

## **Biological Contamination of the Building Environment: Sampling and Analysis**

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### **CONCLUSIONS:**

Since the discovery of microorganisms in the late 1600s, it has been determined that some microorganisms are responsible for occupational illness in agricultural, industrial and office environments. The disease spectrum ranges from allergic reactions to more serious illnesses such as Legionellosis and hypersensitivity pneumonitis.

Due to the ubiquitous nature of microorganisms in the air, sampling without knowledge of the knowledge causing illness may result in meaningless data. A medical opinion as to what organisms may be causing an illness provides direction in terms of sampling strategy. Some sampling strategies may be more appropriate for recovering certain organisms in certain environments. The sampling strategies differ in the data they provide (quantitative vs. qualitative), whether they demonstrate the size distribution of particles and whether collection efficiency is a function of particle size. The type of organisms and concentration are important factors to consider when selecting a sampling strategy.

There are no formal microbial air quality standards. It has been suggested that  $1 \times 10^3$  CUF/M<sup>3</sup> or greater are levels which merit investigation. However, this would not be valid in a facility that has open windows during peak fungal growth months when the outdoor levels frequently exceed this level. In general, a mechanically ventilated un-contaminated space where the HVAC has intact, in-place filters will have far fewer fungi than the outdoor air. Thus, indoor environments with HVAC systems and closed windows that have higher levels of fungi than outside should be investigated. Bacteria levels, on the other hand, are often higher in occupied spaces due to shedding of skin cells (and the bacteria on them) by the occupants. Hard and fast microbial permissible exposure limits will be difficult if not impossible to establish due to the effect of season, time of day, geographical location, weather and pollution, on the type and concentration of microorganisms in the air.

The most effective method of preventing office-related occupational illnesses due to microbes is proper HVAC design and maintenance. Air intakes must be located such that fresh, uncontaminated air is drawn in. Air supplies that are humidified should be humidified with steam rather than cool mists. Filters should be changed regularly. Places where water is likely to collect should be cleaned periodically. Water damaged materials, such as carpet or wallboard, should be replaced as soon as possible. All sources of moisture should be investigated and remediated as necessary.