

Technical Report

Potency Calculation and Reporting of 21 Cannabinoids in LabSolutions using the Cannabis Analyzer for Potency™

Abstract:

Many customers have generated data files for both dry sample and tincture, using the LabSolutions software. This document guides you through producing the reports. Data files which have been acquired via LabSolutions can be reprocessed using LabSolutions PostRun batch. The potency for dry sample is reported in wt.%, those values for the tincture can be calculated in mg/mL.

Keywords: Potency, Cannabis Analyzer, LabSolutions

1. Measure the cannabinoids in dry-sample concentration in mg/L for 21 cannabinoids separation

The concentration in mg/L of the concentrated sample can be calculated for dry sample. This is not considered potency but could be useful. The data file should be re-processed in a PostRun batch file (figure 1) where the user enters a sample amount 1, and a Dil. Factor, in this case, equal to the sample dilution. The resulting data file will automatically calculate the mg/L of the concentrated dry sample (figure 2).

١	Postrun	Sample Name	Sample Type	Method File	Data File	Level#	Dil. Factor	Sample Amt.
I	1	Dry Hemp_8272020	0:Unknown	HighSensitivityMethod_21CRM.lcm	Dry Hemp _ 8272020.lcd	0	100	1

Figure 1: PostRun batch

🗖 🗘 Re	sults View - Co	ompound 1	able		
Peak Tabl	e Compound	Group	Calibra	tion Curve	
ID#	Name	Ret.	Time	Conc.	Unit
1	CBDVA	No peak	is detect	ed.	
2	CBDV	No peak	is detecte	ed.	
3	CBCO	No peak	is detect	ed.	
4	CBDA	No peak	is detect	ed.	
5	CBGA		3.869	258.4	461 mg/L
6	CBG	No peak	is detect	ed.	
7	CBD		4.358	7772.4	467 mg/L
8	THCV	No peak	is detect	ed.	
9	CBCV	No peak	is detect	ed.	
10	THCVA	No peak	is detect	ed.	
11	CBN	No peak	is detecte	ed.	
12	CBDP	No peak	is detecte	ed.	
13	D9-THC	No peak	is detect	ed.	
14	D8-THC	No peak	is detect	ed.	
15	CBL	No peak	is detect	ed.	
16	CBC	No peak	is detect	ed.	
17	THCA	No peak	is detect	ed.	
18	D8-THCA-A	No peak	is detect	ed.	
19	CBCA		9.548	31.4	488 mg/L
20	D9-THCP		10.440	43.0	624 mg/L
21	CBT	No peak	is detect	ed.	

Figure 2: Measure concentration in the data file

2. Measure the concentration in wt.% or potency calculation dry sample for 21 cannabinoids separation

The displayed unit in the method file should be corrected by changing the "Unit" to "%" in the Method View and the Method File should be saved (figure 3).

Figure 4 shows that, for the dry sample only, using equations (1) and (2) below, the total amount of THC (contributions from d9-THC and THCA) can be determined on dry weight basis. Similar equations can be used to calculate the total CBD (contributions from CBD and CBDA). These equations can be edited by the user when reporting the potency for dry samples.

Individual cannabinoid (wt. %) percentage or potency for dry basis can be calculated using equation (3). These calculations can be performed in LabSolutions by adding the Dilution Factor. The Dilution Factor is calculated using equation (4) in Excel and the resulting value put into PostRun batch (figure 5). Figure 6 shows the reprocessed data file for the dry sample.

Total THC (wt.%) = Conc. d9-THC (wt.%) + (Conc. THCA (wt.%) x 0.877)... [Eq.1]Total THC (mg/g) = [Conc. d9-THC (wt.%) + (Conc. THCA (wt.%) x 0.877)] x10... [Eq.2]

 $\begin{aligned} Cannabinoid (wt.\%) &= \begin{pmatrix} Concentration \\ of \\ Component, ppm \end{pmatrix} \begin{pmatrix} Extraction Vol, mL \\ Sample Aliquot, mg \end{pmatrix} \begin{pmatrix} Additional \\ Dilution \\ Factor \end{pmatrix} \begin{pmatrix} Conversion \\ mL \text{ to } L \end{pmatrix} . 100 \dots [Eq.3] \\ Dil. Factor &= (Extraction Vol, mL) \begin{pmatrix} Additional \\ Dilution \\ Factor \end{pmatrix} (1/1000) . 100 \dots [Eq.4] \end{aligned}$

ntegration	Identification	Quantitative	Compound	Group	Performance	Custom	QC Check	Retention	Index	
Quantitativ	e Method:				Unit:	%				

Figure 3: The symbol % in method file

□ <	> Metho	od View - (Custon	m Parameters						66	View 📝 Edit
Inte	gration	Identifica	ation	Quantitative	Compound	Group	Performan	ce Custom	QC Check	Retention Index	
	Т	ìtle		For	mula		Const A	Const B	Const C		
1	1 Total CBD (%) (Conc[7]+(Conc[4]*0.877))					1	1	1			
2	Total TH	HC (%)	(Cond	c[13]+(Conc[17]*0.877))		1	1	1		
3	Total CE	3D (mg/g)	(Cond	c[7]+(Conc[4]*0	.877))*10		1	1	1		
4	Total TH	HC (mg/g)	(Cond	c[13]+(Conc[17]*0.877))*10		1	1	1		
5	Dry weig	ght %	Conc	*100			1	1	1		

Figure 4: Custom parameters in method file

Postrun	Sample Name	Sample Type	Method File	Data File	Level#	Dil. Factor	Sample Amt.
	Dry Hemp_8272020	0:Unknown	HighSensitivityMethod_21CRM.lcm	Dry Hemp _ 8272020.lcd	0	100	102

Figure 5: PostRun batch

ID# Name Ret. Time Conc. Unit Total CBD (%) Total d9-THC (%) Total d9-THC (mg/g) Dry weig 1 CBDVA No peak is detected.		and table Compound Group Campration Curve											
1 CBDVA No peak is detected. 2 CBDV No peak is detected. 3 CBCO No peak is detected. 4 CBDA No peak is detected. 5 CBGA 3.863 2.534 % 76.20066 0.00000 762.00661 0.00000 253 6 CBG No peak is detected. 7 CBD 4.358 76.201 % 76.20066 0.00000 762.00661 0.00000 762.0 8 THCV No peak is detected. 0 0.00000 762.0 762.00	ID#	Name	Ret.	Time	Conc.	Unit	Total CBD (%)	Total d9-THC (%)	Total CBD (mg/g)	Total d9-THC (mg/g)	Dry weight %		
2 CBDV No peak is detected. 3 CBC0 No peak is detected. 4 CBDA No peak is detected. 5 CBGA 3.869 2.534 % 76.20066 0.00000 762.00661 0.00000 253 6 CBG No peak is detected. <	1	CBDVA	No peak	is detecte	d.					·			
3 CBCO No peak is detected. 4 CBDA No peak is detected. 0.00000 762.00661 0.00000 253 5 CBGA 3.869 2.534 % 76.20066 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 0.00000	2	CBDV	No peak	is detecte	d.								
4 CBDA No peak is detected. 5 CBGA 3.869 2.534 % 76.20066 0.00000 762.00661 0.00000 253 6 CBG No peak is detected. 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.00661 0.00000 762.0067	3	CBCO	No peak	is detecte	d.								
5 CBGA 3.869 2.534 % 76.20066 0.00000 762.00661 0.00000 253 6 CBG No peak is detected. 7 7 CBD 4.358 76.201 % 76.20066 0.00000 762.00661 0.00000 762.00 8 THCV No peak is detected. 7 76.20066 0.00000 762.00661 0.00000 762.00 9 CBCV No peak is detected. 7	4	CBDA	No peak	is detecte	d.								
6 CBG No peak is detected. 7 CBD 4.358 76.201 % 76.20066 0.00000 762.00661 0.00000 7620 8 THCV No peak is detected. 76.200661 0.00000 762.00661 0.00000 762.0061 0.00000 762.0061 0.00000 762.0061 76.20066 762.0061 0.00000 762.0061 762.0061 762.0061 762.0061 762.0000 762.0061 0.00000 762.0000 762.0061 0.00000 762.0000 762.0061 0.00000 762.0000 762.0061 0.00000 762.00000 762.0061 0.00000 762.00000 762.00061 0.00000 762.00000 762.00061 0.00000 762.00061 0.00000 762.00061 0.00000 762.00061 0.00000 762.00061 0.00000 762.00061 0.000000 762.00061 0.00000 76	5	CBGA		3.869	2.534	%	76.20066	0.00000	762.00661	0.00000	253.39279		
7 CBO 4.358 76.201 % 76.20066 0.00000 762.00661 0.00000 7620 8 THCV No peak is detected. 0	6	CBG	No peak	is detecte	d.								
8 THCV No peak is detected. 9 CBCV No peak is detected.	7	CBD		4.358	76.201	%	76.20066	0.00000	762.00661	0.00000	7620.06607		
9 CBCV No peak is detected. 10 THCVA No peak is detected. 11 CBN No peak is detected. 12 CBDP No peak is detected. 13 D9-THC No peak is detected. 14 D8-THC No peak is detected. 15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-N No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	8	THCV	No peak	is detecte	d.								
10 THCVA No peak is detected. 11 CBN No peak is detected. 12 CBDP No peak is detected. 13 D9-THC No peak is detected. 14 D8-THC No peak is detected. 15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	9	CBCV	No peak	is detecte	d								
I1 CBN No peak is detected. I2 CBDP No peak is detected. I3 D9-THC No peak is detected. I4 D8-THC No peak is detected. I5 CBL No peak is detected. I6 CBC No peak is detected. I7 THCA No peak is detected. I8 D8-THCA-A No peak is detected. I9 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	10	THCVA	No peak	is detecte	d.								
12 CBDP No peak is detected. 13 D9-THC No peak is detected. 14 D8-THC No peak is detected. 15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	11	CBN	No peak	is detecte	d.								
13 D9-THC No peak is detected. 14 D8-THC No peak is detected. 15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	12	CBDP	No peak	is detecte	d.								
14 D8-THC No peak is detected. 15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	13	D9-THC	No peak	is detecte	d								
15 CBL No peak is detected. 16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	14	D8-THC	No peak	is detecte	d.								
16 CBC No peak is detected. 17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	15	CBL	No peak	is detecte	d								
17 THCA No peak is detected. 18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	16	CBC	No peak	is detecte	d.								
18 D8-THCA-A No peak is detected. 19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	17	THCA	No peak	is detecte	d								
19 CBCA 9.548 0.309 % 76.20066 0.00000 762.00661 0.00000 30. 20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 30.	18	D8-THCA-A	No peak	is detecte	d.								
20 D9-THCP 10.440 0.428 % 76.20066 0.00000 762.00661 0.00000 42.	19	CBCA		9.548	0.309) %	76.20066	0.00000	762.00661	0.00000	30.87014		
	20	D9-THCP		10.440	0.428	8 %	76.20066	0.00000	762.00661	0.00000	42.76853		

Figure 6: Measure concentration in the data file

At this point, the Report Template needs to be edited. In the Properties of the Quantitative Results remove "Custom Parameter 5" from the right side of the screen and add "Conc." and "Unit" then press OK. Table 1 shows the summary of the results and figure 8 shows the generated dry sample report in LabSolutions.

Quantitative Result Properties	×
General Quantitative Results File	
Data: All Fix Detector Number Settings	
Hide Items: Display Items: Area ID# ID# Name Conc. Unit Peak# Group # Group # Group Name Area %	
Column Index: Position: Ref. String: Width[mm]: Format: Custom Parameter 5 Right 18 0 99.99999 Display grid Display column index Cell Height: 5 mm	
Total: Area% Height Height% Concentration Column Performance Setting	
OK Cancel Apply Help	

Figure 7: Editing the report template for dry sample

Table 1: Summary of parts I and II in excel. Measured potency for dry hemp flower

Compound	Conc. (mg/L)	Conc. (wt.%)	Total CBD (%)	Total CBD (mg/g)
CBGA	258.4	2.534	-	-
CBD	7772.4	76.201	76.20	762.00
CBCA	31.4	0.309	-	-
D9-THCP	43.6	0.428	-	-



<Sample Information>

System Administra Sample Name Sample ID Data Filename Method Filename Method Filename Vial # Injection Volume Sample Amount Dilution Factor	ator : Dry Hemp-8272020 : 001 : Dry Hemp _ 8272020.lcd : HighSensitivityMethod_21CRM.lcm : reprocessing Dry Hemp results were : 1-17 : 5 uL : 102 mg : 100	from LabSolutions Sample Type	makign a report from the dry sa : Unknown
Date Acquired	: 8/28/2020 1:25:42 PM	Acquired by	: System Administrator
Date Processed	: 10/20/2020 3:04:27 PM	Processed by	: System Administrator





<Quantitative Results>

Detector	A			
ID#	Name	Ret. Time	Conc.	Unit
1	CBDVA	-	-	%
2	CBDV		-	%
3	CBCO		-	%
4	CBDA	-	-	%
5	CBGA	3.869	2.534	%
6	CBG		-	%
7	CBD	4.358	76.201	%
8	THCV		-	%
9	CBCV		-	%
10	THCVA		-	%
11	CBN	-	-	%
12	CBDP		_	%
13	D9-THC		-	%
14	D8-THC		-	%
15	CBL		-	%
16	CBC		-	%
17	THCA		-	%
18	D8-THCA-A		-	%
19	CBCA	9.548	0.309	%
20	D9-THCP	10.440	0.428	%
21	CBT		_	%

Total THC	0.00	%
Total THC	0.00	mg/g
Total CBD	76.20	%
Total CBD	762.01	mg/g

Figure 8: Dry sample report generated in LabSolutions

3. Measure the potency in mg/mL for tincture for 21 cannabinoids separation

Figure 9 illustrates the modification in PostRun batch file which reprocesses the data file. From the Table style select the Dil. Factor, Sample Amt and Custom Parameters. Enter a sample amount 1 and a Dil. Factor 1. And from drop down menu for the Custom Parameters modify the formula as shown below to represent the calculations in mg/mL. The constant A is the tincture sample dilution. In this case the tincture has been 1000 times diluted (A=1000). Figure 10 shows these calculations. Figure 11 illustrates the generated tincture report in LabSolutions.

	_	_						_	_	
Postrun	San	nple Na	me Method	File	Data File	Dil. Factor	Sample An	t.		Custom Parameters
1	Tinctu	ıre Oil C	HighSensitivityMeth	nod_21CRM.lcm	Tincture Oil C_8272020.lcd	Į	1	1 "Total CBD ((mg/mL)''-	"(Conc[7]+(Conc[4]*0.877))*1000/A"-"1000"-"1"-"1"
		Custon	n Parameters						×	
	10	#	Title		Formula	Const A	Const B	Const C		
		1 1	otal CBD (mg/mL)	(Conc[7]+(Conc	[4]*0.877))*1000/A	1000	1	1	1	
	10	2 1	otal d9-THC (mg/mL)	(Conc[13]+(Con	c[17]*0.877))*1000/A	1000	1	1	1	
		3 n	ng/mL	Conc*A/1000		1000	1	1		
		4				1	1	1		
		5				1	1	1		
						ОК	Cancel	Help		

Figure 9: PostRun batch including the custom parameters for tincture

	L	I I		I				
ID#	Name	Ret. Time	Conc.	Unit	Total CBD (mg/mL)	Total d9-THC (mg/mL)	mg/mL	
1	CBDVA	No peak is detected.						
2	CBDV	No peak is detected.						
3	CBCO	No peak is detected.						
4	CBDA	3.649	0.276	mg/L	9.11895	3.25670	0.27618	
5	CBGA	No peak is detected.						
6	CBG	4.153	0.274	mg/L	9.11895	3.25670	0.27427	
7	CBD	4.351	8.877	mg/L	9.11895	3.25670	8.87675	
8	THCV	4.529	4.433	mg/L	9.11895	3.25670	4.43270	
9	CBCV	No peak is detected.						
10	THCVA	No peak is detected.						
11	CBN	6.176	0.140	mg/L	9.11895	3.25670	0.13989	
12	CBDP	6.830	0.510	mg/L	9.11895	3.25670	0.50989	
13	D9-THC	7.293	3.257	mg/L	9.11895	3.25670	3.25670	
14	D8-THC	7.515	0.061	mg/L	9.11895	3.25670	0.06054	
15	CBL	No peak is detected.						
16	CBC	8.451	0.145	mg/L	9.11895	3.25670	0.14499	
17	THCA	8.795	0.000	mg/L	9.11895	3.25670	0.00000	
18	D8-THCA-A	9.018	0.260	mg/L	9.11895	3.25670	0.25950	
19	CBCA	9.548	0.199	mg/L	9.11895	3.25670	0.19895	
20	D9-THCP	10.298	0.143	mg/L	9.11895	3.25670	0.14348	
21	CBT	10 799	0 594	ma/l	9 11895	3 25670	0.59416	

Figure 10: Measure concentration in the data file



<Sample Information>

System Administra	ator		
Sample Name	: Tincture_Oil_C		
Sample ID	: 001		
Data Filename	: Tincture Oil C 8272020 - Copy (2).ld	b:	
Method Filename	: HighSensitivityMethod_21CRM.lcm		
Vial #	: 1-10	Sample Type	: Unknown
Injection Volume	: 5 uL		
Date Acquired	: 8/28/2020 9:20:00 AM	Acquired by	: System Administrator
Date Processed	: 10/6/2020 3:59:03 PM	Processed by	: System Administrator

<Chromatogram>



<Quantitative Results>

Detector A								
ID#	Name	Ret. Time	mg/mL					
1	CBDVA		0.00000					
2	CBDV		0.00000					
3	CBCO		0.00000					
4	CBDA	3.649	0.27618					
5	CBGA		0.00000					
6	CBG	4.153	0.27427					
7	CBD	4.351	8.87675					
8	THCV	4.529	4.43270					
9	CBCV		0.00000					
10	THCVA		0.00000					
11	CBN	6.176	0.13989					
12	CBDP	6.830	0.50989					
13	D9-THC	7.293	3.25670					
14	D8-THC	7.515	0.06054					
15	CBL		0.00000					
16	CBC	8.451	0.14499					
17	THCA	8.795	0.00000					
18	D8-THCA-A	9.018	0.25950					
19	CBCA	9.548	0.19895					
20	D9-THCP	10.298	0.14348					
21	CBT	10.799	0.59416					

Figure 11: Tincture report generated in LabSolutions



For Research Use Only. Not for use in diagnostic procedure.

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

3.26 mg/mL

9.12 mg/mL

Total THC

Total CBD

The content of this publication shall not be reproduced, altered or sold for any commercial purpose without the written approval of Shimadzu. Shimadzu disclaims any proprietary interest in trademarks and trade names used in this publication other than its own. See http://www.shimadzu.com/about/trademarks/index.html for details.

The information contained herein is provided to you "as is" without warranty of any kind including without limitation warranties as to its accuracy or completeness. Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication. This publication is based upon the information available to Shimadzu on or before the date of publication, and subject

First Edition: October 2020

SHIMADZU SCIENTIFIC INSTRUMENTS

SHIMADZU Corporation www.shimadzu.com/an/

7102 Riverwood Drive, Columbia, MD 21046, USA Phone: 800-477-1227/410-381-1227, Fax: 410-381-1222 URL: www.ssi.shimadzu.com