



National Institute of Standards and Technology
Cannabis Quality Assurance Program

CannaQAP Exercise 2 - Spring 2021

Certificate of Participation for

CTInstruments Ltd.

Cannabinoids in Cannabis

Details of laboratory performance can be found on subsequent pages

CTInstruments Ltd.

CannaQAP Exercise 2 - THC and THCA

Analyte	Lab Code: B036		1. Your Results				2. Community Results			3. Target	
	Sample	Units	x_i	s_i	Z'_{comm}	Z_{NIST}	N	x^*	s^*	x_{NIST}	U
delta8-Tetrahydrocannabinol (d8-THC)	NRC Hemp CRM	%	< 0.02				27	0.0133	0.0025		
delta8-Tetrahydrocannabinol (d8-THC)	Plant Sample 4	%	< 0.02				17	0.00139	0.00065		
delta8-Tetrahydrocannabinol (d8-THC)	Plant Sample 6	%	< 0.02				17	0.00125	0.00071		
delta9-Tetrahydrocannabinol (d9-THC)	NRC Hemp CRM	%	0.0467	0.0058	0.662	0.469	108	0.0372	0.0014	0.0415	0.0233
delta9-Tetrahydrocannabinol (d9-THC)	Plant Sample 4	%	0.0733	0.0058	0.39	0.467	132	0.0677	0.0012	0.0666	0.00747
delta9-Tetrahydrocannabinol (d9-THC)	Plant Sample 6	%	0.0333	0.0058	0.262	0.536	110	0.031	0.00083	0.0286	0.00972
Tetrahydrocannabinolic acid (THCA)	NRC Hemp CRM	%	0.1067	0.0058	0.791	-0.17	138	0.0911	0.0017	0.109	0.0271
Tetrahydrocannabinolic acid (THCA)	Plant Sample 4	%	0.2567	0.0058	1.41	0.653	142	0.215	0.0024	0.237	0.0453
Tetrahydrocannabinolic acid (THCA)	Plant Sample 6	%	0.1567	0.0058	0.916	0.731	140	0.137	0.0017	0.141	0.037
Total d9-THC	NRC Hemp CRM	%	0.1433	0.0058	0.931	0.0969	150	0.111	0.0028	0.137	0.0431
Total d9-THC	Plant Sample 4	%	0.3	0.01	1.21	0.549	152	0.249	0.0033	0.277	0.052
Total d9-THC	Plant Sample 6	%	0.17	0.01	0.829	0.54	151	0.145	0.0024	0.154	0.0384

*Performance results are preliminary and are subject to change.
Final performance information will be provided with the final report.*

x_i	Mean of reported values	N	Number of quantitative values reported
s_i	Standard deviation of reported values	x_{NIST}	NIST-assessed value
Z'_{comm}	Z'-score with respect to community consensus	U	expanded uncertainty about the NIST-assessed value
Z_{NIST}	Z-score with respect to NIST value	x^*	Robust mean of reported values
		s^*	Robust standard deviation

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CannaQAP Exercise 2 - CBD and CBDA

Analyte	Lab Code: B036		1. Your Results				2. Community Results			3. Target	
	Sample	Units	x_i	s_i	Z'_{comm}	Z_{NIST}	N	x^*	s^*	x_{NIST}	U
Cannabidiol (CBD)	NRC Hemp CRM	%	0.5367	0.0058	0.348	-0.75	140	0.517	0.0048	0.584	0.201
Cannabidiol (CBD)	Plant Sample 4	%	0.677	0.012	1.22	1.23	140	0.589	0.0058	0.588	0.058
Cannabidiol (CBD)	Plant Sample 6	%	0.28	0	0.0584	0.702	140	0.278	0.0036	0.25	0.124
Cannabidiolic acid (CBDA)	NRC Hemp CRM	%	1.607	0.023	1.73	0.296	135	1.33	0.013	1.56	0.475
Cannabidiolic acid (CBDA)	Plant Sample 4	%	8.99	0.09	2.47	1.27	136	7.04	0.064	7.99	1.11
Cannabidiolic acid (CBDA)	Plant Sample 6	%	5.047	0.032	1.57	1.84	137	4.23	0.044	4.1	0.823
Total CBD	NRC Hemp CRM	%	1.947	0.023	1.26	-0.118	133	1.7	0.017	1.97	0.631
Total CBD	Plant Sample 4	%	8.56	0.07	2.16	1.09	134	6.8	0.068	7.67	0.979
Total CBD	Plant Sample 6	%	3.2	2.6	-1.63	-1.4	134	3.99	0.04	3.89	0.736

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s_i Standard deviation of reported values		U expanded uncertainty about the NIST-assessed value
Z'_{comm} Z'-score with respect to community consensus	x^* Robust mean of reported values	
Z_{NIST} Z-score with respect to NIST value	s^* Robust standard deviation	

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CannaQAP Exercise 2 - Other Cannabinoids

Analyte	Lab Code: B036		1. Your Results				2. Community Results			3. Target	
	Sample	Units	x_i	s_i	Z'_{comm}	Z_{NIST}	N	x^*	s^*	x_{NIST}	U
Cannabichromene (CBC)	NRC Hemp CRM	%	< 0.02				87	0.0309	0.00058	0.0373	0.0157
Cannabichromene (CBC)	Plant Sample 4	%	< 0.02				100	0.0564	0.0012	0.0619	0.0186
Cannabichromene (CBC)	Plant Sample 6	%	< 0.02				82	0.0249	0.00089	0.0236	0.00873
Cannabidivarin (CBDV)	NRC Hemp CRM	%	< 0.01				56	0.0267	0.0025		
Cannabidivarin (CBDV)	Plant Sample 4	%	< 0.01				29	0.018	0.004		
Cannabidivarin (CBDV)	Plant Sample 6	%	< 0.01				25	0.014	0.003		
Cannabigerol (CBG)	NRC Hemp CRM	%	0.04	0	3.05	3.09	41	0.0122	0.0014		
Cannabigerol (CBG)	Plant Sample 4	%	0.0433	0.0058	2.16	1.81	70	0.0255	0.00096	0.0285	0.0107
Cannabigerol (CBG)	Plant Sample 6	%	0.03	0	4	> 4	43	0.0104	0.00074	0.00891	0.00046
Cannabigerolic acid (CBGA)	NRC Hemp CRM	%	< 0.01				16	0.0128	0.0011	0.0131	0.00398
Cannabigerolic acid (CBGA)	Plant Sample 4	%	< 0.01				44	0.16	0.0054	0.183	0.115
Cannabigerolic acid (CBGA)	Plant Sample 6	%	< 0.01				40	0.0671	0.0028	0.0729	0.03
Cannabinol (CBN)	NRC Hemp CRM	%	0.0333	0.0058	-2.58	-2.85	116	0.0485	0.00053	0.0536	0.00647
Cannabinol (CBN)	Plant Sample 4	%	< 0.02				27	0.0017	0.00058	0.00258	0.000434
Cannabinol (CBN)	Plant Sample 6	%	< 0.02				24	0.001	4e-04	0.00124	0.000143
Tetrahydrocannabivarin (THCV)	NRC Hemp CRM	%	< 0.01				22	0.0036	0.0011		
Tetrahydrocannabivarin (THCV)	Plant Sample 4	%	< 0.01				23	0.007	0.002		
Tetrahydrocannabivarin (THCV)	Plant Sample 6	%	< 0.01				18	0.00037	0.00035		

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