



The Agricultural Health and Safety Network

Our mission is to improve health and safety on the farm through education, service and evaluation research.

The ultimate goal is to reduce injury and illness related to the farm environment through co-operative efforts with our partners.



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Fact Sheet #7

Respiratory Hazards: Molds and Fungi

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Farmers are exposed to many respiratory irritants as they perform their work and therefore are at risk for lung diseases. Damp grains, straw and hay provide ideal growing conditions for molds and fungi in stored grain and livestock feeds. Information on molds and fungi may be found under such terms as mycotoxins, aflatoxins, ochratoxins, thermophilic actinomycetes and estrogenic compounds. Some effects caused of exposure to the mold or fungi and some effects are caused by endotoxins (poisons) produced by these organisms.

Conditions for Growth

Many molds and fungi occur naturally in the soil. Fungal spores can be carried attached to grain dust along with bacteria, insect parts and wastes, rodent hair and wastes, and pollen. During harvest these particles may be picked up and deposited in storage facilities along with the grains. Grain stored with a moisture content of greater than 14% increases the likelihood of mold and fungi growth. Mold growth occurs between 20-30°C but fungi can grow in temperatures as low as 5°C. Large bales create conditions favourable for mold growth. Molds and fungi typically produce a white, sharp smelling dust. Heavy concentrations of mold spores have also been described as dry, white or grey powder or clouds.

Activities

Closed environments, such as bins and barns, may have increased concentrations of molds and fungi. Activities that take place in these closed environments may increase the farmer's exposure to mold-laden dusts potentially resulting in illness. Up to 75% of cases in studies have developed some symptoms after extreme exposure to dust while handling grain.

Examples of work tasks that have produced symptoms include:

- cleaning moldy grain out of bins
- cleaning out moldy grain to dry it
- exposure to moldy silage
- cleaning out harvest equipment (including grain dryers) in preparation for the next year's harvest.

Routes of Entry

Most of the information that is available on health effects of molds and fungi is related to breathing in these organisms carried along with dust. The extremely small size of mold and fungal spores allows them to enter deep into the lungs by bypassing the body's normal defences such as the lining of those nose, coughing and sneezing. Molds and fungi can be carried accidentally to the mouth from hands and other exposed skin and be absorbed through the stomach and intestines.

Health Effects

Inhaling molds and fungi in dust can cause a variety of (immediate) and (long term health problems. Immediate health effects include allergies, skin irritation, poor appetite, headache, and vomiting. Long term health effects can include emphysema, chronic bronchitis, lung fibrosis, dermatitis (skin inflammation), and lung and intestinal cancers.

Medical Conditions

Did you know?

If you find the most comfortable hearing protection for you, for the work you, you will be more likely to wear it.

Exposure to molds/fungi in dust may cause a number of medical conditions*. Following are brief descriptions of some conditions that have been identified after exposure to these dusts.

Farm's Lung Disease (FLD)

- Symptoms may develop within 4-6 hours after exposure to moldy hay or grain. Symptoms include weakness, chills, cough, fever, and a general feeling of unwellness. This disease may also have a more gradual onset with laboured breathing, weight loss and increasing fatigue. Blood tests, x-rays, and lung tests will show changes from normal. The lungs can be permanently damaged. This is an allergic reaction and can be triggered by increasingly small amounts of dusts. FLD may eventually cause death from lung fibrosis if individual does not avoid exposure to dusts or does not wear respiratory protection. Because this is an allergic reaction, within a small group, one individual will usually become ill.

Organic Dust Toxic Syndrome (ODTS)

- This disease occurs when individuals are exposed to moldy grains, hay or silage. Initial symptoms include burning in the eyes and throat, headache and sometimes a cough. Four to twelve hours later an exposed person may suffer with fever, chest discomfort, weakness, muscle aching, shortness of breath, and a nonproductive cough. There is usually no permanent lung damage. Large amounts of dust exposure are usually necessary to trigger the syndrome. Small groups of exposed individuals may become ill.

Silo Filler's Disease

- This is an immediate reaction with the individual experiencing shortness of breath. It is an inflammatory reaction in the lung caused by nitrogen gas from silos. It may result in problems with oxygen being absorbed into the body. X-ray shows lung changes.

Asthma

- Many people who have been diagnosed with asthma are very sensitive to molds and fungi. Exposure to molds and fungi may cause a worsening of symptoms. These individuals are advised to wear a protective device such as an airstream helmet or avoid exposure.

Other

- Some illnesses related to molds and fungi appear less commonly. Examples of this are mycosis and mycotoxicosis.

Mycosis

- It is an effect on the body caused by the fungi itself. Some fungi can lodge in the airways or in a distant part of the lung and grow until a "fungus ball" is formed.

Mycotoxicosis

- It is a poisoning of the body caused by the toxins/wastes produced by a fungi. Symptoms include chills; fever; dry irritating cough; abnormal blood results and x-ray. This illness does not recur.

****It is important to note that these illnesses can only be distinguished by medical examination and testing.***

	ORGANIC DUST TOXIC SYNDROME	FARMER'S LUNG DISEASE
TIME TO ONSET OF ILLNESS	4-12 hours lasting 24-72 hours	4-6 hours lasting about 12-24 hours
SYMPTOMS	Burning eyes,throat, headache or cough when exposed followed by: High fever, chest discomfort, weakness, non-productive cough	Weakness, chills, cough, fever, malaise, shortness of breath, muscle aches or Gradual onset of labored breathing, weight loss, increasing fatigue
EFFECTS	Not known to cause permanent damage	Reaction worsens with each exposure; permanent damage to lungs; death may result
TRIGGERS	Large amounts of dust. In small groups more than one individual may become ill	Increasingly smaller amounts of dust. Allergic reaction; usually within a small group only one person becomes ill

DIAGNOSIS	White blood count is raised	Blood tests, x-rays and lung testing show abnormal results
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Preventing Mold Growth and Human Contact

- Avoid crop rotations that favour fungal infection
- Prevent initial infection in grain by:
 - drying to <13.5% moisture content
 - storing at low temperatures
- Work outside when possible if bales and grain appear moldy
- Use ventilation (fans, exhaust blowers, filters) if you must work in an enclosed area.
- Wet down moldy materials to reduce dust
- Use mechanized systems to distance yourself while handling moldy materials
- Use caution when harvesting crops that have overwintered in the field. They provide ideal conditions for mold growth
- Wear personal protective equipment if you must handle moldy grain or feeds.
- Use caution when using bale-grinders or feed mixers

Safety Equipment and Measures

- A disposable dust mask with two straps and a mouldable metal strip or a respirator with dust filter cartridges (NIOSH approved)
- Wear coveralls over work clothes
- Remove coveralls outside and wash exposed skin (hands, face, neck) well before meals to remove mold/fungi, preventing accidental ingestion while eating.
- Change air filters frequently on harvesting equipment

Although every care had been taken in providing this information, the authors accept no responsibility or liability for any consequences arising from the use of such information.

Reference list available upon request.

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