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SUPPLEMENTARY MATERIAL TO

An effective and facile approach for the determination of bioactive components of *Rheum ribes* in the Kurdish state of Iraq and Siirt region in Turkey

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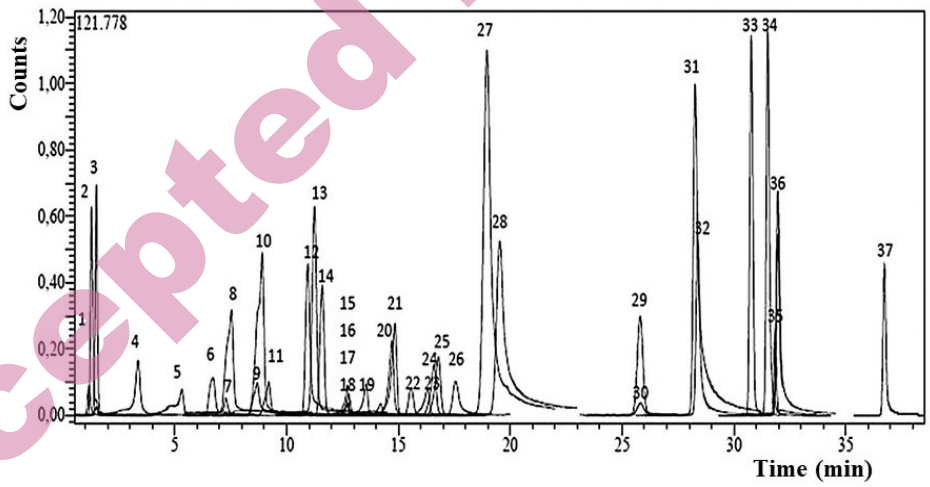

Fig S1. UHPLC-ESI-MS/MS chromatogram of standard mixg (1: Coumarin, 2: Hesperidin, 3: P-Coumaric acid, 4: O-Coumaric acid, 5: Gallic acid, 6: Caffeic acid, 7: Vanillic acid, 8: Salicylic acid, 9: Kainic acid, 10: 4-OH-benzoic acid, 11: Ferulic acid, 12: Chlorogenic acid, 13: Rosmarinic acid, 14: Protocatechic acid, 15: Cinnamic acid, 16: Sinapinic acid, 17: Fumaric acid, 18: Vanillin, 19: Pirokatekol, 20: Malic acid, 21: Syringic acid, 22: Hesperetin, 23: Naringenin, 24: Routine, 25: Quercetin, 26: Quercitrin, 27: Apigenin, 28: Krisin, 29: Liquiritigenin, 30: Isocerythrin, 31: Apigetrin, 32: Rhoifolin, 33: Nicotiflorin, 34: Fisetin, 35: Luteolin, 36: Myricetin, 37: Kaempferol)[1,2]

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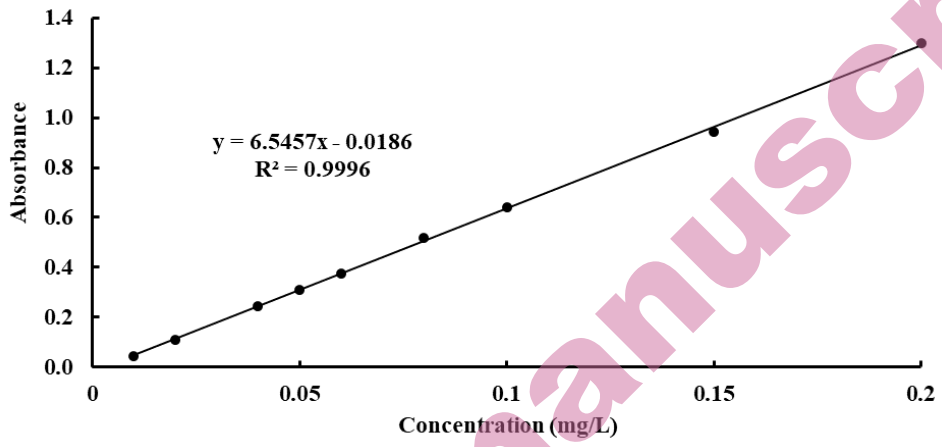

Fig S2. The relation between the concentration of phenolic and the absorbance (Gallic acid standard regression)

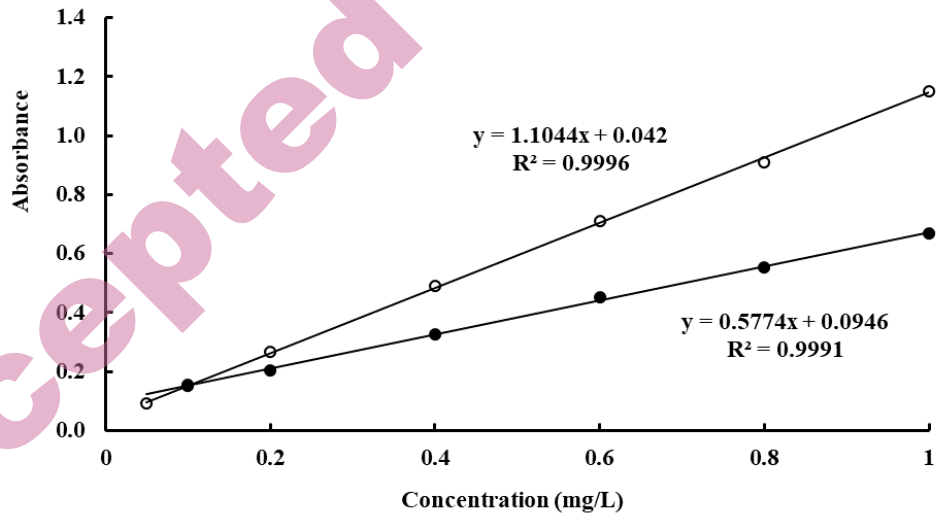

Fig S3. Standard regressions of routine standard (-ɵ-) and FRAP ($FeSO_4$ Regression) (-●-)

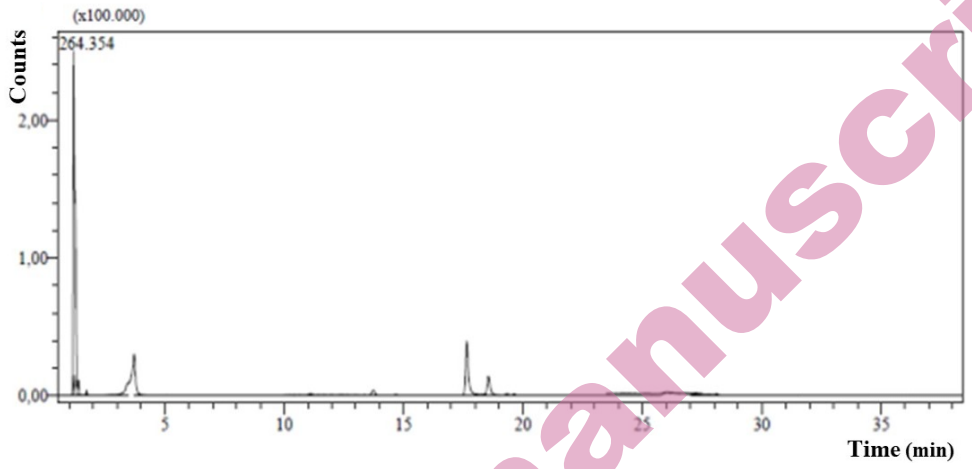

Fig S4. The chromatograms of Gara

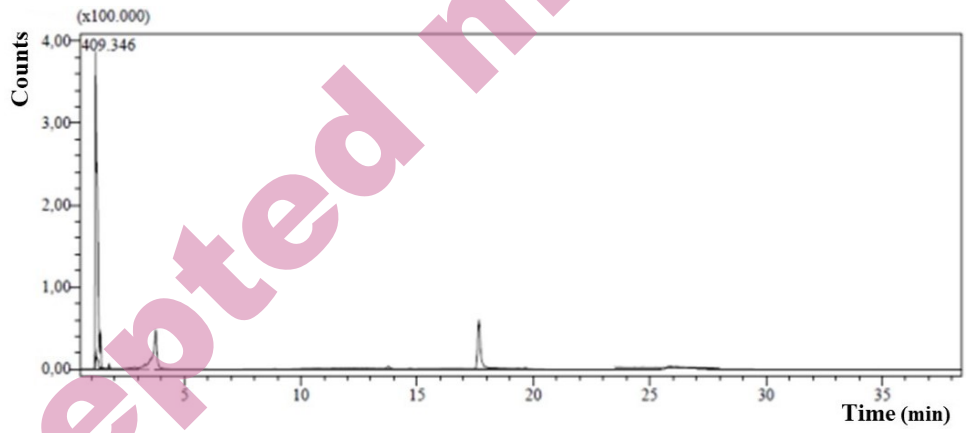

Fig S5. The chromatograms of Korajar

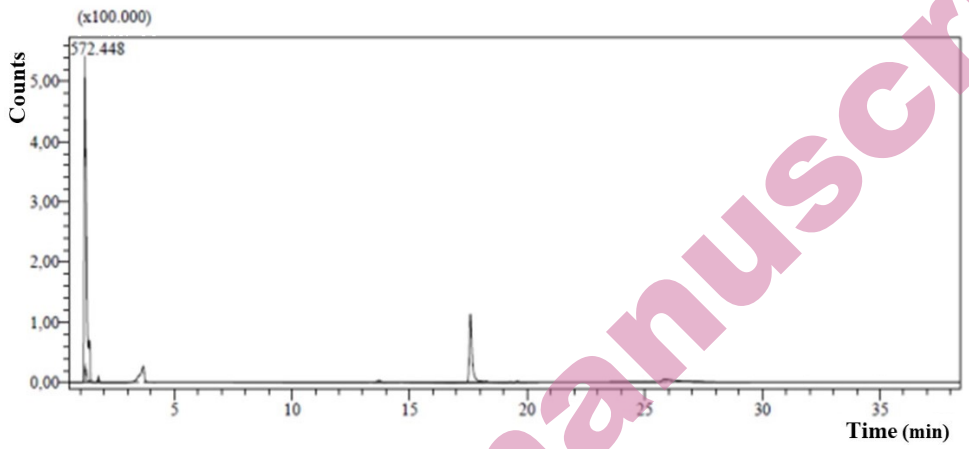

Fig S6. The chromatograms of Sor

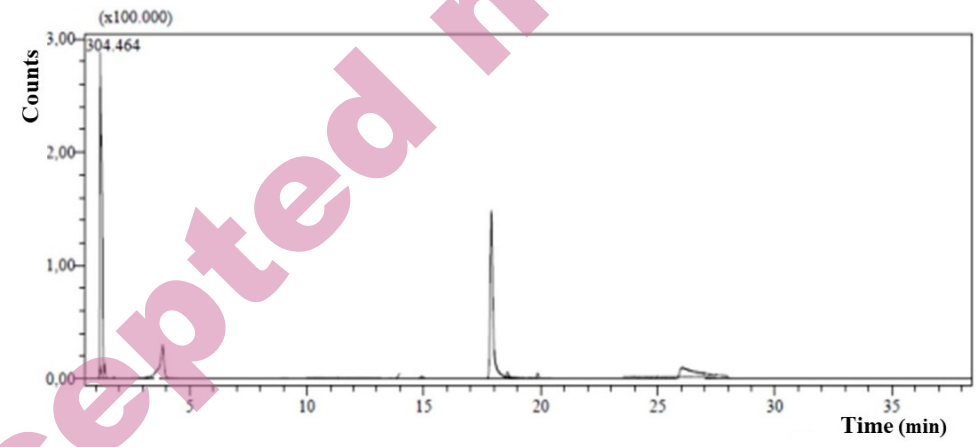

Fig S7. The chromatograms of Rash

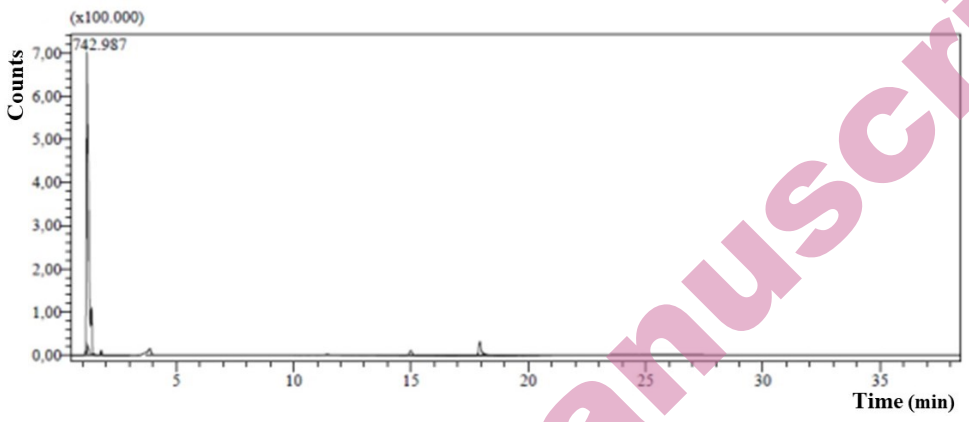

Fig S8. The chromatograms of Qalandar

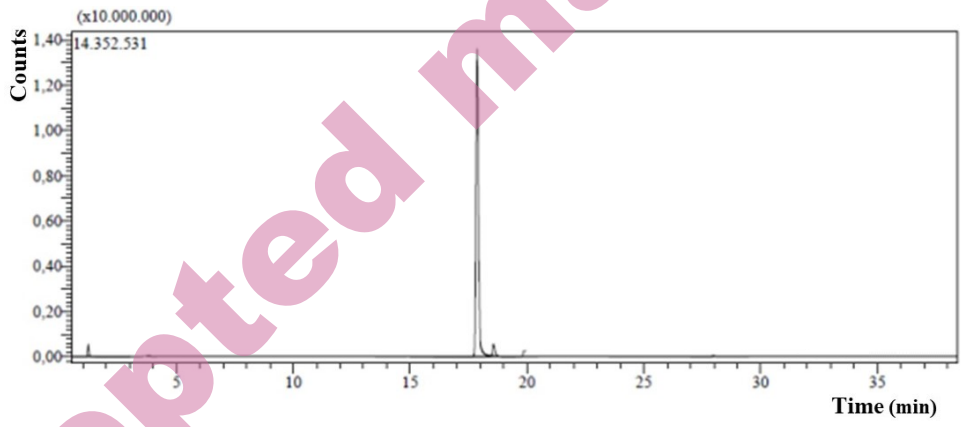

Fig S9. The chromatograms of Pervari

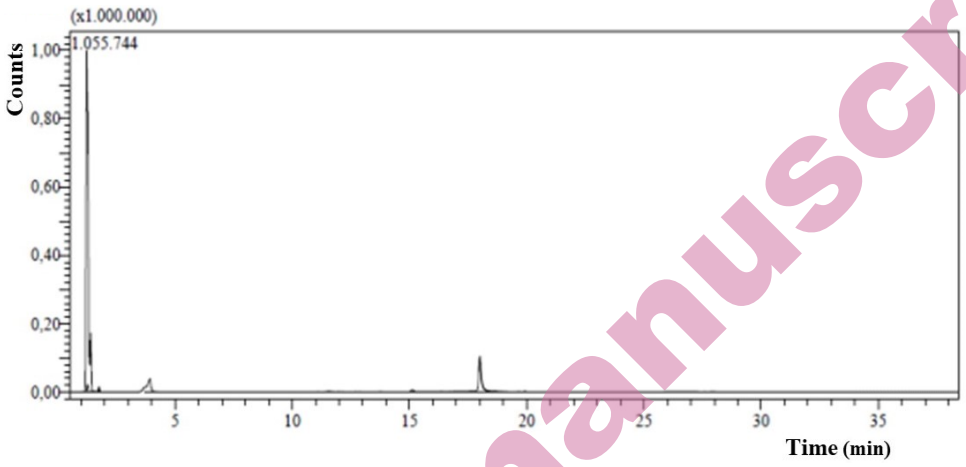

Fig S10. The chromatograms of Şirvan

TABLE SI. Analytical parameters of the LC-MS / MS analysis method [1,2]

Code no	Analytes	RT[a]	Mother ion (m/z)[b]	Fragment ions collision energy (eV)	Ion model	Calibration equation	R^2[c]	RSD (%)[d]		Linearity range	LOD/LOQ[e]	Recovery (%)		U[f]
								Same day	Diff. days	(µg/L)	(µg/L)	Same day	Diff. days	
1	Quinic acid	1.13	190.95	85.3–93.3	Neg	y = 41.06 × + 10671	0.996	0.00259	0.00274	250–10000	75.8/79.4	1.00288	0.98778	0.0082
2	Malic acid	1.23	133.00	115.2–71.3	Neg	y = 316.95 × −42041	0.999	0.00477	0.00527	250–10000	55.3/67.5	1.01266	0.99836	0.0113
3	Fumaric acid	1.48	115.00	71.4	Neg	y = 64.99 × −11592	0.997	0.00536	0.00460	100–5000	28.1/34.5	0.99748	0.99867	0.0124
4	Gallic acid	3.00	168.85	125.2–79.2	Neg	y = 226.76 × + 38152	0.998	0.01601	0.01443	250–10000	95.5/106.9	1.00004	1.00454	0.0282
5	Protocatechuic acid	4.93	152.95	108.3	Neg	y = 297.75 × + 30590	0.995	0.01236	0.01296	100–5000	28.2/31.4	0.99404	1.01070	0.0411
6	Pyrocatechol	6.48	109.00	108.35–91.3	Neg	y = 30.61 × + 14735	0.996	0.01313	0.01339	1000–20000	261.1/278.4	0.99987	0.99936	0.0235
7	Chlorogenic acid	7.13	353.15	191.2	Neg	y = 781.36 × −18697	0.998	0.00058	0.00076	25–1000	6.2/8.1	1.00806	0.99965	0.0069
8	4-OH-benzoic acid	7.39	136.95	93.3–65.3	Neg	y = 409.03 × + 112079	0.998	0.01284	0.01538	250–10000	33.2/38.1	0.99662	1.00058	0.0289
9	Vanillic acid	8.57	166.90	152.3–108.3	Neg	y = 35.84 × −12097	0.999	0.00528	0.00619	1000–20000	122.2/139.7	1.00093	1.04095	0.0508
10	Caffeic acid	8.80	178.95	135.2–134.3	Neg	y = 3963.32 × + 178156	0.998	0.01454	0.01469	25–1000	18.4/22.4	1.00917	0.98826	0.0354
11	Syringic acid	9.02	196.95	182.2–167.3	Neg	y = 42.33 × −52547	0.996	0.01049	0.01345	1000–20000	212.5/233.3	0.99922	0.99977	0.0238
12	Vanillin	10.87	151.00	136.3–92.2	Neg	y = 446.10 × + 70934	0.998	0.00696	0.00793	250–10000	44.3/53.1	0.99679	0.99611	0.0280
13	Salicylic acid	11.16	136.95	93.3–65.3	Neg	y = 5286.26 × + 309192	0.989	0.01016	0.01242	25–1000	5.0/6.5	1.00989	0.99013	0.0329
14	p-Coumaric acid	11.53	162.95	119.3–93.3	Neg	y = 3199.20 × + 13002	0.992	0.01820	0.01727	25–1000	7.3/9.1	1.00617	1.01224	0.0516
15	Rutin	12.61	609.05	300.1–271.1	Neg	y = 561.91 × −16879	0.997	0.00473	0.00624	25–1000	5.5/6.5	1.00994	0.98017	0.0159
16	Ferulic acid	12.62	192.95	178.3	Neg	y = 80.45 × −31782	0.997	0.00708	0.00619	250–10000	36.6/42.0	0.99987	1.00289	0.0494
17	Sinapinic acid	12.66	222.95	208.3–149.2	Neg	y = 141.96 × −73294	0.992	0.01446	0.01517	250–10000	78.7/86.1	1.00164	0.99962	0.0281
18	Hesperidin	12.67	610.90	303.1–465.1	Poz	y = 1340.27 × −43769	0.998	0.00945	0.01126	25–1000	3.4/4.2	1.01733	1.01263	0.0262
19	Isoquercitrin	13.42	463.00	300.1–271.1	Neg	y = 803.23 × + 4981	0,999	0.00682	0.00515	25–1000	5.4/6.3	1.00594	1.00722	0.0133
20	Rosmarinic acid	14.54	359.00	161.2–197.2	Neg	y = 909.67 × −201692	0.994	0.02014	0.01751	100–5000	6.6/8.8	0.99206	1.03431	0.0713
21	Nicotiflorin	14.68	593.05	285.1–255.2	Neg	y = 498.38 × + 79274	0,991	0.00737	0.00875	100–5000	22.4/25.5	1.02558	1.00970	0.0276
22	o-Coumaric acid	15.45	162.95	119.4–93.3	Neg	y = 1219.34 × −10915	0.999	0.02730	0.02566	25–1000	24.4/31.1	0.98344	0.99061	0.0513
23	Rhoifolin	16.11	577.05	269.2–211.1	Neg	y = 237.15 × + 11887	0,999	0.00747	0.01528	100–5000	23.1/27.9	1.01046	1.01739	0.0941
24	Quercitrin	16.41	447.15	301.1–255.1	Neg	y = 339.39 × + 38910	0.999	0.01528	0.02320	100–5000	22.0/25.2	0.99726	1.00620	2.0079
25	Apigetrin	16.59	431.00	268.2–239.2	Neg	y = 1775.55 × + 91121	0,993	0.01797	0.01607	25–1000	5.4/6.1	1.01394	1.00419	0.0597
26	Coumarin	17.40	147.05	91.0–103.2	Poz	y = 33.64 × −89700	0.994	0.01306	0.01239	1000–20000	208.4/228.4	0.99947	1.00081	0.0237
27	Myricetin	18.72	317.00	179.2–151.3	Neg	y = 583.55 × + 205727	0,999	0.00652	0.00711	250–10000	53.2/57.2	0.99982	1.00042	0.0126
28	Fisetin	19.30	284.95	135.2–121.3	Neg	y = 547.46 × + 274791	0,991	0.00557	0.00820	250–10000	54.4/61.4	0.99877	1.00031	0.0148
29	Cinnamic acid	25.61	147.00	103.15–77.3	Neg	y = 9.06 × −12403	0.996	0.00648	0.00816	5000–20000	821.8/859.7	1.00051	0.99927	0.0143
30	Liquiritigenin	25.62	254.95	119.3–135.1	Neg	y = 2384.96 × + 59141	0,996	0.01849	0.01738	25–1000	5.5/6.6	1.00333	0.99957	0.0341
31	Quercetin	28.17	300.90	151.2–179.2	Neg	y = 1198.48 × + 480562	0.990	0.01589	0.01360	100–5000	23.3/28.9	0.98470	1.00103	0.0543
32	Luteolin	28.27	284.75	133.2–151.2	Neg	y = 3272.65 × + 150557	0,997	0.00575	0.00696	25–1000	5.4/6.5	1.00772	0.99524	0.0174
33	Naringenin	30.68	270.95	151.2–119.3	Neg	y = 4315.1 × + 178410	0.995	0.02054	0.02019	25–1000	5.4/6.4	0.99883	1.01002	0.0521
34	Apigenin	31.43	268.95	117.3–151.2	Neg	y = 4548.36 × + 295252	0.990	0.02304	0.02204	25–1000	5.4/6.3	1.01444	1.01331	0.0650
35	Hesperetin	31.76	300.95	164.2–136.2	Neg	y = 876.67 × + 48916	0.997	0.03209	0.02605	25–1000	5.6/6.9	0.98850	0.99435	0.0562
36	Kaempferol	31.88	284.75	255.1–117.3	Neg	y = 26.29 × + 87558	0,992	0.01436	0.01070	1000–20000	206.6/214.3	0.99971	0.99851	0.0209
37	Chrysin	36.65	252.95	143.3–119.4	Neg	y = 2032.13 × + 95593	0,993	0.00490	0.00630	25–1000	5.4/6.2	1.00338	1.00437	2.0083

[a]RT: Retention time, [b]Master ion *(m/z):* Molecular ions of standard compounds (m/z rate), [c]R^2: Determination coefficient, [d]RSD: Relative standard deviation, [e]LOD/LOQ (µg/L): Detection limit/ Assignment limit, [f] U (%): 95% Relative standard uncertainty at confidence level (k=2)). [1,2]

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