Certificate of Analysis

Sample Name:	Bir Kar Traditional	**Batch Number & Sample ID:**	**B2**SA
Description:	Processed noble kava root powder	**Analysis Identification Code:**	241080U41
		Plant Morphologist:	Joses Laau
Process/Mix Date:	**04/10/2024**	**Chromatographer:**	John McGowan
Micro Lab Sampling Date:	04/10/2024	**Microbiologist:**	Ariane Urriza
ASE Processing Date:	08/10/2024	**Sample Preparation Technician:**	Eva David Livo
UHPLC Injection Date:	08/10/2024	**Quality Control Officer:**	Anabel Belen
Date of Report:	25/11/2024	**Quality Assurance Manager:**	Dianne Manley

Executive Summary

Total extracted major kavalactones = **6.42%** of sample mass (w/w)

Chemotype = **423156** Moisture Content: **3.64%** (w/w)

Contamination = **Pass** Categorisation = **Noble kava**

K and DHK Ratios

K to DHK: 1.14	DHK to K: 0.88
K to Y: 2.02	DHK to Y: 1.77
K to DMY: 3.08	DHK to DMY: 2.70
K to DHM: 3.79	DHK to DHM: 3.33
K to M: 4.21	DHK to M: 3.69

Chemical Analysis:

Sample Preparation:1.000 g processed kava powder dispersed with silica sand to fill 10 mL Dionex™ ASE™ cell

Extraction method: Accelerated Solvent Extraction (ASE)

Extraction Process Automation: Thermo Scientific Dionex™ ASE™ 350 Accelerated Solvent Extractor

ASE Conditions – **Solvent**: HPLC grade Acetonitrile (ACN), **Temperature**: 60 °C, **Pressure**: 105 Bar, **Pre-incubation**: 5 min,

Static Hold: 20 min, **Rinse Volume**: 150%, **Dilution to Working Range**: 1 part ASE™ filtrate + 9 parts solvent (ACN) to give 1/10

Pre-UHPLC Particulate Exclusion: ASE™ filtrate passed through Dionex™ D28 cellulose filter prior to dilution to working concentration, then passed through 0.22 µm hydrophilic PTFE filter prior to injection

Chromatographic Conditions:

System:	Thermo Scientific Vanquish Horizon Ultra-High-Performance Liquid-Chromatography
Instrument Components:	VF-A10-A Split Sampler, VF-P10-A binary pump, VH-C10-A Column Compartment, and VF-D11-A Diode Array Detector
Column:	200 x 2.1 mm Hypersil GOLD, 1.9 µm particle size
Mobile Phase:	5% isopropanol to 97% isopropanol in water (nonlinear). Total runtime 15.9 minutes
Column Temperature:	60 °C, with active pre-heating **Injection Volume:** 2.00 µL **Organic Modifier**: None
UV Detection:	362 nm (aflatoxin B_1 and B_2 identification), 341 nm (flavokavain and aflatoxin G_1 and G_2 identification), 246 nm (kavalactone identification), and 218 nm (kavalactone and aflatoxin secondary peaks); Peak identification assisted by elution time and spectrum matching. Relative quantification calculations based on channel 3 (246 nm)
Calibration Standards:	Correlation coefficient for all identified compounds is greater than 99.995% on a 20-point calibration curve derived by serial dilution of 1 ampoule of Cerilliant (kavalactones and flavokavains) and 1 ampoule of Ehrenstorfer (aflatoxins) certified analytical reference standards. Analytical balances calibrated with certified class OIML E2 weights with uncertainty +/- 0.000016 g (NATA accredited for compliance with ISO/IEC 17025, by laboratory No.3279)
Instrument Method:	**Software**: Chromeleon 7.2.10 **Program**: 240604 Hypersil iPrOH
Processing Method:	**Software**: Chromeleon 7.3.2 **Program**: 240606 Hypersil iPrOH Pro
Confidence Probability:	Lower = 99.5% Upper = 99.5%

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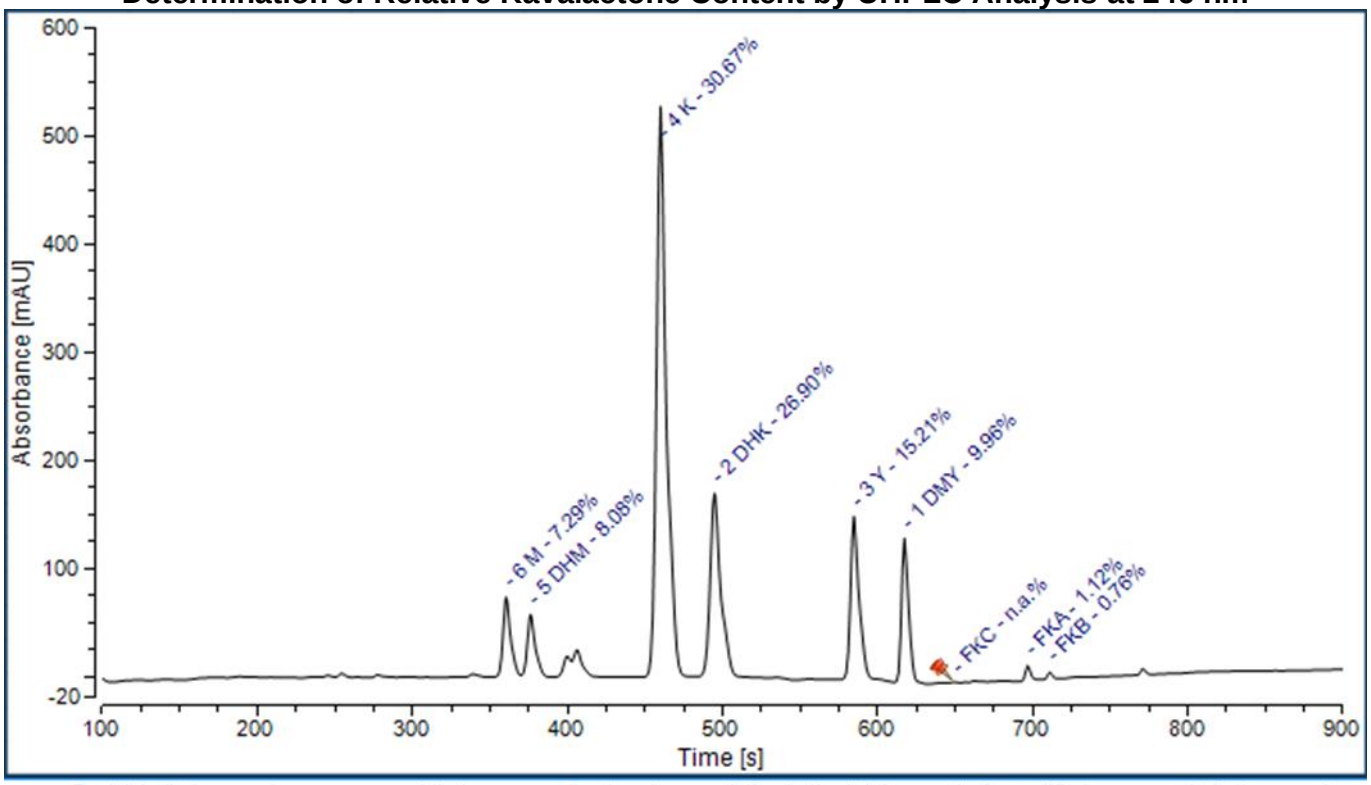
Determination of Relative Kavalactone Content by UHPLC Analysis at 246 nm



Peak labelled percentages represent that compound's abundance relative to the total amount of quantified compounds in the sample

Integration Results

Chem # Name abv	Rel.Amt %	Spectrum Match	Rtn T. min	Rel.Ar %	Rel.Ht %	R^2 %	HV LoD (mg/kg)	Cor.Coef %	Cal. Pts.	Lower Limit	Amount (mg/kg)	Upper Limit	Extracted % of mass
4 K	30.668	999.887	7.667	50.25	46.47	99.997	2.9065	99.998	20	20004	20068	20131	2.007
2 DHK	26.902	999.184	8.246	17.41	14.98	99.998	2.2489	99.999	20	17560	17604	17647	1.760
3 Y	15.214	999.252	9.744	12.34	13.28	99.999	2.0071	99.999	20	9931	9956	9980	0.996
1 DMY	9.959	999.096	10.288	9.11	11.80	99.998	2.2349	99.999	20	6492	6517	6541	0.652
5 DHM	8.083	994.804	6.270	4.43	5.09	99.998	2.0995	99.999	20	5266	5289	5312	0.529
6 M	7.291	998.205	6.008	5.41	6.50	99.998	2.3968	99.999	20	4745	4771	4797	0.477
FKA	1.117	997.196	11.613	0.71	1.24	99.994	0.4032	99.997	20	726	731	735	0.073
FKB	0.765	999.269	11.849	0.30	0.59	99.991	0.4956	99.996	20	495	500	506	0.050
FKC	n.a.	938.372	10.828	0.04	0.07	99.999	0.1742	99.999	20	n.a.	n.a.	n.a.	n.a.
Totals:	100%			100%	100%	**Major Kavalactones Extracted (% of total mass):**							6.420
Flavokavains Extracted (relative %): 1.881						Flavokavains Extracted (% of total mass):							0.12

Peak Results

Peak Name	Peak No.	Purity Match	Ret. T. (S)	Signal to Noise	Peak to Valley	Area mAU*min	Height mAU	Width 50% min	Type	Res (EP)	Asym (EP)	Plates (EP)
4 K	3	999	460.022	36.2	1574.60	64.767	527.498	0.17	BM	3.26	1.37	31718
2 DHK	4	999	494.782	11.7	507.60	22.439	170.049	0.18	MB	8.79	1.37	31976
3 Y	5	1000	584.662	132.4	n.a.	15.903	150.751	0.16	BMB*	3.69	1.39	61418
1 DMY	6	998	617.262	479.1	n.a.	11.748	133.903	0.14	BMB	4.39	1.32	89121
5 DHM	2	998	376.202	4.0	49.06	5.705	57.749	0.14	MB	8.89	1.33	30759
6 M	1	998	360.482	5.1	62.64	6.979	73.729	0.14	BM	1.86	1.32	30012
FKA	8	987	696.762	15.8	n.a.	0.909	14.062	0.10	BMB	2.47	1.33	218878
FKB	9	988	710.942	7.5	n.a.	0.385	6.652	0.09	BMB*	n.a.	1.24	261313
FKC	7	770	649.702	0.9	n.a.	0.049	0.766	0.18	BMB*^	7.55	0.95	157722

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Summary of Microbial Analysis:

Microbial analyses are carried out in accordance with Forney Enterprises' Quality Assurance Programme. Analyses are performed in our modern, well-equipped, built-for-purpose microbiology laboratory, by experienced staff who are skilled in the art, using aseptic technique, calibrated equipment, and high-quality reagents, and incorporate the use of controls. Any given test may be performed using more than one method, substrate, or growth medium, including (but not limited to) 3M Petrifilm, HyServe Compact Dry plates, traditional and chromogenic agars, and culture-specific broths to validate results. We combine the use of industry standard protocols (such as FDA BAM and AOAC OMA) and proprietary methods developed in-house, however, the results reported are from the most sensitive method used (highest test counts). Forney kava is produced in a closely regulated HACCP certified facility, with continuous environmental monitoring and comprehensive testing throughout the production process. The figures below result from testing the finished product as packaged. Kava powder which does not meet the strictest criteria cannot bear the Forney logo.

Indicator Organism	**Test Results (cfu/g)**
Aerobic Plate Count (TPC)	1,100
Coliform	None detected
Escherichia coli	None detected
Yeast	30
Mould	None detected
Staphylococcus spp.	None detected
Salmonella spp.	None detected
Listeria spp.	None detected

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