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Cannabis and Asthma

Marijuana is derived from the species of the genus *Cannabis; C. sativa, C. indica and C. ruderalis*. Cannabis is one of the 11 genera of the family *Cannabaceae*. *Humulus* (hops) and *celtis* (hackberries) are two of the other genera in this family. In addition to its use as a drug, hemp, which can be derived from *cannabis sativa* with a low delta-9-tetrahydrocannabinol (THC) content, is used as a fiber, health food, bird feed, fishing bait and in cosmetics. Hemp can also be derived from other plants such as sisal.

Medical marijuana is legal in 38 states and recreational marijuana is legal in 23 states. In Michigan, medical marijuana became legal in 2008 and recreational marijuana in 2018. With legalization came the opening of multiple facilities that grow and process marijuana. There are over 700 licensed growing facilities, 135 licensed processing facilities and over 305 licensed provisioning facilities in the state. There are over 30,000 workers in the industry in Michigan. Figure 1 shows a growing room in an indoor facility.

See Table 1 for the known allergens to which workers in the marijuana industry may be exposed. Besides marijuana itself, or off gassing of terpenes during drying of the harvested plant a worker could develop allergic symptoms from the disinfectants that are used in the facility to reduce mold growth.

Table 1. Asthma Causing Agents found in Cannabis Growing/Processing Facilities

Plant material Marijuana Terpenes (Carene and maybe Alpha-Pinene)
Disinfectants Bleach Hydrogen Peroxide and Peracetic acid
Mold Powdery mildew Penicillium Alternaria – less common

Figure 1. Young Marijuana Plants in a Grow Room before Flowering

A case report of new onset work-related asthma reported in Michigan is described in Table 2. An additional four patients/workers with aggravation of their preexisting asthma were reported in Michigan from marijuana grow facilities; one from exposure to a disinfectant used in humidifiers, one from marijuana dust and high humidity and heat, one from ozone, and one from working in the cold.

Table 2. Case Report of Work-Related Asthma - A patient reported to the state was a woman in her 40's, who developed wheezing, chest tightness and shortness of breath one year after beginning to work as a cultivation technician at an indoor marijuana growing facility. Prior to that she was a cultivation technician for one year at a different indoor marijuana growing facility. Her symptoms began after going into the grow room where a hydrogen peroxide/peracetic acid disinfectant was being sprayed. When she was interviewed five months after the acute exposure to the disinfectant, she continued to be symptomatic with improvement in her symptoms on weekends and vacations. She was started on montelukast and an albuterol inhaler. She was also concerned about mold growth in the building. The disinfectant continued to be used and she stated her symptoms were worse and she had to take more medication. She had not sought care at an emergency department and had not been hospitalized. She had quit smoking cigarettes 10 years previously after smoking less than quarter pack of cigarettes a day for 22 years. She had asthma as child until the age of 11. She had a sibling with asthma. She did not file for workers' compensation. At the time of the interview, she had not had any breathing tests but stated her doctor wanted her to be tested. Prior to her current job she was a cultivation technician at a different indoor marijuana growing facility; at that facility she had nosebleeds after exposure to a different brand of a hydrogen peroxide/ peracetic acid disinfectant.

An additional six patients have been reported in Michigan with acute bronchitis, pneumonitis or respiratory symptoms from grow facilities in Michigan; after bleach and a cleaner with acid were mixed and generated chlorine gas (two workers in one incident), after grinding used containers of fungicides and herbicides (two workers in one incident), ozone, and a sanitizer containing 75% ethanol. Respiratory irritants used in marijuana grow facilities include ozone, and the use of multiple cleaning agents, fungicides, herbicides, and insecticides.

Figure 2 shows a picture of a drying room where ozone is generated to counter the odor of terpenes emitted when marijuana plants dry.

Figure 2. Marijuana Plants Drying in a Grow Facility

Although not available for routine medical care, positive skin prick tests and specific IgE to *C. sativa* have been reported as part of research studies among workers (1-6), people living around fields where hemp is grown (7-9) and recreational marijuana users (10). Multiple allergens in *C. sativa* have been characterized (6,10). Sensitization to *C. sativa* is common in patients sensitized to tomatoes (11). Contact dermatitis has also been described with exposure to *C. sativa* plants (12).

An example of occupational asthma to *C. sativa* in the medical literature is a 51-year-old man in Spain, who developed rhinorrhea, chest tightness, dyspnea, cough and wheezing one year after he began to earn a living as a bird breeder (1). He fed the birds hemp seed. He had a history of asthma with sensitization to dust mites for which he received immunotherapy. He had 25% eosinophils in his sputum and an obstructive pattern on spirometry. He had positive prick and intra dermal skin tests and specific IgE to *C. sativa*. Three controls were negative. The patient had negative reactions to mold and storage mites. He had a positive specific antigen challenge test to *C. sativa* with a 31% decrease in FEV1. Five asthmatic controls had negative antigen challenge test to *C. sativa*.

Some of the reports of sensitization to *C. sativa* among workers have been among individuals working in a laboratory; two forensic laboratory workers were described from Germany with exposure to hashish and marijuana (2), and two lab workers working with *C. sativa* plants were described from England and Spain (3,4).

Byssinosis both the acute and chronic form, typically caused by exposure to cotton dust, has also been described among hemp rope workers in former Yugoslavia (13,15,16), England (14), and Spain (17,18).

We are very interested in hearing from any practitioners who are aware of patients with respiratory symptoms from working in marijuana growing facilities. Please email or call Dr. Rosenman, rosenman@msu.edu or 517 353-1846.

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*PS Remember to report all cases of occupational disease!

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