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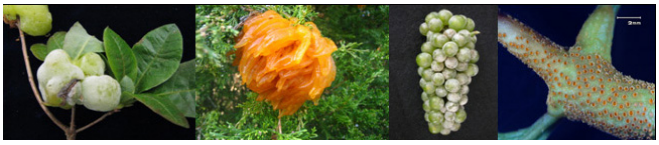

FACT SHEET

# INDOOR MOLDS AND THEIR MANAGEMENT

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Molds (microfungi) are ubiquitous. In nature, molds play both beneficial and detrimental roles in our ecosystem. One simple fact is that our earth would be buried by plant debris and undecomposed materials without molds. Molds use a number of strategies for their dispersal, but wind is one of the major ways. Many molds easily become airborne for their dispersal. It is common to have 2000 or more spores/$m^3$ in the air from spring to fall. These molds can enter our homes or buildings and establish themselves there leading to mold infestation when conditions are favorable for them. Unfortunately, indoor molds only play negative roles to human beings due to their potential detrimental effects on human health when exposed to them. The principle is that nobody should live in a moldy environment.

The indoor environment is an artificial ecosystem and can be perfect for molds. Our comfortable room temperature (70°F) is within the optimal temperature range for most common indoor molds. Many indoor materials, such as dry wall, paper, paper products, books, documents, leather, carpet, fabric, wood, wooden structures, wall papers, furniture, paints and insulation materials etc. are great food sources for molds to explore. The sole determinant factor upon which molds depend is water or high humidity indoors. Thus, water damage (water leak, burst pipe, water intrusion, flood etc.) or unmanaged high humidity will likely result in an indoor mold infestation. The most important fact is that in CT the air in summer is very humid. With such a high humidity in the air, it will lead to molds growing in places, such as basements without sufficient air circulation or dehumidification.

There have been 200-600 different molds reported from indoor environments. The most common indoor molds are *Cladosporium*, *Alternaria*, *Aspergillus*, *Penicillium*, *Epicoccum*, *Acremonium*, *Phoma*, *Ulocladium*, *Stachybotrys*, *Pithomyces*, and *Wallemia sebi* etc. A number of fungal species new to science have been found and reported from indoor environments. The list of indoor molds becomes longer and longer every year. Some indoor molds can grow fast and have very short life cycles. For example, *Aspergillus* and *Penicillium* only take 3-7 days to finish one life cycle under optimal conditions on dry walls. It will not take long for a property to become moldy. Indoor mold damage is shown in Figs 1-3.

Most of the common indoor molds are allergens and can trigger allergies and asthma attacks or cause other respiratory problems. Some indoor molds such as *Stachybotrys chartarum*, *Aspergillus* species

and *Wallemia sebi* etc. can produce toxins in spores and other fungal structures. Inhalation or skin contact with the mycotoxigenic molds pose potential health risks. The toxins produced by molds are not volatile. However, a number of molds, such as *Aspergillus* and *Penicillium* produce volatile organic compounds (VOCs), which are attributed to the musty smell in moldy residences and buildings. VOCs can also have detrimental effects on human health.

Molds self inspection—Two simple methods of self-inspection may help you detect mold infestation in your home: visual inspection and smelling. Check visually your property thoroughly with a flash light. Looking for discolored areas, water stains and water damage. Pay extra attention to your basement, bathroom and kitchen as well as any potential water damage. If molds are present on the interior surface, frequently they are visible to the naked eye. The other way is to smell the odor in your property. Some molds release VOCs, which give out musty smell. This musty smell is an indicator for the presence of molds in a property.

Should we hire a professional to inspect for indoor molds? The most appropriate answer is: It depends. If indoor molds are visible and there are no related medical concerns, you do not need to hire someone to do the mold inspection. You can either clean or remove the infested area. If no visible signs indicate the presence of indoor molds and self inspection does not find any mold infestation, yet musty odors are present or your body shows a negative response whenever you stay indoors, it may mean that you may have a hidden mold or invisible mold issue and you should find a professional to inspect your property to determine whether hidden or invisible molds are present or not. Some molds are colorless. The colonies of these colorless molds are often invisible to the eyes of untrained persons.

The key to reduce the risk of molds occurring indoors is to prevent water intrusion/water damage or high humidity from your property.

Fig 1. Moldy hotel room after the building roof and envelop were damaged by a hurricane.

Fig 2. Hidden Molds due to a water leak.

Fig 3. Moldy ceiling tile caused by high humidity.

After heavy rains or storms, walk through your property to check for any leaks. Any leaks found should be repaired immediately. Wet areas should be dried within 48 hours. Increasing air circulation and temperature will help the drying process. If necessary, a large ventilation fan should be used to expedite the drying process.

For any basement without a/c in CT, it is essential to run a dehumidifier in the basement and keep its relative humidity at 50% or below during the summer. Take a proactive approach to prevent mold infestation in the future. The basement is the most vulnerable place for indoor mold infestation in CT. Do not store your irreplaceable or valuable items in your basement. Avoid storing documents, books, and paper products in your basement. If aforementioned mold-prone goods have to be stored in the basement, they should be shelved off the floor. Choose a water resistant floor covering and avoid carpet in your basement. These precautionary measures will reduce the chance for mold infestation in case of the occurrence of floods, hurricanes, and other natural disasters.

When indoor molds are found, should the molds be identified? Once again, it depends. If there is no health concern to occupants, mold elimination/remediation can be conducted without mold identification. However, if the molds are suspected to relate to a health problem, which an occupant is experiencing, the mold samples should be collected and sent to a mycologist or an AIHA certified environmental microbiology lab for identification. Allergies and fungal infection are often species specific. The mold identification information should be provided to medical professionals to assist in any diagnosis.

Cleaning up and Remediation—Precautions: 1) cleaning up or remediation of a mold infestation should not be conducted without personal protection; 2) the individuals with allergies, asthma, other respiratory problems or compromised immune system should not do mold remediation themselves; 3) always fix the water damage/intrusion or solve high humidity issues first, prior to conducting any mold remediation. When a small colony of mold is found on the smooth, non-porous hard surface in your property, cleaning up can solve the mold issue. One of the principles is not to allow mold spores to spread to other rooms in your property by closing doors, windows and ventilation registers in the infested room. Always wear a pair of rubber gloves and a mask (N-95 rating). Then apply a sanitizer of your choice, such as bleach with a little bit of detergent or 70% alcohol to the colony to kill the mold. The next step is to apply detergent to the colony and wipe/scrape it out and clean the infested and nearby areas.

Due to potential risks of health and safety, when any major mold remediation has to be done, hiring professionals with proper certifications and experience should be considered. “Connecticut Guidelines for Mold Abatement Contractors” (http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pdf/ct_guidelines_for_mold_

abatement_contractors.pdf) should be followed by the parties who are doing commercial mold remediation.

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