and EPA guidelines for mold remediation in schools and commercial buildings define the conditions warranting mold remediation. Always remember that water is the key. Preventing water damage or water condensation will prevent mold growth.

This report is not intended to provide medical advice or advice concerning the relative safety of an occupied space. Always consult an occupational or environmental health physician who has experience addressing indoor air contaminants if you have any questions.



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4. Glossary of Fungi

ASCOSPORES	
Natural Habitat	Everywhere in nature.
Suitable Substrates in the Indoor Environment	Depends on genus and species.
Water Activity	Depends on genus and species.
Mode of Dissemination	Forcible ejection or passive release and dissemination by wind or insects.
Allergic Potential	Depends on genus and species.
Potential or Opportunistic Pathogens	Depends on genus and species.
Industrial Uses	Depends on genus and species.
Potential Toxins Produced	Depends on genus and species.
Other Comments	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.

BASIDIOSPORES	
Natural Habitat	Forest floors. Lawns .Plants (saprobes or pathogens depending on genus)
Suitable Substrates in the Indoor Environment	Depends on genus. Wood products
Water Activity	Unknown.
Mode of Dissemination	Forcible ejection. Wind currents.
Allergic Potential	Type I allergies (hay fever, asthma) . Type III (hypersensitivity pneumonitis)
Potential or Opportunistic Pathogens	Depends on genus.
Industrial Uses	Edible mushrooms are used in the food industry.
Potential Toxins Produced	Amanitins. monomethyl-hydrazine. muscarine. ibotenic acid. psilocybin.
Other Comments	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.

CLADOSPORIUM	
Natural Habitat	Dead plant matter. Straw. Soil. Woody plants
Suitable Substrates in the Indoor Environment	Fiberglass duct liner. Paint. Textiles. Found in high concentration in water-damaged building materials.
Water Activity	Aw 0.84-0.88
Mode of Dissemination	Air
Allergic Potential	Type I (asthma and hay fever).
Potential or Opportunistic Pathogens	Edema. keratitis. onychomycosis. pulmonary infections. Sinusitis.
Industrial Uses	Produces 10 antigens.
Potential Toxins Produced	Cladosporin and Emodin.

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EMSL Order: 142002938
Customer ID: EMSL14
Collected: 7/23/2020
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CURVULARIA	
Natural Habitat	A worldwide saprophytic fungi, being isolated from dead plant material and soil.
Suitable Substrates in the Indoor Environment	Paper, wood products
Free moisture required for mold growth	Unknown
Mode of Dissemination	Wind
Allergic Potential	Hay fever, asthma, allergic fungal sinusitis
Potential or Opportunistic Pathogens	In immunocompromised patients can cause cerebral abscess, endocarditis, mycetoma, ocular keratitis, onychomycosis, and pneumonia.

EPICOCCUM	
Natural Habitat	A worldwide saprophytic fungi, being isolated from dead plant material and soil.
Suitable Substrates in the Indoor Environment	Paper, textiles
Water Activity	0.86-0.90
Mode of Dissemination	Wind
Allergic Potential	Hay fever, asthma
Potential or Opportunistic Pathogens	Unknown

STACHYBOTRYS/MEMNONIELLA	
Natural Habitat	Decaying plant materials and Soil.
Suitable Substrates in the Indoor Environment	Water damaged building materials such as: ceiling tiles, gypsum board, insulation backing, sheet rock, and wall paper. Paper. Textiles.
Water Activity	Aw=0.94
Mode of Dissemination	Insects, Water, and Wind
Allergic Potential	Type I (hay fever, asthma)
Potential or Opportunistic Pathogens	Unknown.
Industrial Uses	Unknown.
Potential Toxins Produced	Mycotoxins produced by Stachybotrys include Roridin A, Roridin E, Roridin H, Roridin L-2, Satratoxin G, Satratoxin H, Isosatratoxin F, Verucarin A, Verucarin J, and Verrucariol.
Other Comments	Stachybotrys and Memnioniella are closely related and many Memnioniella species have been renamed under Stachybotrys. Mycologists are continuing to debate whether Stachybotrys and Memnioniella should be grouped or split apart (see references below). Stachybotrys may play a role in the development of sick building syndrome. The presence of this fungus can be significant due to its ability to produce mycotoxins. Exposure to the toxins can occur through inhalation, ingestion, or skin exposure.
References	Generic hyper-diversity in Stachybotriaceae. L. Lombard et al., Persoonia 36, 2016: 156–246. Overview of Stachybotrys (Memnioniella) and current species status. Y. Wang et al., Fungal Diversity, 2015: DOI: 10.1007/s13225-014-0319-0.

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5. References and Informational Links

Books

- Bioaerosols: Assessment and Control. Janet Macher, Ed., American Conference of Governmental Industrial Hygienists, Cincinnati, OH 1999.
- Exposure Guidelines for Residential Indoor Air Quality. Environmental Health Directorate, Health Protection Branch, Health Canada, Ottawa, Ontario, 1989.
- Fungal Contamination in Public Buildings: Health Effects and Investigation Methods. Health Canada, Ottawa, Ontario, 2004.
- IICRC: S500 Standard and Reference Guide for Professional Water Damage Restoration. 3rd Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2006
- IICRC: S520 Standard and Reference Guide for Professional Mold Remediation. 1st Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2004
- Field Guide for the Determination of Biological Contaminants in Environmental Samples. 2nd Edition, American Industrial Hygiene Association, 2005.

Consumer Links

Read the full text of AIHA's "The Facts About Mold" consumer brochure.

<http://www.aiha.org/get-involved/VolunteerGroups/Documents/Biosafety/VG-FactsAbout%20MoldDecember2011.pdf>

The Occupational Safety and Health Administration (OSHA)

<http://www.osha.gov/SLTC/molds/index.html>

CDC Mold Facts

<http://www.cdc.gov/mold/faqs.htm>

CDC Stachybotrys - Questions and answers on Stachybotrys chartarum and other molds

<http://www.cdc.gov/mold/stachy.htm>

IOM, NAS: Clearing the Air: Asthma and Indoor Air Exposures

<https://www.epa.gov/indoor-air-quality-iaq/should-you-have-air-ducts-your-home-cleaned>

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National Library of Medicine-Mold website

<http://www.nlm.nih.gov/medlineplus/molds.html>

California Department of Health Services (CADOHS)

<https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Mold.aspx>

Minnesota Department of Health

<http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html>

New York City Department of Health and Mental Hygiene

<https://www1.nyc.gov/site/doh/health/health-topics/mold.page>

H.R.: The United States Toxic Mold Safety and Protection Act

EPA

"Should You Have the Air Ducts in Your Home Cleaned?"

<http://www.epa.gov/iaq/pubs/airduct.html>

General information about molds and actions that can be taken to clean up or prevent a mold problem.

<http://www.epa.gov/asthma/molds.html>

"A Brief Guide to Mold, Moisture, and Your Home" - Includes basic information on mold, cleanup guidelines, and moisture and mold prevention

<http://www.epa.gov/mold/moldguide.html>

"Mold Remediation in Schools and Commercial Buildings" - Information on remediation in schools and commercial property, references for potential mold and moisture remediators.

<https://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide>

FEMA

"Homes That Were Flooded May Harbor Mold Problems" - Information and tips for cleaning mold.

<http://www.fema.gov/news-release/homes-were-flooded-may-harbor-mold-problems>

"Dealing With Mold & Mildew in Your Flood Damaged Home.

http://www.fema.gov/pdf/rebuild/recover/fema_mold_brochure_english.pdf



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6. Important Terms, Conditions, and Limitations

A. Sample Retention

Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation

All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

C. Warranty

EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

D. Limits of Liability

In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client or any third party, whether based upon theories

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of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

E. Indemnification

Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL services, the test result data or its use by client

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