

Supplementary information

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Table S1. Total starch, protein, total dietary fiber (TDF), ash, fat and total available carbohydrate (TAC) contents

		Total starch (g/100 g DM)	Protein (g/100 g DM)	TDF (g/100g DM)	TAC (g/100 g DM)	Fat (g/100 g DM)	Ash (g/100 g DM)	Energy values (Kcal. /100 g)
White kidney bean flour		42.04±0.35 ^f d	28.10±0.15 d	15.60±0.40 a	49.27±0.47 d	1.63 ± 0.04 d	5.39 ± 0.08 a	285.30±0.70 ^e
Adzuki flour	bean	49.58±0.21 b	28.31±0.47 d	12.63±0.16 cd	55.09±0.48 b	0.35 ± 0.02 g	3.62 ± 0.05 d	297.39±1.48 ^d
Cowpea flour		44.59±0.65 cd	36.55±0.78 a	13.88±0.11 b	43.36±0.99 g	1.86 ± 0.10 b	4.36 ± 0.03 b	294.79±3.34 ^d
Yellow flour	pea	52.54±0.38 a	27.11±0.16 c	14.26±0.11 b	53.89±0.22 c	1.78 ± 0.01 bc	2.96 ± 0.04 f	295.52±0.50 ^d
Mung flour	bean	49.71±0.10 b	28.37±0.14 d	8.87±0.08 ^f c	57.77±0.25 a	1.40 ± 0.04 c	3.59 ± 0.07 d	316.38±0.79 ^b
Broad flour	bean	45.37±0.35 c	35.40±0.26 b	13.03±0.20 c	46.70±0.13 ^f cd	1.70 ± 0.08 cd	3.17 ± 0.02 e	308.50±0.31 ^c
Chickpea flour		44.09±0.13 de	30.45±0.90 c	12.37±0.72 c	48.28±0.27 e	5.92 ± 0.03 a	2.97 ± 0.07 f	332.75±3.22 ^a
White flour	lentil	43.40±0.25 c	28.13±0.86 d	11.47±0.11 c	55.83±0.86 b	0.77 ± 0.02 f	3.80 ± 0.08 c	309.91±3.15 ^c

Data was presented as mean ± standard deviation (n=3). Different superscript letters in the same row denoted a significant difference according to one-way ANOVA with Tukey's post-hoc test ($p < 0.05$).

Table S2. Starch digestion kinetic parameters of pulse flours and pastes

	C_{∞}	K	R ²	HI	eGI	eGL
Flour						
White kidney bean flour	65.83±0.97 ^c	0.23±0.02 ^{bc}	0.984	65.41±0.58 ^c	64.58±0.50 ^c	2.55±0.02 ^f
Adzuki flour	72.42±0.99 ^b	0.21±0.04 ^{bc}	0.979	71.24±1.16 ^b	69.61±1.00 ^b	3.08±0.04 ^a
Cowpea flour	80.85±3.51 ^a	0.03±0.00 ^d	0.905	58.98±0.47 ^c	59.04±0.41 ^c	2.04±0.01 ^h
Yellow flour	73.05±0.35 ^b	0.36±0.45 ^a	0.997	72.31±0.28 ^{ab}	70.53±0.24 ^{ab}	3.01±0.01 ^b
Mung flour	64.25±0.21 ^c	0.30±0.01 ^{ab}	0.977	63.61±0.35 ^{cd}	63.03±0.30 ^{cd}	2.94±0.01 ^c
Broad flour	64.25±0.53 ^c	0.17±0.02 ^c	0.986	63.24±0.52 ^d	62.71±0.44 ^d	2.39±0.02 ^g
Chickpea flour	75.88±1.08 ^{ab}	0.20±0.08 ^{bc}	0.948	73.20±0.52 ^a	71.29±0.44 ^a	2.83±0.02 ^d
White flour	73.17±2.56 ^b	0.05±0.01 ^d	0.936	57.75±0.62 ^c	57.98±0.53 ^c	2.66±0.02 ^e
Paste						
White kidney bean paste	67.76±0.03 ^{cd}	0.27±0.03 ^{ab}	0.992	67.61±0.98 ^{c*}	66.48±0.85 ^{c*}	2.55±0.03 ^c
Adzuki paste	67.39±0.81 ^{d*}	0.28±0.01 ^{ab}	0.995	66.60±1.06 ^{c*}	65.60±0.92 ^{c*}	2.90±0.04 ^{c*}
Cowpea paste	69.40±0.04 ^{c*}	0.20±0.00 ^{b*}	0.996	67.23±0.09 ^{c*}	66.15±0.08 ^{c*}	2.25±0.01 ^{g*}
Yellow paste	92.59±0.26 ^{a*}	0.25±0.03 ^{ab}	0.995	89.52±0.10 ^{a*}	85.36±0.09 ^{a*}	3.92±0.01 ^{a*}
Mung paste	82.39±0.94 ^{b*}	0.19±0.07 ^b	0.968	80.21±0.19 ^{b*}	77.34±0.17 ^{b*}	3.56±0.01 ^{b*}
Broad paste	64.93±0.76 ^c	0.29±0.06 ^{ab*}	0.989	63.97±0.13 ^d	63.34±0.11 ^d	2.44±0.02 ^f
Chickpea paste	68.49±0.15 ^{cd*}	0.36±0.04 ^{a*}	0.990	66.12±0.54 ^{c*}	65.20±0.47 ^{c*}	2.66±0.03 ^{d*}
White paste	51.86±0.29 ^{f*}	0.30±0.06 ^{ab*}	0.988	51.40±0.85 ^{c*}	52.50±0.73 ^{c*}	2.48±0.12 ^{f*}

C_{∞} and k were calculated by the kinetic equation: $C = C_{\infty} \times (1 - e^{-kt})$. Data was presented as mean ± standard deviation (n=3). Different superscript letters in the same row denoted a significant difference according to one-way ANOVA with Tukey's post-hoc test ($p < 0.05$). "*" The significant difference was found between the pulse flour and its paste according to the independent-sample t-test ($p < 0.05$).

Table S3. Representative indicators for factor analysis

	ReGI	ReGL	RS	T-scfa	B-acid	S-pH
Flour						
White kidney bean flour	15.48	39.24	32.65	94.45	13.07	0.25
Adzuki bean flour	14.37	32.45	25.15	81.26	11.53	0.25
Cowpea flour	16.94	48.98	11.28	84.43	11.54	0.50
Yellow pea flour	14.18	33.26	25.68	81.97	11.32	0.62
Mung bean flour	15.86	34.07	28.97	78.22	9.63	0.28
Broad bean flour	15.95	41.81	32.57	79.94	11.70	0.88
Chickpea flour	14.03	35.33	19.91	88.04	8.42	1.46
White lentil flour	17.25	37.55	18.98	100.05	8.61	1.26
Paste						
White kidney bean paste	15.04	39.27	31.20	66.44	7.62	0.31
Adzuki bean paste	15.24	34.53	31.52	73.97	10.13	0.56
Cowpea paste	15.12	44.45	28.56	79.07	10.96	0.13
Yellow pea paste	11.71	25.54	4.86	85.69	11.93	1.11
Mung bean paste	12.93	28.06	16.52	48.84	4.78	0.17
Broad bean paste	15.79	41.06	32.01	73.31	9.74	-0.13
Chickpea paste	15.34	37.64	31.78	80.38	10.42	0.06
White lentil paste	19.05	40.39	47.46	87.06	14.12	0.41

Table S4. Total variance explained

Component	Initial Eigenvalues		Extraction Sums of Squared loadings		Rotation Sums of Squared loadings	
	Total	Cumulative %	Total	Cumulative %	Total	Cumulative %
1	2.656	44.270	2.656	44.270	1.576	26.265
2	1.739	73.261	1.739	73.261	1.485	51.009
3	0.754	85.825	0.754	85.825	1.352	73.539
4	0.530	94.650	0.530	94.650	1.267	94.650
5	0.188	97.778				
6	0.133	100.000				

Table S5. Variance of common factor

Indicators	A (ReGI)	B (ReGL)	C (RS)	D (T-scfa)	E (B-acid)	F (S-pH)
Initial	1	1	1	1	1	1
Extraction	0.923	0.958	0.966	0.919	0.964	0.949

Table S6. Rotated component matrix

Indicators	Component			
	1	2	3	4
B (ReGL)	0.951	0.162	-0.131	0.095
A (ReGI)	0.736	0.177	0.118	0.580
E (B-acid)	0.137	0.955	-0.031	0.178
D (T-scfa)	0.247	0.702	0.604	0.024
F (S-pH)	-0.129	0.031	0.941	-0.214
C (RS)	-0.182	-0.144	0.263	0.918

Table S7. Factor scores of flours and pastes

	Factor 1	Factor 2	Factor 3	Factor 4	Total score (F1+F4)	Total score (all)
<i>Flour</i>						
White kidney bean flour	0.00	1.51	-0.39	0.21	0.05	0.35
Adzuki bean flour	-0.89	0.77	-0.61	-0.13	-0.28	-0.22
Cowpea flour	2.39	0.35	-0.23	-1.98	0.22	0.26
Yellow pea flour	-0.85	0.55	0.04	-0.03	-0.24	-0.09
Mung bean flour	-0.30	-0.29	-0.15	0.58	0.05	-0.06
Broad bean flour	0.47	0.13	0.51	0.48	0.24	0.39
Chickpea flour	-0.24	-0.69	1.97	-0.30	-0.13	0.15
White lentil flour	0.85	-0.57	2.39	0.07	0.25	0.67
<i>Paste</i>						
White kidney bean paste	0.31	-1.40	-0.43	0.37	0.17	-0.30
Adzuki bean paste	-0.53	-0.32	0.05	0.73	0.02	-0.05
Cowpea paste	0.91	0.30	-1.00	-0.53	0.13	-0.03
Yellow pea paste	-1.95	1.23	0.58	-1.85	-0.95	-0.49
Mung bean paste	-1.09	-2.46	-0.94	-0.51	-0.42	-1.29
Broad bean paste	0.59	-0.29	-1.23	0.18	0.21	-0.16
Chickpea paste	-0.03	0.19	-0.76	0.33	0.06	-0.07
White lentil paste	0.38	0.99	0.20	2.37	0.63	0.94

* The scores for each factor were calculated by using regression methods in SPSS, and the total scores were weighted and summed according to the factor loadings.

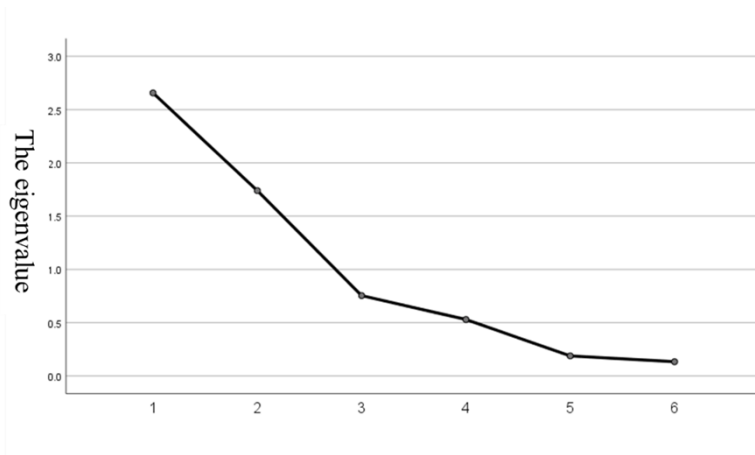


Fig. S1. Gravel figure

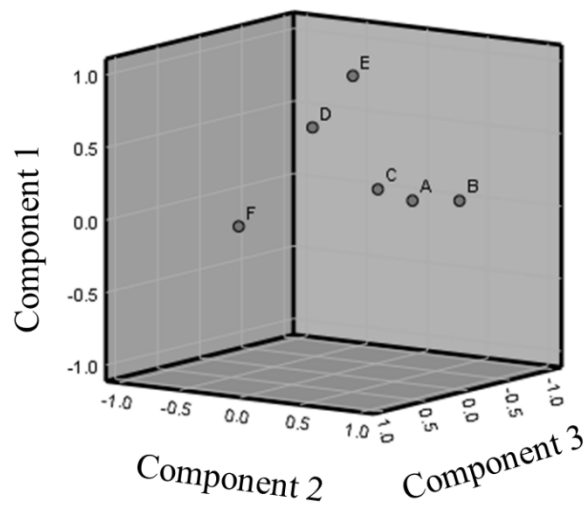


Fig. S2. Component plot in rotated space