

# RAU Project – Risks Related to Cannabis Processing and Extraction

Presentation for  
AIHA BC chapter

Date: September 21 2022

# Agenda

- RAU Cannabis Processing Project
  - Risk Analysis Unit cannabis projects
  - Introduction to Cannabis Processing and Extraction
  - Hazards, Risks and Controls
  - Industry Challenges
  - Resources
- Discussion and Questions

# RAU Cannabis Processing and Extraction Project

- Part of a two phase project starting in 2020
- Phase 2 cannabis processing and extraction starting in 2021



# RAU Cannabis Processing and Extraction Project

## **Project Team**

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## **Internal Stakeholders**

- Experience, Marketing and Insights
- Prevention Field Services, Agriculture Team
- OHS Consultation and Education Services
- Policy, Regulation and Research
- Assessment
- Learning and Development Services

## **External Stakeholders**

- Technical Safety BC
- Extraction equipment manufacturers/suppliers in Canada and USA
- BC Liquor Distribution Branch
- Health Canada
- Cannabis industry employers and workers

# Project Learnings - Overview



- Influx of new employers and workers
- Wide spectrum of business plans and personnel in the industry
- Dynamic industry, rapid changes, highly competitive
- New products and technologies used
- Complex processes and wide spectrum of recipes used
- Large volumes of hazardous chemicals and extremely high pressures
- High potential for catastrophic risk outcomes



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# **Introduction to Processing and Extraction**

# Phases of Processing



Storage

Chart Industries



Preparation

Leafy



Extraction

AbsoluteXtracts



Refinement

Leafy

# Preparation

- Sorting
- Destemming
- Drying
- Curing
- Particle Size Reduction
- Decarboxylation



MarijuanaAdventures



Mobius



Leafy

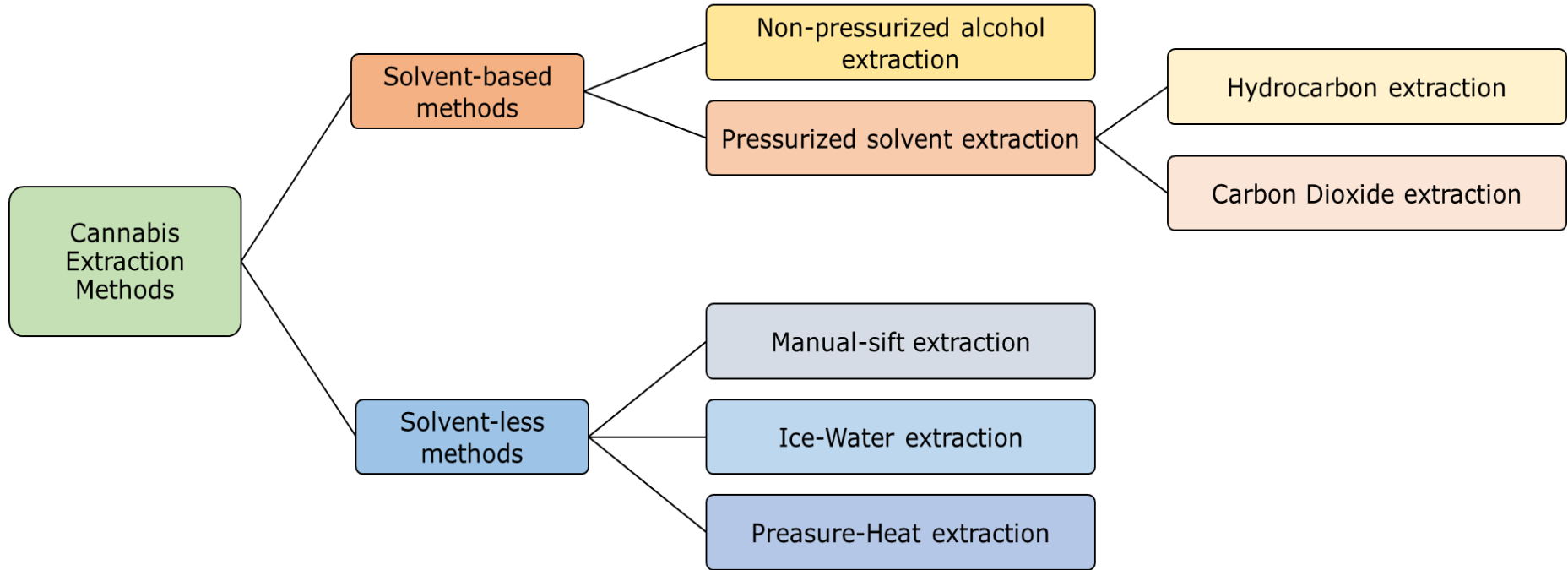


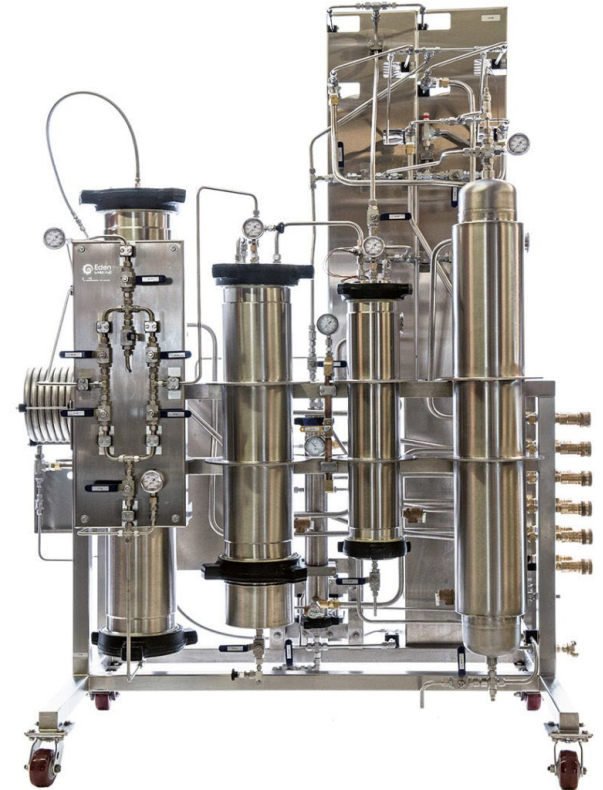
# What is Extraction?

- The process of removing desired components from the cannabis plant material (biomass) resulting in a partially processed material called the crude extract
- The end products being produced are usually named after the extraction process used



# Extraction Methods - Overview





Eden Labs

# Refinement

- The process where extract is purged and refined for further purity (e.g.: secondary derivatives, tertiary derivatives, and recombination of derivatives).

## Secondary Derivatives (40-75%)

- Winterization
- Filtration
- Solvent evaporation
- Crystallization
- Vacuum oven treatment

## Tertiary Derivatives (70-95%)

- Decarboxylation
- Distillation
- Remediation
- Recombination

## Separation and Recombination (95-99%)

- Crystallization
- Separation
- Recombination

- Evapourators: rotavaps, falling film evapourators
- Distillation: Rolled film Short path, molecular distillation
- Filtration
- Winterization
- Isolation/Crystalization reactors



BioMed



NewLabX



Lab Society



LanPhan



Delta Separations

# **Hazards, Risks and Controls**

# What We Learned - Hazards

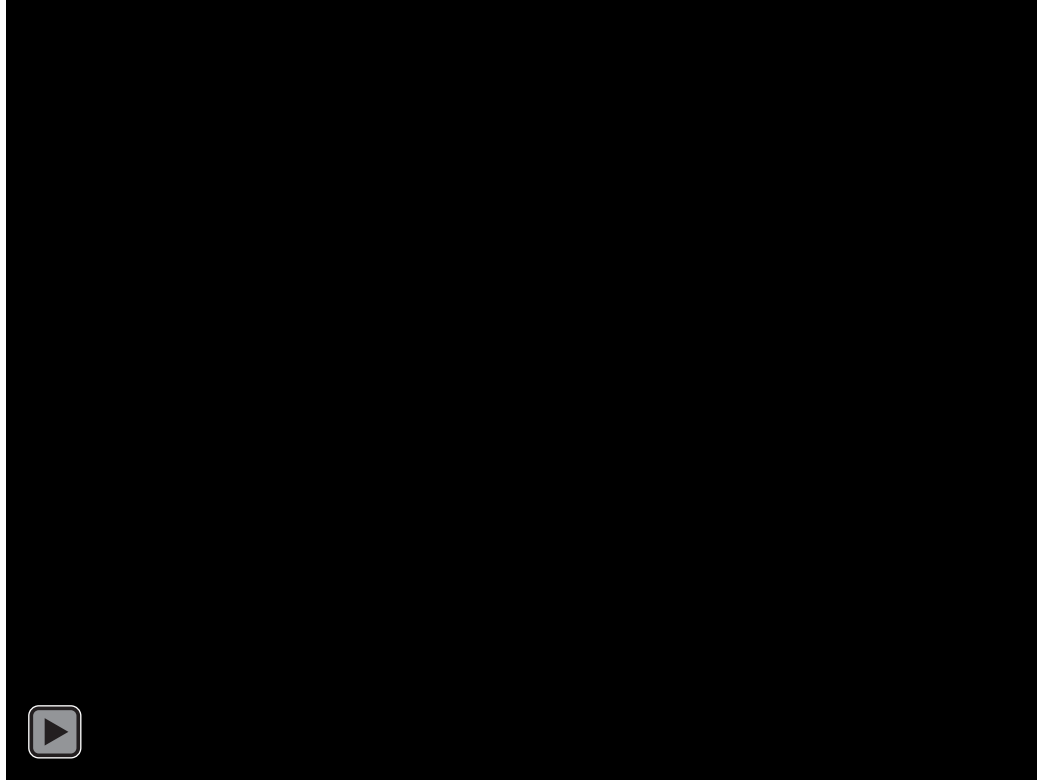


		Storage	Preparation	Extraction	Refinement
Hazards Risk Outcomes	CO <sub>2</sub> Asphyxiation, Explosion	✓		✓	✓
	Cryogenics/Refrigerants Asphyxiation	✓	✓	✓	✓
	Ethanol Fire/Explosion	✓		✓	✓
	Plant particulate Respiratory disease, Sensitization		✓		
	Pressurized systems Explosion	✓		✓	✓
	Propane/Butane Fire/Explosion	✓		✓	✓



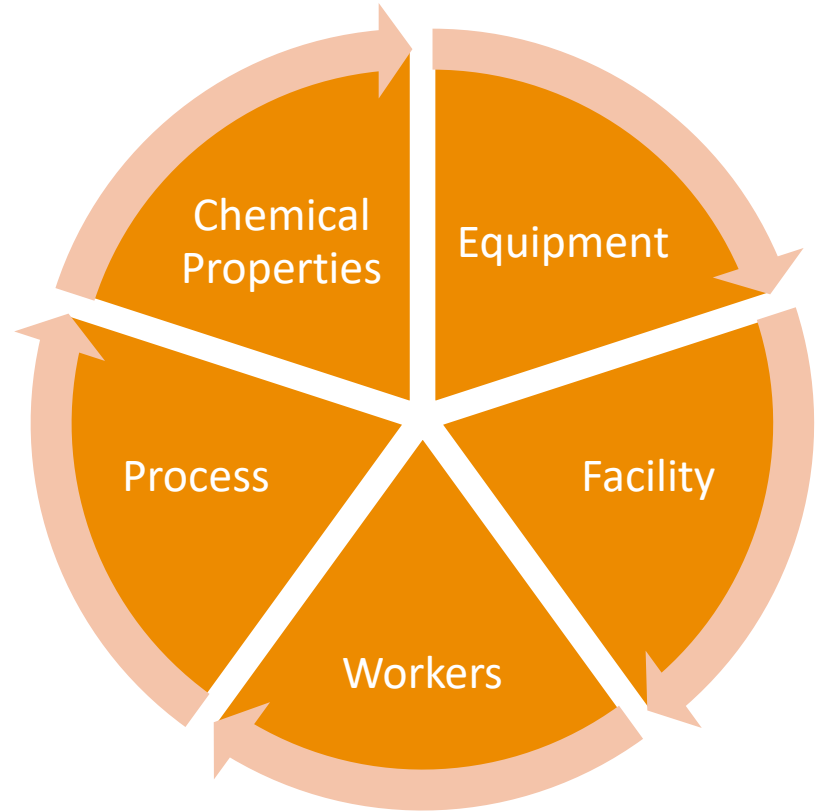
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# Cannabis Extraction Incident





# Assessing the System



# What We Learned – Critical Controls

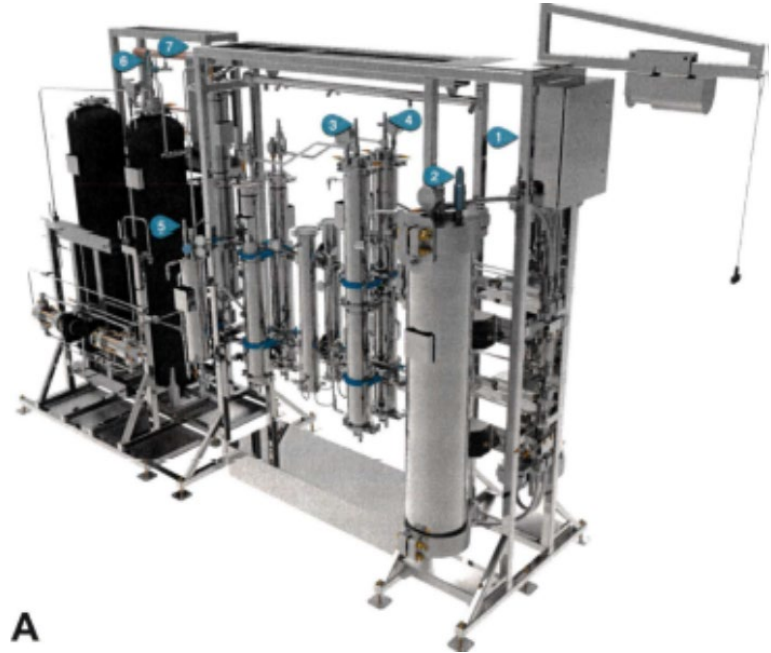
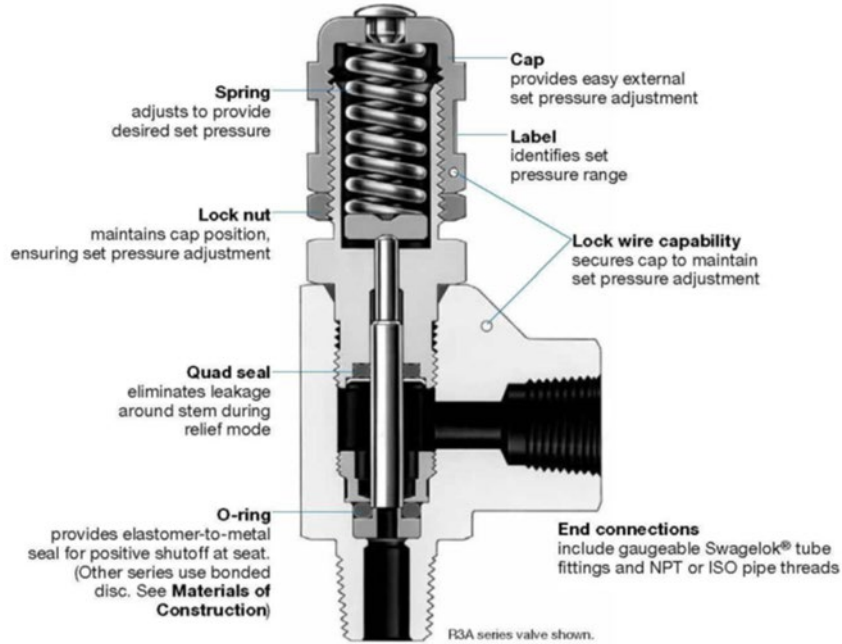
Control Examples of Extraction Equipment	Non-pressurized Alcohol Extraction	Pressurized Solvent Extraction
Bleed bolts		✓
Control system and control panels	✓	✓
Emergency shut down of equipment	✓	✓
Gauges	✓	✓
Filter Bags	✓	✓
Grounding and bonding	✓	✓
Lock out	✓	✓
Pressure relief devices		✓
Safe guarding interlocks	✓	✓
Stability of equipment	✓	✓
Standard: ULC 1389	✓	✓
Inspection, service and maintenance	✓	✓
Worker interaction with equipment	✓	✓

Control Examples of Facility Design	Non-pressurized Alcohol Extraction	Pressurized Solvent Extraction
Automatic shutdown of room	✓	✓
Barriers/bollards	✓	✓
Calibrated weight scales environments		✓
Electrical meets hazardous areas standards	✓	✓
Ventilation	✓	✓
Emergency ventilation	✓	✓
Emergency washing facilities	✓	✓
Fire suppression	✓	✓
Labels and colour-coding	✓	✓
Explosion/fire containment	✓	✓
Occupancy limits	✓	✓
Local exhaust	✓	
Monitors and audio visual alarms	✓	✓
Pressure relief piped to the outside		✓
Standard: ULC 4400	✓	✓
Worker interaction with the facility	✓	✓

# Controls



# Controls continued...



**Challenges**

## 2. Industry Challenges

- 1) Complex legal framework and requirements
- 2) Lengthy license application
- 3) Not aware of new standards
- 4) Lack of understanding of controls
- 5) Lack of support from manufacturers
- 6) Lack of engineering expertise in the industry



**Resources**

# Standards

## ANSI/CAN/UL/ULC 1389:2020

JOINT CANADA-UNITED STATES  
NATIONAL STANDARD

### STANDARD FOR SAFETY

Plant Oil Extraction Equipment for  
Installation and Use in Ordinary  
(Unclassified) Locations and  
Hazardous (Classified) Locations



ANSI/UL 1389-2020



Standards Council of Canada  
Conseil canadien des normes

CAN/ULC-S4400:2019

STANDARD FOR SAFETY OF PREMISES, BUILDINGS AND  
EQUIPMENT UTILIZED FOR THE CULTIVATION,  
PROCESSING AND PRODUCTION OF CANNABIS



Standards Council of Canada  
Conseil canadien des normes



# Standards cont...

Also:

- NFPA 36: Standard for Solvent Extraction Plants
- NFPA 420: Standard on Fire Protection of Cannabis Growing and Processing Facilities [in development]



# Other Resources

## Coming Soon

- Cannabis Extraction and Processing Pressure Vessel Risk Advisory
- Health and Safety in Cannabis Extraction and Processing



# Questions?



Green CulturED