ASPEN Environmental, Inc.
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March 01, 2013

Re: Mold Sampling

Dear Mr. Jon Lewis,

Aspen Environmental, Inc. representatives completed the mold air sampling at 940 Fillmore Street in Denver, Colorado on March 01, 2013. The air samples were collected using Allergenco D disposable air monitoring cassettes according to the manufacturer's recommendations and analyzed by Reservoirs Environmental Inc. located at 5801 Logan Street Suite 100 Denver, Colorado. Please reference the attached laboratory results.

Introduction

Molds are a natural and important part of our environment. They are ubiquitous and are found virtually everywhere. Molds produce tiny spores to reproduce. These spores can be found in both indoor and outdoor air and on indoor and outdoor surfaces. When mold spores land on a damp spot, they may begin growing and digesting whatever they are growing on in order to survive, leading to adverse conditions. In response to increasing public concern, a number of government authorities, including the United States EPA, California Department of Health Services and New York City Department of Health, have developed recommendations and guidelines for assessment and remediation of mold.

While it is generally accepted that molds can be allergenic and can lead to adverse health conditions in susceptible people, unfortunately there are no widely accepted or regulated interpretive standards or numerical guidelines for the interpretation of microbial data. The absence of standards often makes interpretation of microbial data difficult and controversial. This report has been designed to provide some basic interpretive information using certain assumptions and facts that have been extracted from a number of peer reviewed texts, such as the American Conference of Governmental Industrial Hygienists (ACGIH). In the absence of standards, the user must determine the appropriateness and applicability of this report to any given situation. Identification of the presence of a particular fungus in an indoor environment does not necessarily mean that the building occupants are or are not being exposed to antigenic or toxic agents. None of the information contained herein should be construed as medical advice or a call to action for evacuation or remediation. Only a qualified physician should make any decision relative to medical significance.

Methods

1. Surface Samples – Swab, Dust, Tape and Bulk Samples

Swab, Dust and Tape samples are mounted on a glass slide and observed under a bright field microscope for either Qualitative or Quantitative Examination. A bulk sample is also simultaneously observed under a stereomicroscope to look for signs of any visible discoloration or fungal growth, which is then mounted and observed under a bright field microscope for either Qualitative or Quantitative Examination. The samples are analyzed at a minimum of 200X magnification and up to a 1000X magnification. In the qualitative examination, the prepared samples are observed for the presence of any structures or skewing of spore distribution that may indicate growth in the sample being analyzed. In the quantitative examination, the mold spores detected in the sample are counted and reported as spores per cm^2, spores per gram (or 1000mg), or spores per swab/wipe, etc depending on the sample type.

These methodologies do not differentiate between viable and non-viable fungal spores.

2. Air Samples- Spore Trap Device

Spore traps are a unique sampling device designed for the rapid collection and analysis of a wide range of airborne particulates, including fungal spores. While analyzing the sample, the analyst takes a number of variables into account to select the proper analytical method to accurately determine the densities of the various spores on the trace. The densities of the debris and the spores on the trace will determine the approach to analyzing the sample. In general, the sample is directly mounted under the microscope and the various airborne particles detected are counted at a minimum of 200X magnification and up to 1000X magnification, with the entire trace (100% of the sample) being analyzed at 200X or 600X. This method does not differentiate between viable and non-viable fungal spores. This technique does not allow for the differentiation between *Aspergillus* and *Penicillium* spores. Additionally, depending on morphology, other non-distinctive spores are reported in categories such as ascospores or basidiospores. All slides are graded with the following debris scale for data qualification.

3. Data Interpretation

According to ACGIH, "Data from individual sampling episodes is often interpreted with respect to baseline data from other environments or the same environment under anticipated low exposure conditions." In the absence of established acceptable exposure limits, it is often necessary to use a comparison standard when interpreting data. In this instance, it will be necessary to sample the suspect area as well as a non-suspect area. According to ACGIH, "...active fungal growth in indoor environments is inappropriate and may lead to exposure and adverse health effects."

a. Total Fungal Spores

According to ACGIH, ".... differences that can detected with manageable sample sizes are likely to be in 10- fold multiplicative steps (e.g., 100 versus 1000...)". Following this logic, if total fungal spores are ten (10) times greater in the sample from a suspect area than in the negative control sample collected from a non-suspect area, then that sample area may be a fungal amplification site.

b. Mycelial Fragments

Mycelium is a fungal mass that constitutes the vegetative or living body of a fungus. Following the same logic above, if total mycelial fragments are ten (10) times greater in

the suspect sample than in the negative control, then the sample area is considered to be a fungal amplification site. The presence of mycelial fragments provides evidence of microbial growth.

c. Mycotoxins

Molds can produce toxic substances called mycotoxins. More tha n 200 mycotoxins have been identified from common molds, and many more remain to be identified. Some of the molds that are known to produce mycotoxins are commonly found in moisture-damaged buildings. Exposure pathways for mycotoxins can include inhalation, ingestion, or skin contact. Although some mycotoxins are well known to affect humans and have been shown to be responsible for human health effects, for many mycotoxins, little information is available, and in some cases research is ongoing. Some molds can produce several toxins, and some molds produce mycotoxins only under certain environmental conditions. The presence of mold in a building does not necessarily mean that mycotoxins are present or that they are present in large quantities.

d. Water Indicator Molds

Certain authorities identify certain molds whose presence indicates excessive moisture. The presence of a few spores of indicator mold should be interpreted with caution. Additionally, it should be recognized that these named molds are not necessarily the only ones of potential significance.

Summary of Specific Mold Characteristics

Fungi Environmental
Indicator Typically Found

Alternaria

Alternaria is one of the more common fungi found in nature. It is found growing indoors on a variety of substrates including wallboards, painted walls, etc.

Arthrinium *Arthrinium* is a saprobe and is found on plants. It is rarely found growing indoors.

Ascospores

Ascospores are ubiquitous in nature and are commonly found in the outdoor environment. Some fungi that belong to the ascomycete family include the sexual forms of *Penicillium/Aspergillus, Chaetomium*, etc that may be frequently found growing on damp substrates.

Aureobasidium

Aureobasidium is commonly found in a variety of soils. Indoors, it is commonly found where moisture accumulates, especially bathrooms, and kitchens, on shower curtains, tile grout, windowsills, textiles, and liquid waste materials.

Basidiospores

Basidiospores are Saprophytes and plant pathogens and are commonly found in gardens, forests, and woodlands. They also include organisms that are the agent of "dry rot," and other fungi that cause white and brown wood rot, which may grow and destroy the structural wood of buildings.

Bipolaris/Dreschlera

Bipolaris and *Dreschlera* are usually found associated with plant debris, and soil. They are plant pathogens of numerous plants, particularly grasses. *Bipolaris* and *Dreschlera* can grow indoors on a variety of substrates.

Botrytis

Botrytis is commonly found in tropical and temperate climates growing on vegetative matter. They may be found indoors in conjugation with indoor plants, fruits and vegetables.

Chaetomium

Chaetomium is often found on materials containing cellulose such as sheetrock paper, or other wet materials.

Cladosporium

Cladosporium is a common outdoor mold. They are commonly found on dead plants, food, textiles, and a variety of other surfaces. Indoors, they can grow on a variety of substrates including textiles, wood, moist windowsills, etc. It can grow at $0^{o}C$ and is associated with refrigerated foods.

Curvularia

Curvularia is found on plant materials and is considered a saprobe. Indoors, they can grow on a variety of substrates.

Epicoccum

Epicoccum is a saprophyte and considered a weekly parasitic secondary invader of plants. They tend to colonize continuously damp materials such as damp wallboard and fabrics.

Fusarium

Fusarium requires very wet conditions and is frequently isolated from plants and grains. They colonize continuously damp materials such as damp wallboard and water reservoirs for humidifiers and drip pans.

Memnoniella *Memnoniella* can be found growing on a variety of cellulose-containing materials.

Nigrospora *Nigrospora* is especially abundant in warm climates and is rarely found growing indoors.

Oidium/ Peronospora *Oidium* and *Peronospora* are plant pathogens and are not found growing indoors.

Penicillium/ Aspergillus
Penicillium and *Aspergillus* are ubiquitous in environment. *Aspergillus* tends to colonize continuously damp materials such as damp wallboard and fabrics. *Penicillium* is commonly found in house dusts, wallpaper, decaying fabrics, moist clipboards, etc.
Pithomyces/Ulocladium
Pithomyces is commonly found on grass and decaying plant material and are rarely found growing indoors. *Ulocladium* has a high water requirement and therefore colonizes continuously damp materials such as damp wallboard and fabrics.

Rusts Rusts are plant pathogens and only grow on host plants.
Smuts/*Periconia*/
Myxomycetes
Smuts and Myxomycetes are parasitic plant pathogens that require a living host. Smuts do not usually grow indoors. *Periconia* are rarely found growing indoors. Myxomycetes are occasionally found indoors, but rarely growing.
Stachybotrys
Stachybotrys are commonly found indoors on wet materials containing cellulose, such as wallboard, jute, wicker, straw baskets, and other paper materials.
Stemphylium *Stemphylium* is either parasitic or saprophytic and is rarely found growing indoors.
Torula
Torula can grow indoors on cellulose containing materials such as wallboard, jute, wicker, straw baskets, and other paper materials.

Other brown/colorless An uncharacteristic fungal spore that does not lend itself to classification via direct microscopy.
Potential Water Intrusion/Indicator Mold
Potential Water Intrusion/Indicator Mold Capable of Mycotoxin Production

FINDINGS

Aspen Environmental, Inc. has found that the spore count is higher outside than inside the residence in the area sampled. Therefore the area sampled is clear of mold.

Lab ID Number	Sample Location	Penicillium/ Aspergillus Spore Count	Stachybotrys Spore Count	Total Spore Count
917123	Everything Room	53	0	160
917124	Art Room	0	0	130
917125	Larkspur Room	80	0	150
917126	Morning Glory Room	80	0	93
917127	Wood Rose Room	13	0	53
917128	3rd Grade Room	0	0	93
917129	Festival Hall Closet	27	0	160
917130	Festival Hall Room	27	0	120
917131	Outside	67	0	373

Sincerely,

Harold W. Windle
Manager Industrial Hygienist