Instantaneous Harvest Potency Results: Sunrise Case Study

March 2024

Traditional testing methodologies for cannabinoid potency can result in significant lag time between harvesting and obtaining COA results. The flower needs to be dried and cured, followed by further delays from shipping and sample queue at testing facilities. This impedes the beginning of the sales cycle and increases the potential for quality degradation in storage.

Ekidna has developed a test that enables growers to obtain accurate potency values from their flower as soon as it is cut off the plant, no drying or curing required. Ekidna worked with Sunrise to test their flower at harvest, enabling them to rapidly track a variety of conditions in their grow room, and demonstrated that the Ekidna results align perfectly with the COA obtained from their 3rd party testing laboratory, High North.

With Ekidna, Sunrise can know cannabinoid potencies to engage buyers earlier, with confidence in the knowledge that the values will align with COAs from High North.

Sunrise

Sunrise, located in Ottawa, is a pioneering force in blending the precision and rigour of advanced systems with the potential of cannabis. At Sunrise, quality, innovation, and transparency, combined with a relentless pursuit of excellence and unwavering commitment, results in product of the highest caliber. Justin Ambar, Sunrise's director, brings his expertise in food manufacturing regulations to quality assurance in cannabis, and has spearheaded the use of Ekidna's on-site test system to streamline their quality assurance process.

The Problem

A significant time delay exists between harvesting flower and obtaining cannabinoid potency results to begin the sales cycle, leaving producers with elongated lead times when moving product to market and risking quality degradation in storage. When using traditional testing methodologies, flower samples must first undergo the 3 - 4 week drying and curing process before being shipped. Further delays of 2 - 4 weeks can occur at testing laboratories due to long sample queues and shipping backlogs. All of these factors delay sales discussions by up to 8 weeks after harvesting while awaiting COAs, and result in a stagnant product being held in storage for 3 - 4 weeks while awaiting lab results.

As a wholesale provider of medical-grade craft cannabis, Sunrise is often delayed in going to market with its product due to a lack of THC potency knowledge for price setting. Sunrise needed an accurate testing system to analyze pre-harvest potency to secure pro-forma contracts without risking their reputation. Early knowledge of accurate cannabinoid potency, specifically THC, enables Sunrise's to begin entertaining sales conversations and effectively set prices.

Additionally, Justin wanted to investigate how cannabinoid potency might be varying throughout his plants, and throughout the grow room.

The Solution

Ekidna has been Sunrise's on-site test system of choice for post-harvest potency testing. To address the need for accurate and instantaneous potency results during harvest, Ekidna has developed a new testing procedure that can test cannabis flower immediately after being cut off the plant.

Recently, Sunrise began working with Ekidna to use their As-Is Fresh Bud Total THC Potency test to obtain rapid and accurate cannabinoid potency values. With Ekidna, Sunrise can now obtain their THC potency values up to 8 weeks sooner, enabling them to engage buyers and discuss prices weeks earlier, with confidence that the results from Ekidna will align with COA results from a trusted laboratory, High North.

Procedure

Ekidna worked with Sunrise at their facility on October 10th, 2023, to test one of their strains (Kandy Kiss) immediately at harvest. Sunrise wanted to know what the potency of their crop was, as well as how the potency varied throughout the grow room and within the plant.

For the first variable, two different locations in the grow room were sampled from (labelled as A and B in this report).

For the second, cannabis bud samples were collected from three different plant locations: Top (the tallest bud on the plant), Middle (flower that was partially blocked from the light by buds above it), and Base (flower that grew at the very bottom of the plant). The leaves were trimmed off the buds and approximately 1.65 g was tested directly with the Ekidna system using our As-Is Potency Test (Fresh Bud analysis procedure), with a total of 19 different samples investigated.

Ekidna also collected additional samples (using the sample types defined above) to determine moisture content using a vacuum oven method. This enabled Ekidna to convert the as-is fresh bud THCa potency into adjusted (to 0% moisture content) THCa potency. These oven-dried samples were also tested using the Ekidna As-Is Potency Test (Cured Bud analysis procedure) and compared directly to the adjusted potency results.

All Ekidna harvest samples and Ekidna oven-dried samples were submitted for laboratory analysis, using a 3rd party academic facility. On November 1st, 2023, Sunrise submitted cured Kandy Kiss samples to High North, a 3rd party testing laboratory; the COA results were received on November 17th, 2023.

Results

Potency Results: Ekidna Fresh Bud THCa Potency, Adjusted for Moisture

A direct comparison between THCa potency values obtained using Ekidna's As-Is THC Potency test and the industry standard testing methodology (HPLC, measured on solutions prepared from the Ekidna kits) are summarized above for all 19 fresh bud samples in the table below. All potency values have been adjusted to 0% moisture content, using the same moisture content values (reported later in this document) for each testing technique. Ekidna's results align perfectly with HPLC, with %THCa values

between the two methodologies all falling within ±10% relative difference. Minor fluctuations in potency values between samples are anticipated due to natural plant variations.

Sample Location		Mass (mg)‡	%THCa		% Relative Difference§
On Plant	In Room†		Ekidna	HPLC	
Top	A	1686*	30.05	29.56	1.69
		1650*	27.78	27.53	0.89
		1648	24.58	25.20	-2.47
		1667	25.59	24.00	6.60
		1650	24.78	22.91	8.17
		1807	26.39	27.36	-3.54
		1803	25.49	23.96	6.36
		1859	23.70	25.30	-6.32
Middle	A	1647*	24.90	26.30	-5.29
		1652*	24.75	24.63	0.50
		1656*	26.17	26.08	0.32
		1646*	29.89	28.69	4.18
Base	A	1646*	22.89	23.73	-3.57
		1634	19.86	20.51	-3.19
		1651	21.20	22.45	-5.57
		1662	20.19	20.86	-3.23
Top	B	1652*	22.21	22.74	-2.35
Middle	B	1658*	27.11	27.45	-1.23
Base	B	1630*	23.49	21.97	6.93

**Moisture value in calculation matched to corresponding sample; for all other samples, average of all moisture content values (for that sample type) used.*

†A/B labels refer to different locations in grow room.

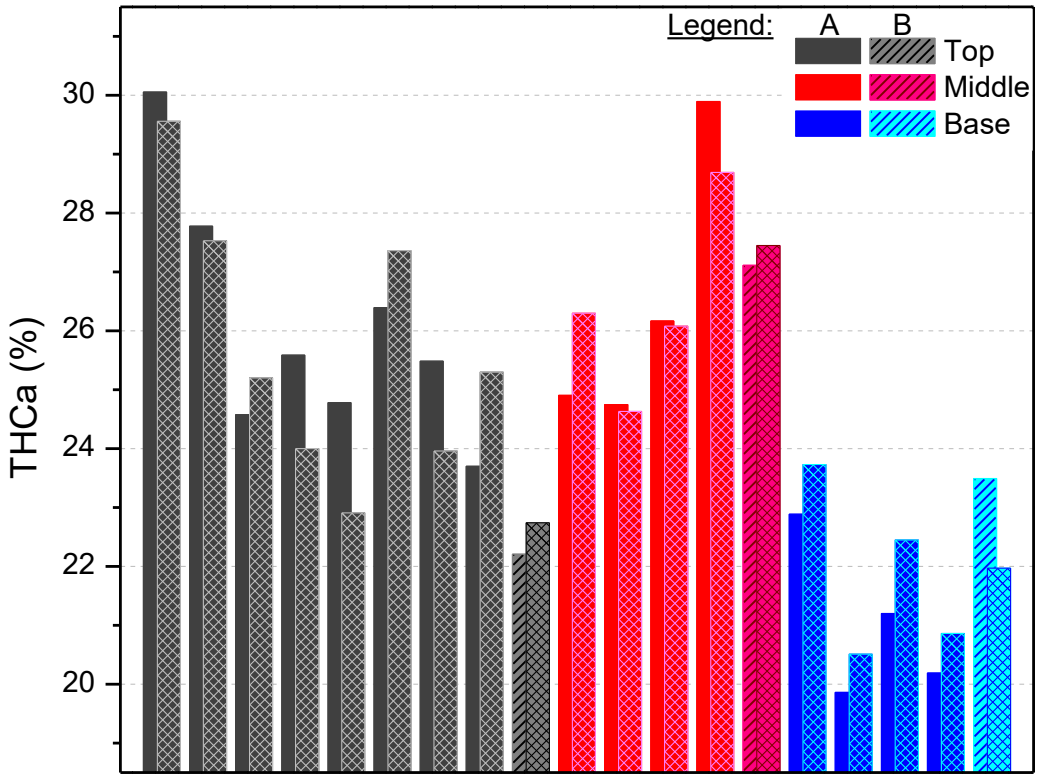
‡Mass of plant material added to Ekidna Fresh Flower test kit.

§$\%\ Relative\ Difference = \left(\frac{\%THCa_{Ekidna} - \%THCa_{HPLC}}{\%THCa_{HPLC}}\right) \times 100\%.$

Based on the results from the Ekidna As-Is Total THC Potency tests, Sunrise was able to determine that their growing conditions were homogenous, with cannabinoid potency relatively constant for plants grown in different locations.

The more important variable for potency was bud location on the plant. While the Top and Middle buds had relatively consistent %THCa values, there was slightly more variability in the values obtained in the Top buds. Interestingly, buds produced near the Base of the plants had consistently lower potency values, with %THCa values that were approximately 5% lower (absolute).

NOTE: %THC values for all samples investigated were below the LOD for the Ekidna system. From HPLC results, the average %THC (adjusted to 0% moisture content) in the fresh bud samples was 0.36%.



Summary of %THCa potency values for Kandy Kiss, measured on harvest day, using Ekidna's As-Is THC Potency test (solid bars) or HPLC (corresponding values shown with cross-filled bars). Sample type, including location in grow room and location on plant, are indicated by the different colors in the Legend. All values adjusted to 0% moisture content.

Potency Results: 3rd Party Lab Testing COA of Cured Bud, High North

After the bud was cured (approximately 3 weeks later), Sunrise submitted cured Kandy Kiss samples for testing at High North. They received potency results over 2 weeks later (approximately 5 weeks after testing with Ekidna), with the results matching perfectly with the adjusted potency values calculated by Ekidna, as shown by the first page of their COA below.

Testing Method	TOP§			MIDDLE§			BASE§		
	Av. %THCa	σ‡	n	Av. %THCa	σ‡	n	Av. %THCa	σ‡	n
Ekidna	25.62	2.16	9	26.57	1.88	5	21.53	1.44	5
HPLC	25.40	2.19	9	26.63	1.37	5	21.91	1.16	5
High North	25.94								

n = number of samples included in average; only one data value from High North.

§Location on plant samples were harvested from; samples from different locations in grow room combined to calculated averages.

‡Standard deviation, 1σ (68 %).

HIGH NORTH ID:
00400439
Date: 2023-11-17
Certificate: 1700232952

High North Inc.
241 Hanlan Rd, Unit 7
Woodbridge, ON, L4L 3R7
1-416-864-6119
LIC-P4PNJMAC20-2022

Client: 2741700 Ontario Inc.
[redacted]
Name: Justin Ambar
[redacted]

Product: Kandy Kiss
Lot: KK-7X12
Matrix: Flower
Sub-matrix: Dried Flower
Sampled: 2023-10-31
Received: 2023-11-01

Certificate of Analysis

Cannabinoid Analysis	LOD (%)	LOQ (%)	wt%	mg/g
Total THC [(THCA x 0.877) + D9-THC]			23.1911	231.9106
Total CBD [(CBDA x 0.877) + CBD]			0.0947	0.9470
THCA-A	0.03	0.06	25.9418	259.4183
CBGA	0.03	0.06	0.7698	7.6984
D9-THC	0.03	0.06	0.4401	4.4008
CBCA	0.03	0.06	0.2043	2.0428
CBDA	0.03	0.06	0.1080	1.0798
CBG	0.03	0.06	0.0899	0.8988
CBC	0.03	0.06	ND	ND
D8-THC	0.03	0.06	ND	ND
CBCVA	0.03	0.06	ND	ND
CBN	0.03	0.06	ND	ND
THCVA	0.03	0.06	ND	ND
CBCV	0.03	0.06	ND	ND
THCV	0.03	0.06	ND	ND
CBD	0.03	0.06	ND	ND
CBDV	0.03	0.06	ND	ND
CBDVA	0.03	0.06	ND	ND
Total of all quantified cannabinoids:			27.5539	275.5389

Measuring Moisture Content

Determining the amount of water present in the plant at harvest is a critical experimental variable that must be measured to accurately convert as-is fresh bud potency into adjusted cured potency. Fresh cannabis flower contains a significant amount of water (often > 70% by mass), which must be accounted for in potency calculations; without it, it is impossible to accurately calculate adjusted dried cannabinoid potency values.

There are a few ways to measure moisture content, including Karl Fischer titration, moisture analyzers, and vacuum ovens. **Handheld moisture probes or meters are not accurate enough**; many only operate in a limited range (i.e., below 40% moisture content). For a more in-depth discussion of the importance

of moisture content measurements when working with fresh flower please see our Accounting for Moisture in Fresh Cannabis and Options for Measuring Moisture Content in Fresh Cannabis discussions.

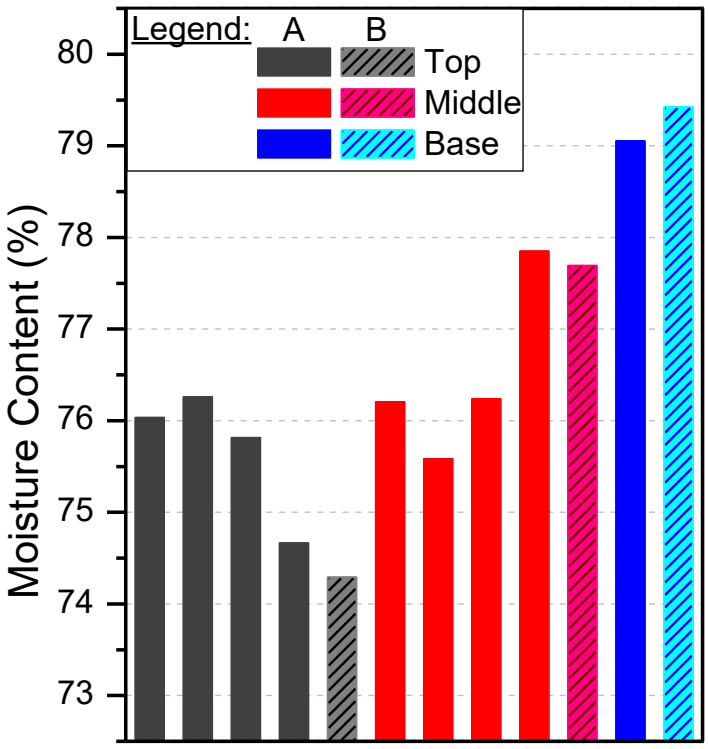
Sunrise Moisture Content Results

Ekidna measured the moisture content for samples harvested from different locations in both the grow room and on the plants, using the same classifications as described above. The samples were transported back to the Ekidna facility in Ottawa and dried in a vacuum oven at 25°C and below 0.01 atm (-752 mmHg) until they were at a constant mass (approximately 48 hours).

For several samples a "matched pair" was prepared: a single piece of bud was divided into two roughly 1.65 g samples at the Sunrise facility. Half was added to the Ekidna As-Is THC Potency test to determine cannabinoid potency, while the other was dried to determine the amount of water present. That value was the moisture content used in calculations to adjust the as-is potency value to predicted potency at 0% moisture content (instead of an average value).

Sample Location		Mass (mg)[‡]	%H_2O[§]
On Plant	**In Room[†]**		
Top	A	1625.3	76.04
		1625.6	76.26
		1661.9	75.82
		2200.3	74.67
Middle	A	1620.7	76.21
		1628.0	75.58
		1629.1	76.24
		1622.3	77.85
Base	A	1617.9	79.05
Top	B	1623.6	74.29
Middle	B	1628.7	77.69
Base	B	1548.4	79.42

[†] *A/B labels refer to different locations in grow room*
[‡] *Starting mass of plant material.*
[§] *Water content determined by drying plant material to constant mass and calculating difference*



The table and bar graph above summarize the moisture content results from 12 different cannabis samples, harvested from different room locations and various locations on the plant. A significant variation (5% absolute difference) in the amount of water present was observed, particularly when comparing flower harvested from different locations on the plant.

Post Harvest

Potency Results: Post-Harvest Cannabis Samples

The 12 oven-dried cannabis samples described in the previous section were suitable for testing with the Ekidna As-Is Total THC test kit, using the Cured Bud analysis method, as well as HPLC. These experiments were performed to confirm potency trends observed in the as-is fresh bud harvest testing.

The table below summarizes the results of these experiments. It should be noted that the fully dried cannabis was very brittle; some trichomes were observed to have fallen off the bud and remained in the sample containers.

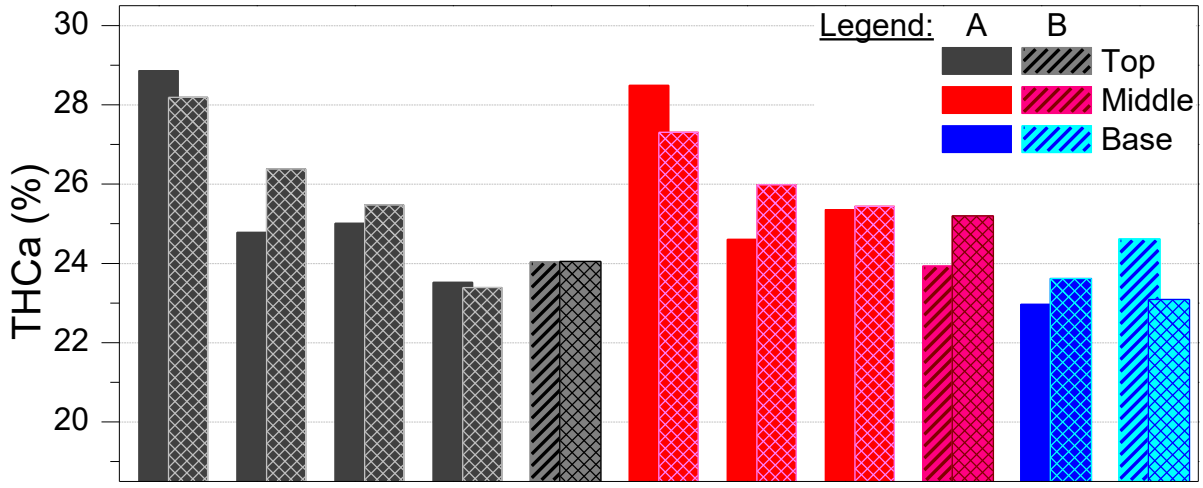
Comparable to the as-is fresh bud samples, no significant differences in cannabinoid potency were observed when comparing flower samples harvested from different areas of the grow room. But the same trend in potency values for buds harvested at different locations on the plants was observed. As with the moisture content adjusted fresh bud data, THCa potency results were relatively similar for the top and middle buds, but significantly lower for buds harvested from the base of the plants.

Sample Location		Mass (mg)‡	%THCa		Average	
On Plant	In Room†		Ekidna	HPLC	Ekidna	HPLC
Top	A	393.2	28.86	28.19	25.24	25.50
		394.4	24.78	26.38		
		405.4	25.01	25.47		
		561.5	23.52	23.39		
	B	426.0	24.03	24.05		
Middle	A	393.9	28.49	27.31	25.60	25.98
		401.2	24.61	25.98		
		365.3	25.36	25.44		
	B	374.6	23.93	25.20		
Base	A	345.0	22.96	23.62	23.79	23.36
	B	324.2	24.62	23.09		

†*A/B labels refer to different locations in grow room*

‡*NOTE: After drying, many of the mass values fell outside of the ideal range for the Ekidna Total THC test.*

NOTE: No significant changes in %THC were observed in oven-dried samples compared to the adjusted fresh bud tests, confirming that the drying procedure was mild enough to avoid decarboxylation. %THC values for all oven-dried samples investigated were below the LOD for the Ekidna system, with an average of 0.42% THC from HPLC.



Summary of %THCa potency values for oven-dried Kandy Kiss samples, measured using Ekidna's As-Is Total THC kits, with the Cured Bud analysis procedure (solid bars). Sample type, including location in grow room and location on plant, are indicated by the different colors in the Legend. Corresponding HPLC values are shown with cross-filled bars.

Contact Info

Please contact Cali Barnstead (cali@ekidnasensing.com) or Nic Boileau (nic@ekidnasensing.com) for more information or questions.

Date	Revision	Changes
November 2023	1.0	Initial release.
April 2024	1.1	Text updates, including revised testing procedure names.