

Comparative assessment of nutritional, thermal, rheological and functional properties of nine Australian lupin cultivars

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Barlock



Gunyidi



Jenabillup



Jindalee



Jurien



Mandelup



Luxor

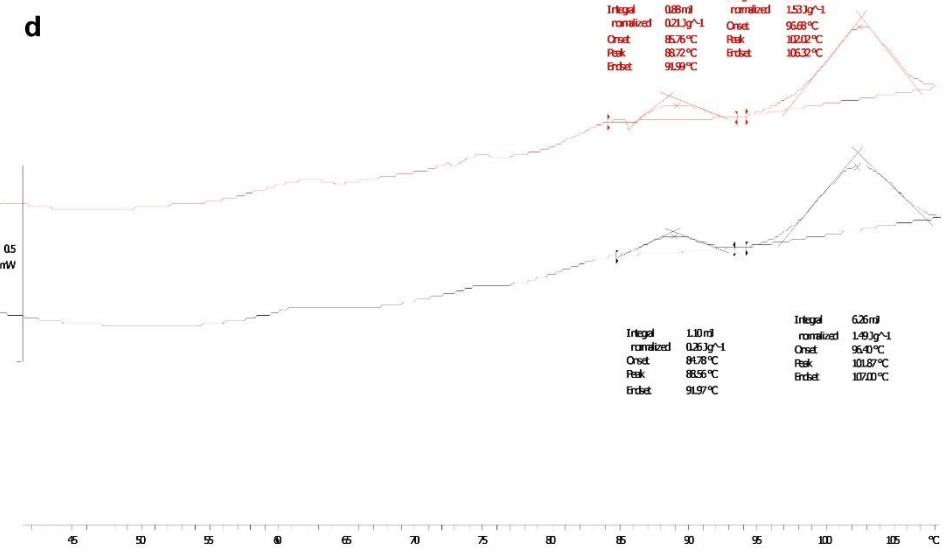
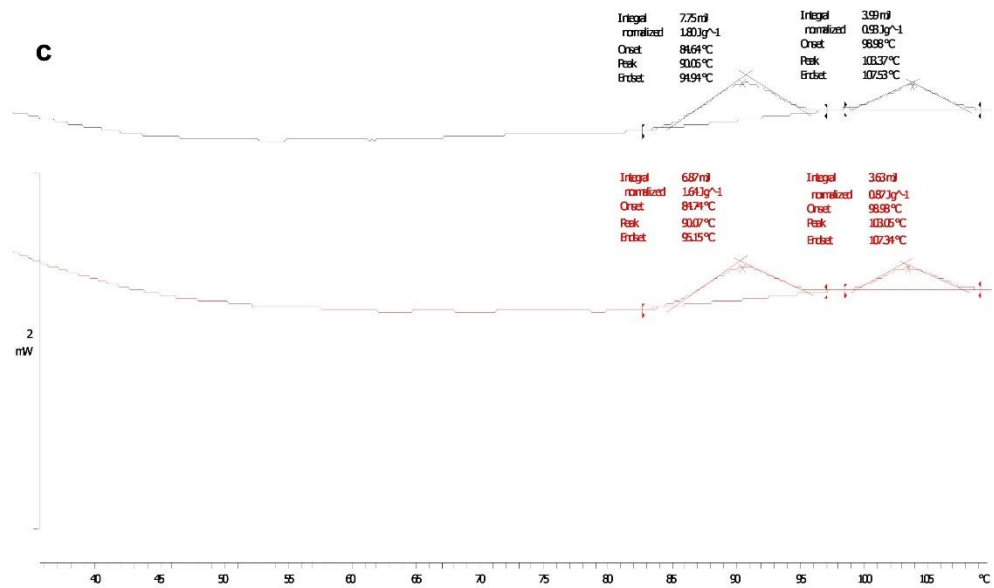
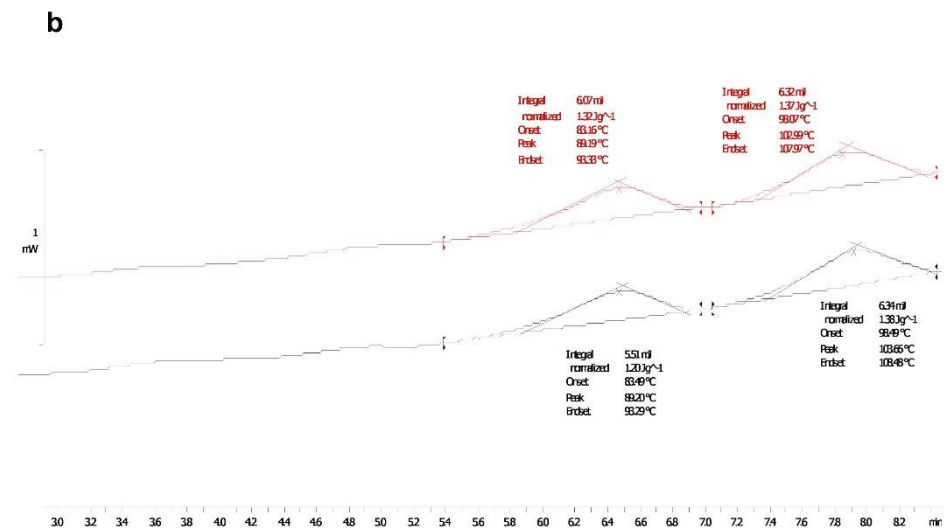
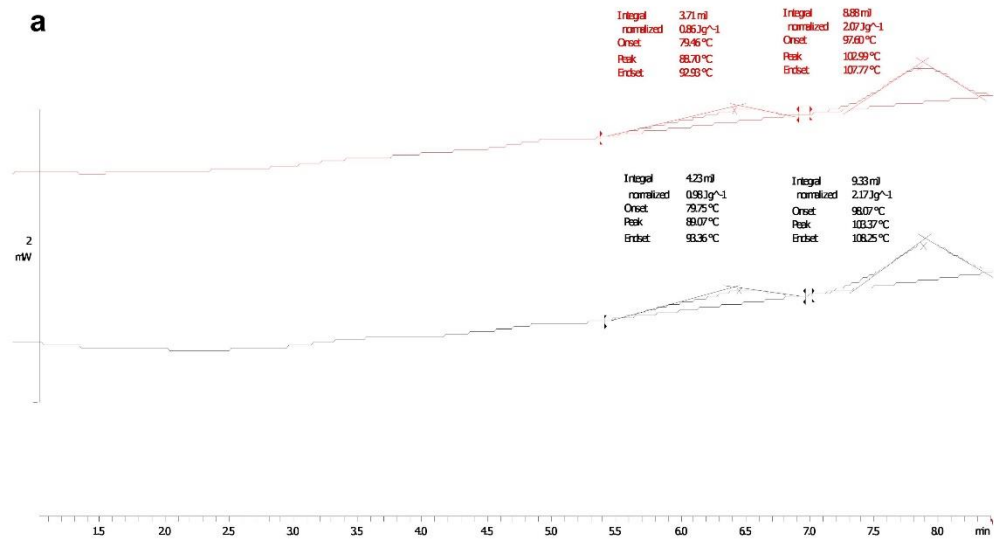


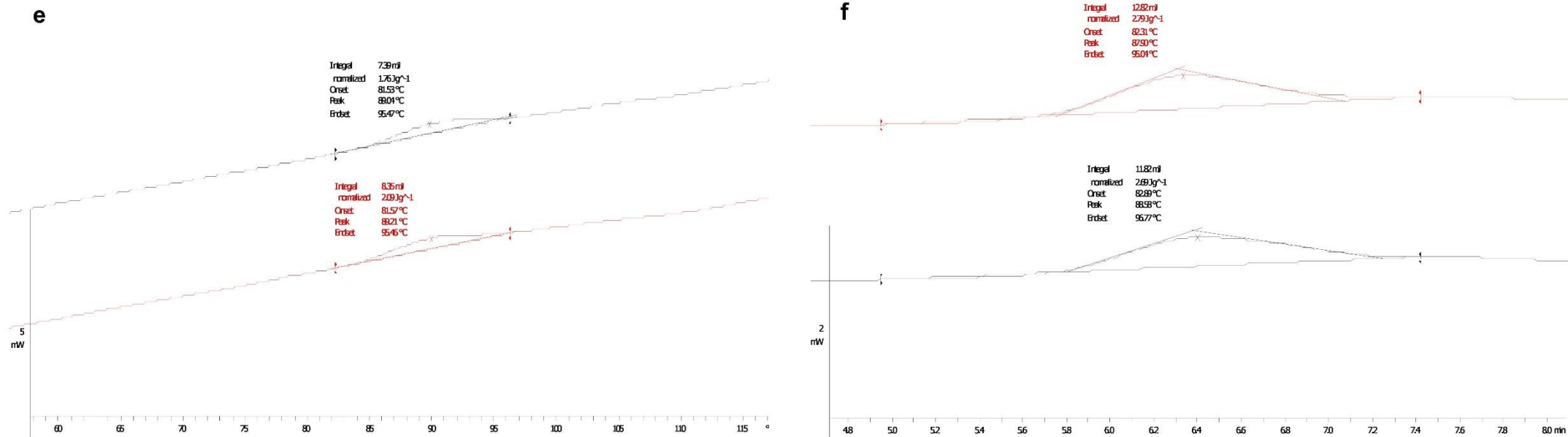
Rosetta



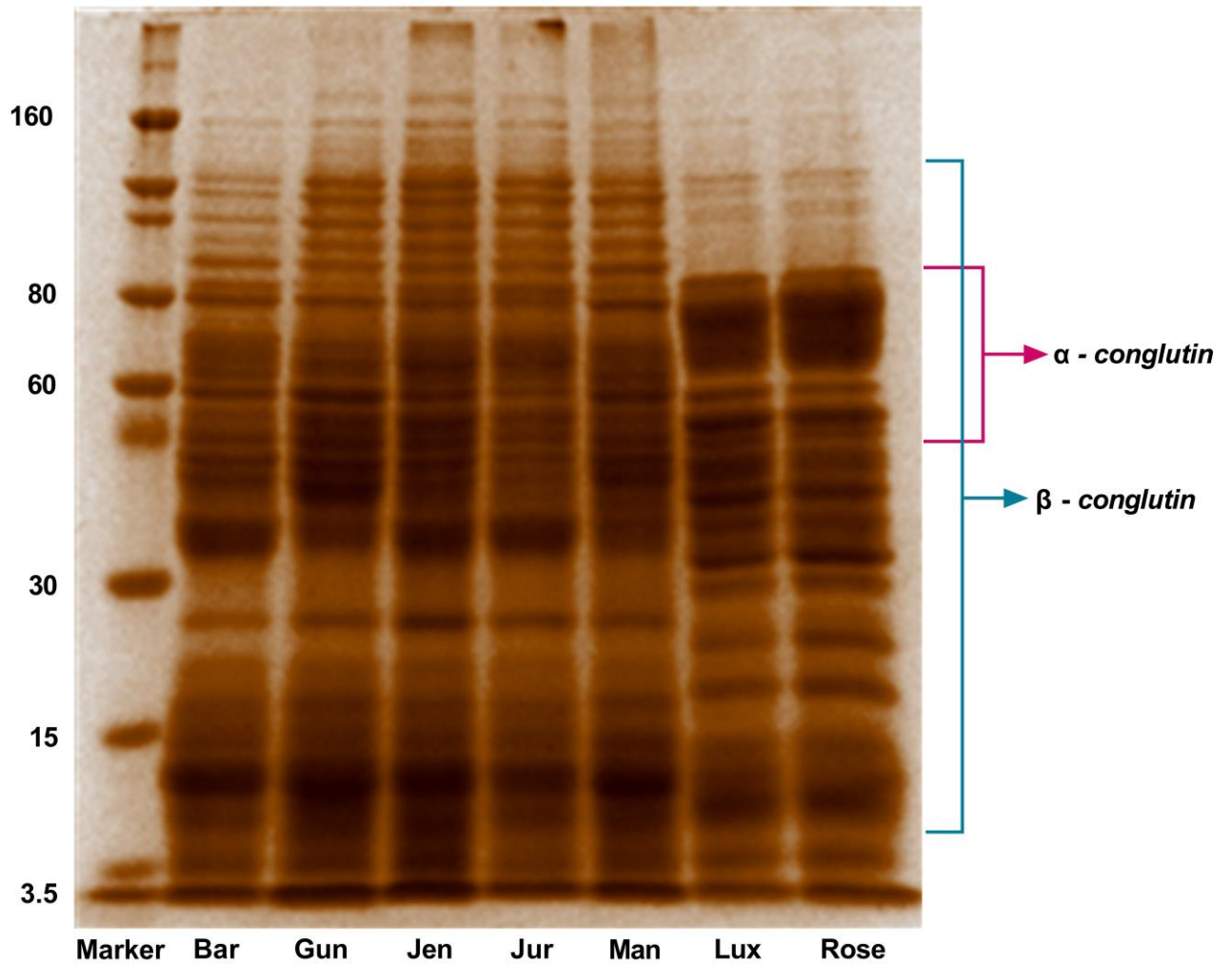
WK388

Supplementary Figure S1. Nine Australian lupin cultivars used in the present work





Supplementary Figure S2. Thermograms of proteins of some lupin flours; where, **a:** Gunyidi, **b:** Jenabillup, **c:** Jindalee, **d:** Mandelup, **e:** Luxor, **f:** Rosetta. The two peaks in the DSC thermogram indicate the presence of two major protein classes: peak 1 represents the vicilins (β -conglutin) and peak 2 represents the legumins (α -conglutin). The red lines represent DSC thermograms of protein isolates while the black lines represent the thermograms of lupin flours.



Supplementary Figure S3. Electrophoretic pattern of major protein isolates (β -, α - and γ -conglutin) of lupin cultivars, separated by SDS-PAGE analysis. Here, Bar is Barlock, Gun is Gunyidi, Jen is Jenabillup, Jur is Jurien, Man is Mandelup, Lux is Luxor and Rose is Rosetta.

Lupin Cultivars	Initial Weight (gm)	Kernal Weight (gm)	%	Seed Coat Weight (gm)	%	Intermediate (gm)	%
Barlock	533.8	362.1	67.83	126	23.60	45.7	8.56
Gunyidi	524	353.3	67.42	129.4	24.69	41.3	7.88
Jenabillup	504	345.8	68.61	115.06	22.83	43.16	8.56
Jindalee	525.4	360.0	68.52	121.3	23.09	44.1	8.39
Jurin	509.7	354.7	69.59	116.9	22.94	38.1	7.47
Mandelup	519.9	354.3	68.15	123.6	23.77	42	8.08
Luxor	510	364.1	71.39	83.9	16.45	62	12.16
Rosetta	508.8	374.6	73.62	78.4	15.41	55.8	10.97
WK388	514.5	368.4	71.60	78	15.16	68.1	13.24

Supplementary Table S1. Kernel and seed coat contents of different cultivars obtained after dehulling of lupin seeds.

Cultivars	Peak 1 (mPa-s)	Peak 2 (mPa-s)	Trough (mPa-s)	Peak 3 (mPa-s)	Peak 1 Time (sec)	Peak 2 Time (sec)	Peak 3 Time (sec)	Final Viscosity (mPa-s)
Barlock	588.5 ± 3.54 c,f,g,h,i	578.5 ± 37.48 b,c,d,g,h,i	512 ± 8.49 ^{c,i}		9.65 ± 0.03 ^{g,h,i}	12.25 ± 0.04		1405 ± 22.63 ^d
Gunyidi	590 ± 4.24 ^{c,f,g,h,i}	464.5 ± 13.44 a,g,h,i	411 ± 8.49		9.69 ± 0.02 ^{g,h,i}	11.83 ± 0.84		1190 ± 19.80
Jenabillup	506.5 ± 11.32 a,b,d,e,f,g,h,i	379.5 ± 4.95 a,f,g,h,i	352.5 ± 3.54 ^a	316.2 ± 0.23 ^e	9.9 ± 0.14 ^{g,h,i}	12.2 ± 0.07	16.2 ± 0.23	1028 ± 31.11 ^g
Jindalee	586.5 ± 10.61 c,f,g,h,i	427 ± 9.9 ^{a,g,h,i}	403.5 ± 7.78		9.54 ± 0.04 ^{g,h,i}	11.54 ± 0.05		863 ± 19.8 ^{a,g}
Jurien	561.5 ± 34.64 c,f,g,h,i	477 ± 18.38 ^{g,h,i}	438 ± 15.56	426.03 ± 0.0 ^c	9.72 ± 0.16 ^{g,h,i}	12.38 ± 0.0	16.0 ± 0.0	1090.5 ± 34.65
Mandelup	688 ± 7.07 a,b,c,d,e,g,h,i	521 ± 19.8 ^{c,g,h,i}	446.5 ± 41.72 ^h		9.92 ± 0.07 ^{g,h,i}	12.59 ± 0.12		1251.5 ± 40.31
Luxor	175 ± 0.0 a,b,c,d,e,f,h,i	1036 ± 32.53 a,b,c,d,e,f,h,i	414 ± 31.11		4.95 ± 0.07 a,b,c,d,e,f	12.12 ± 0.05		1593 ± 347.9 ^{c,d}
Rosetta	122.5 ± 0.71 a,b,c,d,e,f,g,i	900 ± 41.01 a,b,c,d,e,f,g	327.5 ± 61.52 ^{a,f}		4.92 ± 0.16 a,b,c,d,e,f	11.95 ± 0.04		1138 ± 183.85
WK388	147 ± 4.24 a,b,c,d,e,f,g,h	860 ± 41.01 a,b,c,d,e,f,g,h	390 ± 33.94 ^a		4.85 ± 0.14 a,b,c,d,e,f	12.04 ± 0.02		1078.5 ± 21.92

Supplementary Table S2. RVA profile of different lupin cultivars. Data are means of three replicates with standard deviations (SD). Data within the same column with different superscripts are significantly different, pair-wise comparison by Post Hoc Tukey test (^a P < 0.05 vs. Barlock; ^b P < 0.05 vs. Gunyidi; ^c P < 0.05 vs Jenabillup; ^d P < 0.05 vs. Jindalee; ^e P < 0.05 vs Jurien; ^f P < 0.05 vs. Mandelup; ^g P < 0.05 vs Luxor; ^h P < 0.05 vs Rosetta; ⁱ P < 0.05 vs WK388).

Cultivars	Hardness (g/mm)	Work (g.mm)	Peak Force (g)
Barlock	34.17 ± 9.88 ^{g,h}	373.41 ± 18 ^{b,c,d,e,f,g,h,i}	376.92 ± 22.62 ^{b,c,d,e,g,h,i}
Gunyidi	44.04 ± 0.4 ^{h,i}	2612.72 ± 80.65 ^{a,c,d,e,f,g,h,i}	442.04 ± 7.17 ^{a,c,e,f,g,h,i}
Jenabillup	32.36 ± 3.09 ^{g,h}	2195.45 ± 72 ^{a,b,d,e,f,g,h,i}	413.01 ± 80.73 ^{a,b,e,f,g,i}
Jindalee	33.20 ± 44 ^{g,h}	2649.84 ± 25 ^{a,b,c,e,f,g,h,i}	425.56 ± 70.31 ^{a,e,f,g,i}
Jurin	41.24 ± 6.31 ^{g,i}	2825.86 ± 323.66 ^{a,b,c,d,f,g,h,i}	474.13 ± 87.99 ^{a,b,c,d,f,g,h,i}
Mandelup	30.08 ± 1.23 ^{g,h}	2950.11 ± 227.93 ^{a,b,c,d,e,g,h,i}	374.16 ± 47.61 ^{b,c,d,e,g,h,i}
Luxor	50.62 ± 11.72 ^{a,c,d,f,i}	3269.63 ± 286.47 ^{a,b,c,d,e,f,h,i}	506.59 ± 46.70 ^{a,b,c,d,e,f,h,i}
Rosetta	63.68 ± 4.79 ^{a,b,c,d,e,f,i}	2088.84 ± 42.46 ^{a,b,c,d,e,f,g,i}	407.01 ± 4.95 ^{a,b,e,f,g,i}
WK388	26.71 ± 3.25 ^{b,e,g,h}	1321.62 ± 186.28 ^{a,b,c,d,e,f,g,h}	220.12 ± 25.96 ^{a,b,c,d,e,f,g,h}

Supplementary Table S3. Texture analysis of different lupin cultivars. Data are means of three replicates with standard deviations (SD). Data within the same column with different superscripts are significantly different, pair-wise comparison by Post Hoc Tukey test (^a P < 0.05 vs. Barlock; ^b P < 0.05 vs. Gunyidi; ^c P < 0.05 vs Jenabillup; ^d P < 0.05 vs. Jindalee; ^e P < 0.05 vs Jurin; ^f P < 0.05 vs. Mandelup; ^g P < 0.05 vs Luxor; ^h P < 0.05 vs Rosetta; ⁱ P < 0.05 vs WK388).