Me abis



- Srtuctural Overview of the Industry

Jared J. Nieuwenhuis - Founder of Cannabis ChemLab

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How does the industry work?

Step 1: Grow Facilities

- Plants are either grown from seed or cloned from mothers.
- Mothers are mature plants that growers take cuttings from to serve as clones.
- Once the plants reach 12 inches, each plant is logged into METRC and issued an Identification Tag.
- Those tags are grouped into a batch.
- ***Once harvest and curing are completed, if the flower is destined for the dispensary, the labs take their samples from the finished batch.***
- ***If not, the flower moves on to Step 2.***







How does the industry work?

Step 2: Extraction

- There is a wide range of methods for extracting cannabinoids from the biomass. And an even greater range of products resulting from extraction.
- ***Once the extractions are completed, if the concentrate is destined for the dispensary, the labs take their samples from the finished batch.***
- ***If not, the Concentrates moves on to Step 3.***







How does the industry work?

Step 3: Manufacturing Edibles

- Cannabis concentrates are mixed into a variety of substrates to form a large array of products.
- The edible products have a maximum potency of 50mg/unit.
- **Once manufacturing is complete, *the labs take samples from the finished batch.***







Tying it all together:

- **From seed to sale, METRC guarantees every gram of cannabis biomass, concentrate, and manufactured good is accounted for.**
- **METRC is the industry chain of custody, and the Department of Health monitors it daily.**
- **METRC physically prohibits transfers between establishments and dispensaries without a passing certificate of analysis from the labs.**
- **Every product you find in a dispensary has undergone and passed rigorous testing to ensure patient safety.**
- **SO, how do the analytical laboratories do it?**

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How testing labs ensure product quality



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Foreign Material

Organic and Inorganic

- Visually scan the product for the presence of things such as:
- Organic
  - Hair, bugs, etc…
- Inorganic
  - Plastic, metal shavings, glass, etc…



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Moisture/Water Activity

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Predictor of microbial growth

- Water Activity is the vapor or humidity given off by the product.
- Moisture is the % level of water in the product.
- Both are necessary to assess a product's shelf stability over time.

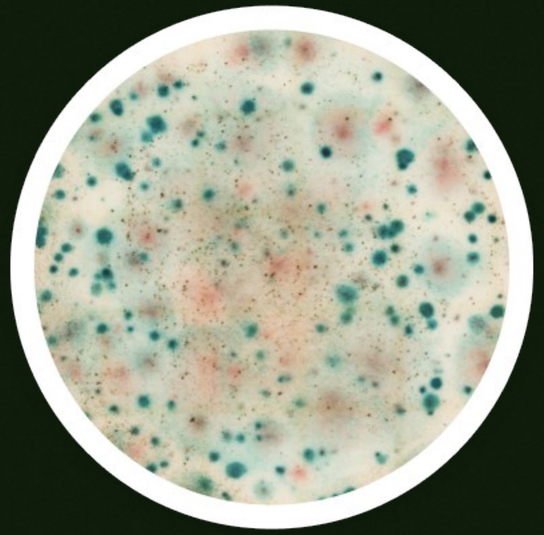


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Microbiology

Total Counts

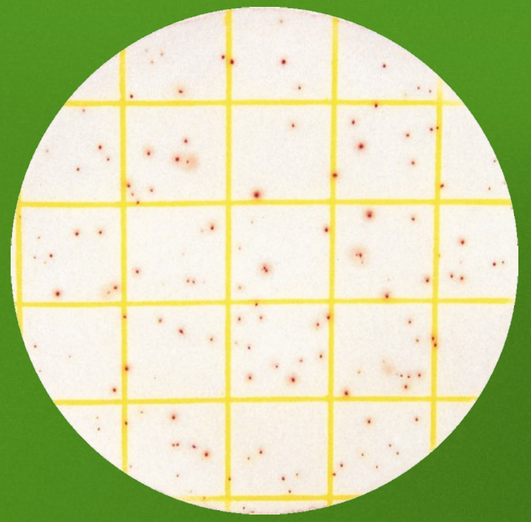
- Total Counts refers to the number of colonies that form on a plate.
- Total Counts are performed for the following:
  - Total Yeast and Mold
  - Total Bile Tolerant Gram Negative Bacteria
  - Total Aerobic Bacteria



TYM



BTGN



Aerobic

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Microbiology

Presence / Absence

- Presence/Absence means the product either has the contamination or it does not.
- Cannabis ChemLab employs DNA separation and amplification to detect these contaminants down to 1CFU/gram.
- Presence/Absence is performed for the following:
  - Aspergillus (Flavus, Niger, Fumigatus, Terreus)
  - Salmonella
  - STEC E.coli



Select AriaMx System

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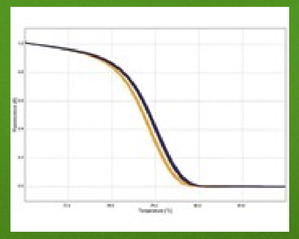


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AiraMx HRM analyis software

HP Laptop

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Potency

Concentration of Cannabinoids

- Potency is used to accurately label products in dispensaries. Think dosage.
- Cannabis ChemLab utilizes High-Pressure Liquid Chromatography (HPLC) to separate cannabinoids, identify them individually, and quantify their concentration.



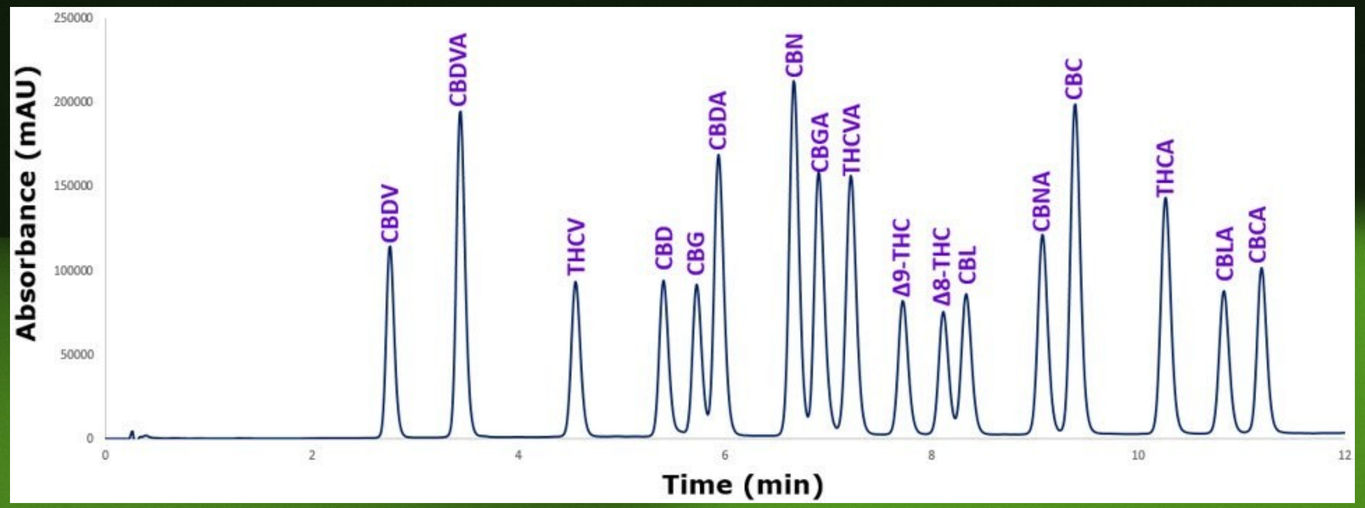
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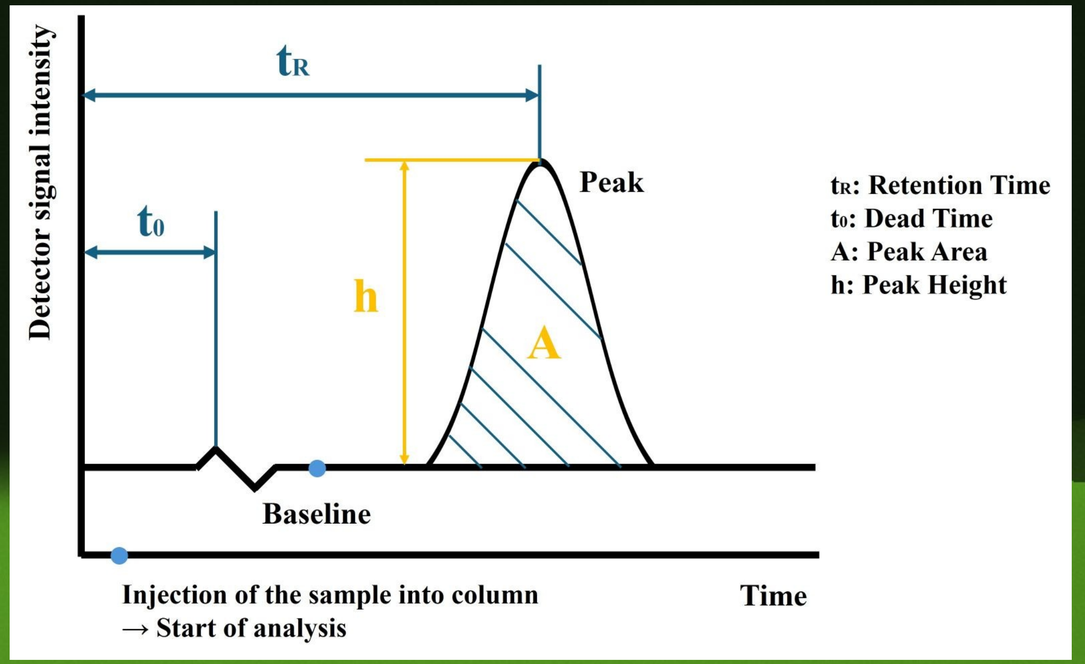
Potency

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Example of a chromatogram



Stock image



Stock image

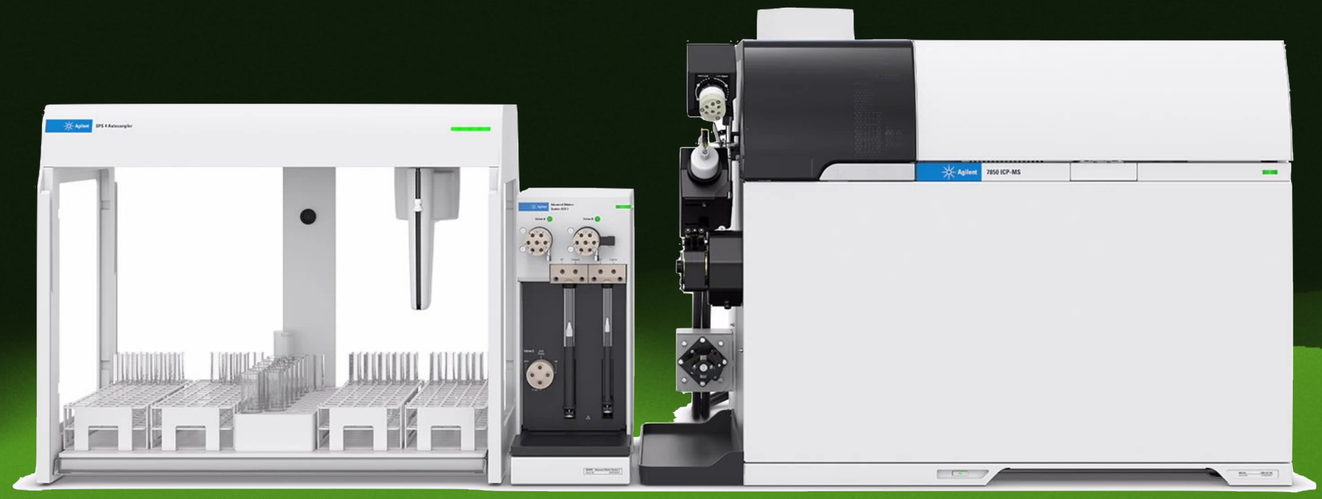
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Heavy Metals

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Lead, Arsenic, Cadmium, Mercury

- Heavy Metals are bioaccumulative, meaning the more you ingest or inhale, the concentration builds up in your body.
- We screen every batch of product for the BIG4.
- We utilize an inductively coupled plasma mass spectrometer, or ICP-MS, to detect and quantify the Big 4.



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Pesticides

Poison for Pests… and people.

- Repeated pesticide exposure can:
  - Irritate the lungs and airways
  - Affects the nervous system
  - Impact vulnerable patients with adverse health outcomes
- Cannabis ChemLab uses liquid chromatography coupled with a triple quadrupole mass spectrometer to detect and quantify pesticides down to ppt levels.



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Mycotoxins

Toxic chemicals made by mold

- Repeated mycotoxin exposure can:
  - Causes Liver and Kidney Damage
  - Lead to Immune System Suppression
  - Cancer Risk; Known Carcinogens
- Cannabis ChemLab uses liquid chromatography coupled with a triple quadrupole mass spectrometer to detect and quantify mycotoxins down to ppt levels.



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Residual Solvents

Leftover Chemicals from Extraction

- Repeated RSA exposure can:
  - Lung and Respiratory Damage
  - Liver and Kidney Toxicity
  - Neurological Effects: nerve damage
- Cannabis ChemLab uses gas chromatography coupled with a mass spectrometer and a headspace autosampler to detect and quantify RSAs down to ppb levels.



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Terpenes

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Aromatic compounds in all plants

- Minor health impacts
  - Some people are allergic to certain terpenes.
- Cannabis ChemLab uses gas chromatography coupled with a mass spectrometer to detect and quantify terpenes down to ppb levels.



What does it mean to PASS testing?

- **The South Dakota Department of Health has established ACTION LIMITS for each test panel.**
- **If the product EXCEEDS those ACTION LIMITS, the product fails that test panel.**
- **If the product FAILS, it must be remediated or destroyed.**
- **Test data is uploaded to METRC where it connects all the way back to the batch.**
- **That batch can not be moved to another Medical Cannabis Establishment without approval from the DoH.**
- **Establishments can either RETEST, REMEDIATE, OR DESTROY the batch.**

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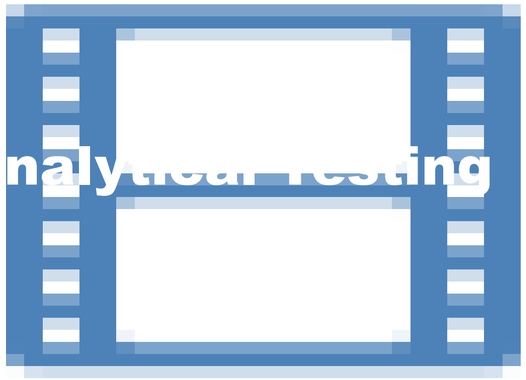
Cannabis is the most highly tested and regulated agricultural product and medicine in the state of South Dakota.

Destroying the Medical Cannabis Program

wont stop people from accessing cannabis

But it will stop people from accessing

Safe, Tested, Clean Cannabis


nalytical Testing