Pure Earth Environmental Announces Commercial Availability of Novel Molecular Diagnostic Services for Fungal Characterization: Quantitative Real-time PCR.

The role of indoor fungi and its particular association to building-related health has been considerably surveyed. Extensive investigative strategies have been employed in assessment of the varieties of fungal contaminants and their relative concentrations potentially contributory to the predisposition of adverse health effects. Cooperatively, the investigative and analytical sections of the environmental microbiology discipline have strived for a comprehensive and standardized means of assessing and controlling exposures to fungal contaminants, although controversy has encompassed such endeavors. Due to the multitudes of fungi prevalent in both indoor and outdoor settings and their wide range of mycotoxin production and allergenic potential, it is necessary to accurately and quantitatively estimate the occurrence of individual fungal species or closely related groups of indoor fungi, thus increasing the validity of data and its interpretations.

Traditionally, a compilation of methods such as observational inspections, moisture monitoring, and culture and microscopic-based fungal analyses of air and surface samples, have provided the foundation for identifying mold problems in buildings. The latter are particularly prone to both qualitative and quantitative inaccuracies and are additionally time and labor intensive. Results from these investigations are only reflective of the thoroughness and competence of the investigators and analysts performing them, thus the advent of molecular diagnostics and the introduction of quantitative real-time polymerase chain reaction for characterization of fungi may largely circumvent these problematic areas of environmental assessments. A methodology widely used in clinical applications, QPCR now enjoys popularity and practical utility in the environmental industry as well. Pure Earth Environmental Laboratory proudly announces its licensed partnership with the United States Environmental Protection Agency and the cooperative research and development agreement established to utilize this DNA-based mold technology in assessment of the presence of selected target organisms in environmental samples, including building dust and air.

Not singly exclusive to fungal allergens, QCPR can also be successfully employed for the detection and quantification of infectious agents such as bacteria and parasites, and it is our intent to maximize this technology as it becomes available. QPCR services may greatly benefit other industries including food and hospital establishments. Of particular importance is sensitivity (often detecting a single spore) and rapidity of results (within 2 to 4 hours). When combined, these elements may provide a significant reduction in the

many deaths (particularly *Aspergillus* related infections) that plague the health care establishment. In the industrial health realm, this "real-time" availability of data may be highly desirable in determination of fungal contamination levels as well as signaling instances where potentially deleterious exposures of building occupants to fungal presence exist.

The mainstay of analytical methods for QPCR analysis, dust and air samples, are highly advantageous when compared to traditional sampling and analytical techniques for a variety of reasons. Airborne fungal populations, transient by nature, cannot be reliably represented, nor can the determination of long term exposure be assessed, though small volume and short interval sampling. QPCR air sampling can occur over a time span of hours and remain unhindered by fungal overcrowding. Alternatively, QPCR is highly sensitive in capture of small loads of target organisms that may typically remain undetected in cultural analysis, but nonetheless, still have substantial toxic or allergenic properties. It has been proposed that dust samples may be the best indicators of cumulative exposures to molds, primarily because dust is a product of long-term deposition processes and may harbor reservoirs of fungal contamination.

Evident are the numerous benefits of QPCR analyses; high specificity and sensitivity to the species level or group level of those species with nearly identical rDNA sequences, the diminishment of subjectivity associated with traditional mycological methods, independence from proper media selection or out-competition with other organisms, the ability to utilize small quantities of material for successful analyses, cost efficiency and rapidity of results, and simple sampling apparatus are among a few. Most substantially, QPCR analyses provide an unmatched standardization with significant emphasis on the quality of results. Built into the QPCR analytical procedure are a variety of statistically determined quality control measures, designed to ensure that the highest quality of reproducible and verifiable data is generated and released to our clients. The laboratory encourages inquiries pertaining to this methodology.