

MOLD AND HUMAN HEALTH

Prof. Dr. Achyut Prasad Sharma



- **British Journal of Ophthalmology, 1980, 64, 30-32**
- **Keratitis due to *Aspergillus flavus*; successfully treated with Thiabendazole**
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WHAT IS MOLD ?



Mold is a fungus that thrives on moisture and poor ventilation.

Mold spores are in the air naturally and attach to any place that is damp where they can begin growing immediately.

WHAT CAUSE MOLDS??

- **Superficial infections:** These fungal infections affect the skin or mucous membranes. Superficial fungal infections (e.g., Yeast Vaginitis, Oral thrush, and Athletes foot) affect millions of people worldwide.
- **Systemic infections:** These occur when fungi get into the bloodstream and generally cause more serious diseases. Systemic fungal infections may be caused either by an opportunistic organism that attacks a person with a weakened immune system. Unlike superficial infections, systemic fungal infections can be life-threatening.
- **Opportunistic infections:** As previously noted, the fungi attack people with weakened immune systems. These can be either systemic or superficial infections

MOLDS PRODUCES MYCOTOXINS

Mycotoxins are secondary metabolites produced by molds that are capable of causing disease and death in humans and other animals.

SOME MYCOTOXIN ARE VERY BAD

Vascular system (Increased vascular fragility, hemorrhage into body tissues, or from lung, cirrhosis. liver cancer e. g., Aflatoxin.)

Digestive system (diarrhea, vomiting, intestinal hemorrhage, liver effects, fibrosis: Aflatoxin; caustic effects on mucous membranes: Vomitoxin.)

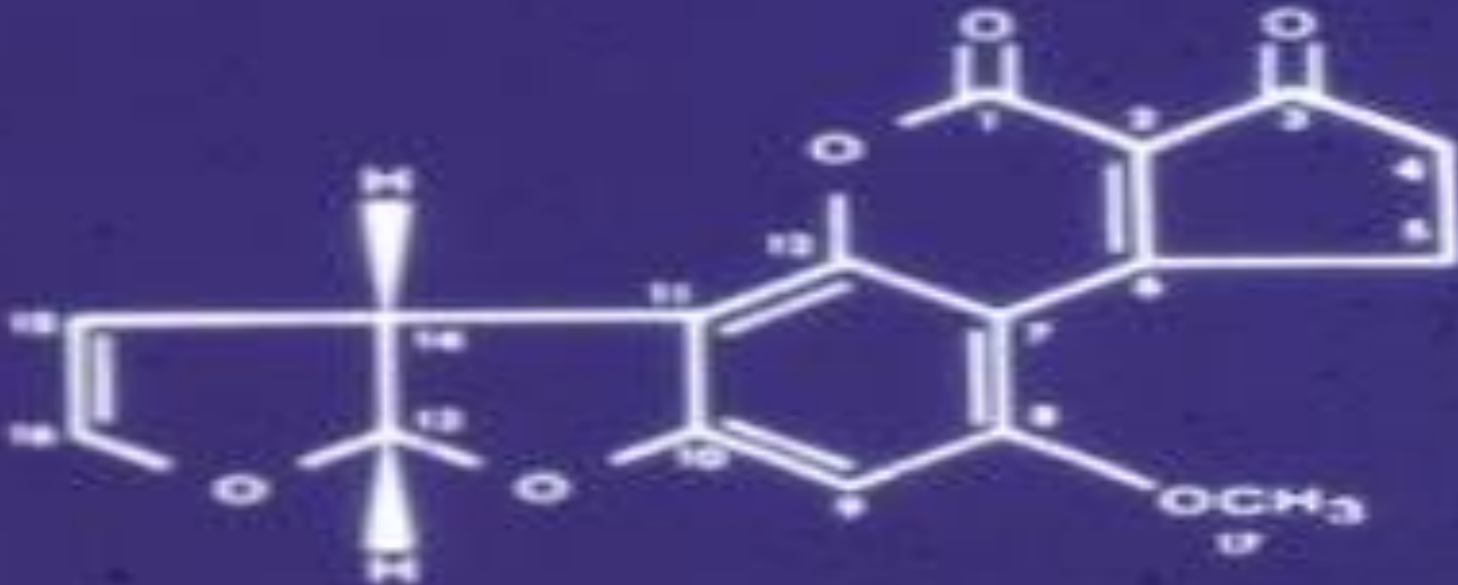
Respiratory system: Respiratory distress, bleeding from lungs e. g., Trichothecenes.)

Nervous system, tremors, incoordination, depression, headache, e. g., Trichothecenes.)

Cutaneous system: Rash, burning sensation sloughing of skin, e. g., Trichothecenes.)

Urinary system, nephrotoxicity, e. g. Ochratoxin

Molecular structure of Aflatoxin



Aflatoxin B₁

WHICH MOLD PRODUCES WHICH MYCOTOXIN??

Mold

Aspergillus flavus
Aspergillus ochraceus
Penicillium veridictium
Trichothecium roseum

Mycotoxin

Aflatoxin
Ochratoxin
Ochratoxin
Trichothecin







MYCOTXINS

Mycotxins are produced by fungi, mycotoxins are associated with diseased or mouldy crops, although the visible mould contamination can be superficial.

Conditions to develop mycotoxins

Mycotoxin stands a greater chance of developing if humidity levels in an area range from 62% to 99%, and temperatures reach a minimum of 86° F (30° C).

Stability of mycotoxins

The highest temperatures having greatest effects.
In general the processes reduce mycotoxin concentrations significantly.

Processing at temperatures greater than 150 °C are needed to give good reduction of moderate reduction of toxins, but not eliminate them completely.

Condition of reducing concentration of mycotoxin

Their heat stability is influenced by other factors, such as moisture level and pH, but heating or cooking processes cannot be relied upon to destroy aflatoxins. For example, roasting green coffee at 180°C for 10 minutes gave only a 50% reduction in aflatoxin B₁ level.

How can they be controlled?

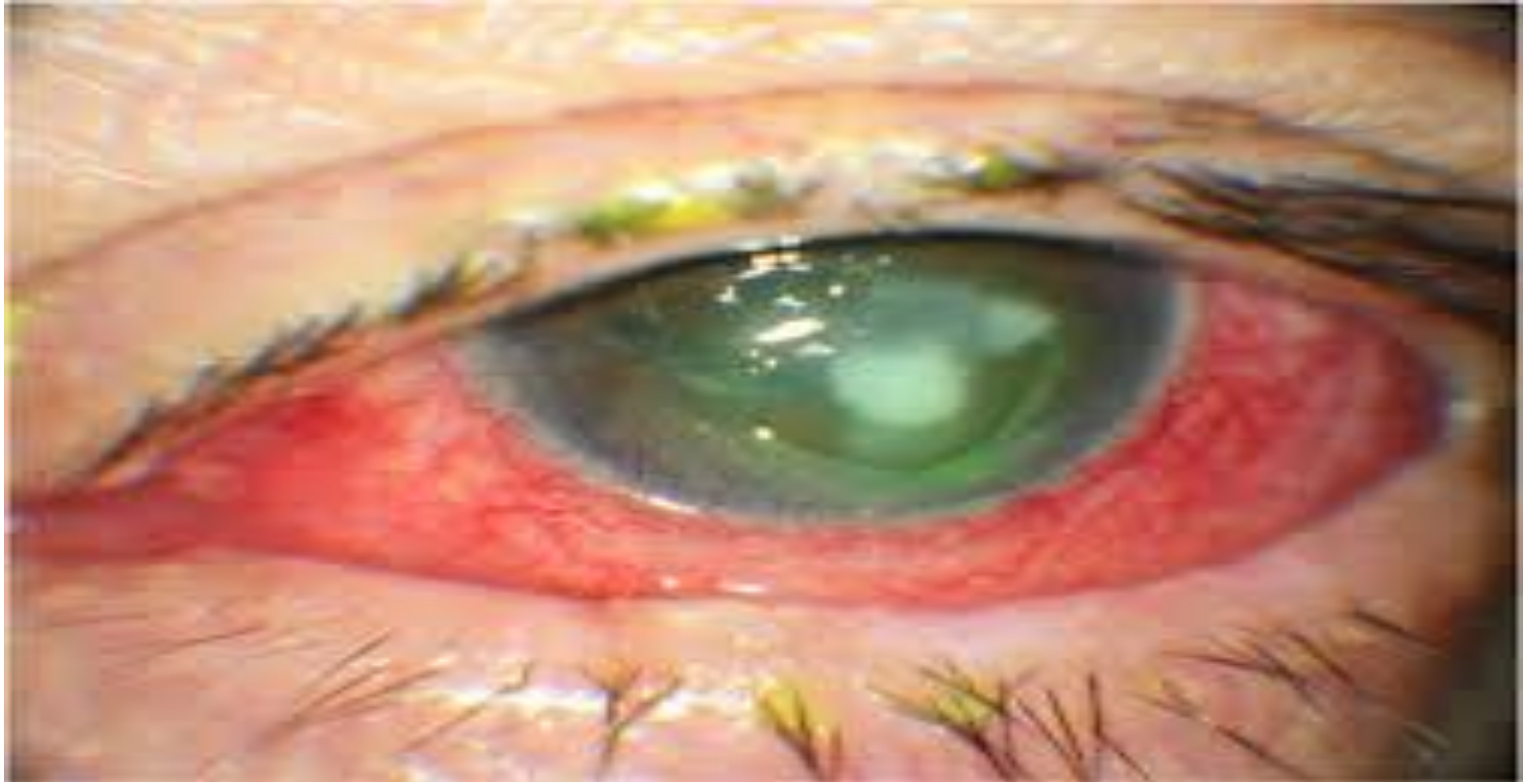
Effective control measure in post-harvest handling and storage is the control of moisture content and hence, the water activity of the crop. Ensuring that susceptible crops are harvested at a safe moisture level, or are dried to a safe level.

These moisture levels must be maintained during storage and transport.

Infections in human

- Superficial infections
- Systemic infections
- Opportunistic infections

SUPERFICIAL INFECTIONS



Superficial infection



Superficial infections



SUPERFICIAL INFECTIONS contd.....



SUPERFICIAL INFECTIONS contd.....



Systemic infections



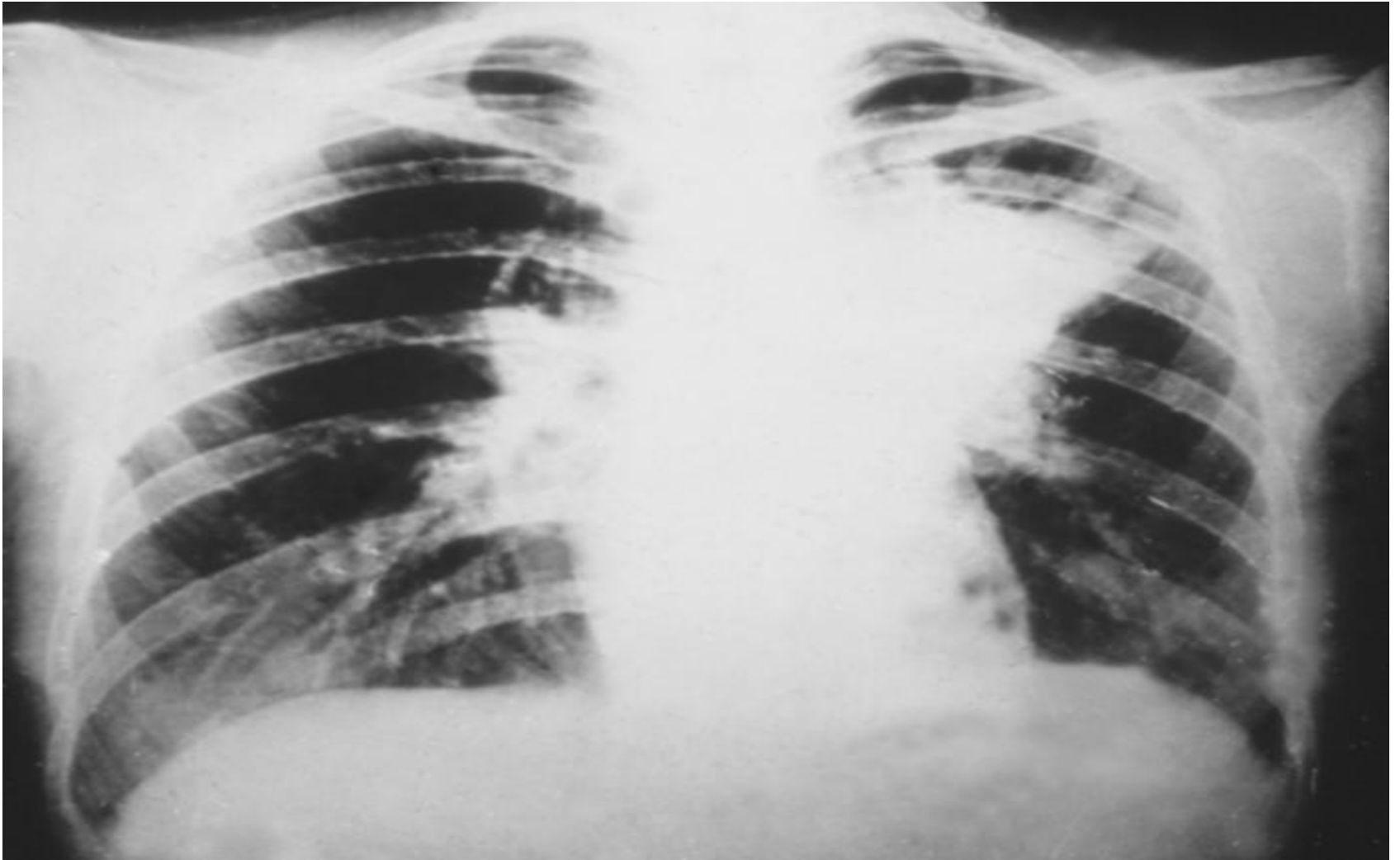
Systemic infections



SYSTEMIC INFECTION contd...



SYSTEMIC INFECTION





HEALTHY LUNG



Smoker's Lungs



Non-Smokers Lungs

SYSTEMIC INFECTION contd...



OPPORTUNISTIC INFECTION contd...



Are the risks greater for some people?

These Infants and children pregnant elderly people
individuals with respiratory conditions or
sensitivities such as allergies or asthma persons
having severely weakened immune systems (For
example, people with HIV infection, chemotherapy
patients, organ transplant recipients)

How mold enter inside body?

Mold spores are tiny. Mold spores range from 1 to 100 microns in size with many types between 2 and 20 micron so small that as many as 250,000 spores can fit on a pin head and a person can inhale as many as 750,000 of these spores per minute.

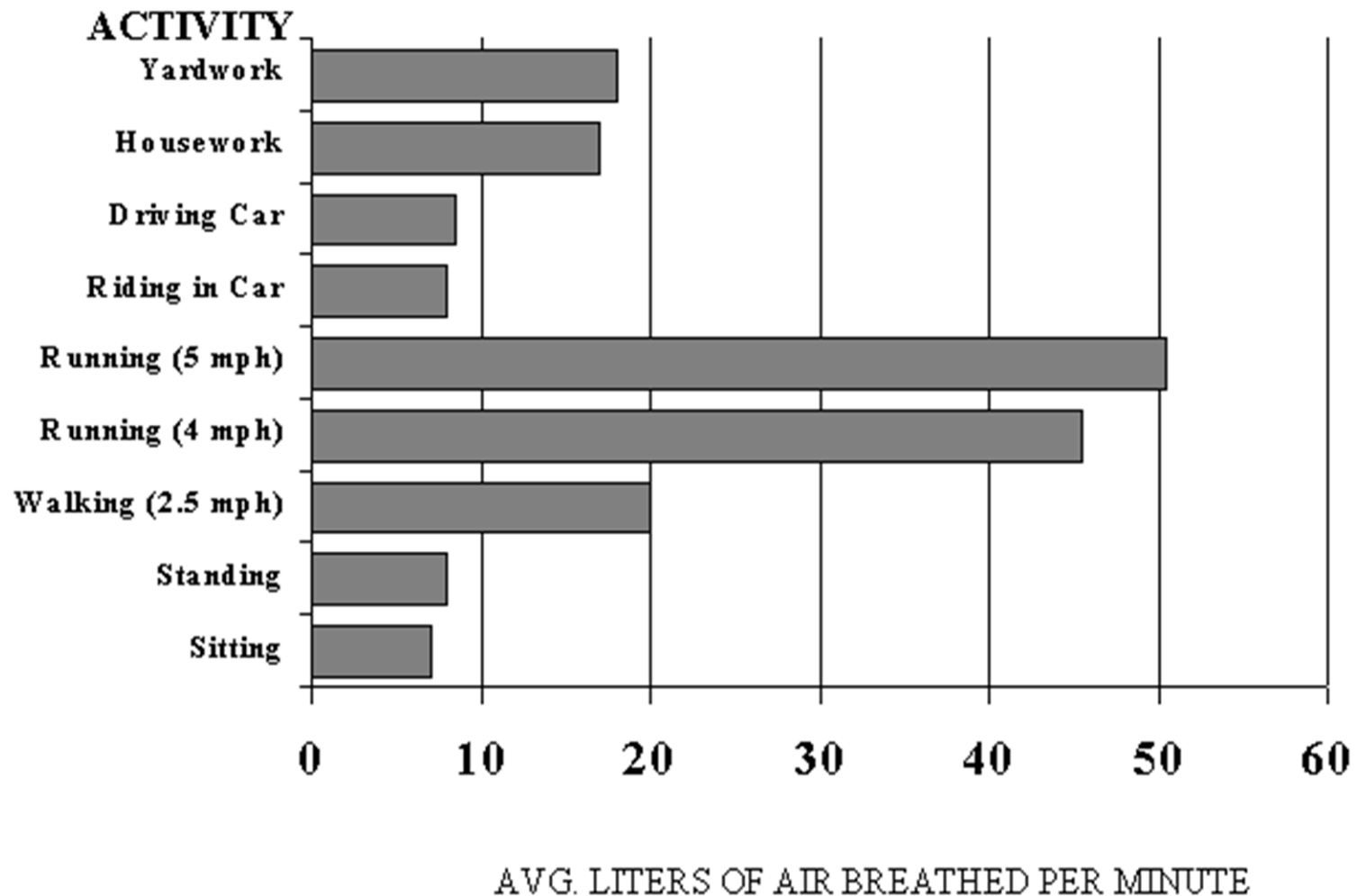
The body has natural defense filtering systems - such as mucous lining, coughing and sneezing - against dusty air which helps remove some contaminants, but most contaminants overpower and pass through these defenses. Mold spores not only bypass defenses because of their number, but also because they are so small.

Amount of air inhaled or exhaled with each breath under resting conditions?

A healthy person at rest takes 15 breaths per minute. The volume of air inhaled in each breath is 450ml. Which is 6.7 liter/min.

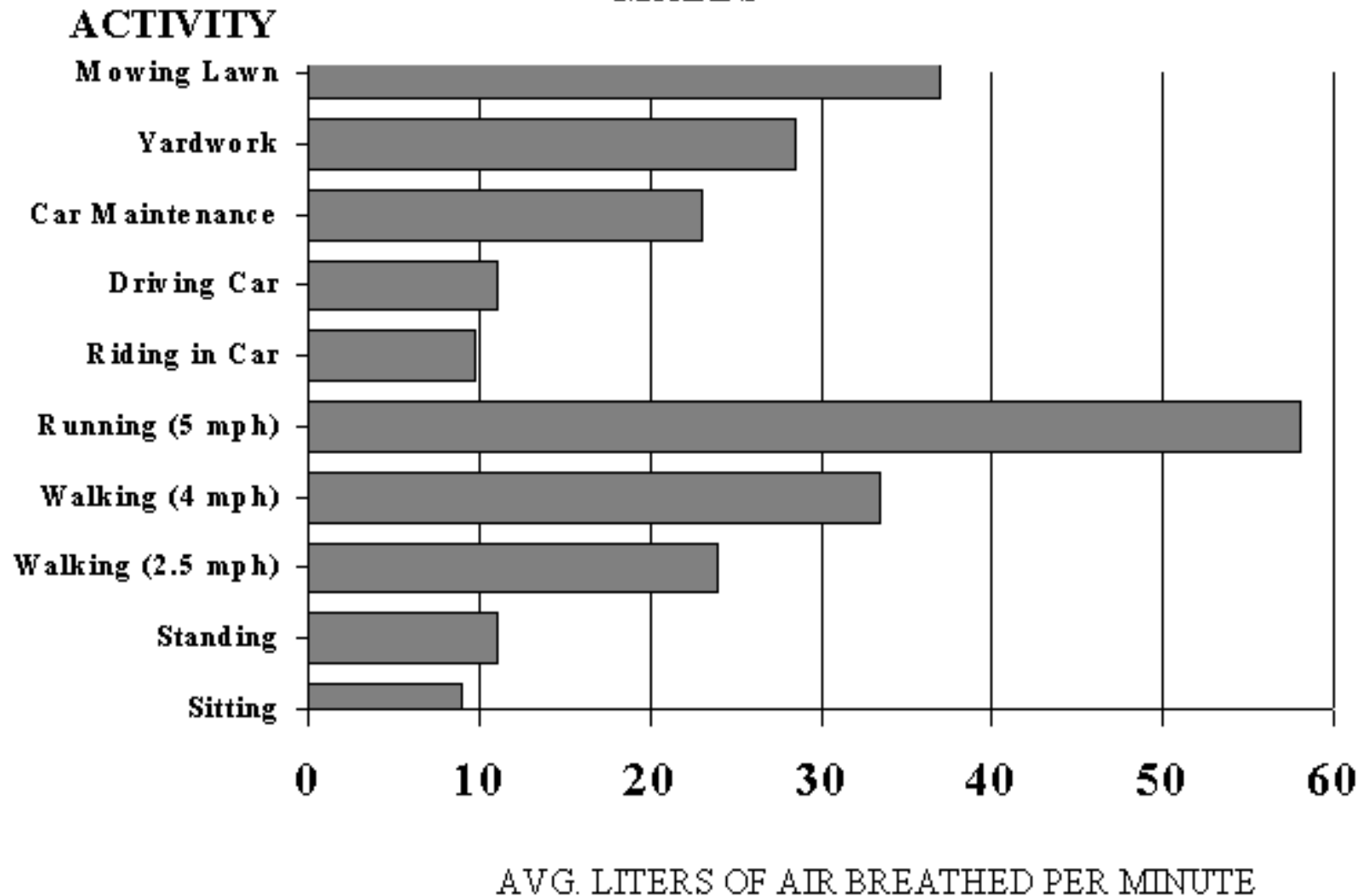
Amount of Air in-take varies a lot

Fig. 2 : AMOUNT OF AIR BREATHED BY ADULT FEMALES



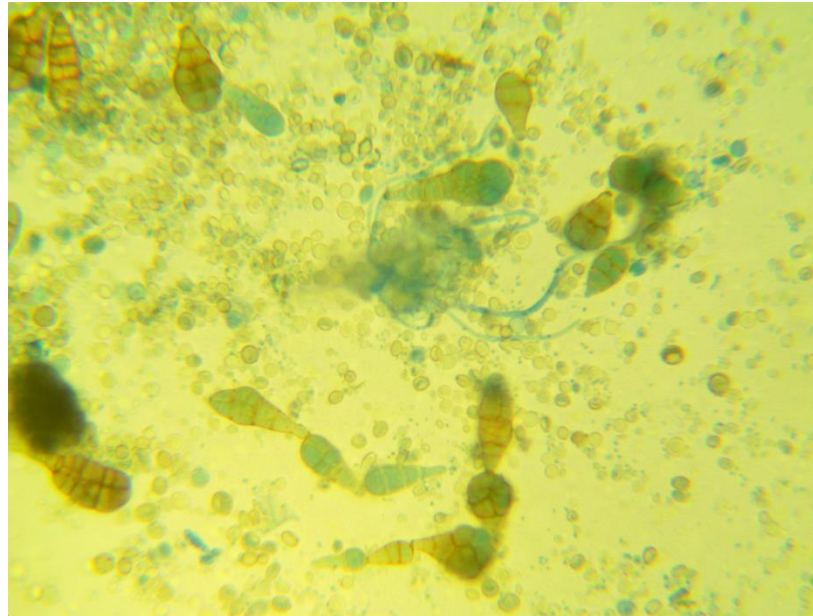
Amount of Air in-take varies a lot contd..

Fig. 3 : AMOUNT OF AIR BREATHED BY ADULT
MALES



Common molds isolated from clinical samples and diseases:

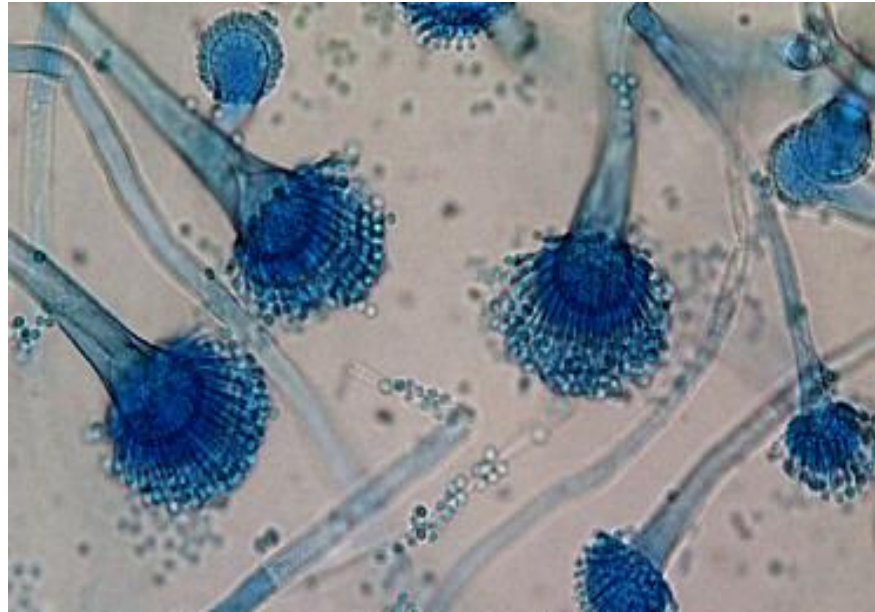
A. *Alternaria*:



Susceptible individuals most frequently affected are immuno compromised. Chronic cases may develop pulmonary emphysema, edema and bronchospasms.

Common molds isolated from clinical samples and diseases: Contd.....

B. Aspergillus:

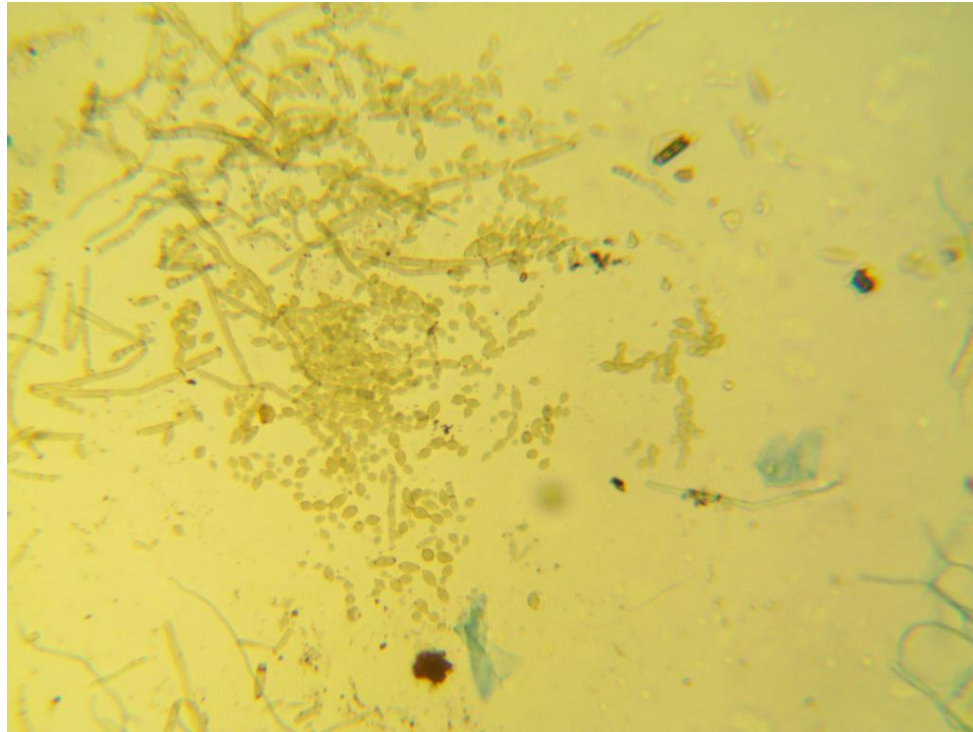


The primary infection route is through inhalation .This infection almost always occurs in people with a weakened immune system due to cancer, AIDS, leukemia, an organ transplant, chemotherapy.

Aspergillus represent a continuum of symptoms from mild sneezing to fatal systemic infections .

Common molds isolated from clinical samples and diseases: Contd.....

C. Cladosporium:

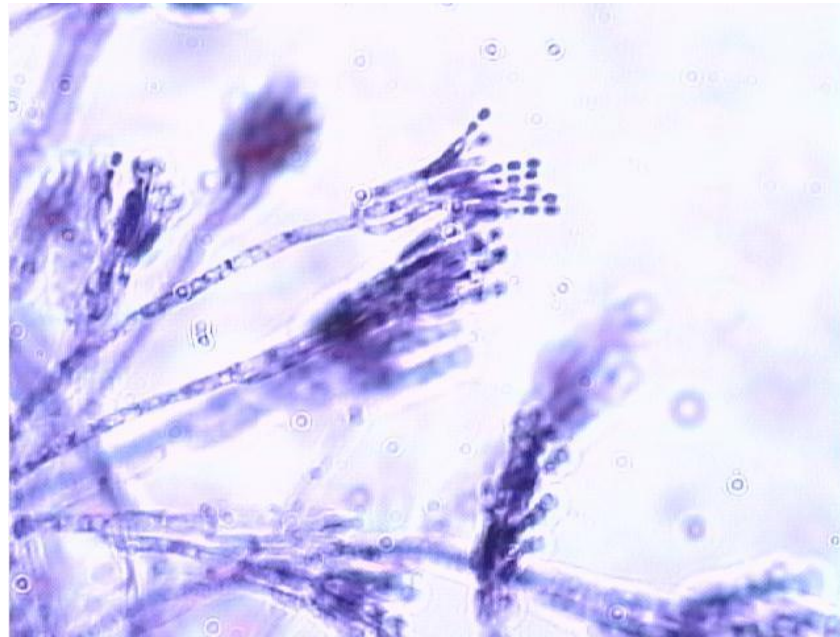


A common cause of extrinsic asthma. Acute symptoms are skin lesions, eye ulcerations, mycosis including infections of nails on feet and hands. Associated with edema.



Common molds isolated from clinical samples and diseases: Contd.....

D. Penicillium:

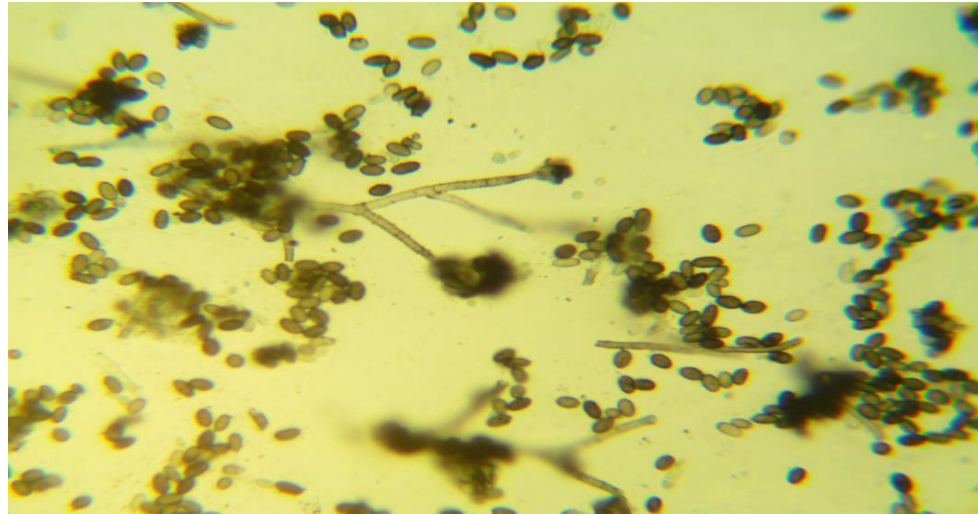


Airborne Penicillium was shown to be significantly associated with lower respiratory infection with children.

Fungi has been isolated from patients with keratitis, ear infections, pneumonia, endocarditis, peritonitis, and urinary tract infections. Penicillium infections are most commonly exhibited in immunosuppressed individuals.

Common molds isolated from clinical samples and diseases: Contd.....

E. Stachybotrys:



Stachybotrys has been linked to a very rare condition called "pulmonary hemosiderosis" (bleeding of the lungs) in infants from extremely contaminated dwellings. This condition can only occur in the developing lungs of infants.

However, other people may develop more general health effects, like eye irritations, asthma aggravation, cold-like symptoms, rashes, headaches, fatigue.

Solutions ? ? ?

- Understand the problems.
- Control the moisture and ventilation. Moisture can become a real problem in your home when there is not enough ventilation to expel that moisture.



Sharma14+®



100% Organic Formula

Safe - Non-Toxic Mold Cleaner

Sharma14+® is scientifically blended to clean mold, from floors, walls, stucco, wood, equipment, (indoor or outdoor) and any other surface not harmed by water. Solution is: pH Neutral, Non-toxic, Non-flammable.

Directions For Use:

Shake thoroughly before use. Apply solution liberally to surface with spray bottle. Agitate with stiff brush (Like an old toothbrush or scrub brush). Allow surface to remain wet with formula and wait for 3-5 minutes. After 5 minutes wipe any excess solution away. Can repeat as needed. Rinse with clean water. Note: Can be used in professional fogger. Use Respirator and protective goggles when fogging.

Storage: Store at room

Acknowledgements

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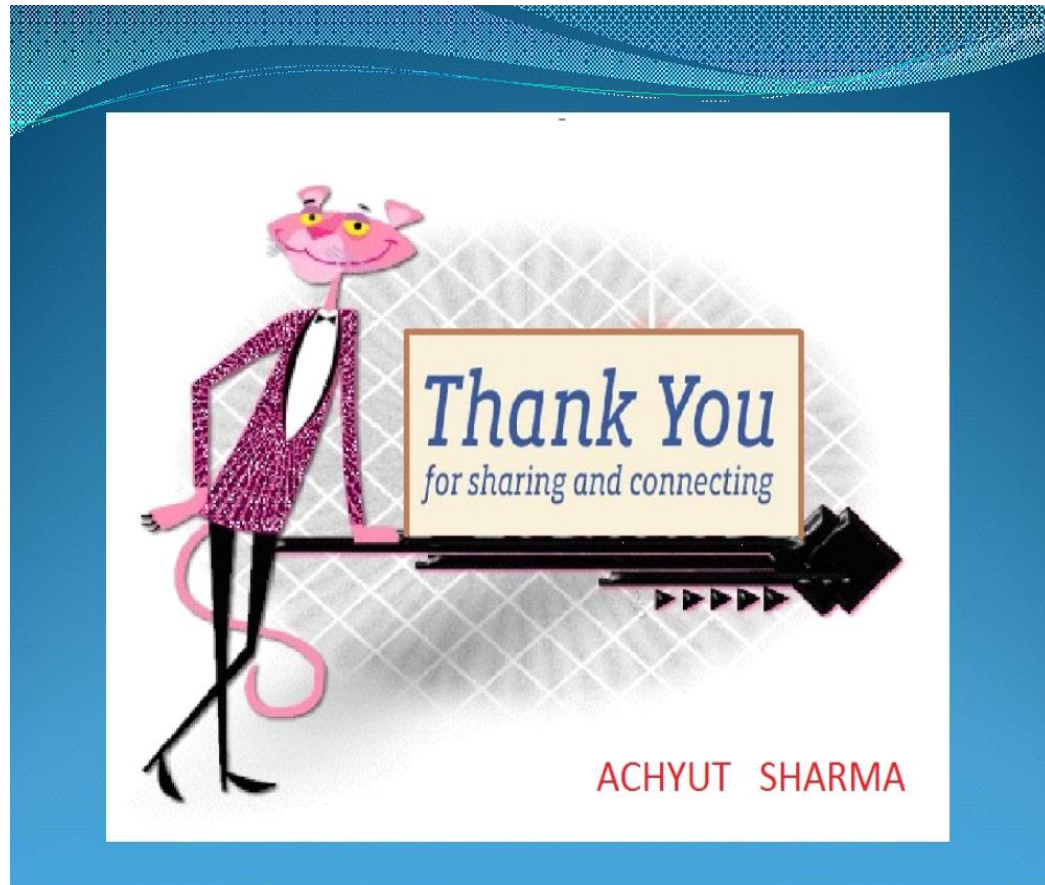
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University of Minnesota Department of Environmental Health;& Safety
"Fungal Glossary <http://www.dehs.umn.edu/iaq/fungus/glossary.html>

SEE YOU AGAIN !!!



Questions???

This is all for the mankind !!!!!