

ERMI

Mold Index Report

Prepared Exclusively For:

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Introduction

The Environmental Relative Moldiness Index (ERMI) was developed by the EPA as a screening tool to evaluate potential risk of indoor mold growth. Mold accumulates in homes over time and can be found in carpet dust and other accumulation sites. Using mold-specific quantitative PCR (MSQPCR), targeted mold species can be quantified biochemically.

Methods

The analysis for species-specific quantification is achieved through the utilization of mold-specific quantitative Polymerase Chain Reaction (MSQPCR) analysis. Nucleic acids are extracted using the bead-beating technique described by the EPA and commercially available kits as predicated by sample matrix. Reference controls are utilized as positive controls, and independent MSQPCR analyses are performed using primers and probes validated specifically for the species of interest. Molds from the 36 species panel are divided into two groups. The first group (Group 1) of 26 species represents molds associated with water damage and the other group (Group 2) represents common indoor molds. The Index is calculated by log-transforming all mold concentrations, then subtracting the sum of the second group from the sum of the first. The resulting ERMI is a whole number usually between -10 and 20 with a standard deviation of ± 3 . In order to most effectively use this new tool, the ERMI must be compared to a national database. Indices were determined using this method for 1,096 homes across the U.S. as part of the 2006 HUD American Healthy Home Survey. Individual indices, ranked from lowest to highest were used to create a national Relative Moldiness Index (RMI) Scale. This tool should be used as one element of an overall assessment or an indication that a more complete assessment is needed. As with all laboratory data, there are limitations that should be considered when using the index.

Quality Assurance

EMLab P&K is staffed with highly trained professionals, including PhD's, chemists, and registered microbiologists with over 40 years of experience. The reliability of test results depends on many factors such as the personnel performing the tests, environmental conditions, selection and validation of test methods, equipment functioning, measurement traceability, as well as the sampling, storage and handling of test items, all of which are a reflection of the laboratories overall quality system.

EMLab P&K has modeled its quality system after ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, one of the most stringent sets of standards in the industry, to ensure that its customers receive the high standard of accuracy, reliability, and impartiality that they have come to expect from a leader in the environmental industry. EMLab P&K's adherence to the standards set forth in ISO 17025 has been validated and formally recognized through accreditations granted by an independent outside agency, the American Industrial Hygiene Association (AIHA). As an additional measure to demonstrate its competency to perform the analyses it offers to its clients, EMLab P&K also participates in a variety of different proficiency testing programs, including the Environmental Microbiology Proficiency Analytical Testing Program (EMPAT) sponsored by the American Industrial Hygiene Association.

As part of its continuous commitment to excellence, EMLab P&K is also inspected, licensed and/or accredited by a number of governmental agencies and independent associations in addition to those already mentioned above. The scope document, accreditation certificates, and proficiency results can all be accessed at www.emlab.com. Below you will find additional information regarding the specific analyses requested for this project.

Data Qualifiers

The Data Qualifiers identify issues or events that are relevant to your analytical results. A data qualifier includes information about the validity, the source of the data whether calculated, entered, or estimated, and the value of an observation. In each case the data qualifiers provide significant information vital to the interpretation of the laboratory data.

Results:

Group 1 Water Damage Indicators Fungal ID	Sample ID Dust Weight	
	Dust-1 5.0 mg	
	SE*	SE/mg
<i>Aspergillus flavus</i>	21	4
<i>Aspergillus fumigatus</i>	ND	<1
<i>Aspergillus niger</i>	30	6
<i>Aspergillus ochraceus</i>	ND	<6
<i>Aspergillus penicillioides</i>	16	3
<i>Aspergillus restrictus</i>	ND	<17
<i>Aspergillus sclerotiorum</i>	ND	<1
<i>Aspergillus sydowii</i>	ND	<18
<i>Aspergillus unguis</i>	270	53
<i>Aspergillus versicolor</i>	ND	<8
<i>Aureobasidium pullulans</i>	1900	380
<i>Chaetomium globosum</i>	ND	<1
<i>Cladosporium sphaerospermum</i>	400	79
<i>Eurotium (Asp.) amstelodami</i>	11	2
<i>Paecilomyces variotii</i>	5	1
<i>Penicillium brevicompactum</i>	64	13
<i>Penicillium corylophilum</i>	ND	<4
<i>Penicillium crustosum (Group 2)</i>	51	10
<i>Penicillium purpurogenum</i>	ND	<1
<i>Penicillium spinulosum</i>	23	5
<i>Penicillium variabile</i>	ND	<1
<i>Scopulariopsis brevicaulis</i>	43	9
<i>Scopulariopsis chartarum</i>	ND	<1
<i>Stachybotrys chartarum</i>	9	2
<i>Trichoderma viride</i>	ND	<2
<i>Wallemia sebi</i>	2	1
Sums of the logs	12.4	

Group 2 Common Indoor Molds Fungal ID	Sample ID Dust Weight	
	Dust-1 5.0 mg	
	SE*	SE/mg
<i>Acremonium strictum</i>	11	2
<i>Alternaria alternata</i>	26	5
<i>Aspergillus ustus</i>	33	7
<i>Cladosporium cladosporioides-1</i>	320	63
<i>Cladosporium cladosporioides-2</i>	17	3
<i>Cladosporium herbarum</i>	82	16
<i>Epicoccum nigrum</i>	11	2
<i>Mucor/Rhizopus</i>	56	11
<i>Penicillium chrysogenum-2</i>	19	4
<i>Rhizopus stolonifer</i>	1	1
Sums of the logs	7.4	

* SE = Spore Equivalents, ND = Not Detected

Sample	Dust-1
ERMI Calculation	12.4 – 7.4
ERMI Result	5

Interpretation of ERMI Result

25th Percentile (Low)

A home with an ERMI index of less than -4 is in the lower quarter (25%) of all the homes tested in the HUD survey (Figure 1). The potential risk of significant indoor mold growth is low.

25th to 75th Percentile (Moderate)

Homes with an ERMI index of -4 to 5 represent 50% of homes in the HUD survey (Figure 1) in the moderate range excluding 25% with the lowest and 25% with the highest values. There is a moderate risk of indoor mold growth for this category.

75th Percentile (High)

Homes with an ERMI index greater than 5 were in the upper 25% of all homes tested in the HUD survey (Figure 1). This category represents the highest potential risk of significant indoor mold growth.

In addition to the ERMI index, this report provides quantitative detection results for each of 36 indoor molds. For more information about potential risks and typical indoor concentrations, see references listed below or contact us at 856-489-4455.

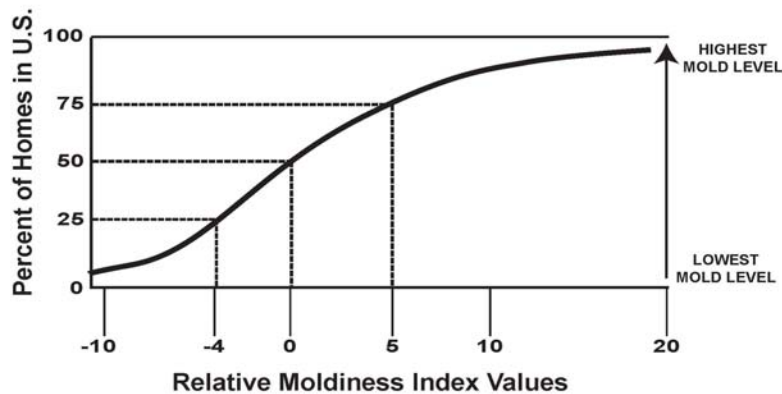


Figure 1.

References

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Sincerely,

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