Organic Dusts

Allergic respiratory responses

Organic dusts include vegetable and animal bio-aerosols such as:

- Bark
- Mouldy hay
- Animal dander (dandruff)
- Mulch
- Grain dust
- Silage
- Potting mix
- Animal droppings
- Urine spray
- Aerosolised faeces.

Generally, human effects come from exposure to particles from grain, hay, pollen, fungi, fungal spores, mycotoxins, bacteria and endotoxins.

Dust from livestock also includes, for example, particles from skin, hair, feathers and excrement.

Exposure can cause lung diseases (some serious) from the allergic response.

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<th>Mycotoxins - toxins produced by fungi</th>
<th>Endotoxins - toxins from bacteria</th>
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The allergic response occurs when repeated exposures, over time, accumulate to produce dramatic lung responses on exposure to tiny amounts of substance.

The diseases are known by names like:

- Organic dust toxic syndrome
- Occupational asthma
- Farmer’s lung
- Legionnaires disease

Problem assessment

Assessing the risk is difficult. Some people may develop the disease while others may not and different people may take differing lengths of time to become reactive to the airborne contaminants.

Any activity which could create airborne dusts, spores and liquid aerosols can lead to exposure, such as:

- Disturbing mushroom compost
- Producing, bagging, using potting mix
- Removing animal droppings
- Handling flapping chickens
- Feeding-out mouldy hay
- Seed dressing
- Cleaning grain silos
- Repairing leaky buildings.
Control measures

The primary aim is to reduce airborne contaminant levels.

- With waste material, dampening before disturbing but this would not be appropriate for products like seeds.
- In confined spaces (e.g. silos) avoiding entry using other work practices is the preferred option, however appropriate protocols for confined space entry must be developed and adhered to if entry required. In non confined indoor environments, specific ventilation may be required.
- Technical innovation which isolates the worker from the source, such as not needing to enter silos or seed cleaning plant

Personal protection - the last and least effective option.

Specific exposures

1. Urine/faeces spray – meat works and chicken processing.

   - The problem: Airborne droplets containing urine and faeces (meat and chicken processing respectively) may transmit zoonotic diseases such as leptospirosis and campylobacter (respectively).
   - Assessing the risk: Difficult – can only be done by measuring the incidence of the disease in the employees in the area.
   - Control: Shielding over processes to prevent sprays of droplets, wearing face shields, frequent hand washing, work practices to prevent the generation of sprays and splashes, covering cuts.

2. Chicken farms

   - The problem: People working in chicken sheds may, over time, develop a variety of respiratory diseases including asthma and extrinsic allergic alveolitis (farmer’s lung). These diseases develop due to cumulative reactions to proteins and other substances in the litter that become airborne. Fungi are often the cause and another well-known known cause is mouldy hay.

   - Assessing the risk: Difficult. Allergic reactions occur only in a minority of individuals, and such clinical sensitisation may not occur for months or years after exposure began. (There are few factors known to influence susceptibility to allergic alveolitis.)

   - Control:
     - Limiting the time of exposure
     - Avoiding exposure
     - Selection of appropriate PPE. The use of battery-powered supplied-air helmets.
     - Avoid prolonged dampness – which aids fungal growth.
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3. Grain dusts

Grain production has been associated with both inflammatory and allergic conditions of the upper and lower airways. This is due to the toxicity of grain dusts and/or their contamination by fungal spores or bacterial endotoxins. Control is by ventilation and confined space entry protocols.

4. Feed additives

Vitamins and enzymes are added to animal feeds to enhance the feed’s properties. Exposure to enzymes used in animal feeds has been linked with occupational sensitisation.

5. Mushroom farming

Characteristic symptoms include Fever, Dry cough, Dyspnea*, Chills, Malaise, Myalgia* and Tachypnea*. These are caused by immunological reactions to inhaled antigens like Micropolyspora faeni and Thermo-actinomyces vulgaris.

Dyspnea is difficulty breathing.
Myalgia is muscle pain.
Tachypnea is rapid breathing.

6. Potting mix

The problem: Hazard from dust due to its bacterial contamination with Legionella bacteria. Symptoms include fever, rigors, sweating, vomiting, cough, chest discomfort, respiratory distress, and pneumonia.

Assessing the risk: Tests of New Zealand potting mixes have revealed a significant percentage positive for Legionella species. Prolonged storage, particularly at higher temperatures, can increase Legionella concentrations. Poor work practices also increase the risk.

Control:

- Open bags slowly - opening away from face
- Wet soils to reduce dust levels
- Avoid working in poorly ventilated areas (e.g. enclosed greenhouses)
- Use a dust mask
- Store bags in a cool area.

Medical practitioners and Public Health Units can provide assistance in diagnosis and management.

7. Seed dressing

Seed dressings are fungicides applied to seeds before planting to protect the seeds against fungi or pests. Preparation and application can result in exposure. Appropriate controls i.e. extraction ventilation, PPE, administrative controls are required.
8. Piggeries and chicken farms – exposure to ammonia from urine.

The problem: Ammonia from urine may result in symptoms of acute poisoning – weepy eyes, coughing and other signs of irritated airways. Animal confinement can produce hydrogen sulphide as well.

Assessing the risk: Self-indicating. The extent of these symptoms and their severity will reflect the degree of exposure.

Control: General air ventilation. Piggeries should have at least 12 air changes per hour. This is a theoretical concept that assumes that all the air in the space changes and that there are no ‘dead spots’. Frequent cleaning of the pens.