SUMMIT
ENVIRONMENTAL, INC.

**I. ANIMAL DANDER, MOLDS, DUST MITES, AND OTHER BIOLOGICALS**

Biological air pollutants are found to some degree in every home school, and workplace. Sources include outdoor air and individuals who shed viruses and bacteria, animals that shed allergens, and indoor surfaces and water reservoirs where fungi and bacteria can grow.

Humidity encourages house dust mite population to increase and allows fungal growth on damp surfaces. Flooding, continually damp carpet, inadequate exhaust in the bathroom, and appliances such as humidifiers, air conditioners, and drip pans under cooling coils support the growth of bacteria and fungi.

**TESTING:**

**Taking into consideration the fact that there are multiple bioaerosols, it should be understood that there is no single air sampling test method used to collect all air-borne biological agents present in a certain environment.

Surface Sampling:
Settle (sedimentation) Plates: Despite limitations, settle plates are widely used to discern likely presence of significant indoor mold amplifiers.
set backs: settle plates can give biased results due to the fact that different bioaerosols have different weights and forms therefore settling at different rates. Because of this reason, the settle plate method not very effective.
Air Sampling:
Vacuum/Culture (Pump) Samples: Samplers can use a vacuum pump to suck a stream of air onto a fungal medium surface trapping bioaerosols in viscous liquid that can be plated on a growth medium. Another type may use various assemblages of pumps and filters are used to collect air samples. The air is run through the filter to collect airborne particles. The filter is then taken to a lab to be analyzed.
Air-O-Cell cassettes: Airborne spores were collected onto air-o-cell cassettes with air flowing at a rate of around 28.3 liters per minute through the cassette. The cassettes are then sent to the laboratory for analysis.
Anderson Cascade Impactors: pre-poured agar plates are made and inserted on the case of the sampling instrument. The air to be sampled enters the sampler and accelerated through the jet orifices of the classification stage. Viable particles are retained on the agar plate which are then removed and replaced on the Petri dish. The plates are then incubated at the appropriate temperature for the appropriate time depending on the sampling bioaerosol:
Types of augers to use:

Fungi:
Malt extract agar (MEA)
Dichloran Glycerol 18 agar (DG-18)

Bacteria:
Tryptic soy agar (TSA)
Casein soy petone agar (CSPA)
Nutrient agar (NA)

Thermophilic Actinomycetes:
Tryptone glucose yeast agar (aka standard plate count agar and standard method agar
Casein soy petone agar (CSPA)
Incubations Conditions:

Fungi:
25 ° C or room temperature with natural light
Bacteria, environmental:

25 to 30 ° C
Bacteria, human-source:

35 to 37 ° C
Bacteria, thermophilic Actinomycetes:

50 to 56 ° C
Following incubation, the total concentration of culturable microorganisms is calculated and divided by the total number of colonies observed on the plate.

Ace Glass All-glass Impingers: These high velocity liquid impingers are widely used for a air sample collection. It draws aerosols at a flow rate of 12.3-12.6 L/min through a inlet tube curved to simulate the nasal passage. In contrast, to the impaction of bioaerosols onto agar, impingers, may give higher bacterial counts in environments where bacteria are carried as aggregates because bacterial clusters are broken up. After approximately 360 seconds of sampling (75 liters), counting of airborne microbes is accomplished by using a membrane filter that is placed in a Petri dish on a pad saturated in TSB and all is then analyzed by a laboratory.

**REMEDIAL ACTION:**

Provide adequate outdoor air ventilation to dilute human source aerosols.
Keep equipment water reservoirs clean and potable water systems adequately chlorinated, according to manufacturers instructions.
Be sure there is no standing water in air conditioner.
Repair leaks and seepage. Thoroughly clean and dry water-damaged carpet and building materials within 24 hours or consider removal and replacement.
Keep relative humidity below 50%. Use exhaust fans in bathroom and kitchen, and vent clothes dryers to outside.
Control exposure to pets.
Vacuum carpets and furniture regularly. Note: Cleaning often re-suspends fine particles, sensitive individuals should avoid such exposure and use a High Efficiency Particulate Air filtered vacuum.
Cover mattresses. Wash bedding and soft toys frequently in water at a temperature of 130 ° F to kill dust mites.