Certificate of Analysis

Sample Name:	Palarasul Instant Kava
Description:	Processed noble kava root
Batch # & Sample ID:	B1SL
Analysis ID:	231017G21

Mix Date:	19/09/2023
Received in Lab:	20/09/2023
Extraction Date:	12/10/2023
UHPLC Run Date:	17/10/2023
Date of Report:	14/03/2024

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

Chemotype = **423165** K/DHM:**7.03**

Categorisation = **Noble kava**

Microbial Contamination = **Pass**

Total Extracted Major Kavalactones = **6.65%** of kava mass

Flavokavain A, B, and C content = < **0.03% of kava mass**

Coefficient of Determination for Calibration: **R^2 > 0.9993**

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

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 + 19 parts solvent (ACN) to give 1/20

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 Gradient:	Nonlinear gradient from equilibration conditions of 10% isopropanol to 95% isopropanol in water. Total runtime 17.5 minutes
Column Temperature:	60 °C **Injection Volume:** 5.00 µL **Organic Modifier**: None
UV Detection:	215, 225, 246, and 349 nm; Relative quantification calculated at 246 nm. Peak identification: 215 nm (methysticin), 225 nm (dihydromethysticin), 246 nm (kavain and dihydrokavain), and 349 nm (yangonin, desmethoxyyangonin, and flavokavains A, B, and C), assisted by elution time and spectrum matching to individual analytical standards of each compound.
Calibration Standards:	Correlation coefficients for all identified compounds are greater than 99.93% on an 11-point calibration curve (318.066 to 0.621 µg/g) derived by serial dilution of 1 ampoule of Cerilliant certified analytical reference standards (ISO 17034, ISO/IEC 17025, ISO 13485, ISO 14001, and ISO 9001 compliant). 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**: - Gentle Gold
Processing Method:	**Software**: Chromeleon 7.2.10 **Program**: - 221121 JR Gold S
Confidence Probability:	Lower = 99.5% Upper = 99.5%

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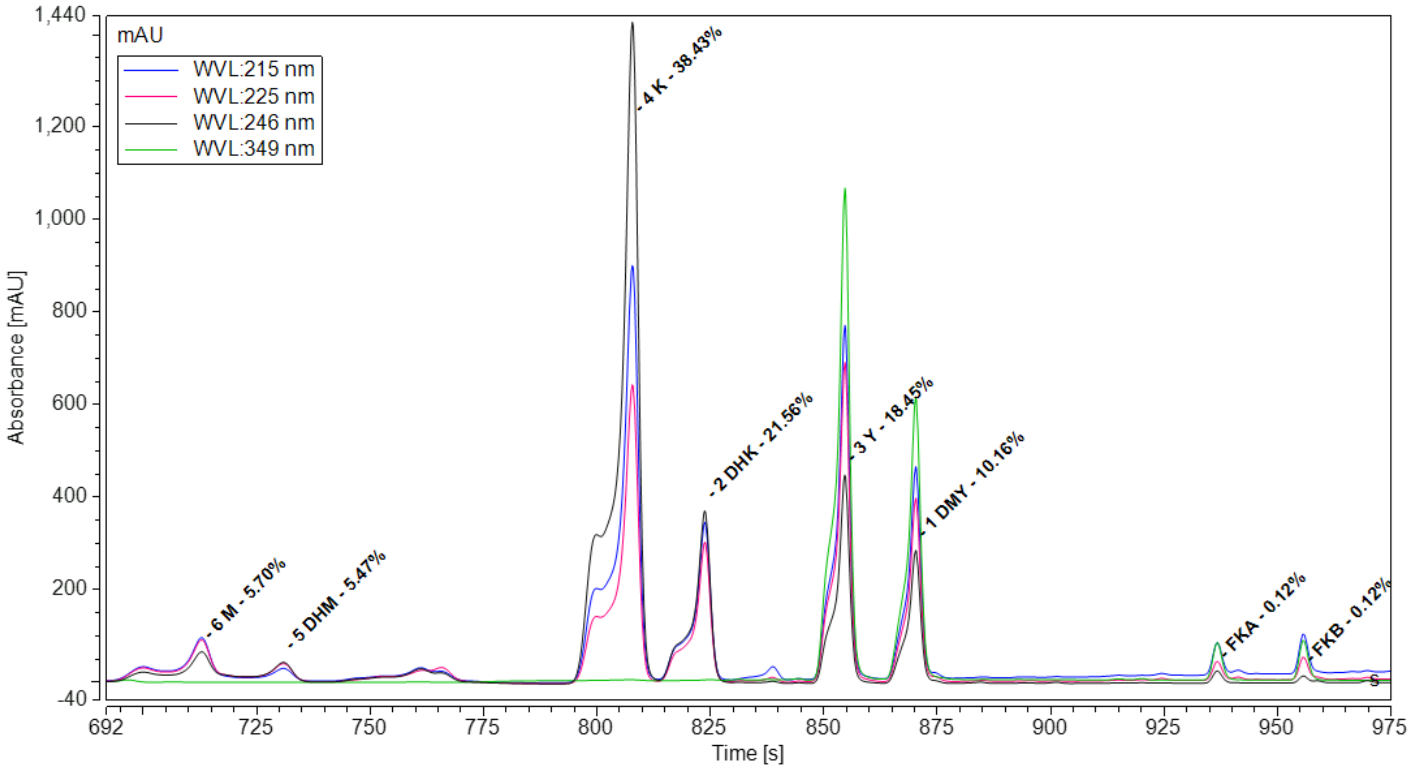
Determination of Relative Kavalactone Content by UHPLC Analysis



Percentages shown on peak labels represent that compound's abundance relative to the total quantity of identified compounds in the sample

Integration Results

Chem # Name abv	Rel.Amt %	Spectrum Match	Rtn T. min	Rel.Ar %	Rel.Ht %	R^2 %	HV LoD	Cor.Coef %	Cal. Pts.	Lower Limit	Amount (mg/kg)	Upper Limit	Extracted % of mass
4 K	38.43	999.678	13.463	59.27	53.25	99.946	16.7342	99.973	11	25051	25651	26251	2.57
2 DHK	21.56	999.303	13.729	13.03	13.82	99.969	12.5876	99.985	11	14020	14389	14759	1.44
3 Y	18.45	999.918	14.243	12.05	16.66	99.967	13.1122	99.983	11	11934	12316	12697	1.23
1 DMY	10.16	999.992	14.504	7.49	10.63	99.964	13.5772	99.982	11	6370	6779	7187	0.68
6 M	5.70	999.963	11.882	4.51	2.45	99.989	7.5388	99.994	11	3568	3805	4042	0.38
5 DHM	5.47	998.246	12.182	2.79	1.64	99.988	7.7755	99.994	11	3404	3649	3894	0.36
FKA	0.12	999.822	15.612	0.50	0.99	99.936	1.5894	99.976	11	77	79	81	0.01
FKB	0.12	999.812	15.928	0.35	0.56	99.961	1.4307	99.980	11	29	77	125	0.01
Total	100			100	100					64454	**66745**	69037	**6.67**

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	Resltn (EP)	Asym (EP)	Plates (EP)
4 K	3	996	807.803	81.4	265.86	126.542	1429.464	0.057	BM	2.91	0.64	311359
2 DHK	4	999	823.753	21.1	69.01	27.828	371.036	0.051	MB	6.51	0.66	403052
3 Y	5	1000	854.603	217.7	n.a.	25.725	447.336	0.042	BMB	3.59	0.73	626213
1 DMY	6	1000	870.253	145.6	n.a.	16.000	285.485	0.043	BMB	16.17	0.75	617231
6 M	1	970	712.903	32.0	4.02	9.634	65.830	0.084	M *	2.06	n.a.	111062
5 DHM	2	912	730.903	21.4	2.68	5.947	43.906	0.088	M *	10.46	n.a.	106781
FKA	7	999	936.703	19.0	n.a.	1.074	26.478	0.037	BMB*	5.06	1.13	968059
FKB	8	852	955.703	6.0	n.a.	0.739	15.081	0.036	BMB*	n.a.	1.68	1E+006

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) and proprietary methods developed in-house, however, the results reported are from the most sensitive method used (highest test counts). R&P 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 R&P logo.

Indicator Organism	**Test Results (cfu/g)**
Aerobic Plate Count (TPC)	120
Coliform	Not detected
Escherichia coli	Not detected
Yeast	Not detected
Mould	Not detected
Staphylococcus spp.	Not detected
Salmonella spp.	Not detected
Listeria spp.	Not detected

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