

Table S1. Two-way ANOVA for physical properties of extruded red Toska beans

Variables	Source	SS	DF	MS	F	p
SME	rpm	0.2390	4	0.0597	550.98	0.0000
	water	0.2312	4	0.0578	533.07	0.0000
	rpm×water	0.0096	16	0.0006	5.56	0.00001
ER	rpm	4.630	4	1.157	715.7	0.0000
	water	12.515	4	3.129	1934.5	0.0000
	rpm×water	2.096	16	0.131	81.0	0.0000
WAI	rpm	0.682	4	0.171	2.20	0.0826
	water	1.547	4	0.387	4.98	0.0018
	rpm×water	3.474	16	0.217	2.80	0.0028
WSI	rpm	1202.91	4	300.73	50.732	0.0000
	water	1373.20	4	343.30	57.914	0.0000
	rpm×water	825.17	16	51.57	8.700	0.0000
Viscosity	rpm	4884.7	4	1221.2	85.92	0.0000
	water	10536.2	4	2634.0	185.32	0.0000
	rpm×water	3780.2	16	236.3	16.62	0.0000
L^*	rpm	225.3	4	56.3	23.3	0.0000
	water	57.4	4	14.4	5.9	0.0003
	rpm×water	864.8	16	54.0	22.4	0.0000
a^*	rpm	16.510	4	4.128	6.672	0.0001
	water	5.342	4	1.336	2.159	0.0791
	rpm×water	14.772	16	0.923	1.492	0.1174
b^*	rpm	64.14	4	16.04	2.007	0.0993
	water	32.53	4	8.13	1.018	0.4019
	rpm×water	247.00	16	15.44	1.932	0.0257

Table S2. Two-way ANOVA for physical properties of extruded white Aura beans

Variables	Source	SS	DF	MS	F	p
SME	rpm	0.2499	4	0.0624	669.0	0.0000
	water	0.1070	4	0.0267	286.7	0.0000
	rpm×water	0.0098	16	0.0006	6.6	0.0000
ER	rpm	5.926	4	1.481	1216.9	0.0000
	water	17.661	4	4.415	3627.0	0.0000
	rpm×water	0.514	16	0.032	26.4	0.0000
WAI	rpm	0.292	4	0.073	2.0	0.1040
	water	0.134	4	0.033	0.9	0.4521
	rpm×water	2.623	16	0.164	4.6	0.0000
WSI	rpm	1062.19	4	265.55	123.59	0.0000
	water	807.72	4	201.93	93.98	0.0000
	rpm×water	783.62	16	48.98	22.79	0.0000
Viscosity	rpm	445.7	4	111.4	10.14	0.0000
	water	635.6	4	158.9	14.46	0.0000
	rpm×water	1901.3	16	118.8	10.82	0.0000
L^*	rpm	223.5	4	55.9	25.1	0.0000
	water	62.4	4	15.6	7.0	0.0001
	rpm×water	313.4	16	19.6	8.8	0.0000
a^*	rpm	11.3317	4	2.8329	5.895	0.0003
	water	13.6197	4	3.4049	7.085	0.0001
	rpm×water	19.4523	16	1.2158	2.530	0.0027
b^*	rpm	49.15	4	12.29	14.39	0.0000
	water	24.29	4	6.07	7.11	0.0000
	rpm×water	83.38	16	5.21	6.11	0.0000

Table S3. Two-way ANOVA for nutritional properties of extruded red Toska beans

Variables	Source	SS	DF	MS	F	p
Protein	rpm	6.12	4	1.53	14.1	0.0000
	water	4.59	4	1.15	10.6	0.0000
	rpm×water	32.03	16	2.00	18.5	0.0000
Fiber	rpm	2.113	4	0.528	395536.9	0.0000
	water	1.810	4	0.453	338862.	0.0000
	rpm×water	7.798	16	0.487	364987.1	0.0000
Reducing sugar	rpm	76.764	4	19.191	32.615	0.0000
	water	19.545	4	4.886	8.304	0.0002
	rpm×water	225.132	16	14.071	23.913	0.0000
Total Phenols	rpm	17.806	4	4.452	9.940	0.0001
	water	122.370	4	30.593	68.310	0.0000
	rpm×water	334.316	16	20.895	46.656	0.0000
Anthocyanin	rpm	0.31026	4	0.0776	6265	0.0000
	water	0.41919	4	0.1048	8465	0.0000
	rpm×water	1.19626	16	0.0748	6039	0.0000
Total Flavonoids	rpm	0.0103	4	0.0026	289.82	0.0000
	water	0.0091	4	0.0023	257.21	0.0000
	rpm×water	0.0169	16	0.0011	118.91	0.0000
Antiradical activity	rpm	1.1021	4	0.2755	81.6	0.0000
	water	3.3946	4	0.8487	251.4	0.0000
	rpm×water	5.2953	16	0.3310	98.0	0.0000
Reducing power	rpm	2.9359	4	0.7340	52.623	0.0000
	water	1.9968	4	0.4992	35.791	0.0000
	rpm×water	15.7285	16	0.9830	70.480	0.0000

Table S4. Two-way ANOVA for nutritional properties of extruded white Aura beans

Variables	Source	SS	DF	MS	F	p
Protein	rpm	2.29	4	0.57	4.6	0.0067
	water	12.53	4	3.13	24.9	0.0000
	rpm×water	24.78	16	1.55	12.3	0.0000
Fiber	rpm	1.562	4	0.390	54704	0.0000
	water	8.743	4	2.186	306253	0.0000
	rpm×water	30.814	16	1.926	269842	0.0000
Reducing sugar	rpm	159.875	4	39.969	99.045	0.0000
	water	68.275	4	17.069	42.297	0.0000
	rpm×water	203.611	16	12.726	31.535	0.0000
Total Phenols	rpm	5.9954	4	1.4989	9.309	0.0001
	water	2.4176	4	0.6044	3.754	0.0159
	rpm×water	15.7158	16	0.9822	6.101	0.0000
Total Flavonoids	rpm	0.0021	4	0.0005	2.387	0.0781
	water	0.0076	4	0.0019	8.825	0.0001
	rpm×water	0.1284	16	0.0080	37.341	0.0000
Antiradical activity	rpm	0.0498	4	0.0124	6.1177	0.0014
	water	0.0068	4	0.0017	0.8298	0.5189
	rpm×water	0.1908	16	0.0119	5.8626	0.0001
Reducing power	rpm	0.0265	4	0.0066	184.56	0.0000
	water	0.0718	4	0.0179	499.84	0.0000
	rpm×water	0.1383	16	0.0086	240.66	0.0000