

Supplementary Material

Ultrasound-Assisted Extraction of Flavonoids from Kiwi Peel: Process Optimization and Bioactivity Assessment

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Table S1. Natural and coded values of the independent variables used in the five-level central composite rotatable design (CCRD) used to optimize the extraction of flavonoids from kiwi peel.

Coded values	Natural values		
	Time (min)	Ultrasonic power (W)	Ethanol concentration (% <i>v/v</i>)
-1.68	1	5	0
-1	10	106	20
0	23	253	50
+1	36	400	80
+1.68	45	500	100

Table S2. Parametric values estimated with the polynomial Equation (1) and statistical information of the model fitting procedure. Parametric superscripted 1, 2, and 3 stand for the variables time, ultrasonic power, and ethanol concentration, respectively.

		Yield	BtEC	EC	Q3G	Q3R	FLAV
Intercept	b_0	50.4±0.6	0.308±0.007	1.04±0.02	0.155±0.001	0.1464±0.0005	1.66±0.02
Linear term	b_1	1.1±0.5	-0.014±0.005	0.04±0.02	ns	0.0011±0.0004	0.03±0.01
	b_2	2.7±0.5	0.002±0.004*	ns	-0.019±0.001	ns	-0.05±0.01
	b_3	-3.1±0.5	0.002±0.004*	-0.11±0.02	0.002±0.001	0.0010±0.0004	-0.09±0.01
Quadratic term	b_{11}	ns	0.034±0.004	-0.26±0.02	ns	ns	-0.22±0.01
	b_{22}	1.8±0.5	0.046±0.004	ns	-0.015±0.001	ns	ns
	b_{33}	-2.5±0.5	0.107±0.004	-0.22±0.02	0.0016±0.001	-0.0046±0.0004	-0.13±0.01
Interaction term	b_{12}	ns	ns	ns	ns	ns	ns
	b_{13}	ns	ns	-0.07±0.03	ns	ns	-0.06±0.02
	b_{23}	ns	ns	ns	0.021±0.001	ns	0.06±0.02
Statistical information							
Model F-value		25.16	115.35	96.35	212.27	42.19	61.24
Lack of fit		ns	ns	ns	ns	ns	ns
R ²		0.8999	0.9816	0.9718	0.9899	0.8879	0.9728
R ² _{adj}		0.8641	0.9731	0.9617	0.9852	0.8667	0.9569
Ad. Precision		22.49	31.36	24.42	40.72	22.49	24.02
C.V. (%)		3.55	3.83	8.43	2.97	1.14	3.58

BtEC: B-type (epi)catechin dimer; EC: epicatechin; Q3G: quercetin-3-*O*-glucoside; Q3R: quercetin-3-*O*-rhamnoside; FLVAV: total content of flavonoids; R²: coefficient of determination; R²_{adj}: adjusted coefficient of determination; Ad. Precision.: adequate precision; C.V.: coefficient of variation or relative standard deviation; ns: not significant. In all cases, the model *p*-value was < 0.0001.

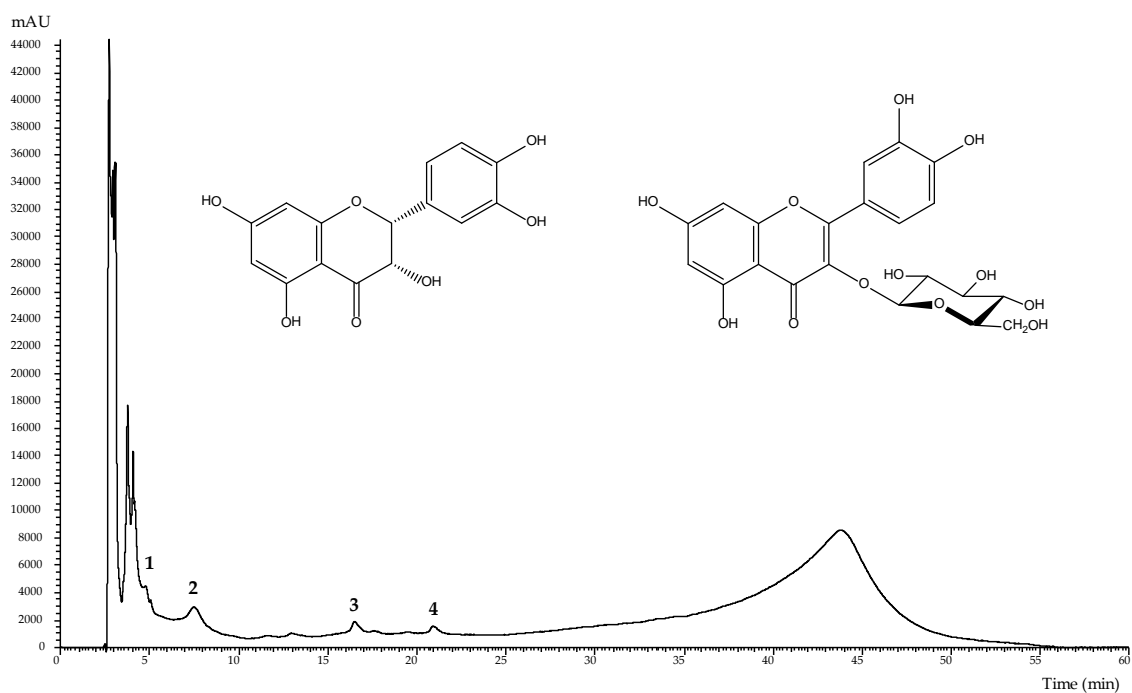


Figure S1. HPLC-chromatographic profile of phenolic compounds in kiwi peel extract and chemical structure of (-)-epicatechin and quercetin-3-O-glucoside. The compounds identification is presented in Table 1.

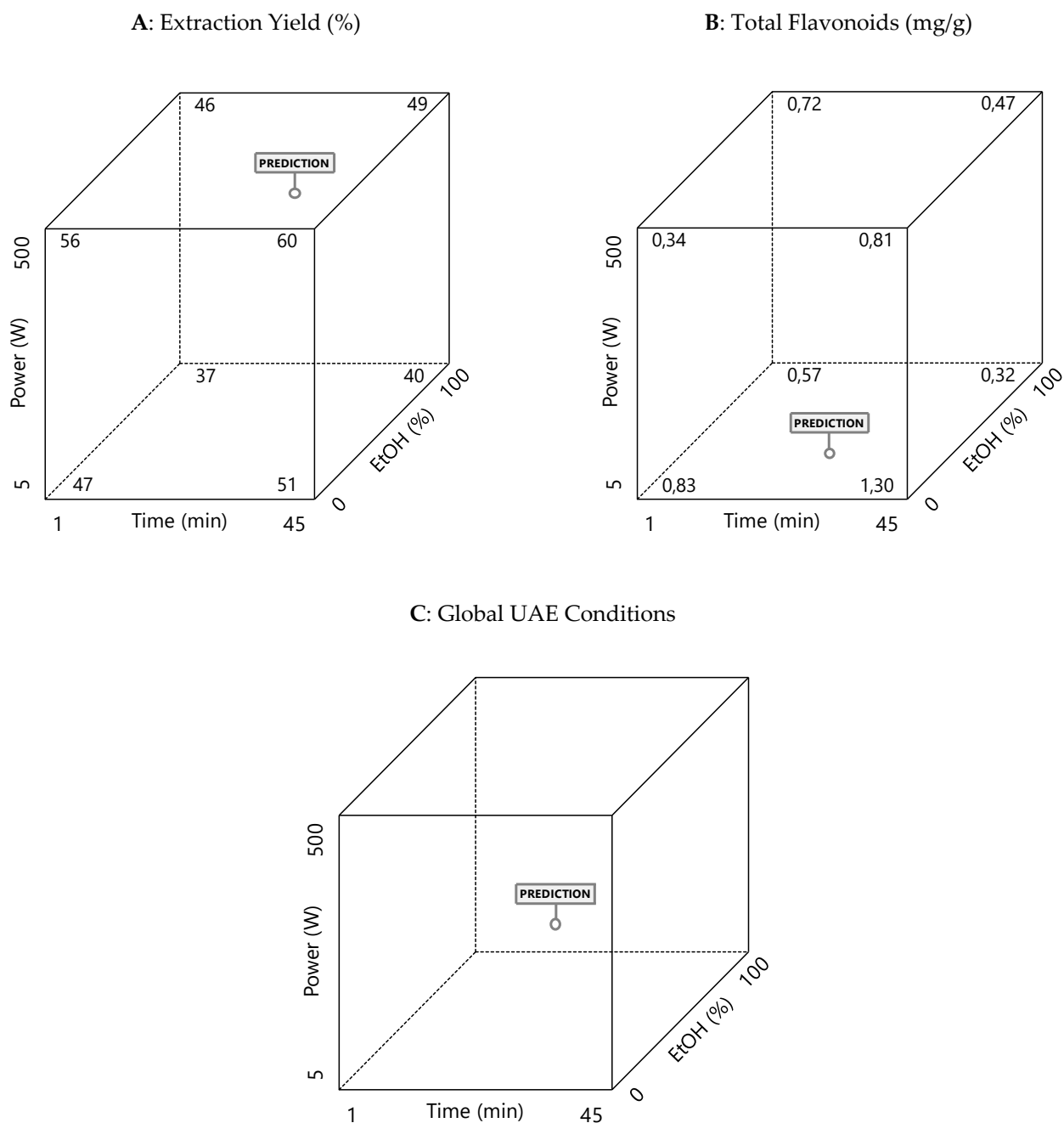


Figure S2. Cube plots illustrating the optimal values as a function of the three independent variables for extraction yield (A), total content of flavonoids (B), and all responses simultaneously (C). The values at each vertex of the first two cubes are response values. The model-predicted values represented in each cube plot are shown in **Table 3**.