

Variability of Cannabinoid Potency within Process Lots of Cannabis Flower

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L a b o r a t o r i e s



Goal of the Study

- Determine the variability of cannabinoid potency between different samples from the same process lot – only looking at Total THC
- How representative is a single sample of the entire lot?

Case Study 1 –Indoor Grow

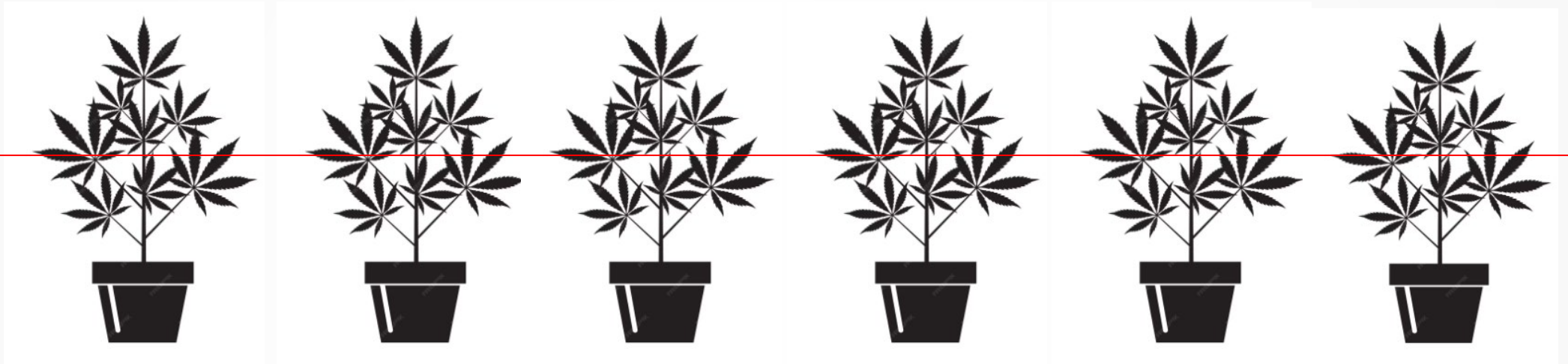
- 6 Plants of the same cultivar/process lot – LA Kush Cake
 - Plants ordered 1-6 from front to back of row
- ~10 grams sampled from the top and bottom halves of each plant
- 4 one-gram samples tested from each 10-gram homogenized sample



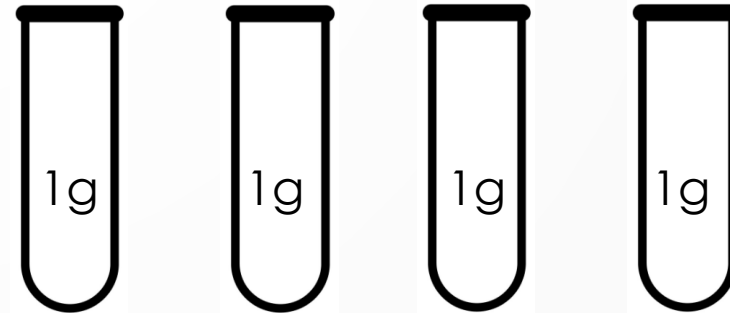
Case Study 1 –Indoor Grow

10 grams

10 grams



Each 10 grams



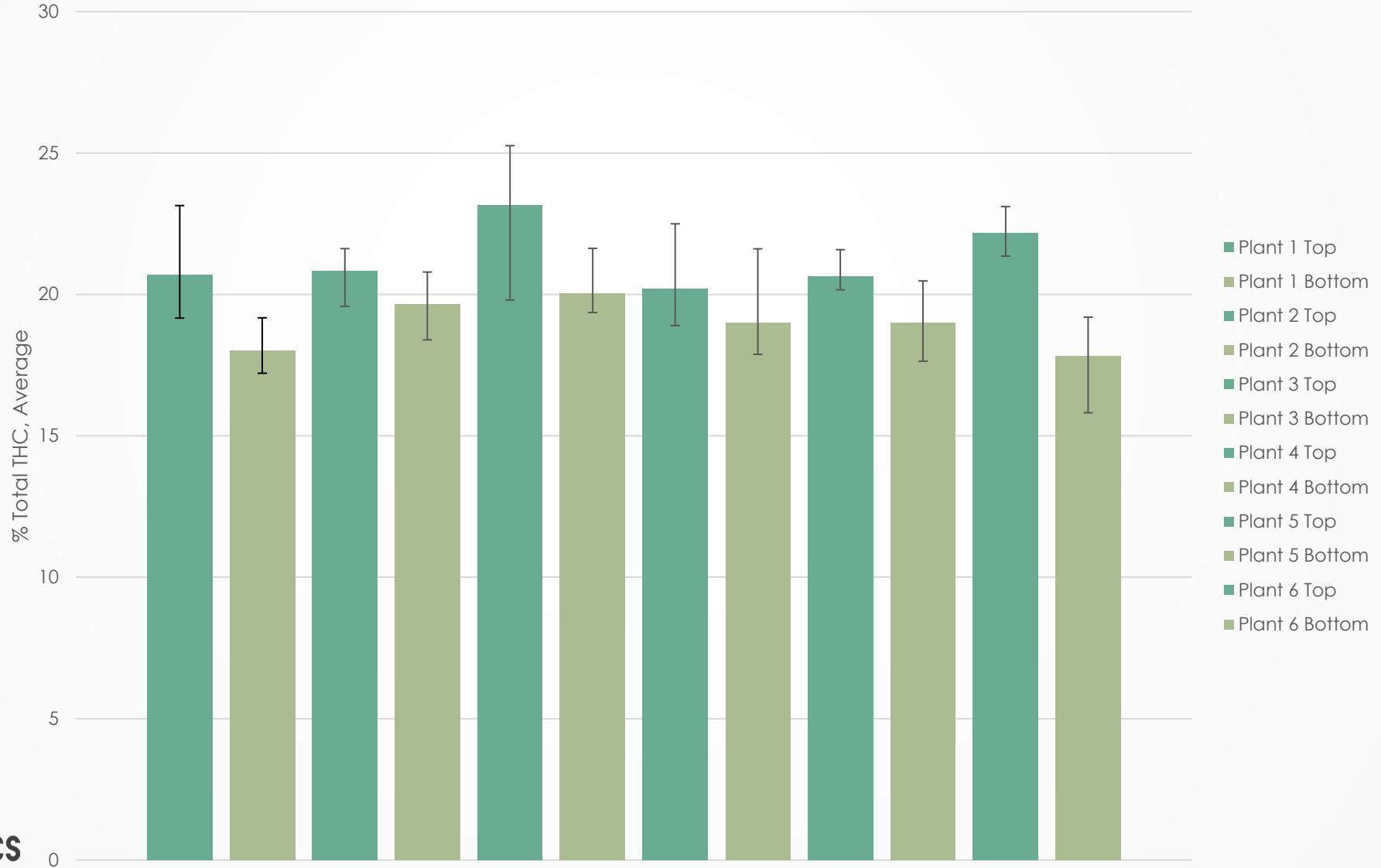
Case Study 1 –Indoor Grow



Case Study 1 – Results

Sample	Lowest Result % Total THC	Highest Result % Total THC	Average Result % Total THC
Plant 1 Top	19.16	23.14	20.7
Plant 1 Bottom	17.21	19.17	18
Plant 2 Top	19.58	21.62	20.83
Plant 2 Bottom	18.39	20.79	19.66
Plant 3 Top	19.8	25.26	23.17
Plant 3 Bottom	19.36	21.63	20.03
Plant 4 Top	18.9	22.5	20.2
Plant 4 Bottom	17.88	21.61	19
Plant 5 Top	20.16	21.58	20.65
Plant 5 Bottom	17.64	20.58	18.99
Plant 6 Top	21.35	23.1	22.17
Plant 6 Bottom	15.81	19.19	17.83

Case Study 1 – Results



Case Study 1 – Takeaways

- Top halves of plants usually produce bud with higher THC, but only consistently in one plant
- One sample taken at random from this process lot could range from 15.81 – 25.26 % Total THC

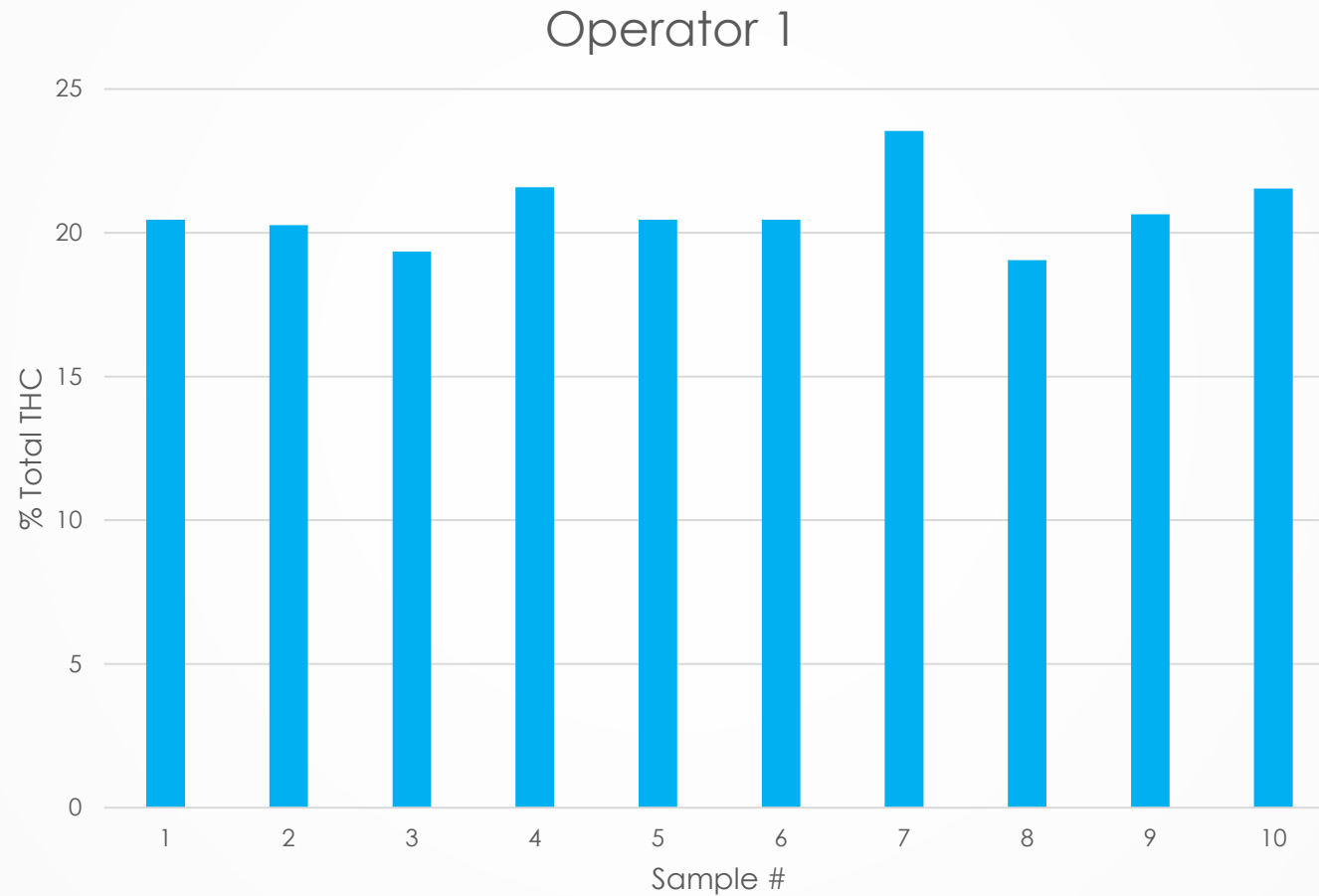


Intra-Lab Variability

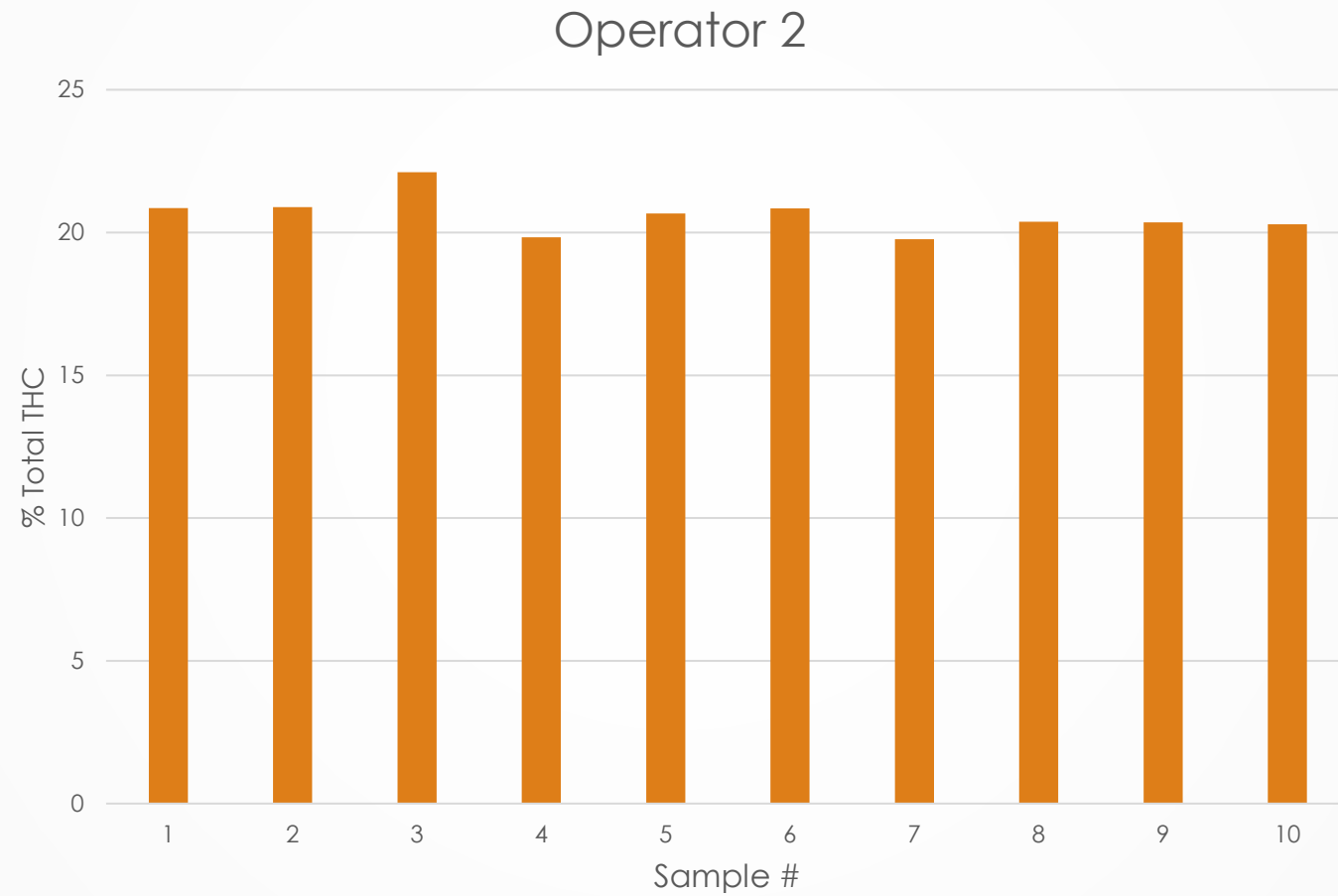
- Homogenized all of the remaining flower
 - ~36g, 6g from the top/bottom of each plant
- Analyzed 30 x 1 gram samples
 - 3 operators over 3 days, 10 samples/operator
- Operator = the person who weighs, extracts, dilutes, and analyzes the sample



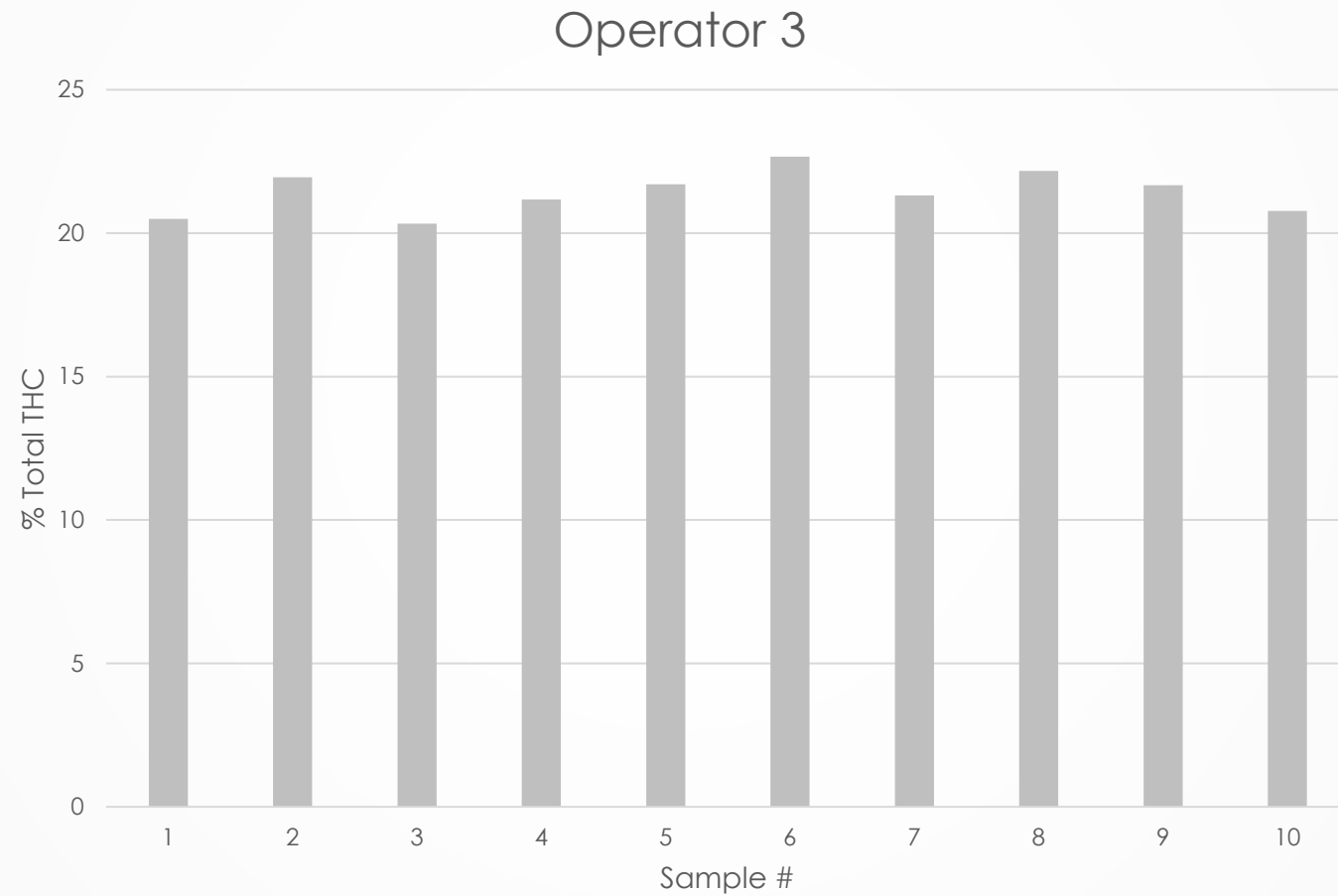
Intra-Lab Variability



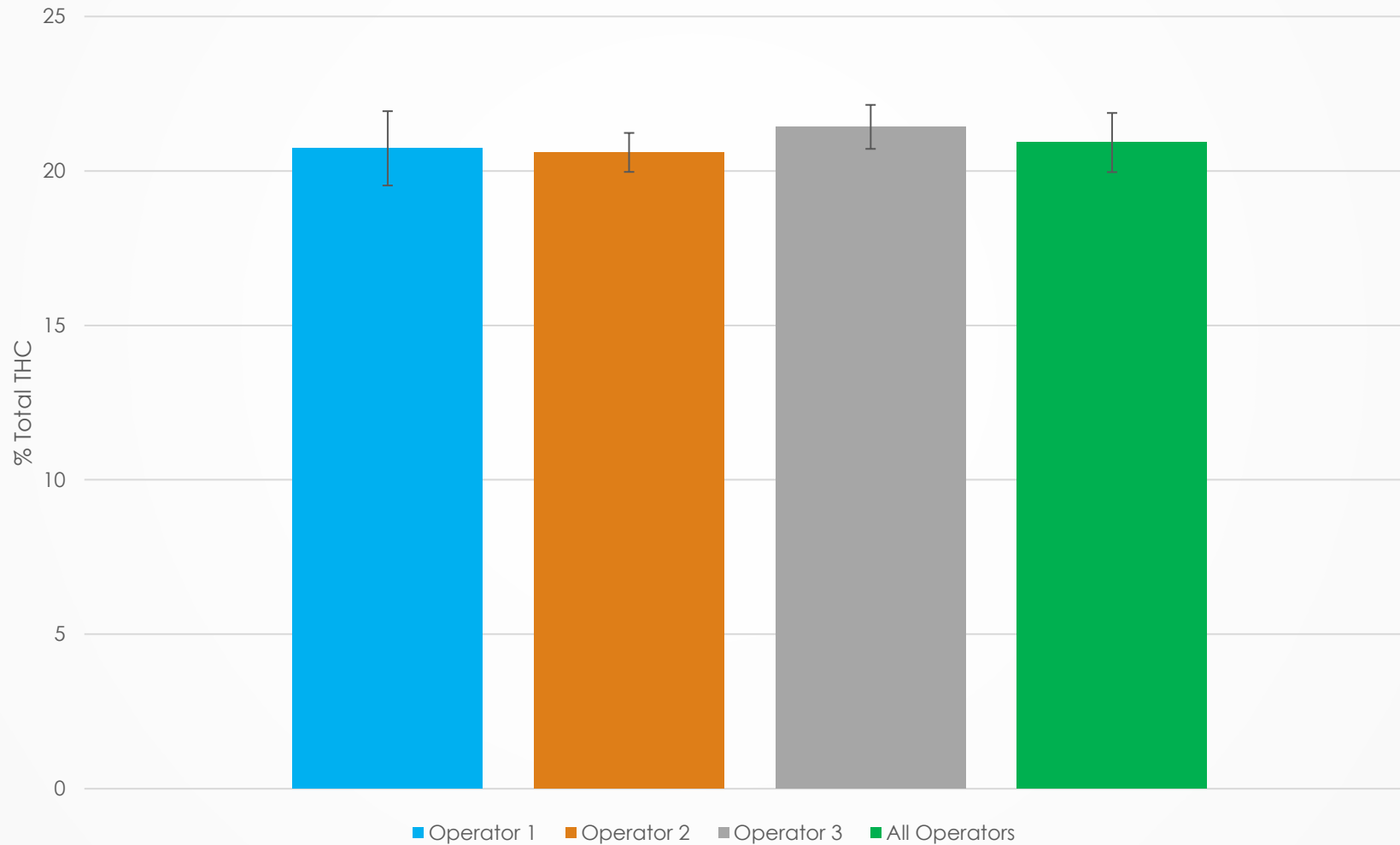
Intra-Lab Variability



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Intra-Lab Variability

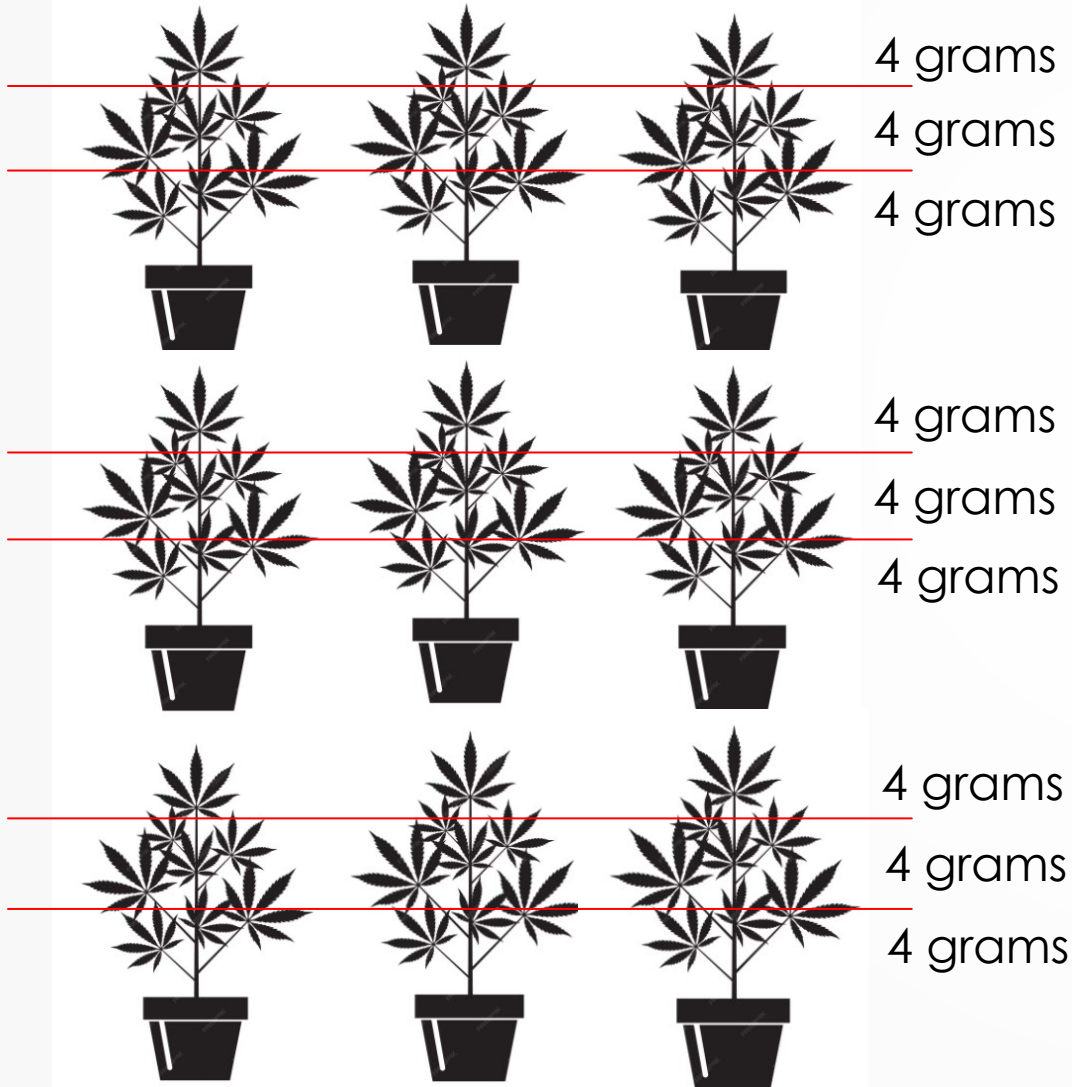
- Average of all results = 20.92 % Total THC +/- 0.96%
 - 4.6% Coefficient of Variance (Std Dev/Mean)
 - >95% of tests from a well-homogenized sample will be within +/- 10% of the mean value for that sample
- This means that if we test 20 1-gram extractions from a sample with an average value of 20% Total THC, $\geq 19/20$ results will be between 18-22% Total THC

Case Study 2 –Indoor Grow

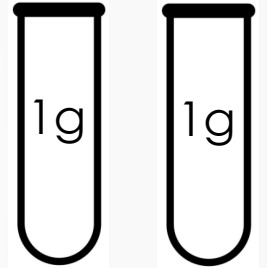
- 3 cultivars (process lots) – Tropicana Slurpee, Starfighter, Super Boof
- 3 plants per cultivar - front, middle, and back of row
- ~4 grams each from the top, middle, and bottom of each plant, homogenized and tested with duplicate 1g extractions



Case Study 2 –Indoor Grow



Each 4 grams



Case Study 2 – Indoor Grow

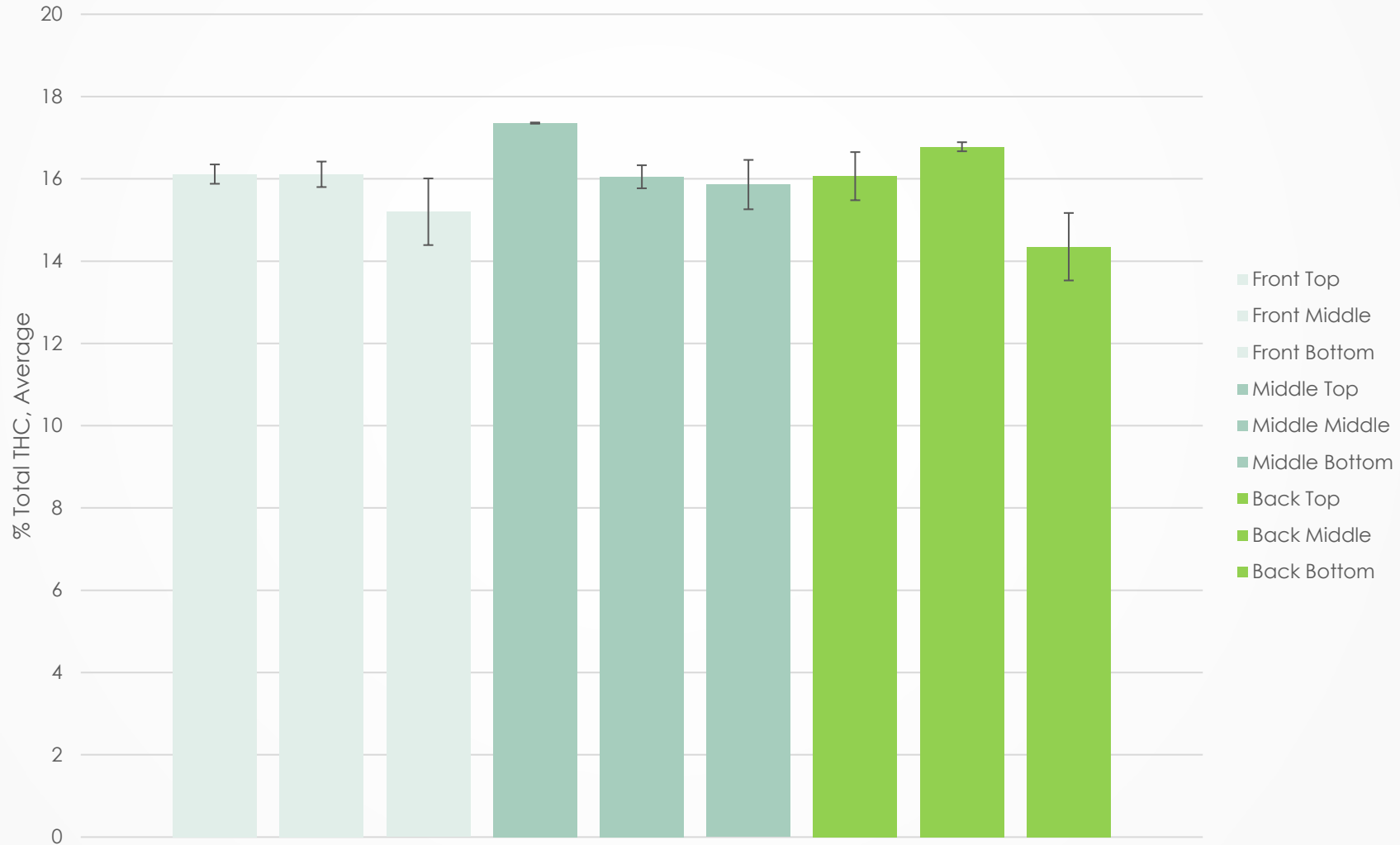


Case Study 2 –Tropicana Slurpee

Sample	Total THC Result 1 (%)	Total THC Result 2 (%)	Average (%)
Front Top	16.35	15.88	16.12
Front Middle	15.8	16.42	16.11
Front Bottom	14.39	16.01	15.2
Middle Top	17.37	17.34	17.36
Middle Middle	16.33	15.77	16.05
Middle Bottom	15.26	16.46	15.86
Back Top	15.48	16.65	16.07
Back Middle	16.67	16.89	16.78
Back Bottom	13.53	15.17	14.35

Average = 15.99%

Case Study 2 –Tropicana Slurpee



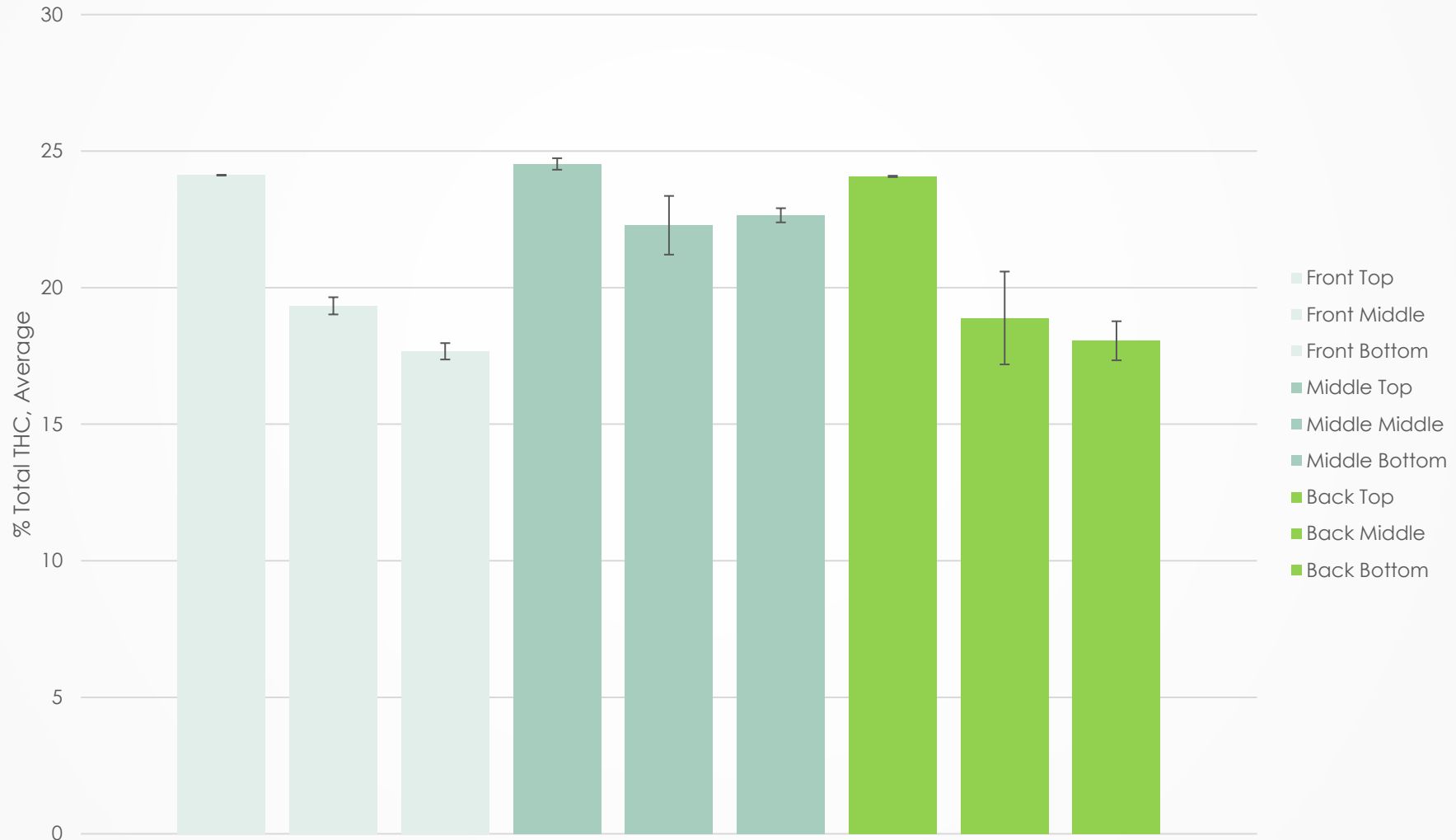
Case Study 2 –Starfighter

Sample	Total THC Result 1 (%)	Total THC Result 2 (%)	Average (%)
Front Top	24.11	24.13	24.12
Front Middle	19.65	19.02	19.34
Front Bottom	17.97	17.37	17.67
Middle Top	24.74	24.32	24.53
Middle Middle	23.36	21.21	22.29
Middle Bottom	22.39	22.91	22.65
Back Top	24.05	24.1	24.08
Back Middle	20.59	17.19	18.89
Back Bottom	17.34	18.77	18.06

Average = 21.29%



Case Study 2 – Starfighter

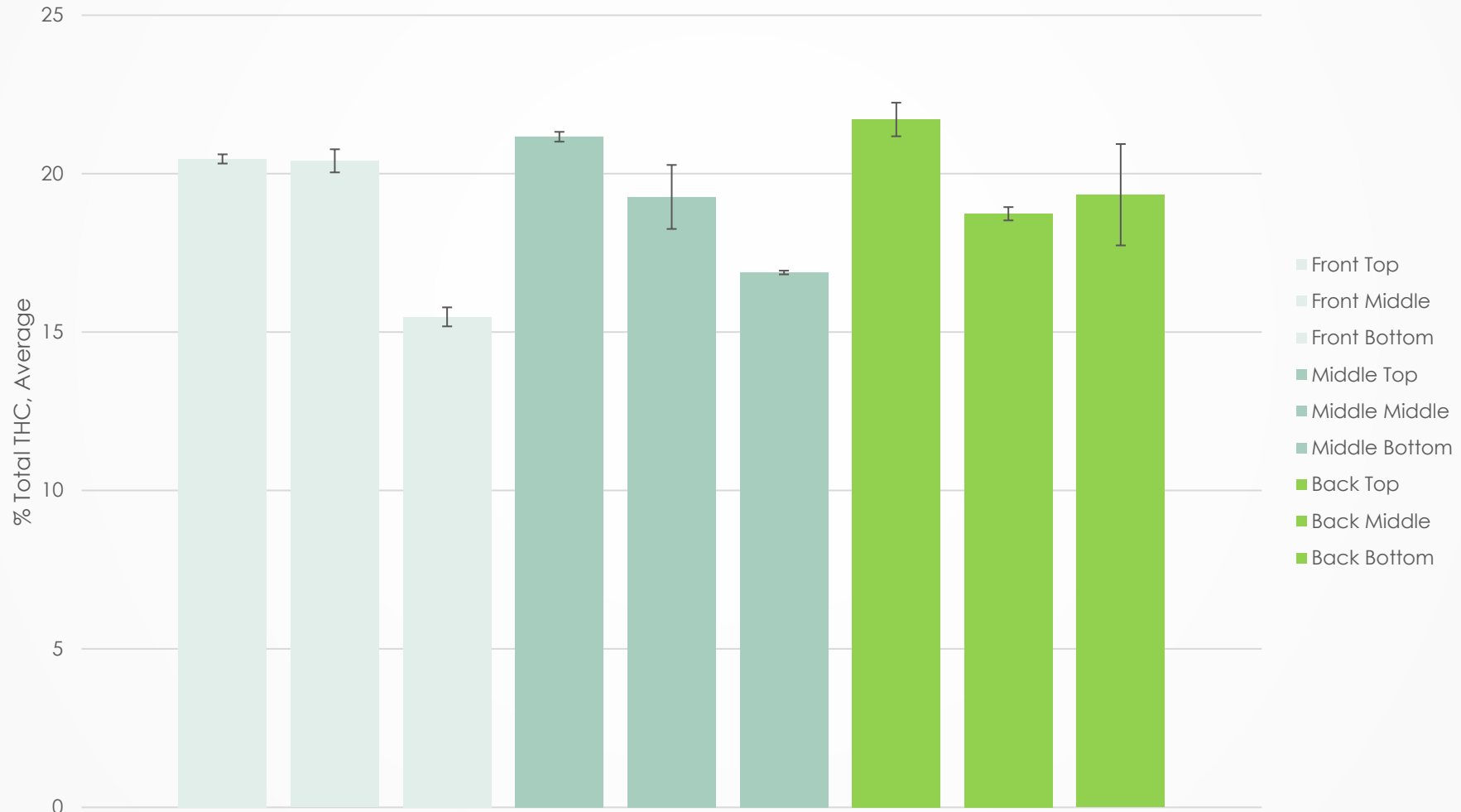


Case Study 2 –Super Boof

Sample	Total THC Result 1 (%)	Total THC Result 2 (%)	Average (%)
Front Top	20.32	20.61	20.47
Front Middle	20.04	20.77	20.41
Front Bottom	15.18	15.78	15.48
Middle Top	21.32	21.01	21.17
Middle Middle	20.27	18.26	19.27
Middle Bottom	16.94	16.82	16.88
Back Top	21.18	22.24	21.71
Back Middle	18.94	18.53	18.74
Back Bottom	17.74	20.93	19.34

Average = 19.27%

Case Study 2 – Super Boof



Case Study 2 –Takeaways

- ▶ THC content generally higher Top > Middle > Bottom
 - ▶ Strain dependent, plant dependent
- ▶ Plants in the middle of the row might have slightly higher THC content (more light exposure?)
- ▶ Individual samples from the same cultivar can vary by >7% Total THC

Conclusion

- Total THC variability within process lots can be 7-10%
- For a representative result create a composite sample from tops and bottoms of several plants
- Larger sample size = less variability
- Next step is to expand the study to outdoor grows, larger process lots

Thank you!
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