

Supplementary Information for

The polyphenol/caffeine ratio determines the arousal-inducing properties of the green tea ethanol extract

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Table S1. Estimated coefficients of the fitted quadratic polynomial equations for dependent variables based on the t-statistic for green tea extraction.

Parameters	Y ₁		Y ₂		Y ₃		Y ₄		Y ₅		Y ₆	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	62.200	0.001	27.500	0.001	42.467	0.001	416.43	0.001	38.933	0.001	126.27	0.001
X ₁	-3.217	0.003	-0.621	0.400	5.079	0.001	18.94	0.001	9.624	0.001	7.283	0.001
X ₂	2.183	0.015	1.558	0.069	-1.269	0.024	-0.60	0.715	2.617	0.001	0.672	0.377
X ₁ X ₁	-5.300	0.001	-5.406	0.001	4.410	0.001	-7.82	0.011	4.208	0.001	1.548	0.120
X ₂ X ₂	-1.100	0.183	-1.256	0.179	0.185	0.711	-3.55	0.130	-0.417	0.370	-0.402	0.647
X ₁ X ₂	-0.250	0.780	0.975	0.354	-0.800	0.214	-0.75	0.778	1.025	0.097	-0.125	0.904

X₁: ethanol concentration (%), X₂: extraction time (min).

Y₁: Sleep duration (min), Y₂: yield (yield of GE, %), Y₃: caffeine (caffeine content, mg/g), Y₄: TPC (total phenolic content, mg GAE/g), Y₅: TFC (total flavonoid content, mg QE/g), Y₆: EGCG ((-)-epigallocatechin gallate content, mg/g). GE, green tea ethanol extract; GAE, gallic acid equivalents; QE, quercetin equivalents.

Table S2. Analysis of variance for dependent variables in green tea ethanol extraction.

Dependent variables	Sources	DF	SS	MS	F-value	P-value
Y ₁ (Sleep duration)	Regression					
	Linear	2	120.908	60.454	21.100	0.003
	Square	2	159.927	79.964	27.920	0.002
	Interaction	1	0.250	0.250	0.090	0.780
	Residual					
	Lack of fit	3	11.662	3.887	2.920	0.265
	Pure error	2	2.660	1.330		
	Total	10	295.407			
Y ₂ (Yield)	Regression					
	Linear	2	22.503	11.251	3.080	0.134
	Square	2	165.739	82.869	22.690	0.003
	Interaction	1	3.803	3.803	1.040	0.354
	Residual					
	Lack of fit	3	15.144	5.048	3.240	0.245
	Pure error	2	3.120	1.560		
	Total	10	210.307			
Y ₃ (Caffeine)	Regression					
	Linear	2	219.260	109.630	86.700	0.001
	Square	2	117.486	58.743	46.460	0.001
	Interaction	1	2.560	2.560	2.020	0.214
	Residual					
	Lack of fit	3	5.876	1.959	8.770	0.104
	Pure error	2	0.447	0.223		
	Total	10	345.629			
Y ₄ (TPC)	Regression					
	Linear	2	2873.750	1436.880	63.550	0.001
	Square	2	355.200	177.600	7.850	0.029
	Interaction	1	2.250	2.250	0.100	0.765
	Residual					
	Lack of fit	3	95.450	31.820	3.610	0.224
	Pure error	2	17.610	8.800		
	Total	10	3344.270			
Y ₅ (TFC)	Regression					
	Linear	2	795.743	397.871	393.630	0.001
	Square	2	116.930	58.465	57.840	0.0100
	Interaction	1	4.203	4.203	4.160	0.097

Y ₆ (EGCG)	Residual					
	Lack of fit	3	4.407	1.469	4.540	0.186
	Pure error	2	0.647	0.323		
	Total	10	921.929			
	Regression					
	Linear	2	427.938	213.969	55.590	0.001
	Square	2	18.075	9.037	2.350	0.191
	Interaction	1	0.062	0.062	0.020	0.904
	Residual					
	Lack of fit	3	16.079	5.360	3.380	0.236
	Pure error	2	3.167	1.583		
	Total	10	465.320			

DF: degrees of freedom, SS: sum of square, MS: mean square

Y₁: Sleep duration (min), Y₂: yield (yield of GE, %), Y₃: caffeine (caffeine content, mg/g), Y₄: TPC (total phenolic content, mg GAE/g), Y₅: TFC (total flavonoid content, mg QE/g), Y₆: EGCG ((-)-epigallocatechin gallate content, mg/g). GE, green tea ethanol extract; GAE, gallic acid equivalents; QE, quercetin equivalents.

Table S3. Contents of compounds from PP 60 (mean ± SD).

Caffeine (mg/g)	TPC (mg GAE/g)	TFC (mg QE/g)	EGCG (mg/g)	EGC (mg/g)	ECG (mg/g)	EC (mg/g)	CA (mg/g)	L-theanine (mg/g)
0.04 ± 0.01	942.15 ± 11.47	19.79 ± 6.66	395.50 ± 13.52	199.02 ± 6.30	122.88 ± 3.71	79.60 ± 2.65	22.84 ± 0.81	nd

SD, standard deviation; EGCG, (-)-epigallocatechin gallate; EGC, (-)-epigallocatechin; ECG, (-)-epicatechin gallate; EC, (-)-epicatechin; CA, (+)-catechin; PP 60, polyphenon 60; TPC, total phenolic content; GAE, gallic acid equivalents; nd, not detected; TFC, total flavonoid content; QE, quercetin equivalents.