

Overview of the Emerging Cannabis Industry and AIHA's Cannabis Industry Health and Safety Task Force



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DISCLAIMER

The American Industrial Hygiene Association (AIHA) and its affiliate members of the AIHA Cannabis Health & Safety Task Force DO NOT condone the use of Cannabis or Cannabis products or encourage any persons to violate any State or Federal law. It is the sole intention of the AIHA Cannabis Health & Safety Task Force and its affiliates to work with employers, employees, government regulators and other interested parties to promote effective health and safety work practices and comply with applicable regulations in states where either medicinal or recreation cannabis is legal.

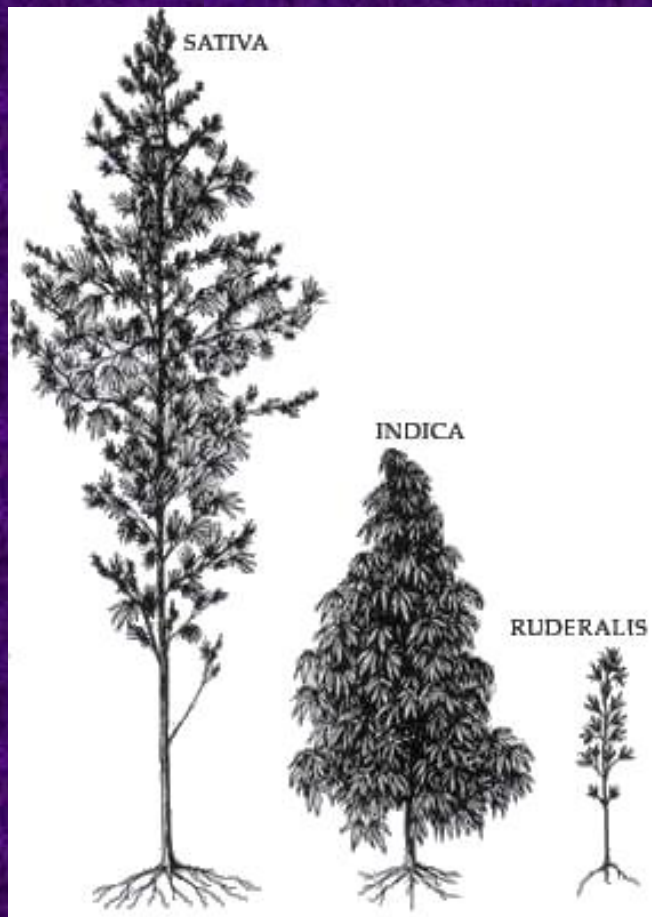
AGENDA



- **Introduction to Cannabis**
- **Potential Medicinal Benefits and Risks of Cannabinoids**
- **Brief History of Cannabis Regulation**
- **The Cannabis Supply Chain**
- **AIHA Cannabis Health & Safety Task Force**

Introduction to Cannabis

CANNABIS (/ˈKÆNƏBɪs/) IS A GENUS OF FLOWERING PLANTS IN THE FAMILY CANNABACEAE.



The number of species within the genus is disputed.

Three species may be recognized:

- Cannabis sativa,
- Cannabis indica, and
- Cannabis ruderalis.

Introduction to Cannabis

The primary psychoactive compound in cannabis is tetrahydrocannabinol (THC); one of 483 known compounds in the plant, including at least 113 other cannabinoids (compounds unique to cannabis) and at least 100 different terpenes.



Introduction to Cannabis

C. Sativa, C. Indica and C Ruderalis can all be cross bred to produce numerous stains, each with unique genotypes that in turn, express unique cannabinoid and terpene profiles



Currently, there are over 2600 different commercially available strains of cannabis

Cannabinoids

Many of the Cannabinoids (besides THC) have been associated with potential therapeutic benefits, including:

- THCA (tetrahydrocannabinolic acid)
- CBD (cannabidiol)
- CBDA (cannabidiolic acid)
- CBN (cannabinol)
- CBG (cannabigerol)
- CBC (cannabichromene)
- CBL (cannabicyclol)
- CBV (cannabivarin)
- THCv (tetrahydrocannabivarin)
- CBDV (cannabidivarin)
- CBCV (cannabichromevarin)
- CBGV (cannabigerovar)
- CBGM (cannabigerol monomethyl ether)
- CBE (cannabielsoin)
- CBT (cannabicitran)

Cannabinoid Receptors

At present, there are two known types of cannabinoid receptors, termed CB1 and CB2, with mounting evidence of more.

CB1 receptors are found primarily in the brain, more specifically in the basal ganglia and in the limbic system. They are also found in both male and female reproductive systems. CB1 receptors are absent in the medulla oblongata, the part of the brain stem responsible for respiratory and cardiovascular functions.

CB2 receptors are predominantly found in the immune system, or immune-derived cells with the greatest density in the spleen. CB2 receptors appear to be responsible for the anti-inflammatory and possibly other therapeutic effects of cannabis seen in animal models.

Potential Medicinal Benefits

Potential therapeutic benefits of Cannabis for treatment of:

Chronic pain

Cancer

Chemotherapy-induced
nausea

Anorexia and weight loss

Irritable bowel syndrome

Epilepsy

Spasticity related to MS

Tourette syndrome

Huntington's disease

Parkinson's disease

Dystonia

Dementia

Glaucoma

Traumatic brain injury

Anxiety

Depression

Sleep disorders

Posttraumatic stress disorder

Schizophrenia and other
psychoses

Potential Health and Safety Risks

Potential risks associated with Cannabis:

Lung cancer

Esophageal cancer

Other cancers

Acute myocardial infarction

Stroke

Chronic obstructive
pulmonary disorder

Chronic bronchitis

Asthma

Pregnancy complications

Occupational injury

Motor vehicle crash

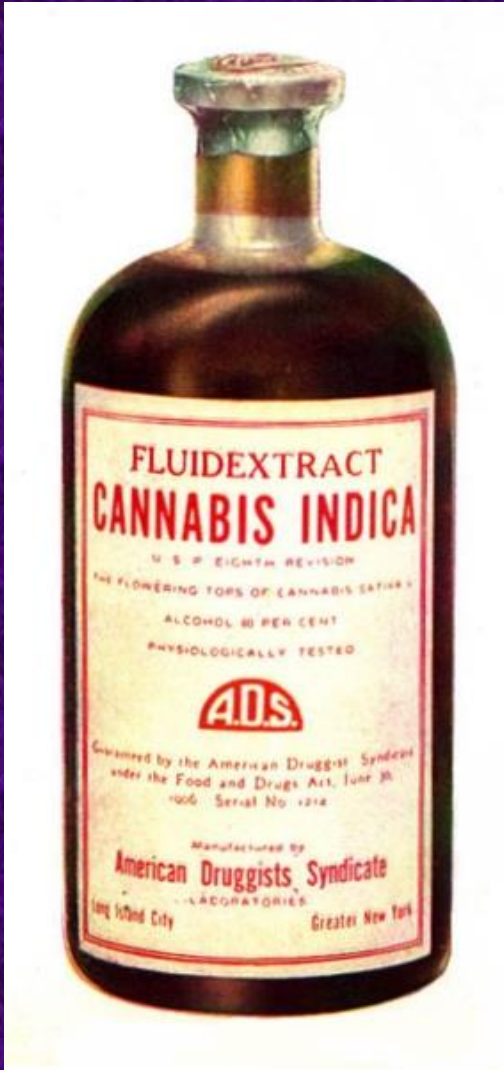
Neonatal conditions

Schizophrenia and other
psychoses

Depression

Anxiety

HISTORY OF CANNABIS IN THE US

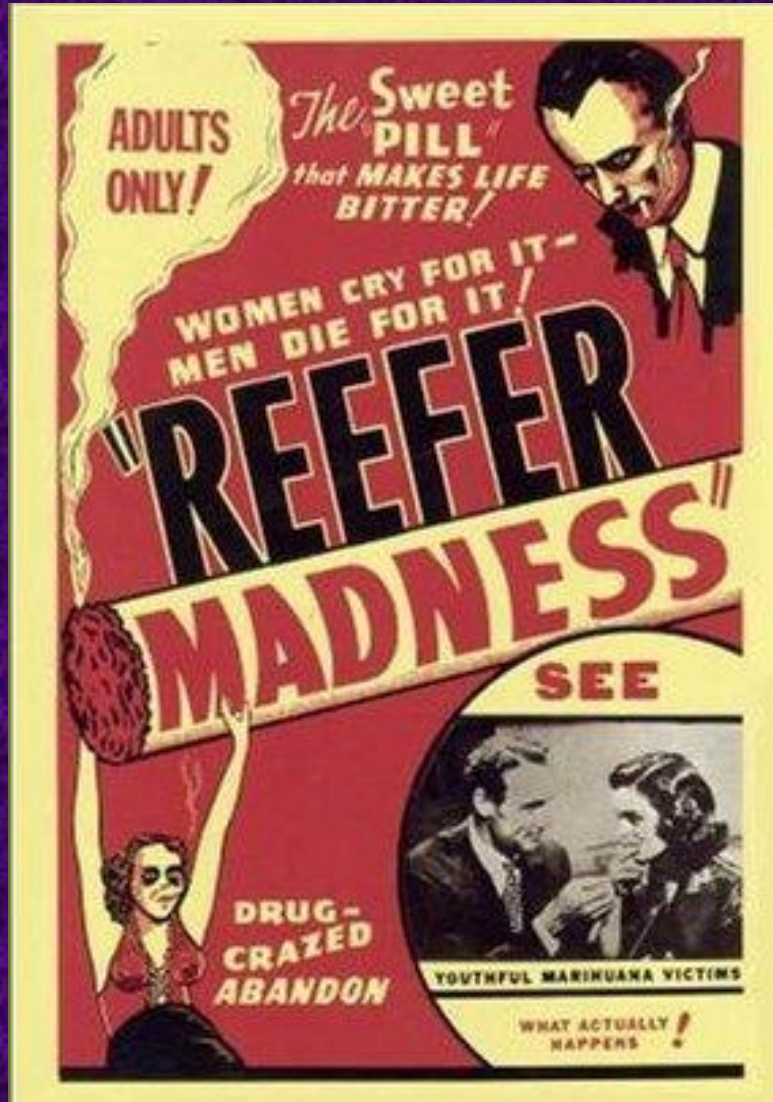


- Pre-1850s American colonists grew hemp for rope and fabric. Medicinal preparations of cannabis became available in American pharmacies.
- 1906 – Congress passed the “Pure Food and Drug Act” (PFDA) requiring that certain special drugs, including cannabis, be accurately labeled with contents.

HISTORY OF CANNABIS IN THE US

- 1930 - Federal Bureau of Narcotics (FBN) formed. Use of cannabis and other drugs came under scrutiny as a push to outlaw all recreational drugs.
- The Marihuana Tax Act of 1937 made possession or transfer of marihuana illegal throughout the US, excluding medical and industrial uses, through imposition of an excise tax on all sales of hemp.

HISTORY OF CANNABIS IN THE US



1938 - Food and Drug Administration (FDA) established. Marijuana defined as a "dangerous drug".

HISTORY OF CANNABIS IN THE US

- 1970 - Congress passed the Controlled Substances Act. Prohibited the use of cannabis for any purpose and assigned a Schedule I classification deemed to have a high potential for abuse and no accepted medical use – thereby prohibiting even medical use of the drug.
- 1988 – Cannabis specific receptors are discovered in both humans and animals including mammals, birds and reptiles.
- 1996 - California voters approved Prop 215 (Compassionate Use Act of 1996), making the state the first in the nation to legalize the medical use of cannabis.

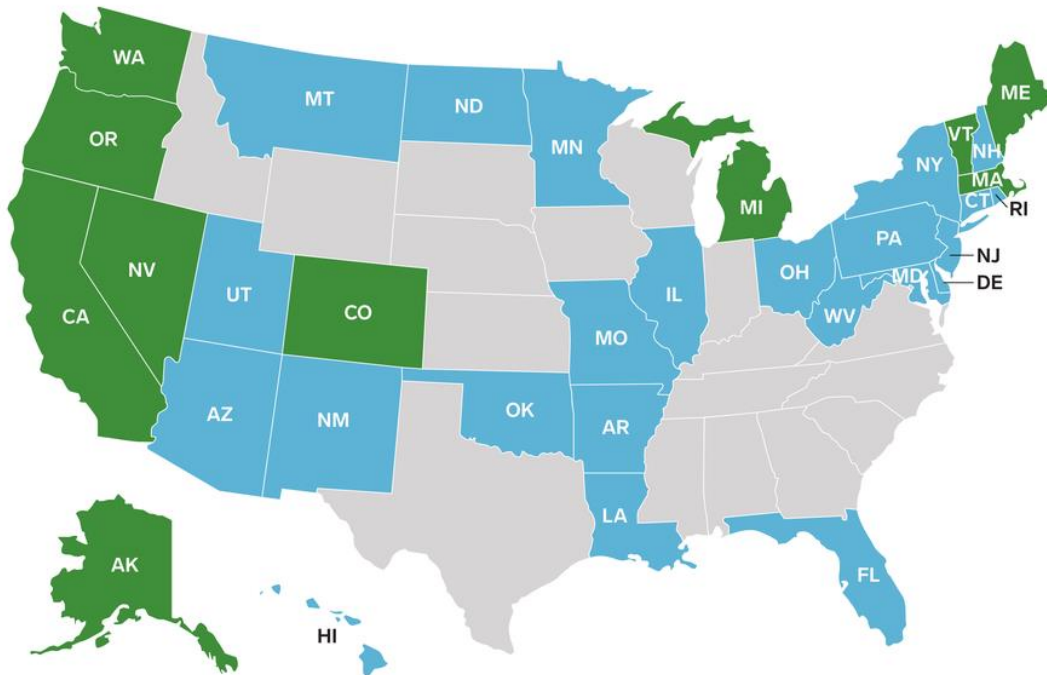
HISTORY OF CANNABIS IN THE US

- 2012 - Colorado and Washington became the first states to legalize cannabis for recreational use when voters approved Colorado Amendment 64 and Washington Initiative 502
- 2017 – AIHA establishes the Cannabis Industry Health & Safety Task Force
- October 17, 2018 – Canada becomes the second country to fully legalize recreational cannabis
- December 6, 2018 – Michigan becomes the 10th State to legalize recreational cannabis

THE MAGNITUDE OF THE CANNABIS INDUSTRY

States where marijuana is legal

■ Legalized recreational and medical marijuana ■ Legalized medical marijuana



Insider Inc.

**Medical Cannabis
Legal in 33 States
and DC**

**Recreational
Cannabis Legal in
10 States and DC**

THE MAGNITUDE OF THE CANNABIS INDUSTRY

- In 2014, there were an estimated 182.5 million cannabis users (3.8% of the population aged 15 – 64).
- According to Forbes, the international market for cannabis is currently estimated to be worth \$7.7 billion and projected to hit \$31.4 billion by 2021.
- The U.S. currently drives 90 percent of global cannabis sales, but its share will drop in large part due to Canada's plans to legalize recreational marijuana in July 2018.

THE MAGNITUDE OF THE CANNABIS INDUSTRY

- As of 2017, there were between 20-28,000 cannabis businesses in the US.
- There are approximately 200,000 legal cannabis workers in the US



- It's estimated that the Canadian cannabis industry could create around 125,000 jobs in the first year after legalization, including a large number of science-based R&D positions

CANADA – FULL RECREATIONAL LEGALIZATION – OCTOBER 17, 2018



OH CANADA!



AIHA CANNABIS INDUSTRY HEALTH & SAFETY TASK FORCE



All levels of cannabis business have a need for safety and health measures

MISSION STATEMENT

The mission of the American Industrial Hygiene Association's (AIHA) Cannabis Health and Safety Task force is to provide information and knowledge to stakeholders, based on accepted scientific principles and practices, in order to identify, evaluate and mitigate health and safety risks associated with the cultivation, processing, manufacturing, distribution and sales of cannabis products. Stakeholders include the cannabis industry (including trade associations and advocacy groups), government regulatory agencies, environmental health and safety professionals, public health and public safety personnel and the general public.

AIHA CANNABIS INDUSTRY HEALTH & SAFETY TASK FORCE

Currently, the Task Force consists of 51 professionals:

- 36 Industrial Hygienists/EHS professionals
- 5 Occupational Physicians/Toxicologists
- 1 Psychiatrist
- 4 Public Health Professionals
- 3 AIHA staff
- 1 EHS Attorney
- 1 Student Intern

AIHA CANNABIS INDUSTRY HEALTH & SAFETY TASK FORCE

The Task Force consists of 5 subgroups:

- Cultivation
- Processing and Manufacturing
- Distribution and Retail
- Laboratory Accreditation
- Medical Surveillance/Impairment

The goal of the Task Force is to publish a guidance document on hazards, controls and best management practices specific to the cannabis industry.

HAZARDS ASSOCIATED WITH CULTIVATION AND MFG OPERATIONS

Legal Cannabis Growing Operations Hazards & Health Risks



Excessive UV exposure



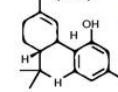
Excessive CO₂ exposure



Accidental exposure to
DANGER!
oxides of Nitrogen



Tetrahydrocannabinol (THC)



Drug exposures while handling plant buds

Personal Protective Equipment (PPE) Suggestions

Respirators



Respiratory protection may help reduce exposure to pesticides or chemicals.

Eye & Face Protection



Eyewear can be used to protect from contact with THC, pesticides and chemicals.

Skin Protection



Coveralls, lab coats, aprons, footwear, and especially gloves can be used to prevent skin contact and exposure to THC, pesticides and fertilizers.

HAZARDS ASSOCIATED WITH CULTIVATION OPERATIONS

Chemical Hazards

- Pesticides
- Fertilizers - Ammonia (aqueous and/or anhydrous) may become more popular in large-scale operations as a fertilizer.
- CO₂ – used inside a growing room will increase yield. CO₂ levels can reach (and sometimes exceed) the TLV of 5000 ppm.
- SO₂ - molten sulfur is sometimes burned to inhibit mold and mildew growth
- Also occasional CO (from generators) and VOC's (from cleaning compounds)

HAZARDS ASSOCIATED WITH CULTIVATION OPERATIONS

Ergonomic Risks

Harvesting and trimming of cannabis is labor intensive.



Ergo risks include:

- Bending and reaching
- Manual handling of heavy materials (i.e. fertilizers, CO₂ tanks, potting soils)
- Trimming of dried cannabis flowers (buds) which is performed with tiny scissors/trimmers and can result in pinch grips, wrist extensions, chronic hand soreness and/or carpal tunnel syndrome.

HAZARDS ASSOCIATED WITH CULTIVATION AND MFG OPERATIONS



Physical and Biological agents

- UV Light
- Heat Stress
- Mold & Mildew (Bioaerosols)
- Insects (Buds love cannabis)
- Potentially dangerous animals (rodents, snakes, deer)

HAZARDS ASSOCIATED WITH CULTIVATION AND MFG OPERATIONS

Physical Hazards

Occupational Injuries

burns, cuts, bruises, slips, trips, falls, and strains are possible in many areas of the cannabis industry

Electrical and Mechanical Hazards

Electrical: temporary wiring, electricity in highly humid or watering areas. Mechanical: forklifts, trimming machines, wood chippers, grinders

Fire Hazards (flammable and explosive)

Explosion and fire hazards extracting oils from the plants, working with compressed gasses and flammable/combustible liquids

HAZARDS ASSOCIATED WITH CULTIVATION AND MFG OPERATIONS

Physical Hazards

Dangerous Work Environments

Working at heights, in confined spaces, with UV lighting, excessive noise, workplace violence and security issues



LABORATORY ACCREDITATION

The lab accreditation subgroup is investigating an accreditation process for cannabis sampling and analysis. The requirements for analytical testing vary from state to state and currently there is no standardization for analyte profiles or lot size.

Sample analysis is required in most legal cannabis markets and usually includes the following:

- Potency (%THC)
- A limited cannabinoid profile
- Presence of mold
- Presence of pesticides



LABORATORY ACCREDITATION

In order to reach a consensus of what lab accreditation for cannabis should reasonably include, the lab accreditation subgroup is looking into three distinct areas –

- Sample collection (i.e. sampling methods, number of samples per lot, etc.),
- Sample analysis (i.e. what should we be analyzing for – cannabinoids, terpenes, pesticides, mold & fungi, metals, other contaminants), and
- Auditing lab operations (i.e. demonstration of competency).

The subgroup is also reviewing and comparing existing accreditation standards, specifically ISO 17025 (that now allows for accreditation of sampling activity) and the TNI standard.

MEDICAL SURVEILLANCE/IMPAIRMENT

- More research is needed to define what constitutes impairment resulting from cannabis use.
- The Occupational and Environmental Medical Association of Canada (OEMAC) is the largest national association of physicians with an interest in occupational and environmental medicine (OEM).
- OEMAC has released a position statement on the implications of cannabis use for safety-sensitive work

MEDICAL SURVEILLANCE/IMPAIRMENT

OEMAC position statement on the implications of cannabis use for safety-sensitive work

- Irrespective of the source of procurement, the use of cannabis can lead to impairment, which may adversely impact the performance of individuals at work.
- It is recognized that the timing and duration of cannabis impairment is variable and that more research is needed in this regard. To provide practical guidance, until definitive evidence is available, it is not advisable to operate motor vehicles or equipment, or engage in other safety-sensitive tasks for 24 hours following cannabis consumption, or for longer if impairment persists.

MEDICAL SURVEILLANCE/IMPAIRMENT

A “**safety-critical**” task is “one where certain forms of personal impairment can put other people at risk” and can include risks both to the worker as well as to others arising out of performance error due to physical or mental conditions.

“**Safety-sensitive**” work can be one or more “safety-critical” tasks that are or may be performed, and where possible consequences include death or serious injury of a worker or a member of the general public, or, alternately, damage to or serious disruption of equipment, production or the environment.

MEDICAL SURVEILLANCE/IMPAIRMENT

“Decision-critical” work may affect workers’ wellbeing and livelihoods, and impact employer oversight and stewardship of products and services, but without the same direct and near-term adverse effects as **“safety-sensitive”** work.

Impairment in **“decision-critical”** workers (particularly of the neurocognitive variety) can still pose workplace difficulty with coworkers, supervisors and clients in the domains of attendance, performance, and workplace relationships, and result in financial, legal, reputational or psychological harm, and/or corporate liability.

THANK YOU

Thanks to all of the members of the AIHA Cannabis Health and Safety Task Force for their contributions to this presentation

QUESTIONS



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