OREGON HEALTH AUTHORITY

August 5, 2025

Improving the Reliability of Data for Cannabis Testing

Environmental Measurement Symposium

St. Louis, MO

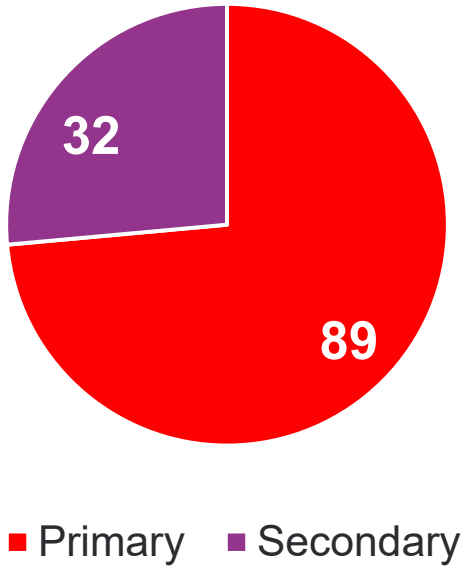
Oregon Environmental Laboratory Accreditation Program

- ORELAP is part of Oregon Health Authority (OHA)
- Accredit environmental, drinking water, cannabis, and psilocybin testing labs to 2016 TNI Standards & Oregon Administrative Rules (OARs)

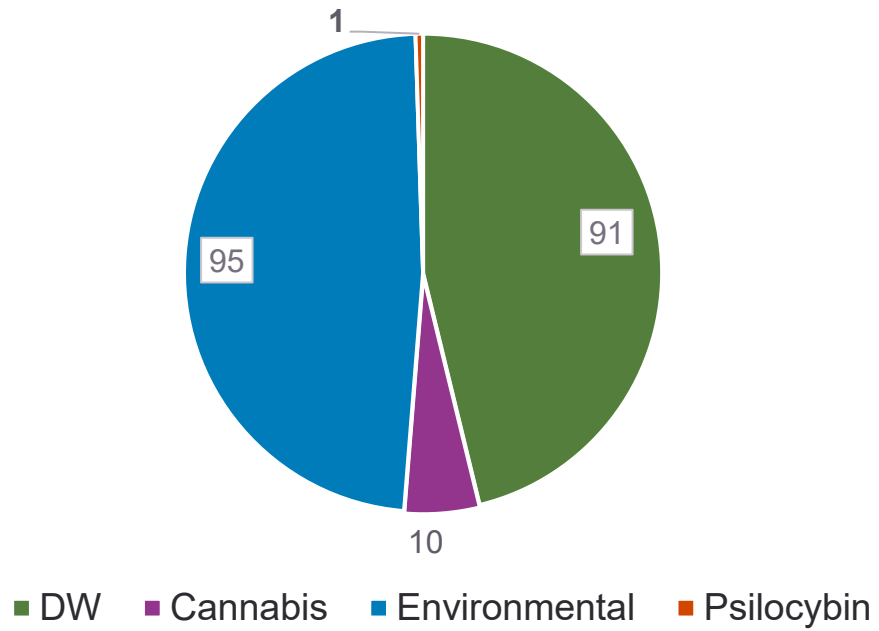
ORELAP at a glance…

121 Total Laboratories in Program

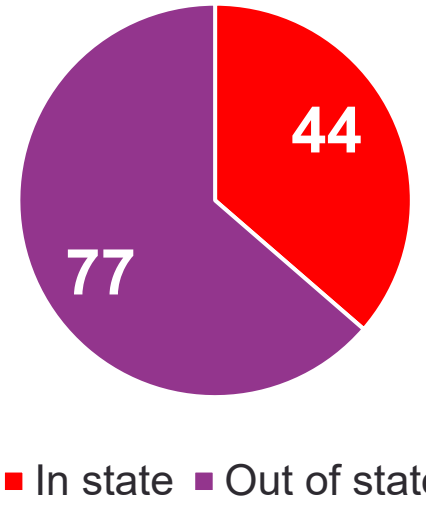
Accreditation Type



Laboratory Type



In/Out of state



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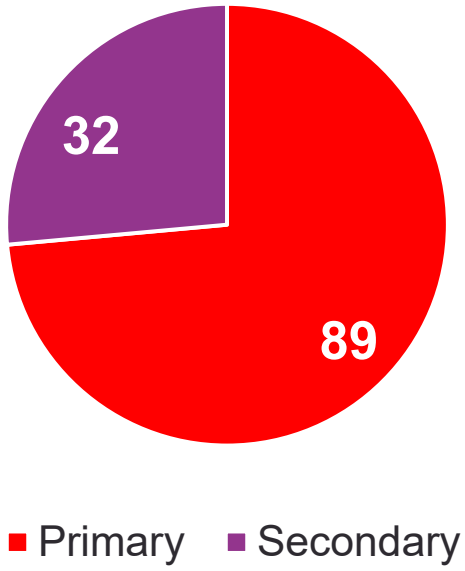

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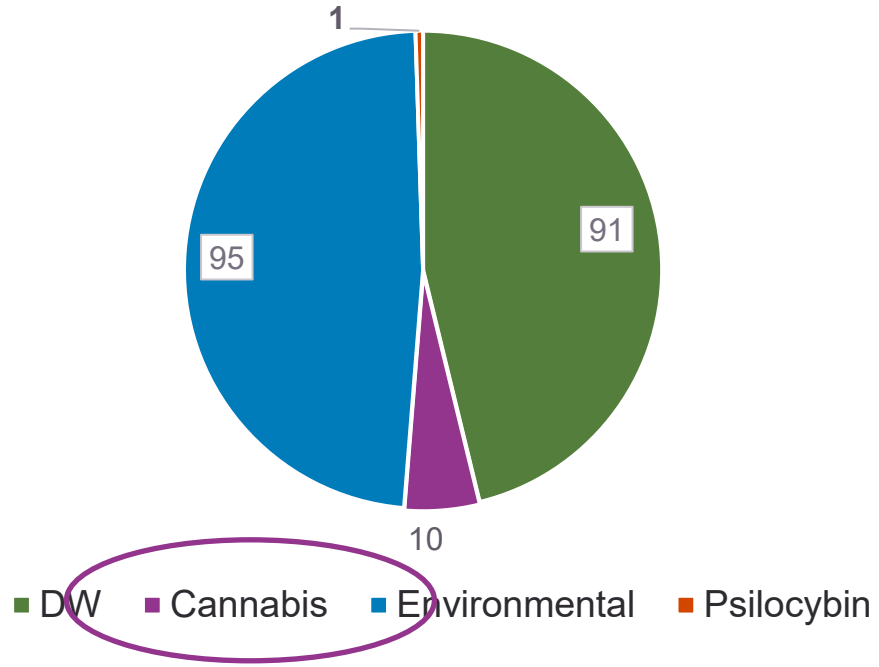

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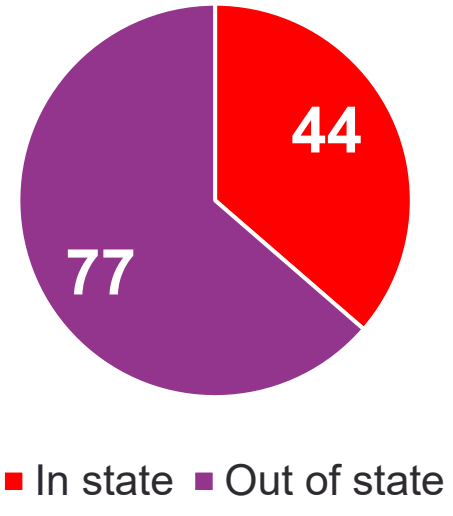


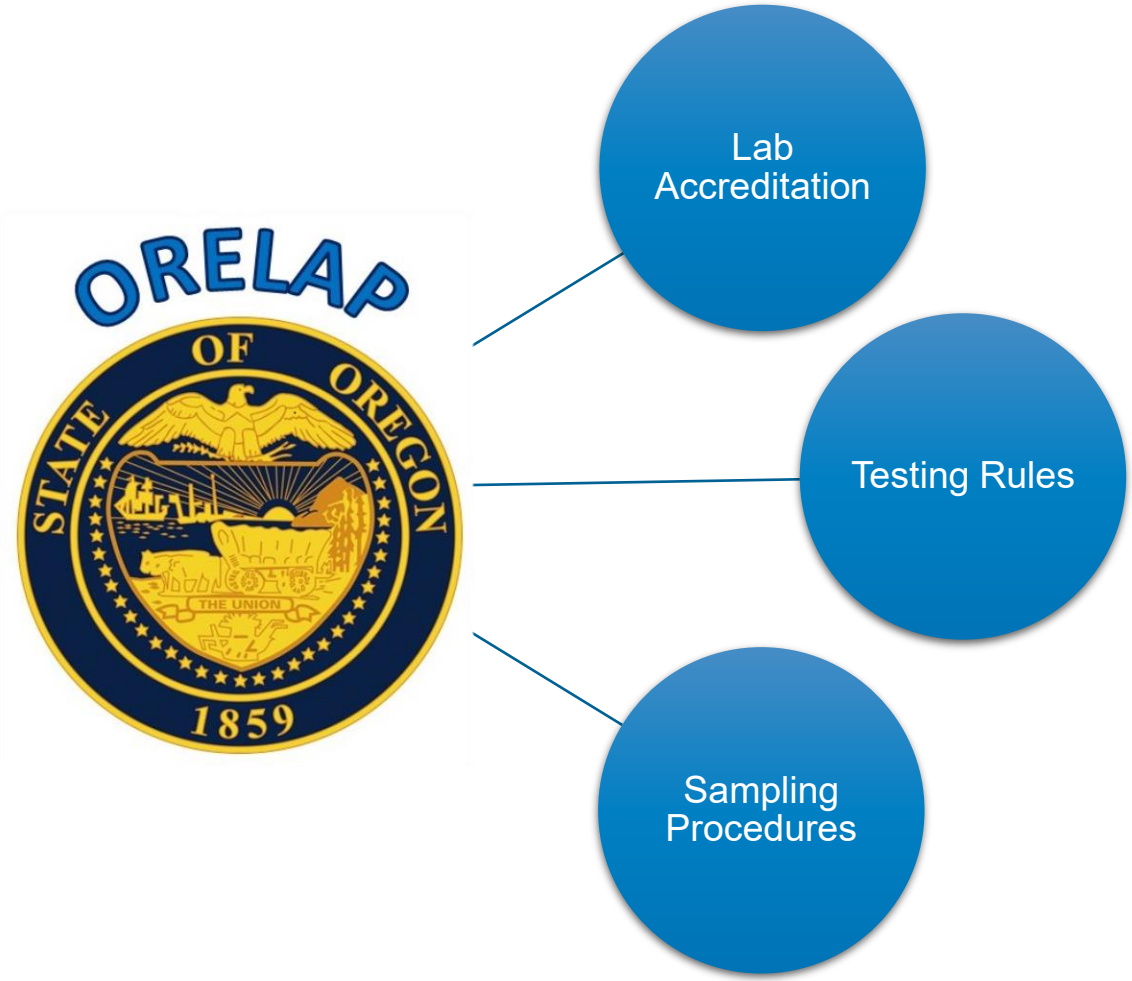
Cannabis Testing Regulations in Oregon

ORELAP accreditation required

Samples taken by laboratory staff

Fields of Accreditation:

- Potency (cannabinoids)
- Contaminant testing
- Water activity
- Moisture content
- Sampling



Required Testing

Familiar analyte classes and technologies to the environmental laboratory:

Pesticides & Mycotoxins	LC-MS/MS
Residual solvents	GC-head space MS
Heavy metals	ICP-MS

Required Testing

And some less familiar analyte classes and technologies:

Cannabinoids	HPLC-DAD or UV-Vis
Moisture content	Moisture balance
Water activity	Water activity meter
STEC and Salmonella	qPCR

Oregon's framework for ensuring cannabis testing data quality:

Sampling

Protocol for Collecting Samples of Usable Marijuana

ORELAP-SOP-001 Rev. 4.1

Protocol for Collecting Samples of Concentrates, Extracts, and Products

ORELAP-SOP-002 Rev. 4.3

Data Quality Issues in Cannabis Testing

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Obstacles unique to cannabis testing:

1. Inconsistent regulations between states
2. Reference methods lack sufficient detail
3. Market dynamics – higher THC results favored
4. Cannabis material heterogeneity

Inconsistent State Regulations

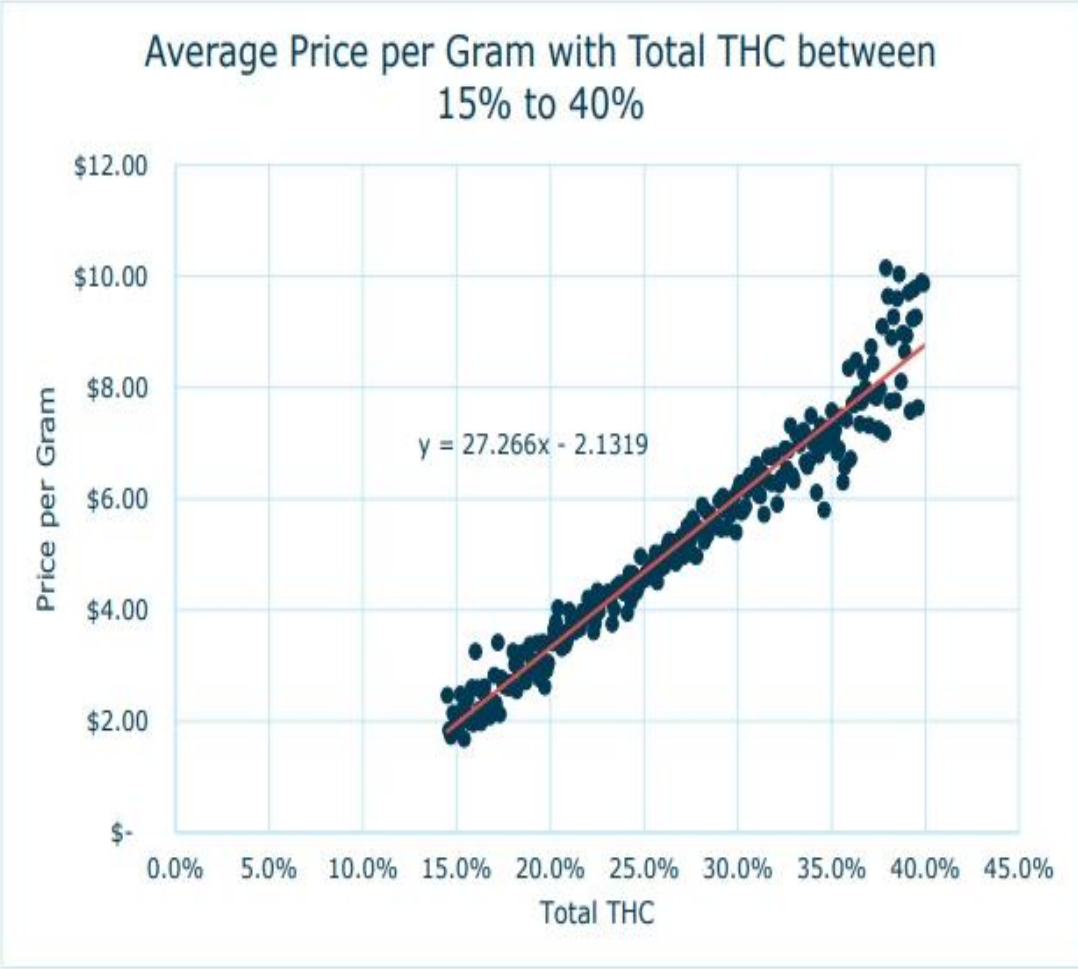
- Pesticides, metals, microbiological testing requirements
- Frequency of testing
- Sampling rules
- Complicates PTs for nation-wide use

Reference Methods

- National standards bodies have developed some methods specific to cannabis
- Differences between state regulations hamper efforts at standardization
- Diversity of matrices



Market Dynamics in Oregon's Cannabis

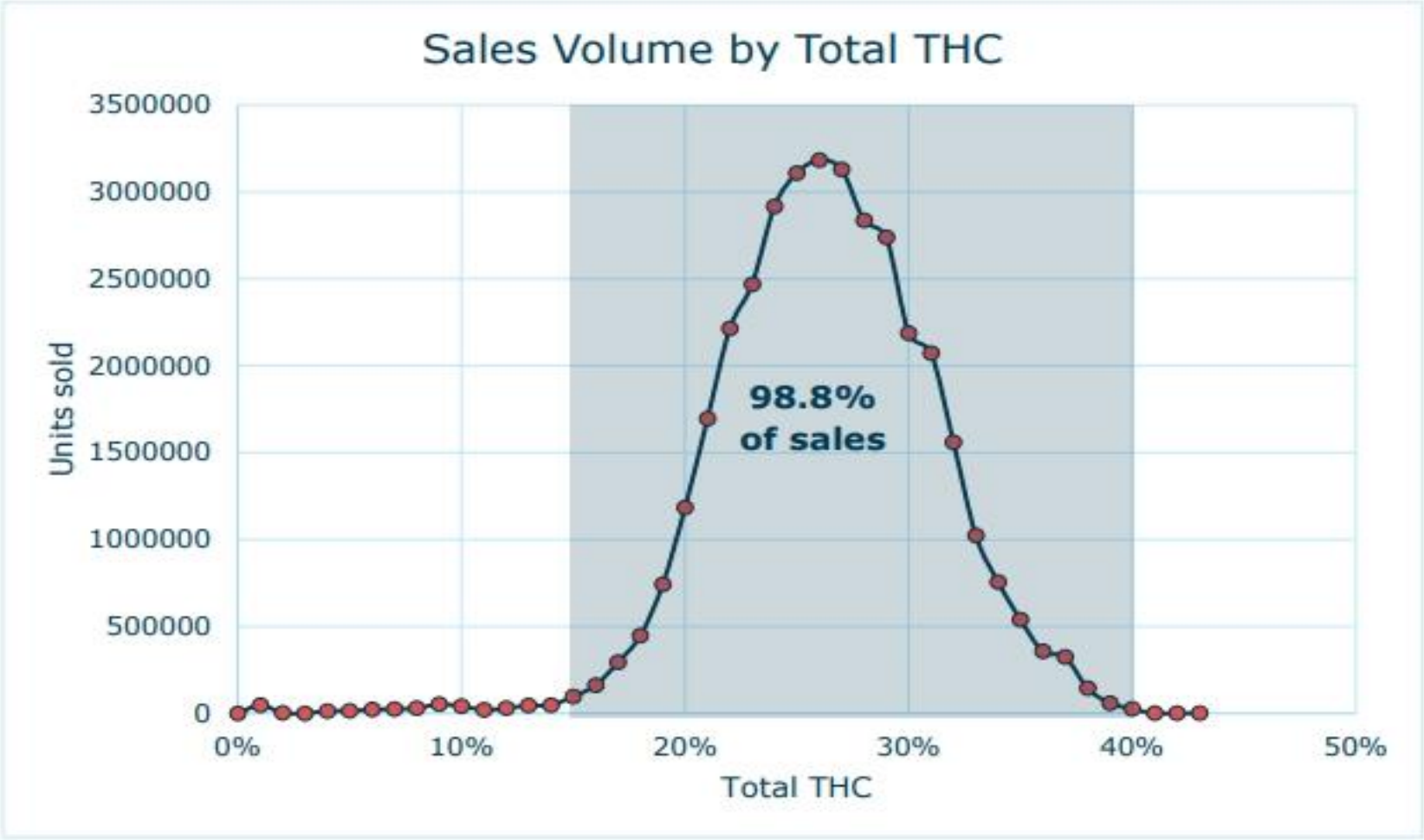


- A single number for Total THC is reported on labels
- Wholesale price of cannabis flower is THC-dependent
- Price to consumers is also dictated primarily by Total THC

Total THC = THCA + (0.877 * d9-THC)

Standiford, Crowley, & Voelker. Technical Report: Evaluating Compliance, Potency, and Pesticides in Oregon's Marijuana and Hemp Markets. OLCC. 2025 May

Market Dynamics in Oregon's Cannabis



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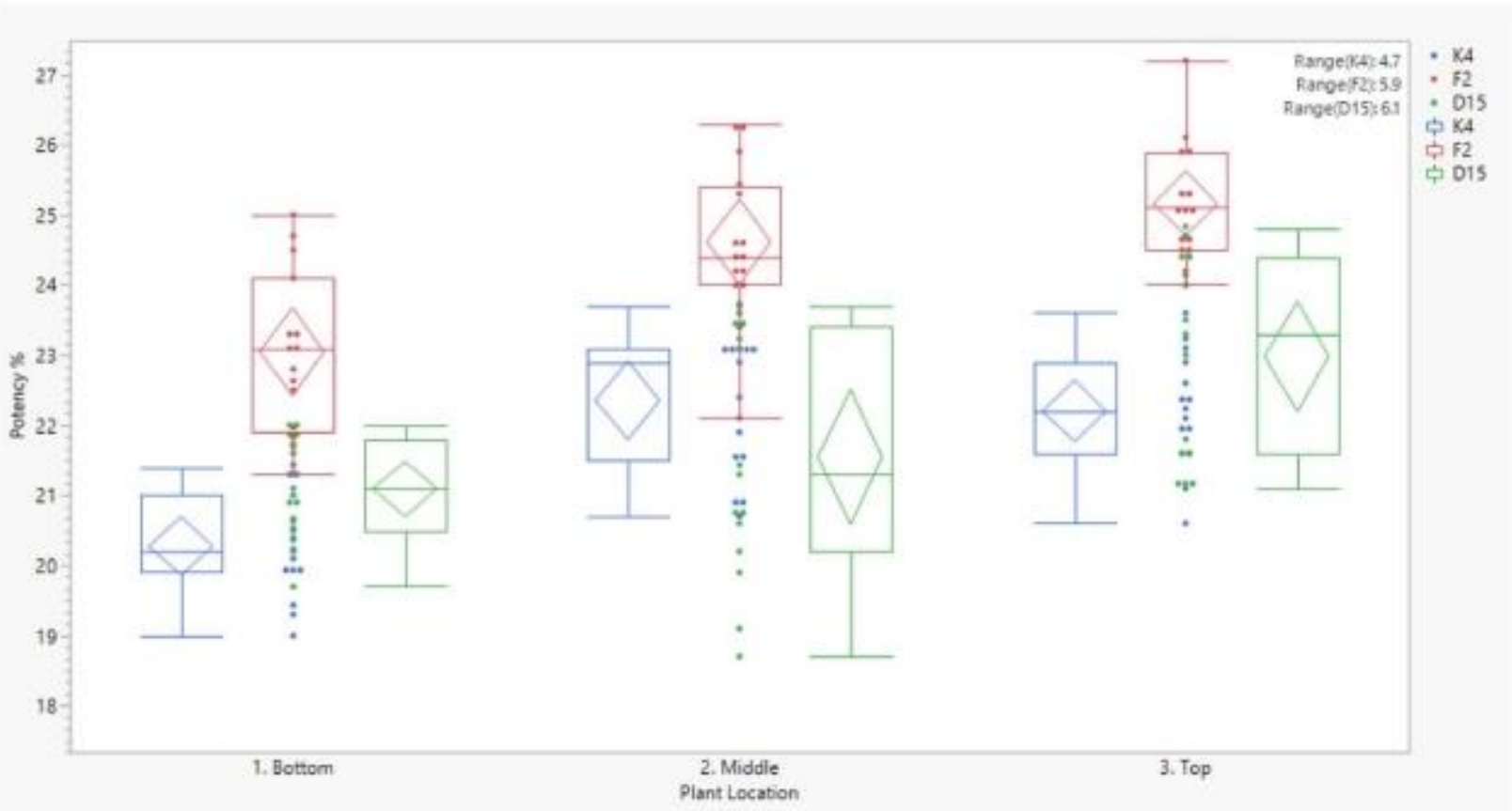
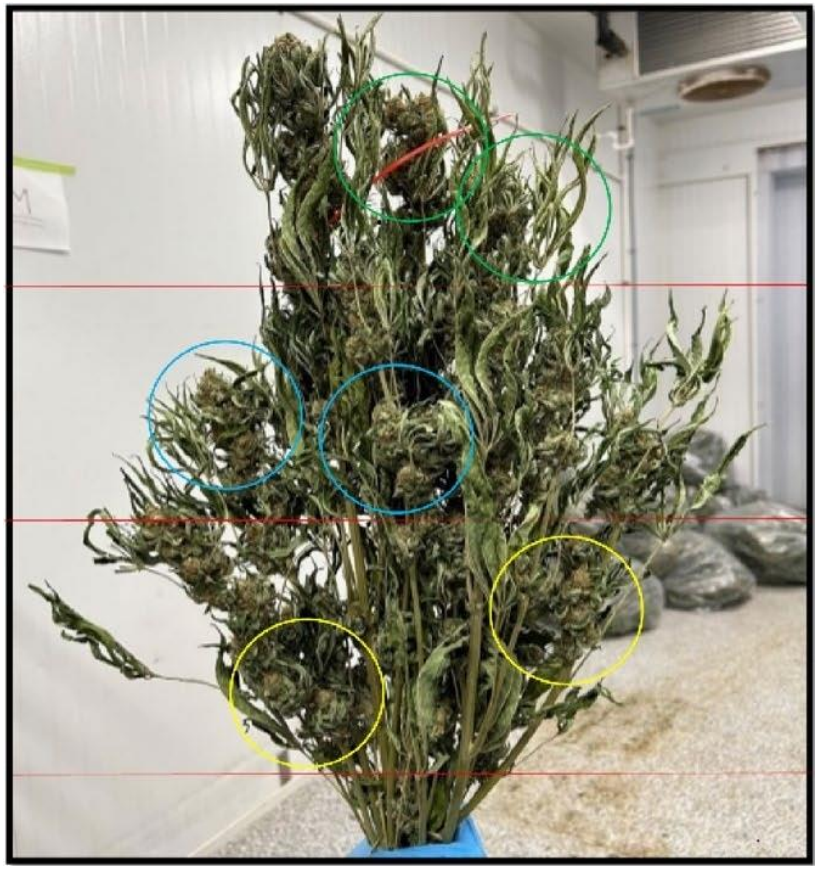
Cannabis Material Heterogeneity





Cleary, B., Maloney, K., Toor, A. *et al.* Variability of total THC in greenhouse cultivated dried Cannabis. *Sci Rep* **15**, 25285 (2025). https://doi.org/10.1038/s41598-025-06962-2

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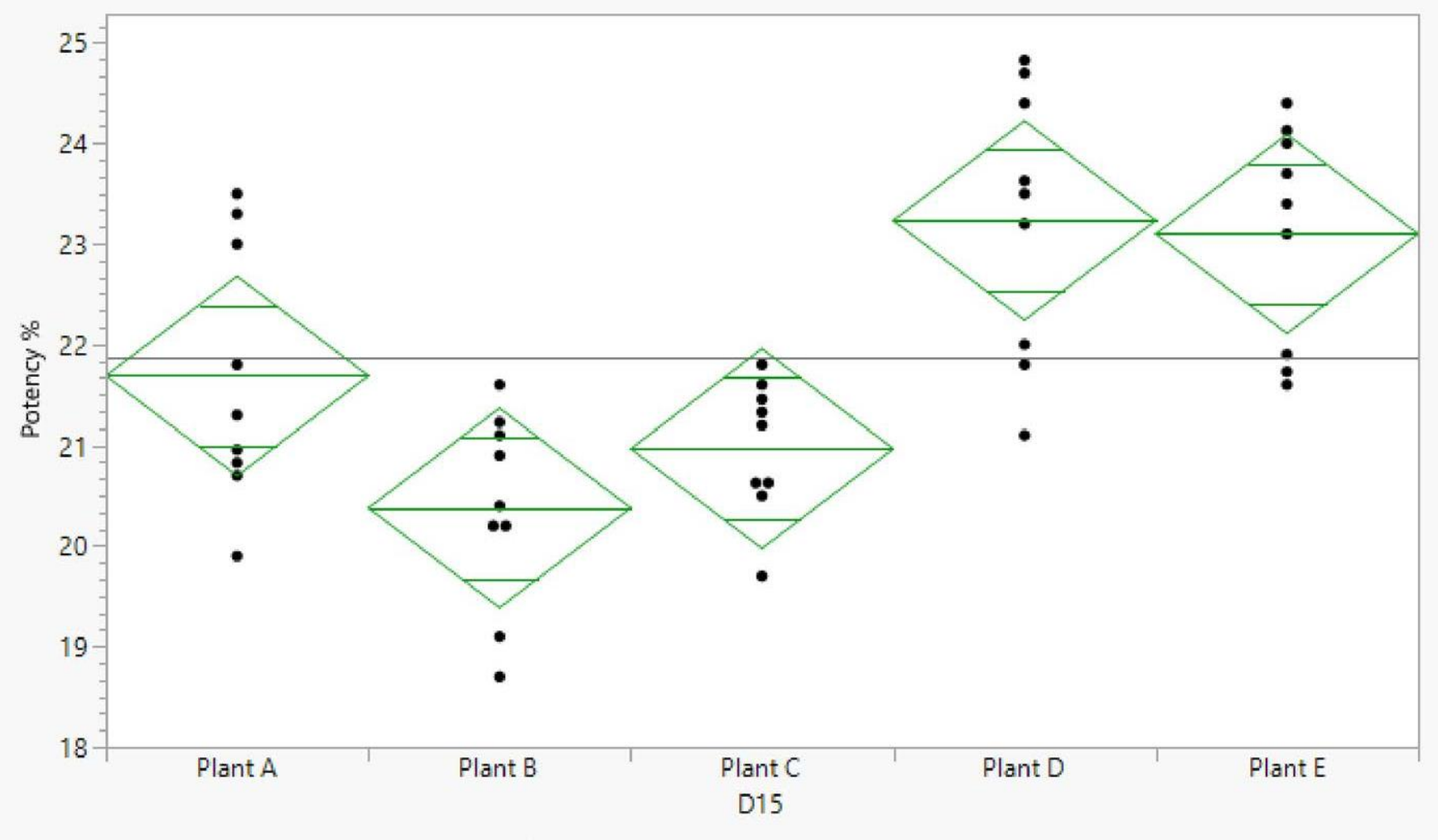

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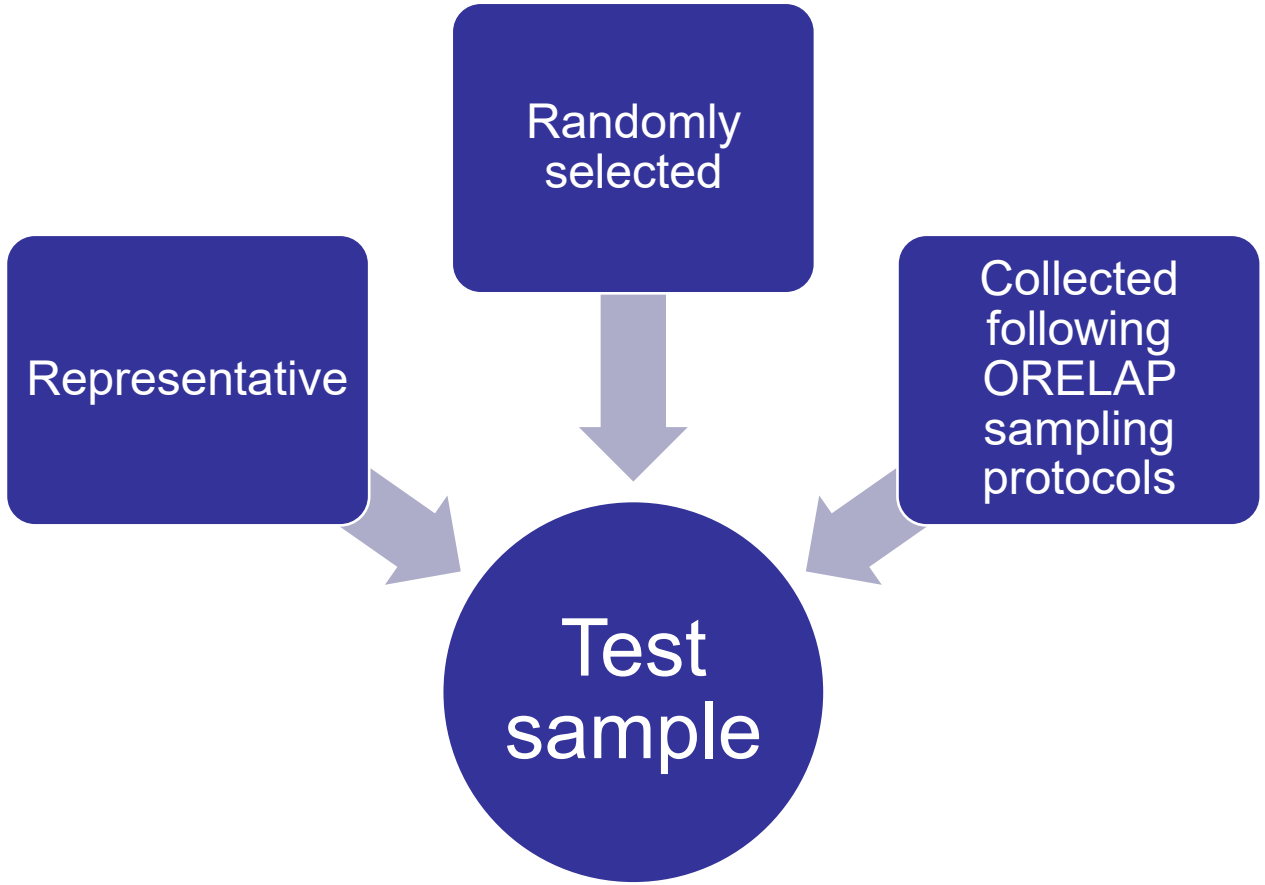
Prescriptive Sampling Procedures as a way of Improving Reliability of Testing Data

Representative Sampling



Sampling Objectives

Collect samples in a random and representative manner

Random sampling decreases intentional or unintentional bias

Representative means every piece of the batch has an equal chance of being selected for testing

"The Quality of the Data Can Only be as Good as the Quality of the Sample"

Representative Sampling

- Minimum sample mass – 0.5% of batch weight for cannabis flower
- Prescribed minimum number of increments
- Each increment should be approximately equal

ORELAP Sampling Protocols

Protocol for Collecting Samples of Usable Marijuana

ORELAP-SOP-001 Rev. 4.1

Table 2 – Minimum number of sample increments for the primary sample based on batch size.

Size of batch (lbs)	≤ 4.0	≤ 8.0	≤ 12.0	≤ 16.0	≤ 20.0
No. of increments	7	8	9	10	12

Size of batch (lbs)	≤ 24.0	≤ 28.0	≤ 32.0	≤36.0	≤40.0
No. of increments	14	16	18	20	24

Size of batch (lbs)	≤44.0	≤48.0	≤50.0
No. of increments	28	32	36

Protocol for Collecting Samples of Concentrates, Extracts, and Products

ORELAP-SOP-002 Rev. 4.3

Table 7 - Sample increments per batch size of cannabinoid concentrates, extracts, finished inhalable cannabinoid products, or industrial hemp-derived vapor items for the primary sample, the duplicate sample, and replicate samples based on weight of the batch or process lot. Each replicate sample shall include the number of increments required for the primary and duplicate.

Batch Weight		Sample Increments Required		Number of Replicates
Pounds	Kilograms	Primary	Duplicate	
0-3.31	0-1.50	1	1	
3.32-6.61	1.51-3.00	3	3	
6.62-13.23	3.01-6.00	5	5	
13.24-26.46	6.01-12.00	7	7	
26.47-55.12	12.01-25.00	7	7	1
55.13-110.23	25.01-50.00	7	7	2
110.24-220.46	50.01-100.00	7	7	3

Examples of Improper Sampling

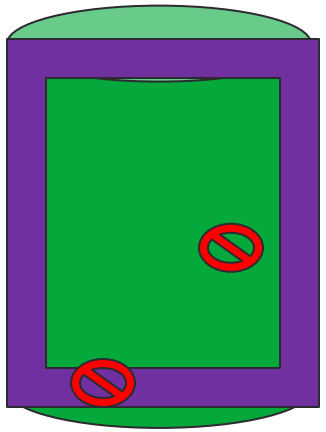
Wrong: Samples only collected from top

= Pesticides

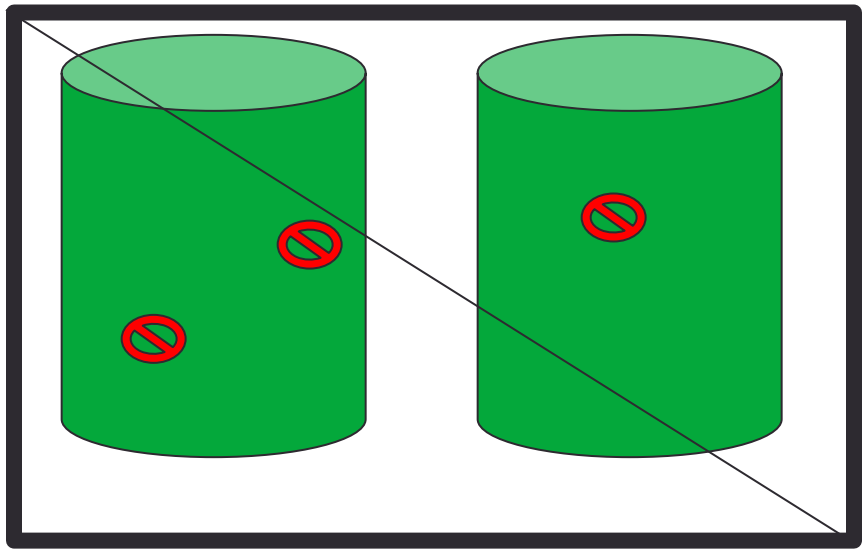
= Area Sample Collected

Examples of Improper Sampling

Sampler does not
have access to entire batch!



2 containers are hidden



= Pesticides

= Location Sample Could be Collected

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"The Quality of the Data Can Only be as Good as the Quality of the Sample"

Questions?

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