

Microbials and Indoor Air Quality



Moulds and Bacteria



Microbials and indoor air quality

Microbials are very small living organisms invisible to the naked eye that can multiply in large numbers. They are naturally present in our environment in a wide range of species and numbers. We are exposed to them in our daily activities. Microbials are present in the soil, on our skin, hair and in the air we breathe. They have been used for centuries to manufacture common food products such as yogurt, cheese, beer and wine. Modern technologies also known as “biotechnologies” use microbials to manufacture products such as medicine and cosmetics.

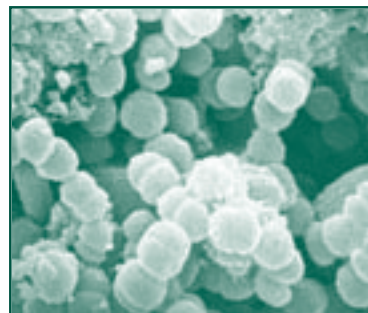
Seemingly harmless, microbials can become a health problem in indoor air environments when certain species are present or when their numbers are too high.

There are two types of microbials which can affect indoor air quality: moulds and bacteria.

Moulds



Bacteria



Some basic facts

- Most types of moulds are present in both our outdoor and indoor environments.
- Indoor air generally has a higher level of bacteria than outdoor air. Most of these bacteria are harmless and are shed from skin and respiratory tracts.
- An increase in the number or the predominance of one specie indoors may cause a health problem.
- Water, or water vapour, is a key element required by most microbials to multiply.
- Moulds usually grow in large, easily observable colonies.
- Bacteria are impossible to see with the naked eye.
- Moulds and bacteria may produce toxins known as mycotoxins or endotoxins. They have been linked to sick building syndrome.
- Viruses are less of a concern when dealing with indoor microbials. They are mostly responsible for the common cold, the flu and diseases such as chicken pox and measles. Virus transmission depends on close proximity or direct contact with an infected individual or object. Viruses do not multiply outside a host and, in most cases, do not survive long once airborne.

Symptoms of exposure

Symptoms vary greatly among individuals, ranging from fever, coughing, nausea, irritation of the nose and throat to sinusitis, asthma and allergies. Immuno-compromised (weaker) individuals or older people may be at higher risk.

Growth requirements

The key to reducing microbial growth is controlling the conditions under which they strive.

Moulds

Moulds require an organic material such as cellulose (paper containing materials) or dust with high water content for nutrient and support. The material must be wet or humid for growth to occur. A moderate to high relative humidity (greater than 70 per cent) is also sufficient for some species.

Bacteria

Bacteria thrive in organic material such as decaying organic matter or birds' droppings. They are highly dependent on the presence of water and grow in suspension while feeding on organic material. Bacteria form a “slimy” film on the surface of containers when left standing.

Famous examples of past exposures

- Philadelphia 1976: Legionnaire’s disease caused by a bacteria that was carried by pigeons into a hotel heating, ventilating and air conditioning (HVAC) system.
- BBC Headquarters 1988: Legionnaire’s disease killed 10 people.

Observable signs of microbial growth

Microbials can be detected by observable signs or indications of their presence.

Moulds

- Mouldy smell
- Signs of recent or past water infiltration
- Green or black “dusty” growth on building materials

Bacteria

- Presence of still, cloudy water
- Slimy feel on the surface of container containing standing water
- Presence of pigeons near the HVAC or on the building

Control measures

Simple measures can be applied to control microbial proliferation in your work environment and at home.

- Avoid water infiltration and condensation.
- Avoid water accumulation.
- Keep relative humidity below 70 per cent.
- Avoid dust accumulation in HVAC and inside buildings.
- Ensure good drainage from water drip pans.
- Prevent pigeons from nesting and resting on building.
- Provide adequate filtration in HVAC (50-70 per cent dust spot efficiency).
- Provide HEPA filtered respirators for employees working with microbial contaminated materials.

Microbial sampling

Usually, microbials can be detected visually. However, in some instances, the WHSCC may undertake sampling to confirm their presence.

Exposure standards

There are presently no exposure standards for microbials in North America, due to limitations set by sampling techniques, microbial diversity and individual sensitivities.

However, guidelines have been published by Health Canada in a booklet entitled “Indoor Air Quality in Office Buildings: A Technical Guide.” These guidelines are based on results from hundreds of air samples taken over several years.

Clean-up procedures for contaminated materials

Moulds

Most moulds release billions of spores when they are disturbed. Employees involved in the clean up of moulds should wear NIOSH approved respirators with HEPA filters and proper coveralls. Depending on the size of the contaminated surface, it should be well ventilated and sealed from the rest of the building. Contaminated air from the removal area should not be allowed to re-circulate in the rest of the building.

Moulds infiltrate the porous materials (such as wood) they grow on. Cleaning the surface will not remove all of the moulds.

Any contaminated porous (gyproc, insulation, wood, ...) material should be discarded. Completely removing all microbials from such material is almost impossible. Furthermore, if some contaminated materials are left behind, chances are the microbials will grow back.

Non-porous materials (metals, glass, concrete, ...) can be cleaned and disinfected. Household bleach diluted 1 in 10 makes a good disinfectant solution (wear gloves). Pure bleach is not recommended, as it is too corrosive.

The greatest level of exposure to microbials is likely to happen when contaminated materials are disturbed. The health effects of such exposure can be so severe that medical attention may be required.

Bacteria

Contaminated water should be drained and all contaminated surfaces should be disinfected. Further water infiltration or accumulation should be prevented. If organic matter is present, it should be removed and provision should be made to prevent further contamination of the area.

For more information, contact WHSCC Prevention Services at **(506) 453-2467** or **1 800 442-9776**