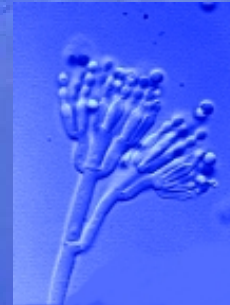




Evaluating Practical Applications of the Environmental Relative Moldiness Index for Residential Mold Assessments

Jason Dobranic, Ph.D. & Cathy Cutler, B.Sc.

EMSL Analytical, Inc

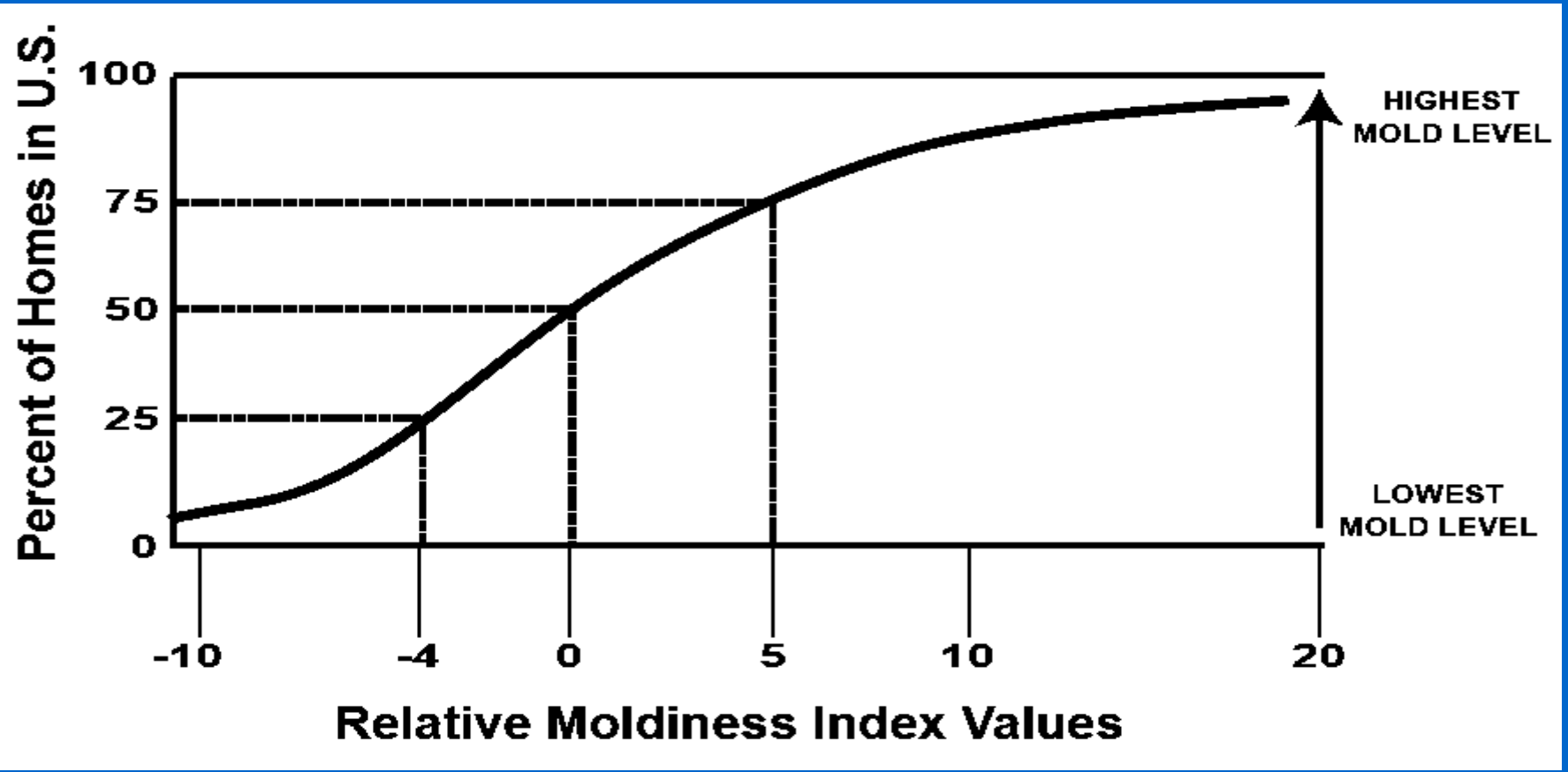


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Study Goals

- How does a consultants traditional assessment methods compare to the ERMI?
- “Put the ERMI in the hands of professionals and get their feedback”.

ERMI Across US



Source : Dr. Steve Vesper, EPA

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Study Method

- 5 consultants involved
- 4 homes evaluated each
- No restriction on sampling methods utilized
- ERMI sample included
- 2 questionnaires submitted for each home

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PCR Dust Samples

- 0.45 μm MCE filter paper cassette
- 3 by 6 ft area marked off
- Composite sample from living room and a bedroom



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Questionnaire #1

- Why did the client request the investigation/sampling?
- Were occupants complaining of adverse health effects? If yes, please list.
- Were visible signs of water damage noted anywhere?
- Was visible mold present? If yes, estimate square footage

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Questionnaire #1

- Did you collect any other readings from the living space (temp., moisture, relative humidity, thermal imaging)?
- Did you conclude that the home had a mold problem?
- What key information did you use to come to this conclusion (visuals, spore trap data, direct exams, etc)?

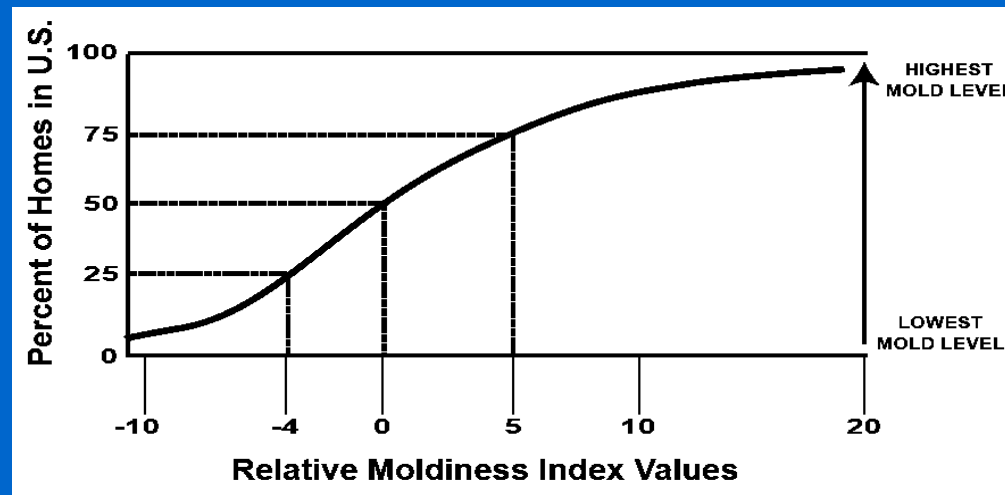
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Questionnaire #1

- Did you recommend further testing? If yes, what type?
- Did you recommend remediation of the home?
- Any other comments you may wish to add?

Questionnaire #2

- Looking at the ERMI value provided and the chart below, would you consider the ERMI for this home, High, Medium, or Low compared to homes across the US?



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Questionnaire #2

- Did the ERMI value correlate with your initial findings?
- Based only on the ERMI, would you conclude the home had a mold problem?
- Based only on the ERMI, would you recommend further testing?

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Questionnaire #2

- Please comment on ERMI dust sample collection (any issues in the field?)
- Do you have any other comments regarding the ERMI?

ERMI Fungi List

EMSL Analytical, Inc. - Microbiology

107 Haddon Ave., Westmont, NJ 08108 Tel: 800-220-3675 Fax: 856-858-0648

Client: Mold Consultant
1234 Testing Way
South Jersey, NJ 08003

Attention: Mr. Consultant
Project: 05/18/1903

EMSL Order ID: 370600000
Date Received: 10/10/2006
Date Analyzed: 10/10/2006
Date Reported: 10/10/2006

Fungal Species Identification and Enumeration by Mold Specific Quantitative Polymerase Chain Reaction (MSQPCR) (EMSL Method:M050)

based on USA EPA SOP MERB-020, Revision No. 3, 7/11/02

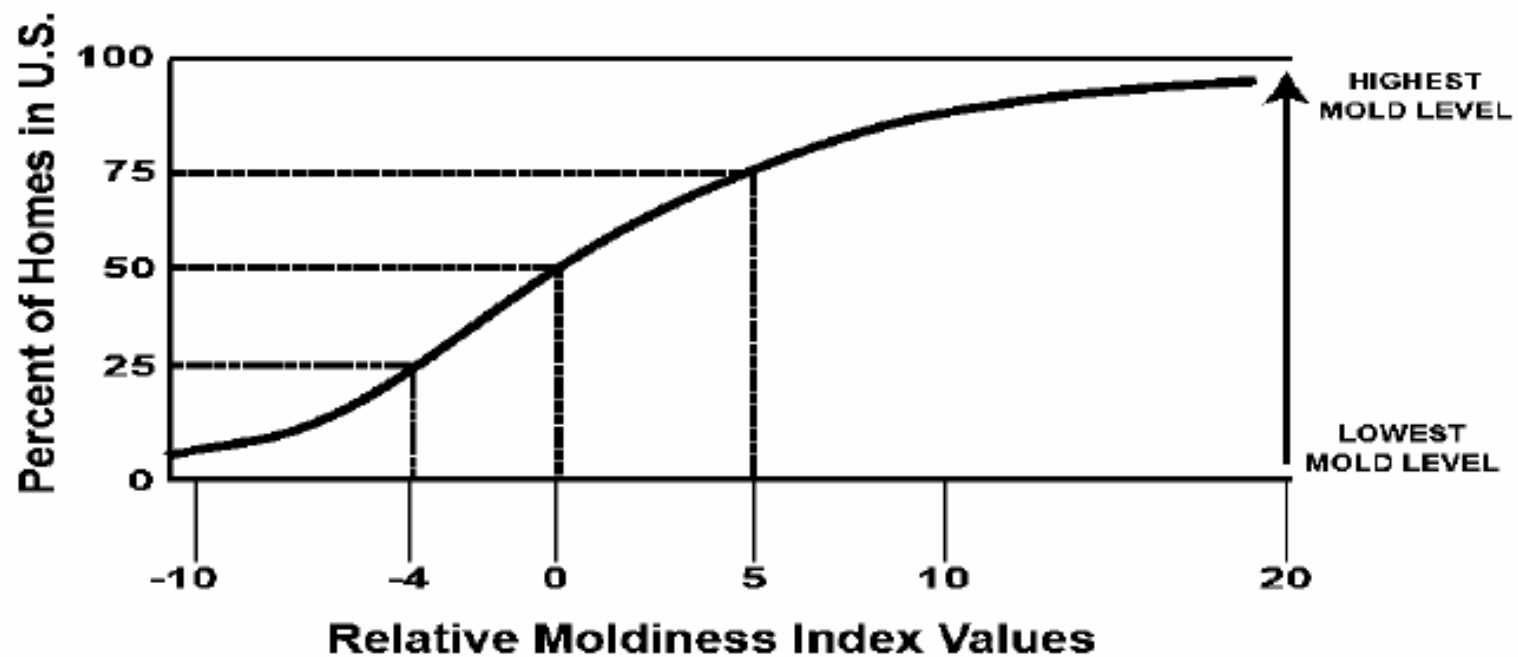
Lab Sample Number	6793-1		-	-	-	-	-	
Client Sample ID	1		-	-	-	-	-	
Sample Location	Composite dust		-	-	-	-	-	
Sample size	6.6 mg dust		-	-	-	-	-	
EPA 36 Species Identification	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust
Group 1								
<i>Aspergillus flavus</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus fumigatus</i>	ND	ND	-	-	-	-	-	-

EPA 36 Species Identification	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust
Group 1								
<i>Aspergillus flavus</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus fumigatus</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus niger</i>	502	76	-	-	-	-	-	-
<i>Aspergillus ochraceus</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus penicillioides</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus restrictus</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus sclerotiorum</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus sydowii</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus unguis</i>	ND	ND	-	-	-	-	-	-
<i>Aspergillus versicolor</i>	1,879	285	-	-	-	-	-	-
<i>Eurotium (A.) amstelodami</i>	76,535	11,596	-	-	-	-	-	-
<i>Aureobasidium pullulans</i>	72,844	11,037	-	-	-	-	-	-
<i>Chaetomium globosum</i>	73	11	-	-	-	-	-	-
<i>Cladosporium sphaerospermum</i>	ND	ND	-	-	-	-	-	-
<i>Paecilomyces variotii</i>	113	17	-	-	-	-	-	-
<i>Penicillium brevicompactum</i>	ND	ND	-	-	-	-	-	-
<i>Penicillium corylophilum</i>	ND	ND	-	-	-	-	-	-
<i>Penicillium crustosum (group2)</i>	ND	ND	-	-	-	-	-	-
<i>Penicillium purpurogenum</i>	4,386	665	-	-	-	-	-	-
<i>Penicillium spinulosum</i>	ND	ND	-	-	-	-	-	-
<i>Penicillium variable</i>	965	146	-	-	-	-	-	-
<i>Scopulariopsis brevicaulis</i>	30	4	-	-	-	-	-	-
<i>Scopulariopsis chartarum</i>	512	78	-	-	-	-	-	-
<i>Stachybotrys chartarum</i>	ND	ND	-	-	-	-	-	-
<i>Trichoderma viride</i>	ND	ND	-	-	-	-	-	-
<i>Wallemia sebi</i>	34,476.4	5,224	-	-	-	-	-	-
Sum of the Logs	26.0		-		-		-	

Fungal Species Identification and Enumeration by Mold Specific Quantitative Polymerase Chain Reaction (MSQPCR) (EMSL Method:M050)

based on USA EPA SOP MERB-020, Revision No. 3, 7/11/02

Lab Sample Number	6793-1		-	-	-	-	-	
Client Sample ID	1		-	-	-	-	-	
Sample Location	Composite dust		-	-	-	-	-	
Sample size	6.6 mg dust		-	-	-	-	-	
EPA 36 Species Identification	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust	Total cells in sample	cells/ mg dust
Group 2								
<i>Acremonium strictum</i>	ND	ND	-	-	-	-	-	-
<i>Alternaria alternata</i>	112	17	-	-	-	-	-	-
<i>Aspergillus ustus</i>	ND	ND	-	-	-	-	-	-
<i>Cladosporium cladosporioides I</i>	7,742	1,173	-	-	-	-	-	-
<i>Cladosporium cladosporioides II</i>	151	23	-	-	-	-	-	-
<i>Cladosporium herbarum</i>	208	31	-	-	-	-	-	-
<i>Epicoccum nigrum</i>	5,291	802	-	-	-	-	-	-
<i>Mucor and Rhizopus group</i>	361	55	-	-	-	-	-	-
<i>Penicillium chrysogenum</i>	ND	ND	-	-	-	-	-	-
<i>Rhizopus stolonifer</i>	ND	ND	-	-	-	-	-	-
Sum of the Logs	11.8		-	-	-	-	-	
ERMI Value:	14		-	-	-	-	-	
ERMI Interpretation* (see graph and description below)	Level 4		-	-	-	-	-	



ERMI is a copyright of Dr. Steve Vesper and the US EPA.

Real-time PCR analysis of molds is performed at EMSL Analytical, Inc. in agreement with the Patent License Agreement between EMSL Analytical, Inc. and the United States Environmental Protection Agency's National Exposure and Research Laboratory-CI as well as the Patent License Agreement between EMSL Analytical, Inc. and Applied Biosystems.

EMSL maintains liability limited to cost of analysis. Interpretation of the data contained in this report is 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. The above test report relates only to the items tested. EMSL bears no responsibility for sample collection activities or analytical method limitations.

Based on preliminary data published by the US EPA (chart above), the following ERMI levels can help predict whether an indoor environment is moldy. As research progresses, forthcoming data may change this interpretation and further refine the ERMI.

ND=None detected; the result is below the analytical detection limit or not present.

Level 4 = Buildings with an ERMI in the 4th quartile have the greatest likelihood of having a mold problem.

Level 3 = Buildings with an ERMI in the 3rd quartile have a greater likelihood of having a mold problem.

Level 1 & 2 = Buildings with an ERMI in the 1st or 2nd quartile have a low likelihood of having a mold problem.

For further technical information regarding the development of the EPA Relative Moldiness Index© (ERMI) refer to the April 2006 issue of "The Synergist" pages 39-43 or www.epa.gov/iaq

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Results

- 7 homes with significant mold had High ERMI.
- 5 homes with moderate mold had Medium ERMI.
- 5 homes with no significant mold had Low ERMI.

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Results

- 1 home had low mold but High ERMI (False Positive?).
 - Consultant recommended going back for further evaluation.
- 2 homes had high mold but Low ERMI (False Negative).
 - One had extensive mold (Asp/Pen & Stachy) in basement but air samples on other floors not high.
 - One had *Stachybotrys* growth on wall but none in ERMI sample (low amount of dust collected, 0.1 mg)

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Results

- Did you recommend further testing?
 - After initial data received: 19 No – 1 Yes
 - After ERMI data received: 10 No – 10 Yes

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Results

- Summary
 - 85% matched consultants initial findings
 - 5% false positive (?)
 - 10% false negative (reduce or eliminate this problem with a visual walkthrough)

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Results

- Comments from Consultants
 - Data interesting and thought provoking.
 - Sampling method should be simplified (“Not really into going on all fours to sample”.)
 - Time consuming
 - Operable method

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Acknowledgments

- Roche Diagnostics Corporation
- 5 anonymous consultants

Contact Information

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