

Supporting Information

Development of an eco-friendly approach based on dispersive liquid-liquid microextraction for the quantitative determination of quercetin in *Nasturtium officinale*, *Apium graveolens*, *Spinacia oleracea*, *Brassica oleracea var. sabellica*, and food samples

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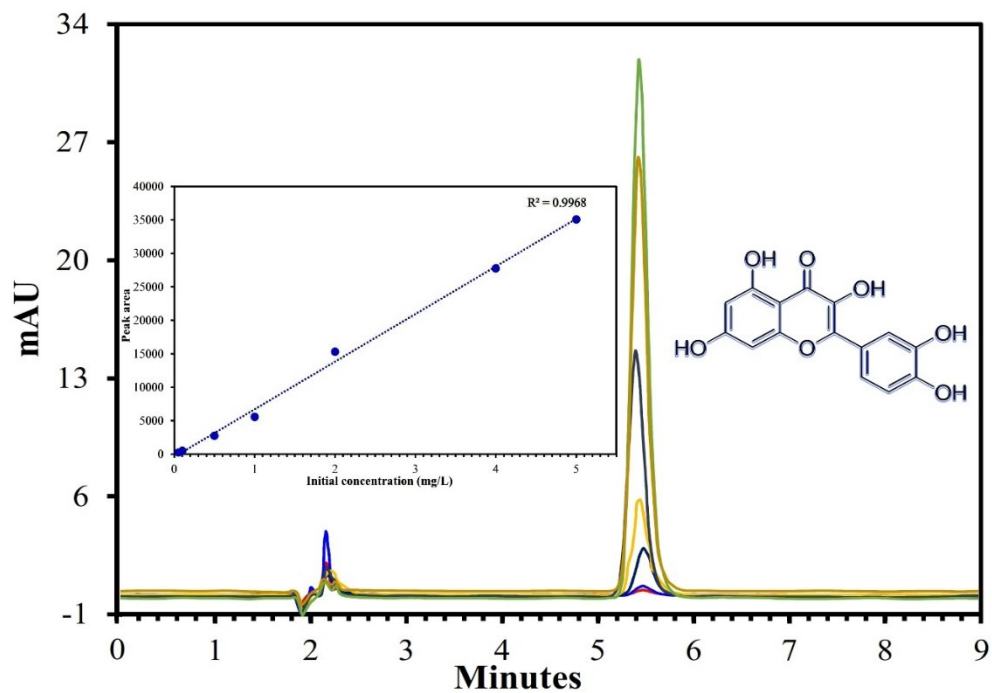


Fig. S1. Structure and calibration curve of quercetin before preconcentration. mobile phase: methanol: orthophosphoric acid 0.3% [70:30, v/v]; flow rate: 1.0 mL min⁻¹; column: KNAUER Smart line HPLC system equipped with UV-VIS 2550 Detector, Zorbax SB-C₁₈ column (15 cm × 3.9 mm id, 5 μm particle size) under ambient temperature (25 °C); λ = 365 nm.

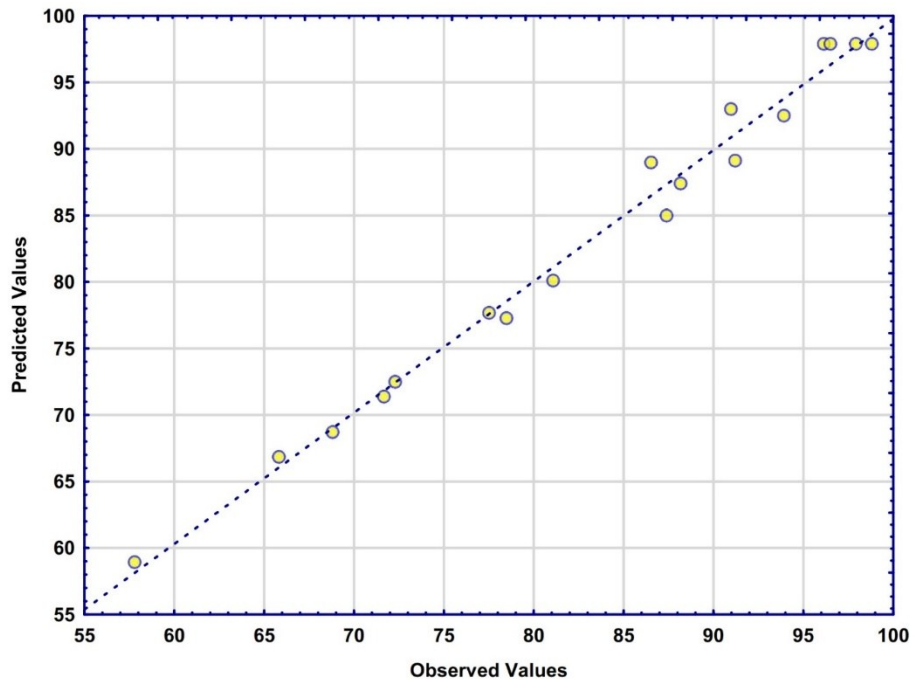


Fig. S2. Observed vs. predicted results for the extraction recovery of quercetin via CCD equation.

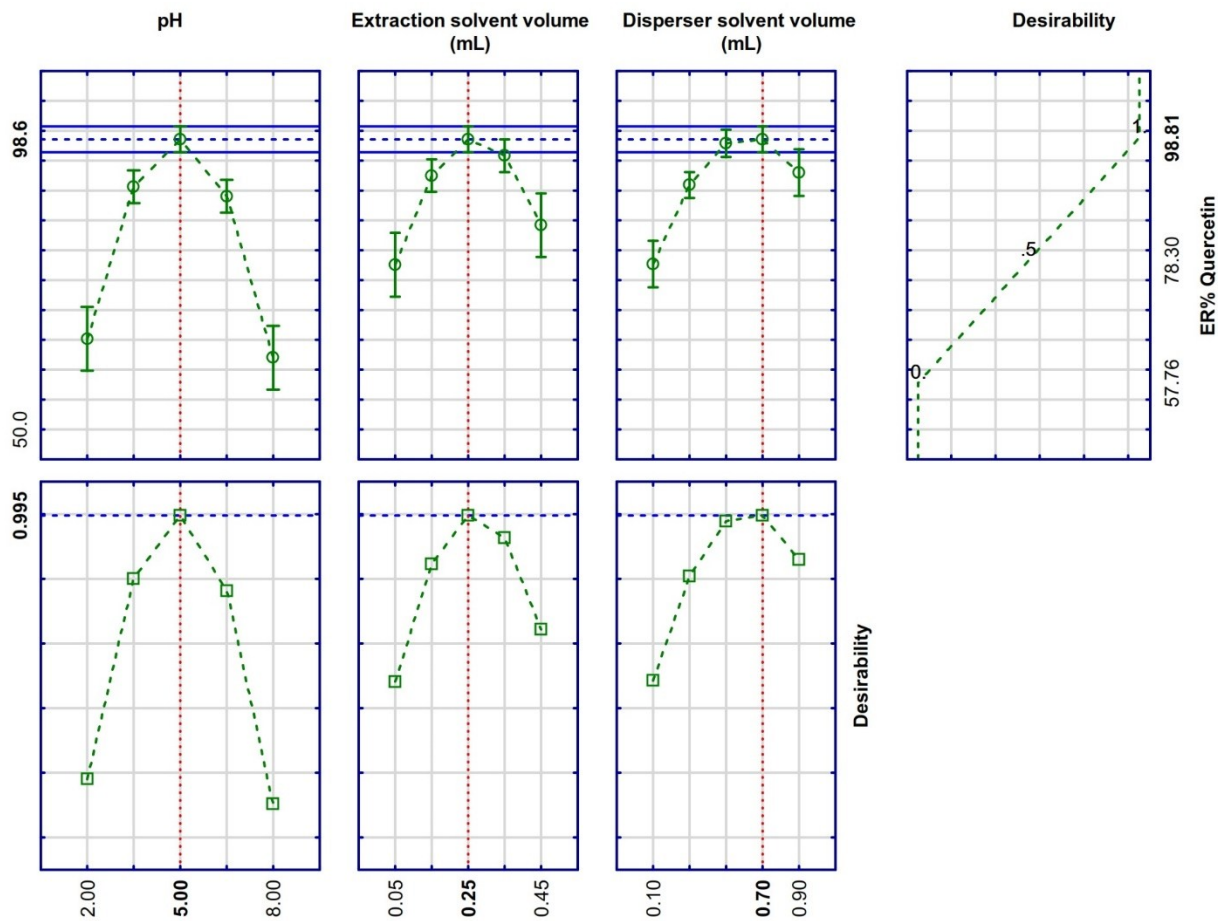


Fig. S3. Profiles for optimum conditions, predicted value, and desirability function for extraction recovery of quercetin. Vertical dashed lines indicate current values after optimization.

Table S1. Levels of variables and experimental design matrix for Plackett-Burman experiment with observed response for the significant variable determination.

Independent variables				Unit	Levels		
					Low (-1)	Center (0)	High (+1)
(A) pH				-	3.00	4.50	6.00
(B) Ionic strength (NaCl)				%	0.00	5.00	10.0
(C) Extraction solvent volume (Dodecanol)				mL	0.10	0.25	0.40
(D) Disperser solvent volume (acetonitrile)				mL	0.20	0.40	0.80
(E) Extraction time				min	0.50	3.50	6.50
Run	A	B	C	D	E	ER% quercetin	
1	1	1	1	1	1	67.86	
2	-1	1	-1	-1	1	25.65	
3	-1	-1	-1	1	1	40.76	
4	-1	1	1	-1	-1	45.98	
5	0	0	0	0	0	74.40	
6	1	-1	-1	-1	-1	48.98	
7	0	0	0	0	0	75.65	
8	-1	-1	1	1	-1	53.87	
9	1	1	-1	1	-1	60.87	
10	1	-1	1	-1	1	54.40	

Table. S2. Analytical characteristics of **DLLME-SFOD-HPLC-UV** for determination of quercetin.

Sample	Linear range ($\mu\text{g L}^{-1}$)	LOD ($\mu\text{g L}^{-1}$)	LOQ ($\mu\text{g L}^{-1}$)	R²	EF
Red onion	0.80-3500	0.157	0.522	0.9976	102.30
Double-distilled water	0.80-3500	0.161	0.537	0.9978	99.43
Spinach (<i>Spinacia oleracea</i>)	0.80-3500	0.155	0.518	0.9969	103.05
Celery (<i>Apium graveolens</i>)	0.90-3500	0.162	0.541	0.9986	98.67
Broccoli (<i>Brassica oleracea</i>)	0.85-3500	0.150	0.501	0.9976	106.63
White onion	0.80-3200	0.155	0.517	0.9930	103.23
Watercress (<i>Nasturtium officinale</i>)	1.00-3500	0.165	0.551	0.9960	96.90
Apple juice	0.80-3500	0.149	0.495	0.9995	107.78