

ASPERGILLUS

Part 1: What Is Aspergillus?

By Nancy E. Masters

Aspergillus is a group of molds that can pose pathogenic problems. These “opportunistic fungi” exist worldwide, especially in the Northern hemisphere. It grows in decaying vegetation, including marijuana. Decay occurs as result of harvested green plant material not being adequately dried. The problem is most prevalent when marijuana is placed in plastic bags. However, there is potential for fungus development in quantities of moist marijuana placed in paper. Residual moisture in the marijuana encourages bacterial growth, which in turn facilitates the growth of molds. Current knowledge indicates that “this fungi can thrive at elevated temperatures. It tends to be abundant in damp, decaying vegetation heated by bacterial fermentation. As the temperature rises, other micro-organisms cease to grow, but Aspergilli will flourish under these conditions and can almost become a pure culture.”(1) Only a few of these molds can cause disease in humans.

Aspergillus Fumigatus is diagnosed in 90% of all *Aspergillus* infections. Initially a threadlike flat white growth, it becomes a powdery, blue-green mold as consequence of production of spores. Handling the decaying material can result in an inhalation exposure to the spores. Anyone working with such decaying plant material may be subject to potential health hazards arising from *Aspergillus*. Physicians have found these spores in the ears, nose and lungs of humans.

While *Aspergillus* is considered opportunistic fungi, most people are naturally immune and do not develop *Aspergillus* related disease, Aspergillosis. The severity of Aspergillosis is related to various factors including the state of an individual’s immune system or the presence of a predisposed condition. Thus, persons with compromised immune systems are at greater risk of infection. Most initial infections are as result of inhalation of spores and involve the respiratory system. When the disease does occur, it takes several forms.

Aspergillosis can range from sinusitis conditions to pulmonary infections as severe as pneumonia. Allergic aspergillosis typically becomes chronic. Continued colonization of the spores in the body may result in the continuation of a chronic condition or can become invasive. (2)

Aspergillus disease can occur in the sinuses leading to *Aspergillus* Sinusitis. In individuals with normal immune systems, stuffiness of the nose, chronic headache or discomfort of the face is common. Drainage of the sinus, by surgery, usually cures the problem, unless the *Aspergillus* has entered the sinuses deep inside the skull. Then antifungal drugs and surgery are usually successful. When individuals have damaged immune systems such as is caused by leukemia or a bone marrow transplant, *Aspergillus* Sinusitis is more threatening. This type of sinusitis is a form of invasive aspergillosis. Symptoms include fever, facial pain, nasal discharge and headaches. Diagnosis is made by finding the fungus in fluid or tissue from the sinuses and with scans. Powerful antifungal drugs are essential in the treatment. Surgery is done in most cases as a step in determining exactly the nature of the problem and is often helpful in eradicating the fungus. (3)

Allergic bronchopulmonary aspergillosis (ABPA) results where an allergy to the mold spores develops. This condition is quite common in asthmatics; up to 20% of asthmatics might get this at some time during their lives. The symptoms are similar to those of asthma; intermittent episodes of feeling unwell, coughing and wheezing. Some patients cough up brown colored plugs of mucus. Diagnosis can be made by X-ray or by sputum, skin and blood tests. If untreated, long term ABPA can lead to permanent lung damage. (4)

Many people with damaged or impaired immune system die from invasive aspergillosis. The earlier the diagnosis is made the higher their chance of survival. Unfortunately, there is no good diagnostic test. Often, treatment has to be initiated when the condition is only suspected. This condition is usually clinically diagnosed in persons with low defenses resulting from medical conditions such as bone marrow transplant, low white cells after chemotherapy, AIDS or major burns are at moderate risk of infection. A rare inherited condition that gives people low immunity (chronic granulomatous disease) also puts these people at moderate risk. Individuals with invasive aspergillosis usually have a fever and symptoms from the lungs (cough, chest pain or discomfort or breathlessness) which do not respond to standard antibiotics. (5)

In extreme cases, the fungus can transfer from the lung through the blood stream to the brain and other organs, including the eye, the heart, the kidneys and the skin. Usually this is a sign that the individual has a severe infection with a higher risk of death. However, sometimes infection of the skin enables an earlier diagnosis and treatment. (6)

This is a rather extensive explanation of *Aspergillus* and the resulting Aspergillosis conditions. It is not intended to create fear and panic but rather to begin necessary dialogue and awareness. Most individuals will never be confronted with the more serious aspergillosis conditions. However, many are potentially in a position for *aspergillus* exposure in the property and evidence room that could result in their developing sensitivity to this fungus. So, what can be done to avoid *aspergillus* exposures and other ancillary problems? Part 2, What Can Be Done About Aspergillus; will attempt to address some of these issues.

1. Arizona Department of Public Safety, Information Bulletin #85-01, dated 2/1/85
2. Aspergillosis by Dr. Michael R. McGinnis. Medical Mycology Research Center, University of Texas Medical Branch at Galveston, Texas, USA, page 1.
3. Aspergillus by Dr. Javier Vilar, Infectious Diseases, Manchester University, United Kingdom, Aspergillosis Website, Pages 1-3.
4. Ibid.
5. Ibid.
6. Ibid.

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Part 2: What Can Be Done About Aspergillus?

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Aspergillus, Part 1, dealt with the definition of *Aspergillus* and the various diseases that can occur as result of exposure to the fungal spores. The real issue is not the existence of *Aspergillus* but the reality of dealing with these spores in the property and evidence room. *Aspergillus* problems in this police facility environment can be attributed to the following problems:

1. An *Aspergillus* rich culture in the environment.
2. Inadequate ventilation in the environment.
3. Improperly packaged marijuana being stored.
4. Large quantities of marijuana being stored.
5. Inadequate housekeeping in the evidence/property area.
6. Inadequate use of personal protective equipment.

It has already been established that *Aspergillus* will thrive in an environment that is warm and provides area for the spores to continue developing. When marijuana has become extensively contaminated with *Aspergillus*, it becomes a living receptacle and potential amplifier for microorganisms. Once spores have escaped the initial environment (i.e., packaging or container), they will layer out on any available surface. The matrix of the evidence facility often provides these surfaces. Walls and floors consisting of concrete that exhibit small openings in the matrix provide an excellent area for fungal spores to lodge. Porous surfaces such as cardboard boxes, leather, paper and burlap bags, and building insulation support and serve as a reservoir for microorganisms when dirt and debris become trapped in the pores. (1) Activity in and around these reservoirs of spores and dust disturbs the particulate layers and they become airborne. This provides an excellent opportunity for property/evidence room personnel to receive inhalation exposures.

Ventilation plays a key role in maintaining an *Aspergillus* free environment. Property and evidence facilities should have a separate, negative pressure ventilation system that vents outside the building. Inadequate ventilation promotes the multiplication of microorganisms which in turn allows these them to become highly concentrated. Where HVAC systems are in place, the filters must be replaced on strictly scheduled intervals. Dirty, contaminated filters reduce the effective filtration and causes microorganisms to reproduce and recirculate into the work area. (2) Suitable clean, filtered outside makeup air must be provided. While local codes may vary, a minimum should be at least 10 liters per second per occupant. Inadequate ventilation systems should be upgraded as soon as possible.

Marijuana is often submitted to the evidence facility in burlap or paper bags. Unfortunately, these packaging materials provide an excellent matrix for the escape of *Aspergillus* spores. The real problem with marijuana, as a decomposing plant material, is the moisture content left in the plant. Living marijuana plants contain about 80% water. Fungi cannot grow below 15% moisture content. Perfectly dried marijuana contains about 10% – 15% water. (3) Most growers market their product above 15% since it is sold as soon as possible and by weight and not volume. This is the product that is submitted to the evidence facility. In addition to the yet

moist packaged marijuana is the whole plant that has been pulled up from a cultivation site. Both scenarios present the impossible question: how much moisture content is still present in any given amount of marijuana being submitted into evidence? The answer is unknowable. The only adequately dried marijuana is that which is brittle. Since the moisture content is an uncontrollable factor, packaging becomes the only solution to the problem.

Proper packaging presents its own dilemma. Burlap and paper provide an inadequate barrier for *Aspergillus* spores. The only material left is an impermeable bag. Such bags are usually manufactured of plastic. Plastics create the problem that moisture-laden marijuana enclosed in such material will eventually decompose into a material equivalent to mush and soup. Once in this state, its evidentiary value may come into question. Management must make the decision regarding packaging versus the potential for introduction of *Aspergillus* spores into the storage facility.

In fact, most agencies store quantities of marijuana that may not need to be maintained in their facility. Firstly, marijuana should not continue to be stored if the case has been adjudicated. Such marijuana should be sent for destruction as soon as reasonably possible. Secondly, agencies should make a commitment to maintain only the amount of marijuana required by law to adjudicate the case. Why not document and photograph the excessive amounts of marijuana, take necessary samples for laboratory analysis, and then destroy it. Considering the potential health hazards presented by quantities of marijuana, why take the risk of becoming infested with *Aspergillus* spores. All efforts should be made to reduce the amount of marijuana being held in the evidence facility. Evidence should be inspected as it is delivered and cleaned and sealed appropriately before being stored.

Housekeeping procedures present one of the best solutions and preventative measures available for contamination problems in the evidence facility. If a facility is suspected of being contaminated, corrective measures can be taken. Discard all porous building materials and property that are visually contaminated with fungi. Wash the entire storage area down with a dilute bleach solution (1 cup per gallon of water). All smooth surfaces potentially contaminated with fungus should be included in the decontamination. Workers must be provided with adequate personal protective equipment including protective clothing, gloves, goggles, shoe covers and particulate masks.

Once decontamination is complete, seal all porous surfaces such as concrete walls to eliminate dust and debris settling points. These settling areas provide reservoirs for microbial growth. Vacuum and wet wipe (with an anti-fungal agent) all building and content surfaces in the evidence facility. (4)

It is imperative that a regular schedule for housekeeping be developed that includes vacuuming and surface cleaning with appropriate disinfectants. This may require an attitude upgrade on the part of the evidence facility personnel. Housekeeping should never be viewed as an extra responsibility. It is an integral part of her/his job and is a standard part of operations.

Personal protective equipment is the mainstay of protection for personnel in providing necessary protective barriers between them and a potentially damaging material. When handling or storing marijuana, long sleeves, gloves and a dust/particulate respirator should be worn. Disposable sleeves can be purchased through many safety equipment suppliers. A jump suit or protective

coat/smock will provide such protection. Latex gloves are adequate but a no powder vinyl or nitrile glove may be preferable where latex sensitivity is a concern. While a standard dust/particulate mask is adequate, some individuals may prefer to use a High Efficiency Particulate (HEPA) mask. Personnel who exhibit microbial sensitivities are often more confident of protection with this type of mask. As added protection, eye goggles (chemical splash) can be worn to assure that no *Aspergillus* spores can lodge in the moist areas of the eyes while handling marijuana.

As previously noted, personal protective equipment should always be worn during decontamination of the storage facility. Management must encourage all employees to review labels on disinfecting agents prior to use. Adequate ventilation must be provided when performing decontamination.

An ancillary problem related to marijuana storage is the problem of rodents. Unfortunately, mice like to eat and nest in marijuana. The most obvious sign of mouse infestation is the appearance of droppings. The health hazard comes with the infestation by the common deer mouse. This mouse is prevalent throughout the United States. It is also a carrier of the hantavirus which attacks the respiratory system. This virus caused the death of a number of people in the Four Corners area of the country a few years ago and cases continue to be reported to this day. The hazard is associated with an accumulation of mouse droppings and subsequent exposure to those droppings when swept up or moved around. If the property and evidence facility displays an abundance of mouse droppings, measures should be taken to eliminate these rodents. Personal protective equipment should be worn during any cleaning procedures.

All that remains is for evidence facility personnel and their management to recognize the hazards of marijuana storage. Once the awareness is there, preventative steps can be taken to ensure a healthier work environment.

1. A Bioaerosol Investigation in the Evidence and Supply Area by Mitchell L. Payes, Consulting Industrial Hygienist, January 14, 1989, page 15.
2. Ibid.
3. How to Preserve Pot Potency by The Bush Doctor, High Times, May 1993, Page 3.
4. A Bioaerosol Investigation in the Evidence and Supply Area by Mitchell L. Payes, Consulting Industrial Hygienist, January 14, 1989, page 4.

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