

## Certificate of Analysis

**Sample Name:** Borogoru Traditional  
**Description:** Processed noble kava root powder

**Batch Number & Sample ID:** B2SA  
**Analysis Identification Code:** 241008U43

**Process/Mix Date:** 07/10/2024  
**Micro Lab Sampling Date:** 07/10/2024  
**ASE Processing Date:** 08/10/2024  
**UHPLC Injection Date:** 08/10/2024  
**Date of Report:** 25/11/2024

**Plant Morphologist:** Joses Laau  
**Chromatographer:** John McGowan  
**Microbiologist:** Ariane Urriza  
**Sample Preparation Technician:** Eva David Livo  
**Quality Control Officer:** Anabel Belen  
**Quality Assurance Manager:** Dianne Manley

### Executive Summary

Total extracted major kavalactones = **7.01%** of sample mass (w/w)  
 Chemotype = **423156**                      Moisture Content: **3.83%** (w/w)  
 Contamination = **Pass**                      Categorisation = **Noble kava**

### K and DHK Ratios

K to DHK: 1.23	DHK to K: 0.82
K to Y: 2.03	DHK to Y: 1.66
K to DMY: 3.24	DHK to DMY: 2.64
K to DHM: 3.82	DHK to DHM: 3.12
K to M: 3.85	DHK to M: 3.14

### 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<sub>1</sub> and B<sub>2</sub> identification), 341 nm (flavokavain and aflatoxin G<sub>1</sub> and G<sub>2</sub> 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)

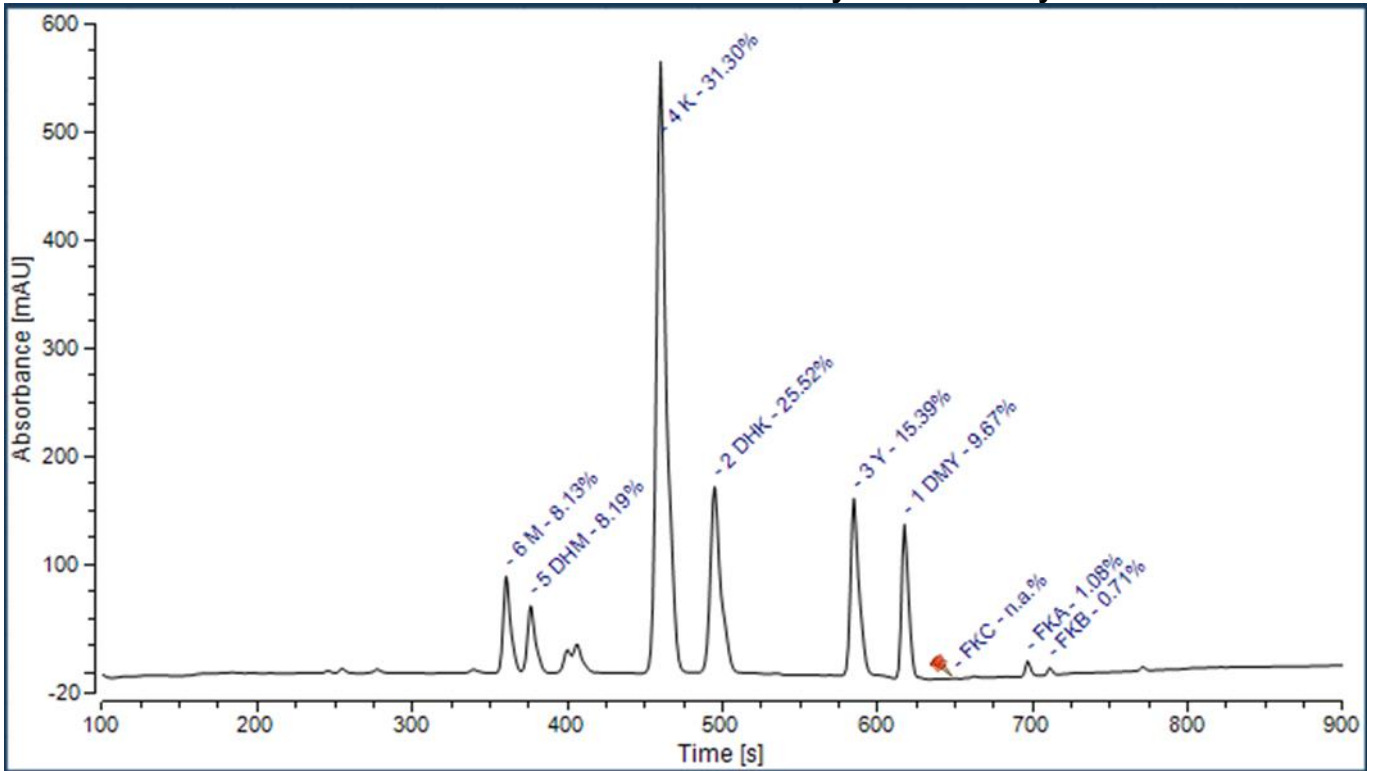
**Calibration Standards:** Correlation coefficient for all identified compounds is greater than 99.995% on a 20-point calibration curve derived by serial dilution of 1 ampoule of Cerilliant (kavalactones and flavokavains) and 1 ampoule of Ehrenstorfer (aflatoxins) certified analytical reference standards. 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%

## 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 #	Rel.Amt	Spectrum	Rtn T.	Rel.Ar	Rel.Ht	R^2	HV LoD	Cor.Coeff	Cal.	Lower	Amount	Upper	Extracted
Name abv	%	Match	min	%	%	%	(mg/kg)	%	Pts.	Limit	(mg/kg)	Limit	% of mass
4 K	31.303	999.923	7.667	50.96	46.46	99.997	2.9065	99.998	20	22284	22355	22426	2.236
2 DHK	25.521	999.560	8.247	16.41	14.19	99.998	2.2489	99.999	20	18181	18226	18271	1.823
3 Y	15.393	999.313	9.744	12.40	13.44	99.999	2.0071	99.999	20	10967	10993	11020	1.099
1 DMY	9.669	999.109	10.288	8.79	11.67	99.998	2.2349	99.999	20	6880	6905	6931	0.691
5 DHM	8.192	996.583	6.271	4.46	5.09	99.998	2.0995	99.999	20	5827	5851	5874	0.585
6 M	8.130	999.033	6.008	6.00	7.34	99.998	2.3968	99.999	20	5780	5806	5833	0.581
FKA	1.081	996.049	11.611	0.68	1.18	99.994	0.4032	99.997	20	767	772	776	0.077
FKB	0.710	999.818	11.848	0.28	0.56	99.991	0.4956	99.996	20	502	507	513	0.051
FKC	n.a.	945.846	10.825	0.03	0.06	99.999	0.1742	99.999	20	n.a.	n.a.	n.a.	n.a.
<b>Totals:</b>	<b>100%</b>			<b>100%</b>	<b>100%</b>	<b>Major Kavalactones Extracted (% of total mass):</b>							<b>7.014</b>
Flavokavains Extracted (relative %):				1.791				Flavokavains Extracted (% of total mass):				0.13	
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	460.041	36.5	780.18	70.492	565.756	0.18	BM	3.27	1.36	30794	
2 DHK	4	996	494.841	11.1	238.22	22.696	172.750	0.18	MB	8.89	1.38	33145	
3 Y	5	1000	584.661	230.0	n.a.	17.151	163.676	0.15	BMB*	3.72	1.41	62080	
1 DMY	6	997	617.261	192.7	n.a.	12.166	142.078	0.14	BMB	4.48	1.30	90906	
5 DHM	2	999	376.281	4.0	45.04	6.163	62.039	0.14	MB	8.79	1.34	30405	
6 M	1	997	360.481	5.8	64.90	8.301	89.395	0.14	BM	1.89	1.38	31186	
FKA	8	987	696.641	12.6	n.a.	0.937	14.354	0.10	BMB	2.48	1.37	214134	
FKB	9	995	710.901	6.0	n.a.	0.382	6.841	0.09	BMB*	n.a.	1.26	268623	
FKC	7	766	649.501	0.7	n.a.	0.047	0.788	0.13	BMB*^A	7.71	0.90	173469	

Disclaimer: The testing protocols employed utilise samples and are representative only of the respective batch, not necessarily other batches or products, even if apparently identical.

These analytical tests have been conducted by suitably qualified personnel on reputable equipment, using high-quality reagents and robust protocols, based upon industry standards. The results are generated in-house, and we believe them to be accurate and precise, however, despite our best efforts, errors may exist; No guarantee is expressed or implied.

These results should not be used as a final determination for use in a finished product; It is recommended that they be verified by the purchaser's quality control department and through the third-party services of an additional certified testing laboratory to ensure the purchased material meets specifications.

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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)	6,000
Coliform	None detected
<i>Escherichia coli</i>	None detected
Yeast	70
Mould	None detected
<i>Staphylococcus spp.</i>	None detected
<i>Salmonella spp.</i>	None detected
<i>Listeria spp.</i>	None detected