



ERMI

Mold Index Report

Prepared Exclusively For:

EMLab P&K
1150 Bayhill Drive, Suite 100
San Bruno, CA 94066

Project Name: Example Report

Project ID Number: 999999

June 5th, 2008



This report has been prepared at the request of and for the exclusive use of the client named in this report. EMLab P&K will not release results or report to a third party without prior written consent.

EMLab P&K June 5th, 2008
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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.

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Results:

5.0 mg 5.0 mg

SE* SE/mg SE* SE/mg

Aspergillus flavus 21 4 *Acremonium strictum* 11 2

Aspergillus fumigatus ND <1 *Alternaria alternata* 26 5

Aspergillus niger 30 6 *Aspergillus ustus* 33 7

Aspergillus ochraceus ND <6 *Cladosporium cladosporioides* -1 320 63

Aspergillus penicillioides 16 3 *Cladosporium cladosporioides* -2 17 3

Aspergillus restrictus ND <17 *Cladosporium herbarum* 82 16

Aspergillus sclerotiorum ND <1 *Epicoccum nigrum* 11 2

Aspergillus sydowii ND <18 *Mucor/Rhizopus* 56 11

Aspergillus unguis 270 53 *Penicillium chrysogenum*-2 19 4

Aspergillus versicolor ND <8 *Rhizopus stolonifer* 1 1

Aureobasidium pullulans 1900 380 **Sums of the logs**

Chaetomium globosum ND <1

Cladosporium sphaerospermum 400 79 * SE = Spore Equivalents, ND = Not Detected

Eurotium (Asp.) amstelodami 11 2

Paecilomyces variotii 5 1

Penicillium brevicompactum 64 13

Penicillium corylophilum ND <4

Penicillium crustosum (Group 2) 51 10

Penicillium purpurogenum ND <1

Penicillium spinulosum 23 5

Penicillium variable ND <1

Scopulariopsis brevicaulis 43 9

Scopulariopsis chartarum ND <1

Stachybotrys chartarum 9 2

Trichoderma viride ND <2

Wallemia sebi 2 1

Sums of the logs

Sample

ERMI Calculation 12.4 7.4

ERMI Result

Dust-1

5

12.4

Group 1

Water Damage Indicators

Fungal ID

Sample ID

Dust Weight

Sample ID

Dust Weight

7.4

Group 2
Common Indoor Molds
Fungal ID

Dust-1 Dust-1

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Sincerely, Lab reviewed by:

Project Manager, EMLab P&K Technical Manager Biochemistry

Figure 1.

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)

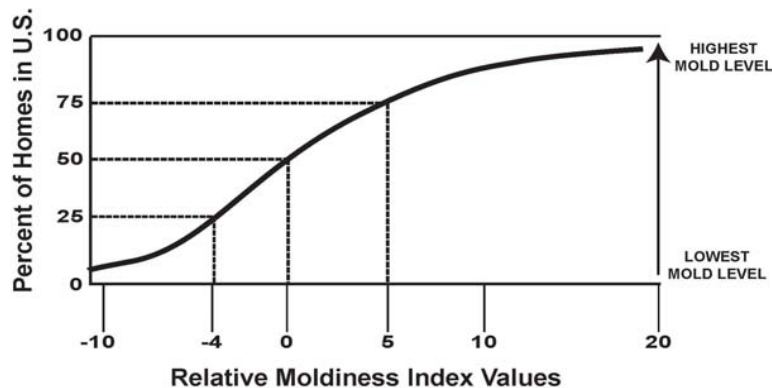
Homes with an ERMI index of -4 to 5 represent 50% of homes in the HUD survey (Figure 1) in the moderate range excluding 25% with the lowest and 25% with the highest values. There is a moderate risk of indoor mold growth for this category.

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.



References

1. Meklin, T.M., Haugland, R.A., Reponen, T., Varma, M., Lummus, Z., Bernstein, D., Wymer L.J., Vesper, S.J. Quantitative PCR analysis of house dust can reveal abnormal mold conditions. *Journal of Environmental Monitoring*, 2004, 6: 615-620.
2. Vesper, S.J. Developing the EPA Relative Moldiness Index © based on mold-specific quantitative PCR. *The Synergist*, April 2006:39-43.
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4. Vesper, S.; McKinstry, C.; Haugland, R.; Wymer, L.; Bradham, K.; Ashley, P.; Cox, D.; Dewalt, G.; Friedman, W. Development of an Environmental Relative Moldiness Index for US Homes. *JOEM* 49(8), August 2007: 829-833.

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