

Industrial Hemp and WHS Risks

Purpose

1. To provide the Industrial hemp industry with an overview on industrial hemp processing and potential workplace health and safety (WHS) issues.

Recommendation

2. That the hemp industry presidents:
 - a. **Note** this overview provided by consultant Chris Murphy and Dr Olivia Reynolds, Senior Manager, Emerging Industries (earlier draft reviewed by Dr Maggie Davidson MAIOH | Senior Lecturer - Environmental Health & Occupational Hygiene, School of Science, Western Sydney University).
 - b. **Consider** their obligations as industry presidents on this matter.
 - c. **Consider** consulting with Safe Work Australia.

Background

3. The EICC raised hemp silicosis as an issue at the November 2023 meeting, after a hemp stakeholder had addressed this with a member.
4. In response, the Senior Manager, procured a brief review of the current status, to be produced in the form of this overview and shared with the hemp industry presidents.
5. Chris Murphy, an external consultant who has been supporting the EI Program, drafted the overview.
6. It is the responsibility of the hemp industry to maintain their own Work Health and Safety standards, including on this issue.
7. This information is provided for informational purposes only. It is not intended to be a substitute for professional advice. Further consultation with appropriate experts should be sought.

Hemp dust and risk

8. Processing industrial hemp has the potential to create workplace health and safety risks (WHS) associated with hemp dust exposure.
9. Studies in the northern hemisphere and an Australian pilot study reported high levels of inhalable and respirable organic dusts.

Silicosis

10. Silicosis may be a risk not solely from the processing of industrial hemp, but also from other harvested crops. At present, there is no published literature on silicosis and industrial hemp processing.

Key Issues/Updates

11. Key items to note:
 - a. Currently, there is no hemp-specific guidance material for the Australian industry to follow regarding acceptable worker exposure standards (WES).
 - b. As a minimum, guidance material should be developed on recommended control measures to manage risks and protect workers from exposure to inhalable hemp dust based on current knowledge.
 - c. An information overview has been drafted for publication to make industry aware of, and empower them to manage the risk with the current knowledge available (Appendix A).

Appendix A. Overview: Industrial hemp processing and potential WHS issues

Industrial hemp dust exposure:

Processing of industrial hemp (*Cannabis sativa*) has the potential to create workplace health and safety risks (WHS) associated with hemp dust exposure. Occupational exposure to hemp dust is demonstrated as producing allergic and respiratory health effects, potentially causing permanent lung damage and disease (Fishwick et al, 2001; Gardner et al, 2020; Sack et al, 2023). Hemp dust is classed as an organic dust, a complex mixture of environmental agents including soil, salts, chemicals, microorganisms and their constituents, plant, animal and insect debris, and many other agents.

A small pilot study (Gardner et al, 2020) in regional Victoria identified that workers involved in hemp processing are potentially exposed to excessive levels of inhalable and respirable organic dusts. Similarly, a 2001 study (Fishwick et al, 2001) found that a modern-day hemp fibre processing plant produces significant quantities of respirable dust, highly contaminated with endotoxin and microorganisms.

Other studies in the northern hemisphere have also reported high dust exposure in relation to hemp production and the occurrence of respiratory diseases in hemp workers. Most studies were undertaken in the hemp textile industry during the late twentieth century and may not be relevant to modern hemp processing plants.

Occupational lung diseases that have been associated with hemp processing are:

- Byssinosis (brown lung disease/Monday morning fever) is caused by dust from hemp, flax, and cotton processing. The condition is chronic and characterized by chest tightness and shortness of breath.
- Hypersensitivity pneumonitis (farmers' lung) is caused by the inhalation of fungus spores from mouldy hay, bird droppings, and other organic dusts. The disease is characterized by inflamed air sacs in the lungs, leading to fibrous scar tissue in the lungs and abnormal breathing.
- Occupational asthma is caused by inhaling certain irritants in the workplace, such as dusts and is the most common form of occupational lung disease. It is characterized by symptoms such as a chronic cough and wheezing.

Silicosis

Silicosis is an occupational lung disease caused by breathing in airborne crystalline silica.

Crystalline silica, silicon dioxide (SiO_2), is a naturally occurring and widely abundant mineral that forms the major component of most rocks and soils. There are both non-crystalline (amorphous) and crystalline forms of SiO_2 , the crystalline form being the most toxic when inhaled.

Silicosis may be a risk not solely from the processing of industrial hemp, but also from other harvested crops. Hemp's woody fibres contain the element silicon (Si), which is thought to be a protective mechanism from damage by insects, diseases and infer drought tolerance (Luyckx et al. 2017), and different from crystalline SiO_2 . However, crystalline silica particles may become lodged in plant material during harvesting, storage, and transportation, which can become aerosolised during future processing. At present, there is no published literature on silicosis and industrial hemp processing.

Silica dust or respirable crystalline silica (RCS) is generated by mechanical processes such as crushing, cutting, drilling, grinding, sawing, or polishing of natural stone or other silica containing products. RCS may also be present from soil and windblown dusts during harvesting, baling,

transportation, and processing, and has been identified in settled and airborne dust samples from Australian hemp textile mill (M. Davidson, *pers. comm.*).

If a worker is exposed to and breathes in RCS, they could develop the lung disease silicosis, as well as chronic bronchitis, emphysema, or lung cancer. RCS exposure has also been associated with autoimmune diseases such as systemic sclerosis, rheumatoid arthritis, and increased serum autoantibodies (National Institute for Occupational Safety and Health (NIOSH) website [Major Occupational Lung Diseases, Silicosis | NIOSH | CDC](#) accessed 10th April 2020)

Safe work methods

A person conducting a business or undertaking (PCBU) should keep worker exposure to dust as low as reasonably practicable (ALARP). In addition, workers must be educated regarding potential health hazards from inhalation of organic dusts (with or without silica), and the methods for managing and limiting their exposure to reduce the risk of lung and other allergic and irritant diseases.

Currently, there is no hemp-specific guidance material for the industry to follow regarding acceptable worker exposure standards (WES).

Wetting of dust, using appropriate exhaust ventilation and extraction hoods, and wearing the right dust respirators (with appropriate education and fit testing) are common ways of reducing worker potential exposure to organic dusts and RCS. Caution with dust wetting is advised as this may promote fungal growth in some environments and with plant products. If using personal protective equipment (PPE) or respiratory protection equipment (RPE), the workplace will need to have a plan, as well as education, training and fit testing for each employee supplied with a respirator.

There are a range of recommended control measures to manage risks and protect workers from exposure to inhalable hemp dust (Gardiner et al, 2020):

Type of control	Control measure
Engineering and isolation	<ul style="list-style-type: none"> • Supply and install local exhaust ventilation (LEV) at the entry feed of decortication and hammer mill machinery. • Enclose machinery and dust generating processes, such as sieving, as much as possible. • Supply and install under machinery extraction to inhibit dust settling. • Supply and install general ventilation to reduce indoor dust accumulation.
Administrative	<ul style="list-style-type: none"> • Quality control systems for rejection/acceptance of product based on potential for excessive emission of dust or biological aerosols (mould, endotoxin, pollen, etc.) when processed. • Educate employees on the respiratory effects associated with hemp dust. • Train employees on dust hazard identification. • Introduce a health surveillance program. • Implement a cleaning and maintenance schedule for the air filtration systems. Include scheduled filter changes, servicing, and duct cleaning. • Use industrial high-efficiency particulate arrestance vacuum systems to clean premises and equipment on a routine basis. Eliminate the use of compressed air for cleaning purposes.

	<ul style="list-style-type: none"> • Install signage instructing employees to wear respiratory protection equipment (RPE), safety goggles/glasses and safety boots prior to entering the process area (if personal protective equipment (PPE) is required). • Implement a PPE maintenance schedule and management plan (if PPE is required). • Implement a training schedule on the use of RPE.
Personal protective equipment (PPE)	<ul style="list-style-type: none"> • If suitable engineering controls cannot be attained, provide workers with RPE, safety goggles/glasses, and safety boots. • Ensure RPE is selected, fit tested, and maintained in accordance with Australian Standard AS/NZS1715:2009 selection, use, and maintenance of respiratory protective equipment. Train employees on correct RPE use.

Further management recommendations

Whilst there is no hemp-specific guidance regarding dust exposure, the following suggestions are proposed for industry stakeholders:

- As new information becomes available, update guidance material on recommended control measures to manage risks and protect workers from exposure to inhalable hemp dust. These information resources should include managing workplace health and safety risks (WHS) associated with hemp dust exposure in relation to industrial hemp harvesting and processing.
- In the short to medium term, support studies that can inform development of acceptable worker exposure standards (WES) for industrial hemp harvesting and processing. These studies can quantify the airborne concentrations of inhalable hemp dust and worker exposure to hemp dust in the Australian hemp processing industry – and contribute to refinement of management recommendations for industry to follow regarding acceptable worker exposure levels to hemp dust.

References

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