United States Environmental Protection Agency

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The Environmental Relative Moldiness Index (ERMI)

Innovative Science for a Sustainable Future

A research tool, called the Environmental Relative Moldiness Index (ERMI), has been developed by EPA scientists for estimating mold contamination. In using this tool, researchers analyze the DNA from mold found in dust samples collected from a home, and then compare the sample to the ERMI's scale. Researchers can then use the results to estimate the amount of mold in a home and indicate some of the types of mold present.

The ERMI scale for estimating mold contamination was developed for use in research studies related to mold exposure and health impacts. ERMI has been peer reviewed for research purposes but has not been validated for non-research purposes. For this reason, EPA does not recommend the routine public use of ERMI in homes, schools, or other buildings.

Why develop a moldiness index?

The Institute of Medicine's 2004 report, "Damp Indoor Spaces and Health" recommended the development of "more rapid measurement methods for specific microorganisms that use DNA-based and other technology." This report also indicated that the "application of the new or improved methods will allow more valid exposure assessment of microorganisms and their components, which should facilitate more-informed risk assessments." As a result, EPA researchers developed a DNA-based method for quantifying molds called Mold Specific Quantitative PCR (MSQPCR). The "application" of the MSQPCR technology resulted in the development of the ERMI.

In 2009, the World Health Organization's meta-analysis of studies associating mold contamination with adverse health effects concluded that building dampness and mold were associated with approximately a 30 to 50 percent increase in a variety of respiratory and asthma-related health outcomes. Therefore, the 2009 WHO's "Guidelines for Indoor Air Quality: Dampness and Mold" recommended that exposures to mold be "minimized." To assess the relative level of mold in homes, EPA researchers used MSQPCR while conducting the U.S. Department of Housing and Urban Development's American Healthy Homes Survey (AHHS), to quantify mold populations in over 1,000 homes representing housing from across the continental U.S. Using a standardized sample from each home and the analysis of 36 indicator molds in each sample, EPA researchers then ranked the values for the relative level of "moldiness" for each home from lowest to highest to create the Environmental Relative Moldiness Index (ERMI) scale.

The application of the ERMI scale

The ERMI scale ranges from a low of approximately -10 to a high of about 30 and can be used by extrapolation to estimate any U.S. home's relative level of moldiness compared to the AHHS representative national selection of homes. The ERMI assessment has been used by EPA to help characterize relative levels of mold contamination in homes and other buildings and is being used to investigate potential relationships between ERMI values and health effects. In our studies to date, higher ERMI values in homes have been correlated with a greater likelihood of occupant asthma. As the approach has not been validated through a multi-lab study, we cannot comment on the accuracy of information obtained from others using ERMI. Inspection for water damage and mold remain the key to current EPA mold-assessment guidance.

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