

## CONTROLLING BIOLOGICAL CONTAMINATION

Controlling moisture sources in buildings is the best way to prevent unwanted biological growth. Mold can begin to grow within 24 hours of water intrusion, but prompt action can reduce damage or loss. Wonder Makers Environmental recommends the following steps for dealing with water intrusion:

1. **DRY** – As soon as possible after water intrusion, remove water from carpeting, furniture, and other fabrics, drying them thoroughly. Use dehumidifiers and air conditioning/ventilation to speed up the drying process. Professional assistance from water loss specialists may be necessary.
2. **SANITIZE** – Once water has been removed, sanitize all non-porous items using a commercial cleaner/fungicide and dry thoroughly. Once again, use dehumidifiers and air conditioning/ventilation to speed up the drying process.
3. **DISPOSE** – Certain items are not readily dryable and ought to be disposed of. These include ceiling tiles, drywall, insulation, and non-essential files and papers.
4. **REPAIR** – Determine and eliminate the source of the water intrusion. Repair all structural damage, as well as obvious design flaws.
5. **REMEDiate** – Remove all visible fungal growth using equipment and procedures that will protect you and the surrounding areas from exposure (see the description of the Mold Away kit on the back page). A trained mold remediation contractor may be necessary for moderate or large size projects.

For a detailed description of proper mold control procedures see the book, *Fungal Contamination: A Comprehensive Guide for Remediation*, by Wonder Makers Environmental.

## MOLD AWAY

This do-it-yourself kit contains everything needed to safely remove mold growth and sanitize approximately 10 square feet of contamination.

- Includes personal protective equipment, tools, cleaner and encapsulant, and isolation supplies
- Comprehensive, easy-to-follow instruction booklet included
- Effective on all types of mold
- Designed for residential and commercial use
- Refills of Go-Away fungicidal cleaner and Stay-Away mold-resistant coating available

Mold Away kit includes:

1 disposable protective suit, 3 pair latex gloves, 1 pair safety glasses, 1 disposable respirator with instructions, 1 plastic sheet, 2 plastic disposal bags, 1 roll masking tape, 1 bottle Go-Away fungicidal cleaner, 1 spray nozzle, 1 scrub brush, 1 Stay-Away mold-resistant coating, 1 disposable paintbrush, 3 disposable towels.

Call Wonder Makers Environmental to order: 888-382-4154

## REFERENCES

The following documents are vital parts of the standard of care for the mold remediation industry:

Occupational Safety & Health Administration (OSHA), *A Brief Guide to Mold in the Workplace*, 2003. [www.osha.gov/dts/shib/shib101003.html](http://www.osha.gov/dts/shib/shib101003.html)

Environmental Protection Agency, *Mold Remediation in Schools and Commercial Buildings*, 2001. [www.epa.gov/iaq/molds/index.html](http://www.epa.gov/iaq/molds/index.html)

New York City Department of Health, *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*, 1993. [www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html](http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html)

Health Canada, *Fungal Contamination in Public Buildings: A Guide to Recognition and Management*, 1995. [www.hc-sc.gc.ca/hecs-sesc/air\\_quality/pdf/fungal.pdf](http://www.hc-sc.gc.ca/hecs-sesc/air_quality/pdf/fungal.pdf)

Association of Specialists in Cleaning and Restoration, *Recommended Professional Practice for Remediation of Mold Contamination in Building Interiors*, 2003. ASCR, 8229 Cloverleaf Dr., Suite 460, Millersville, MD 21108, 800-272-7012, [www.ascr.org](http://www.ascr.org)

Institute of Inspection Cleaning and Restoration Certification (IICRC), *S520 Standard and Reference Guide for Professional Mold Remediation*, 2003. [www.iicrc.org](http://www.iicrc.org)

American Industrial Hygiene Association, *Report of Microbial Growth Task Force*, 2001. AIHA, 2700 Prosperity Ave., Suite 250, Fairfax, VA 22031, 703-849-8888, [www.aiha.org](http://www.aiha.org)

American Conference of Governmental Industrial Hygienists, *Bioaerosols: Assessment and Control*, 1999. ACGIH, 1330 Kemper Meadow Dr., Cincinnati, OH 45240 513-742-2020, [www.acgih.org](http://www.acgih.org)

Institute of Inspection Cleaning and Restoration Certification (IICRC), *S500 Standard and Reference Guide for Professional Water Damage Restoration*, 1999. [www.iicrc.org](http://www.iicrc.org)

Air Sample Data  
Interpretation

EVERYTHING  
YOU NEED TO KNOW  
ABOUT MOLD IN THE AIR



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## BACKGROUND INFORMATION

Bioaerosols are airborne particles of living things, like mold and pollen. This category is often expanded to include other particulate matter that can be identified during microscopic analysis. This particulate matter can include opaque particles, synthetic fibers, mineral fibers (i.e., asbestos, gypsum), fiberglass, cellulose, and others. Following is information on various bioaerosol components and on controlling biological contamination.

## FUNGI

Fungi is the scientific term used to categorize living organisms such as mold, mildew, yeast, and mushrooms. Fungi are complex organisms that require water, a food source, and suitable temperature requirements to survive and thrive. Many types of fungi can be found indoors and outdoors at all times of the day and in all seasons of the year.

Although more studies are being conducted, the tremendous variety of fungal species makes the potential seriousness of health problems difficult to assess. Health effects from fungi can range from mild allergic reactions to severe illnesses. Problems can develop from direct inhalation of spores or their chemical byproducts. The health effects from these byproducts also are not well-known. Upper respiratory and allergy symptoms caused by elevated mold spore concentrations in buildings can mimic symptoms associated with other forms of building contamination, such as volatile organic compounds and formaldehydes. For this reason, proper evaluation of bioaerosol contamination may be required to identify the source of an indoor air quality problem.

Symptoms experienced by individuals exposed to mold spores can vary from person to person and include:

- Watery eyes
- Blocked nose or trouble breathing
- Coughing
- Runny nose
- Sore throat
- Recurring sinus or throat infections
- Wheezing
- Skin rashes
- Headaches
- Fever
- Lethargy or fatigue
- Asthma attacks
- Dizziness
- Nausea or vomiting
- Muscle aches
- Loss of memory or mental acuity
- Bloody nose

Fungi grow naturally outdoors and are an important part of the decomposition process. Although there are variations in outdoor air fungal spore counts related to location, season, and time of day, most out-of-doors air samples are dominated (over 90%) by the following spores:

- *Cladosporium*
- *Alternaria*
- Mushrooms (ascospores and basidiospores)
- Rusts and smuts (primarily flower and leaf parts)
- *Aspergillus* and/or *Penicillium*

Other molds that may be listed in a bioaerosol report normally occur as less than 10% of the total spore count. Mold spore concentrations can also be affected by local weather patterns, and may differ between day and night. For these reasons, indoor and outdoor mold spore concentrations and the genus or species of spores found must be simultaneously compared to determine if indoor amplification is occurring. The molds most susceptible to indoor amplification include:

- *Penicillium*
- *Stachybotrys*
- *Aspergillus*
- *Zygomycetes*

When moisture intrusion becomes chronic or involves sewage contamination, toxigenic fungi (e.g., *Stachybotrys*) may become pervasive and be accompanied by increased concentrations of bacteria and viruses. Chronic moisture can also initiate the growth of mushrooms, including dry rot and wet rot. These fungi can rapidly colonize and destroy structural wood components of a building and can result in massive indoor airborne spore concentrations. Serious illness in both immunocompromised and healthy individuals can result when these conditions occur.

High variability in mold spore concentrations will exist in different geographic locations and during different seasons. The tables in this brochure serve as a basic guide to evaluating the degree of indoor airborne mold spore amplification.

As a general rule, typical indoor airborne mold spore concentrations should be less than half the outside concentrations or less than approximately 2,000 spore counts per cubic meter of air (c/m<sup>3</sup>). *Aspergillus/Penicillium* spore concentrations should be less than 1,000 c/m<sup>3</sup>. At these concentrations, no symptoms would be anticipated in sensitized, non-sensitized, or allergy-prone individuals.

## POLLEN

Pollen grains are masses of microspores that transfer male genetic material during the reproductive cycle of flowering plants. Pollen is not often found indoors. In a typical air conditioned building, airborne pollen concentrations will be very low (less than 30 c/m<sup>3</sup>) or will not be detected at all.

## PARTICULATES

A wide category of dust and dirt identifiable in bioaerosol samples is counted under the heading “particulates”. The opaque particle category encompasses a range of dark contaminants, including combustion emissions (primarily diesel exhaust), paint-like binders from degrading sound liners in larger HVAC systems, and toner particles associated with copiers and printers. This category of particle does not normally occur in concentrations exceeding 2,000 c/m<sup>3</sup> in “clean” environments. Exact identification of the particle source is not always possible, but should be investigated as a potential contributor to air quality complaints when airborne concentrations exceed 2,000 c/m<sup>3</sup>.