

Supplementary data

A Novel Acylated Flavonol Tetraglycoside with Inhibitory Effect on Lipid

Accumulation in 3T3-L1 Cells from Lu'an GuaPian Tea and Quantification of Flavonoid Glycosides in Six Major Processing Types of Tea

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Table S1. Cell toxicity and inhibitory effects on lipid accumulation in 3T3-L1 cells offour acylated FGs (**1**, **7**, **8**, **9**)

compounds	concentration	inhibition rate (%)	lipid content (%)
1	100 μ M	6.72 ± 0.79	44.61 ± 2.08
	50 μ M	6.62 ± 1.07	55.53 ± 1.34
	25 μ M	5.25 ± 0.93	58.17 ± 1.98
7	100 μ M	7.88 ± 1.26	43.46 ± 2.31
	50 μ M	7.67 ± 0.67	58.82 ± 3.17
	25 μ M	5.88 ± 0.82	57.47 ± 1.14
8	100 μ M	8.57 ± 1.33	65.67 ± 2.25
	50 μ M	6.77 ± 1.08	68.03 ± 3.02
	25 μ M	5.61 ± 0.53	71.43 ± 1.47
9	100 μ M	9.10 ± 0.78	44.45 ± 2.33
	50 μ M	7.20 ± 1.16	47.91 ± 1.52
	25 μ M	6.88 ± 1.21	55.37 ± 2.10
taxol	10 μ M	90.86 ± 3.04	
resveratrol	88 μ M		40.35 ± 2.13

Table S2. Standard curves information for quantitative analysis of FGs by UPLC

FGs	standard curves	linear correlations (R^2)	linear range ($\mu\text{g/ml}$)
Vitexin 4"-O-Glu (20)	$y = 5\text{E}+06x - 1628.5$	0.9993	1.375-22
Q 3-O-Glu-Rha-Glu (16)	$y = 3\text{E}+06x - 15457$	0.9970	12.500-200
K 3-O-Glu-Rha-Glu (10)	$y = 4\text{E}+06x - 10674$	0.9992	13.438-430
K 3-O-Glu-Rha (17)	$y = 5\text{E}+06x - 6477.1$	0.9991	2.438-78
K 3-O-Glu (21)	$y = 2\text{E}+07x - 5947.1$	0.9989	0.563-18
Q 3-O- <i>p</i> -Cou-Glu-Ara-Rha-Glu (9)	$y = 2\text{E}+06x - 122.7$	0.9998	0.781-50
K 3-O- <i>p</i> -Cou-Glu-Ara-Rha-Glu (1)	$y = 1\text{E}+06x - 250.94$	0.9990	1.281-82
Q 3-O- <i>p</i> -Cou-Glu-Rha-Glu (8)	$y = 8\text{E}+06x - 2567.3$	0.9995	0.688-44
K 3-O- <i>p</i> -Cou-Glu-Rha-Glu (7)	$y = 5\text{E}+06x - 355.26$	0.9998	0.156-20

Table S3. Method validation information for quantitative analysis of FGs by UPLC

FGs	Precision (RSD/%)	Repeatability (RSD/%)	Stability (RSD/%)	LOD (ng)	LOQ (ng)	Recovery	
						%	(RSD/%)
Vitexin 4"-O-Glu (20)	0.48	2.58	1.29	0.05	0.17	106.36	1.20
Q 3-O-Glu-Rha-Glu (16)	0.76	1.70	3.86	0.61	2.04	107.57	0.63
K 3-O-Glu-Rha-Glu (10)	0.49	0.30	2.62	0.47	1.55	99.84	0.03
K 3-O-Glu-Rha (17)	2.04	3.06	2.45	0.10	0.32	94.71	2.71
K 3-O-Glu (21)	0.57	1.38	1.61	0.02	0.08	100.91	1.19
Q 3-O- <i>p</i> -Cou-Glu-Ara-Rha-Glu (9)	2.74	3.23	3.71	0.09	0.28	101.12	3.98
K 3-O- <i>p</i> -Cou-Glu-Ara-Rha-Glu (1)	0.72	3.21	3.88	0.15	0.49	107.80	1.96
Q 3-O- <i>p</i> -Cou-Glu-Rha-Glu (8)	0.21	1.85	4.17	0.12	0.39	103.89	5.48
K 3-O- <i>p</i> -Cou-Glu-Rha-Glu (7)	2.56	2.69	5.36	0.05	0.17	98.47	3.52

Table S4. The chemical profiles of the six major processing types of tea

Tea	GC	CAF	EGC	C	EC	EGCG	GCG	ECG	CG
Green	2.616	35.634 ±	34.783±	3.646±	13.649±	74.666±	3.79±	23.385±	0.397±
	±0.085	0.217	0.698	0.065	0.284	0.985	0.018	0.407	0.034
White	0.737 ±	35.298±	9.942±	2.561±	4.639±	43.432±	2.731±	16.06±	1.355±
	0.482	1.384	0.756	0.224	0.639	3.606	0.24	1.558	0.417
Yellow	1.423 ±	34.104±	30.745±	3.529±	12.079±	63.724±	3.587±	22.591±	0.429±
	0.037	0.384	1.085	0.151	0.464	2.529	0.146	0.902	0.042
Oolong	1.888 ±	33.428±	20.347±	3.043±	8.399±	39.95±	2.658±	12.618±	0.827±
	0.059	0.346	0.646	0.057	0.226	0.158	0.007	0.115	0.178
Black	0.454 ±	31.229±	0.377±	1.117±	0.569±	2.282±	3.168±	1.747±	0.572±
	0.078	1.646	0.092	0.089	0.092	0.286	0.145	0.116	0.27
Dark	2.106 ±	34.186±	20.492±	1.562±	8.946±	15.566±	1.26±	6.404±	0.393±
	0.211	1.91	1.557	0.138	0.885	1.573	0.033	0.544	0.013

GC: (+)-Gallocatechin; CAF: caffeine; EGC: (-)-epigallocatechin; C: (+)-catechin; EC: (-)-epicatechin; EGCG: (-)-epigallocatechin-3-*O*-gallate; GCG: (-)-gallocatechin-3-*O*-gallate; ECG: (-)-epicatechin-3-*O*-gallate; CG: (-)-catechin-3-*O*-gallate

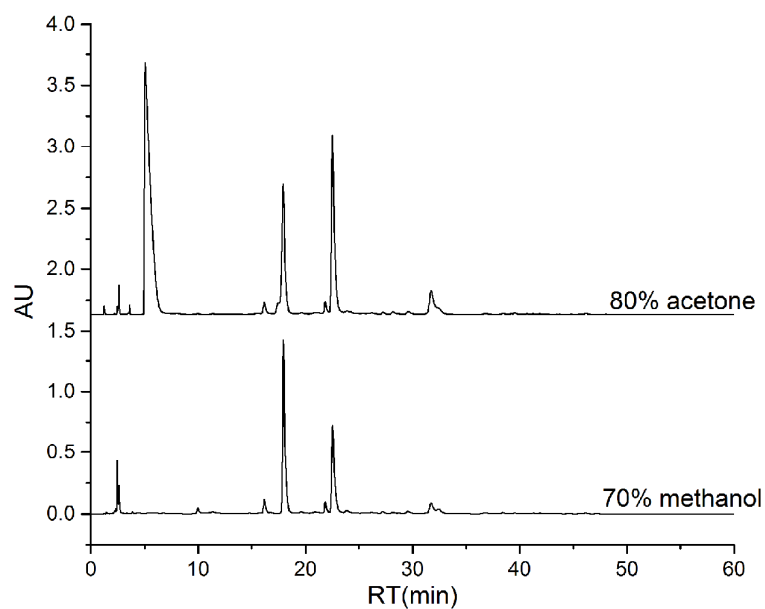


Figure S1A. The HPLC analysis of Lu'an GuaPian green tea at 280 nm. (The above curve was Lu'an GuaPian green tea extracted with 80% aqueous acetone, the below was Lu'an GuaPian green tea extracted with 70% aqueous methanol).

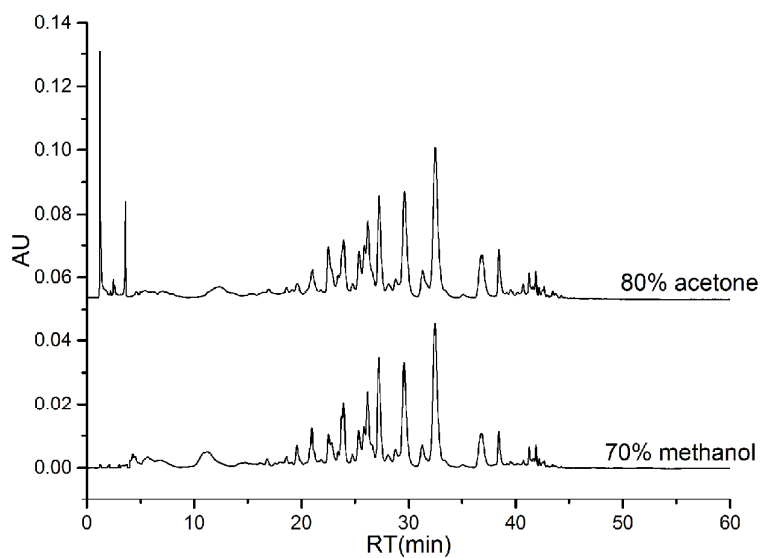


Figure 1B. The HPLC analysis of Lu'an GuaPian green tea at 350 nm. (The above curve was Lu'an GuaPian green tea extracted with 80% aqueous acetone, the below was Lu'an GuaPian green tea extracted with 70% aqueous methanol).

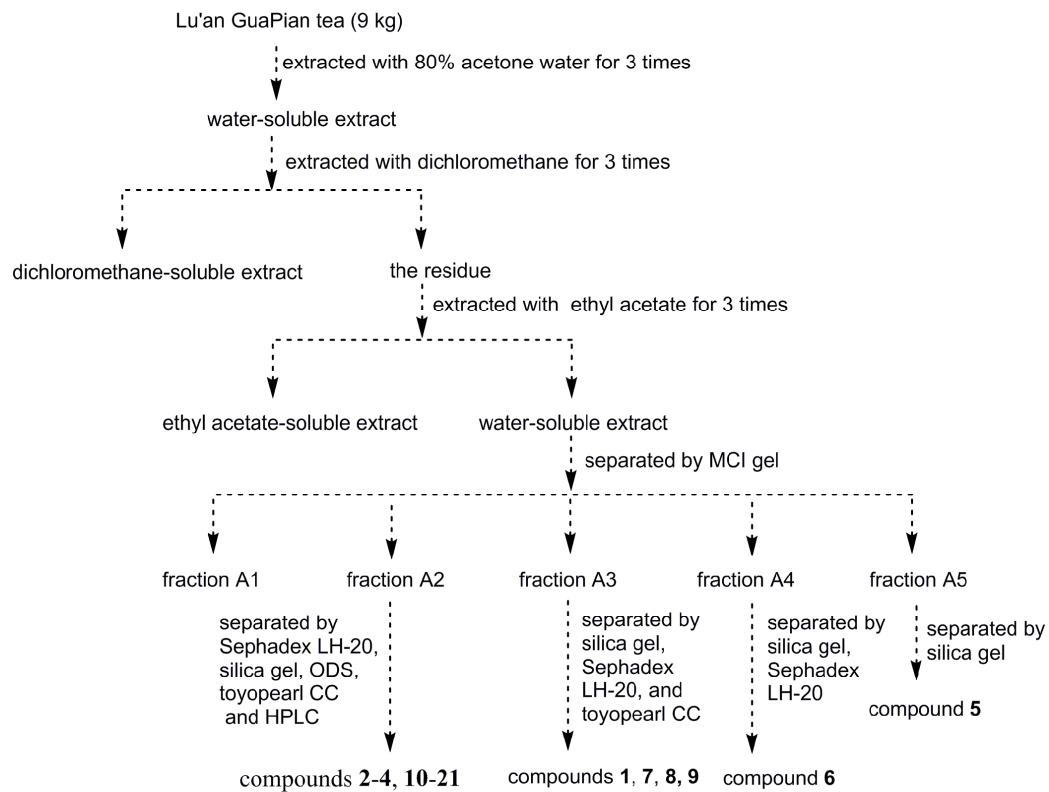


Figure S2. Flowchart of extraction and isolation of **1-21** from Lu'an GuaPian tea

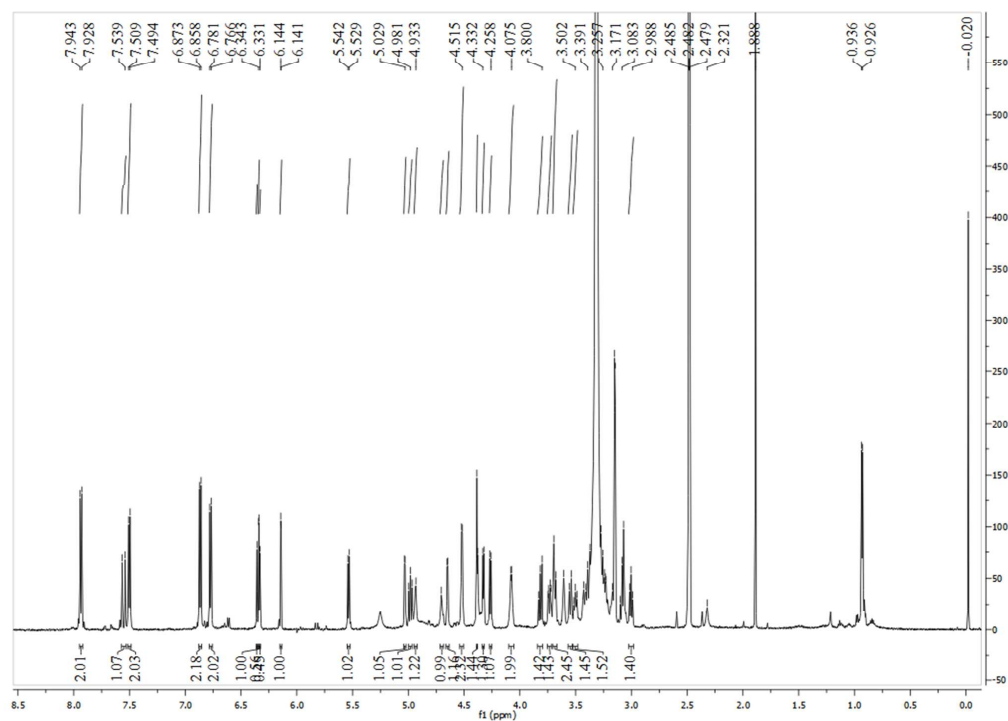


Figure S3. ¹H NMR spectrum of compound 1

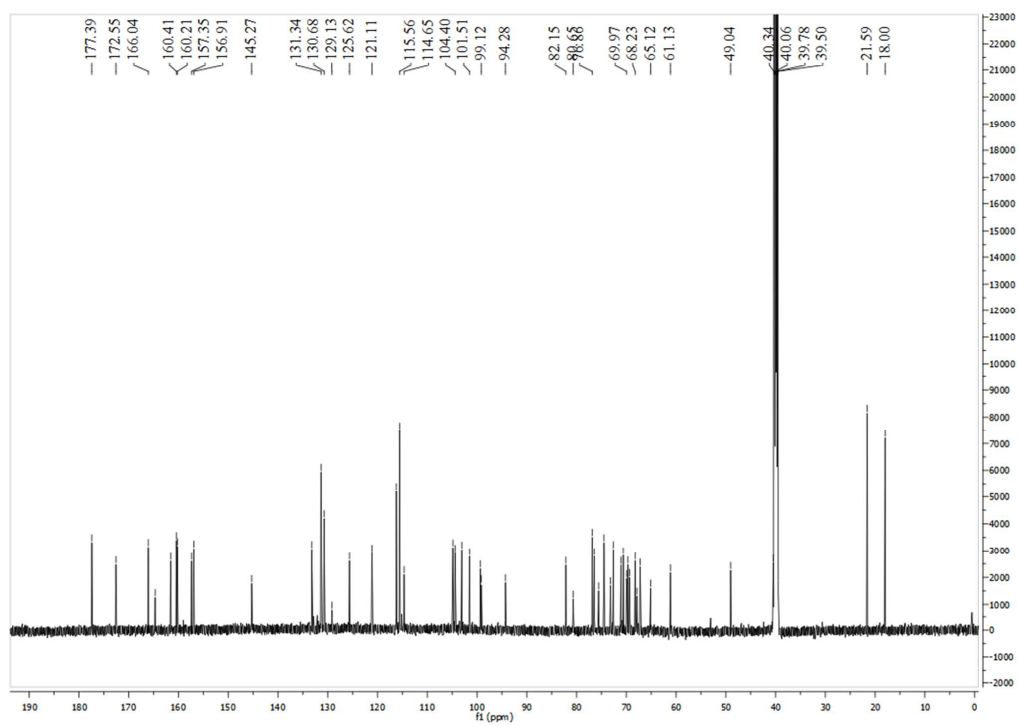


Figure S4. ^{13}C NMR spectrum of compound **1**

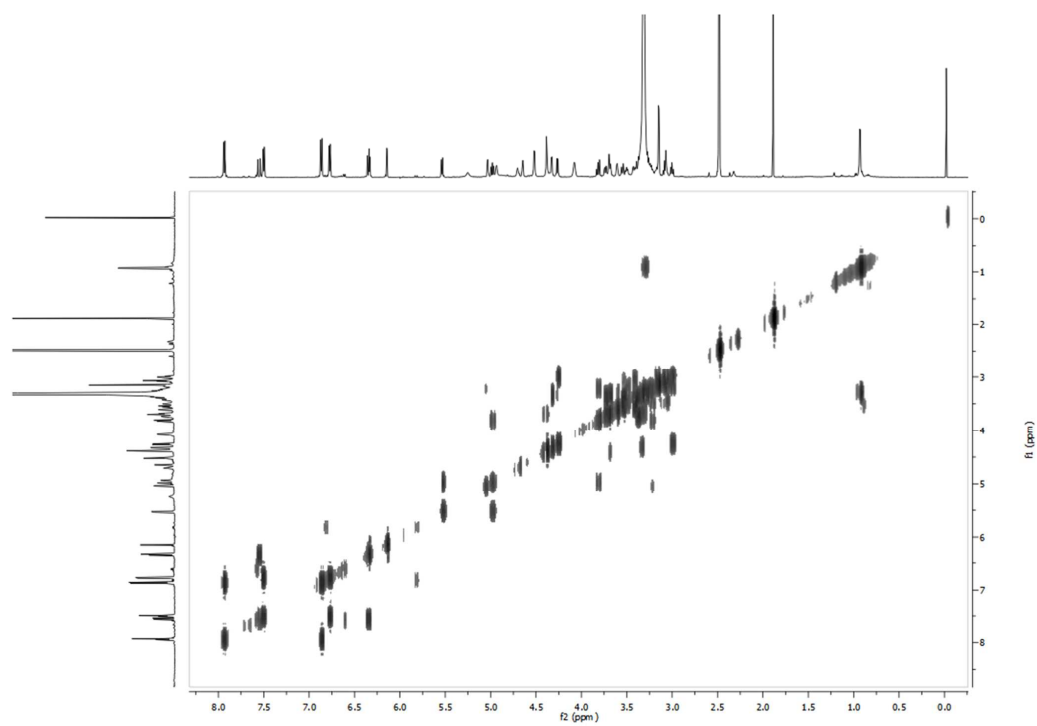


Figure S5. ^1H - ^1H COSY spectrum of compound **1**

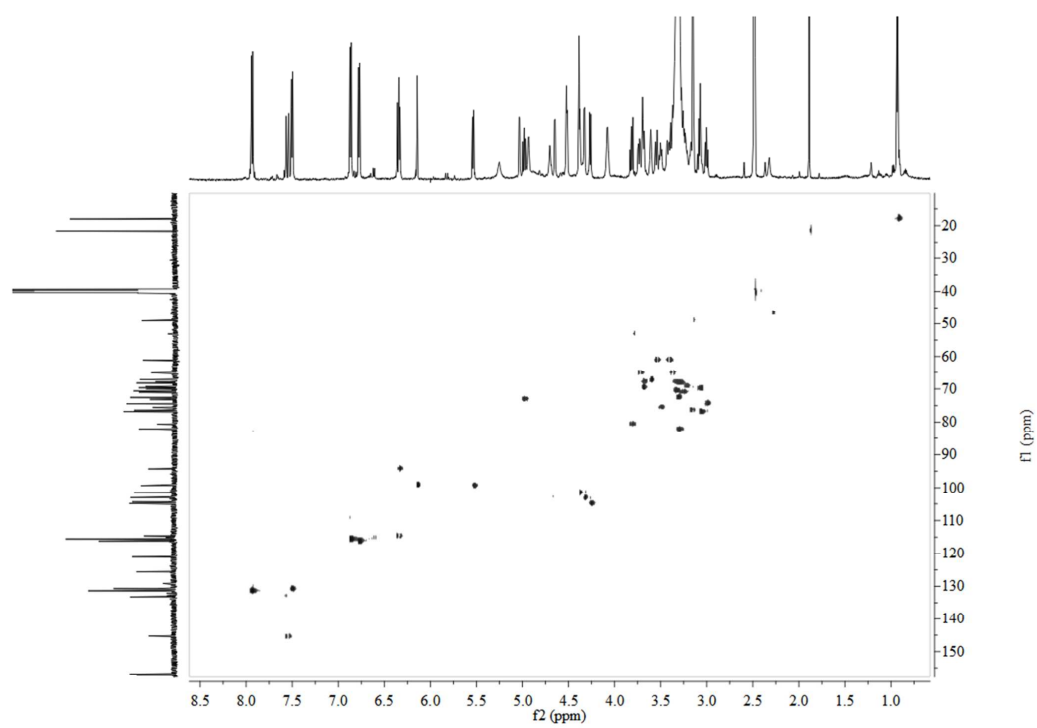


Figure S6. HMQC spectrum of compound **1**

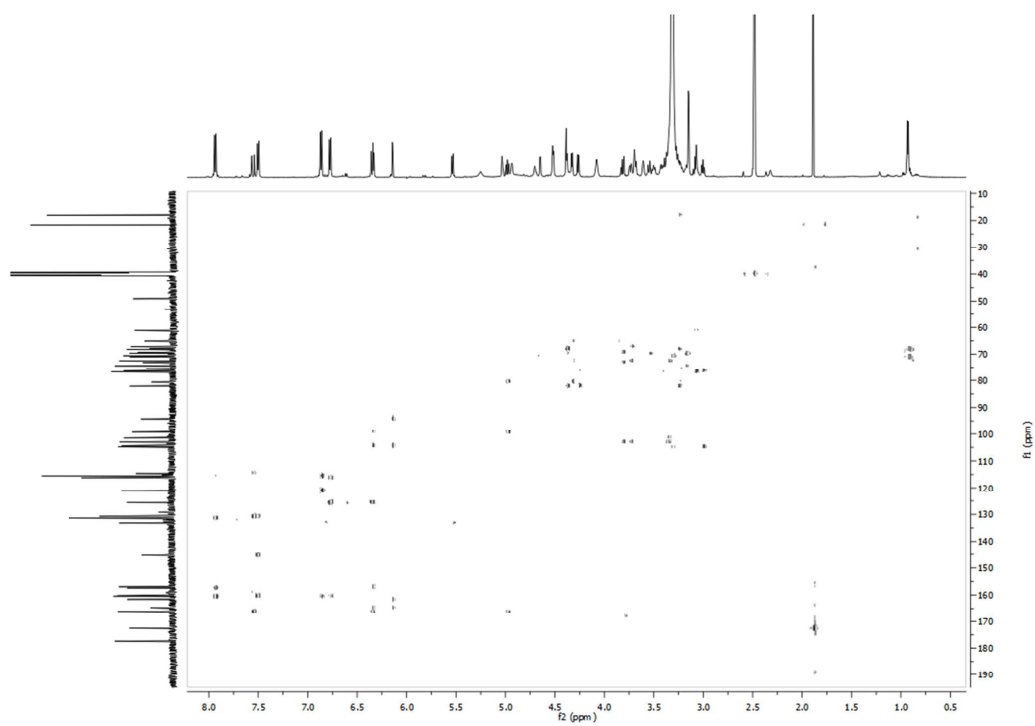


Figure S7. HMBC spectrum of compound **1**

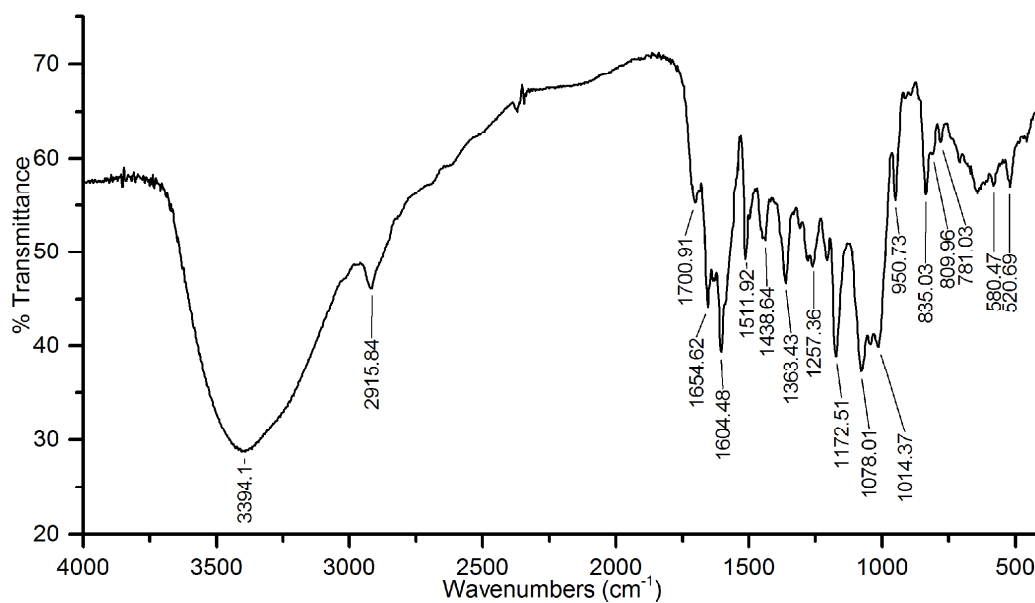


Figure S8. IR spectrum of compound **1**

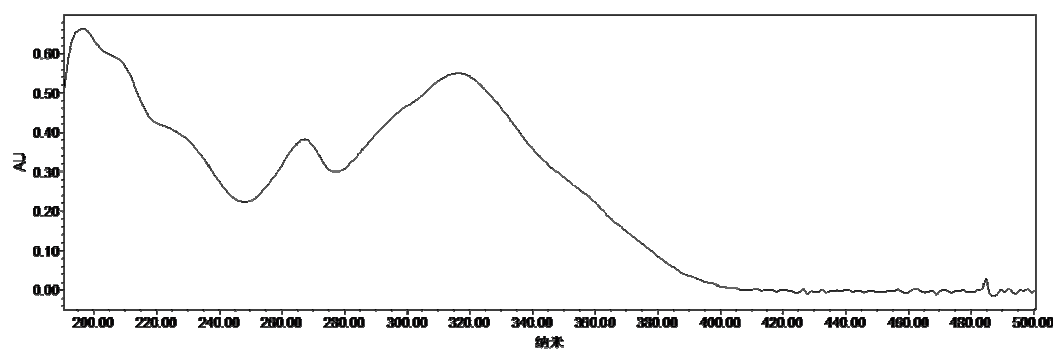


Figure S9. UV spectrum of compound 1

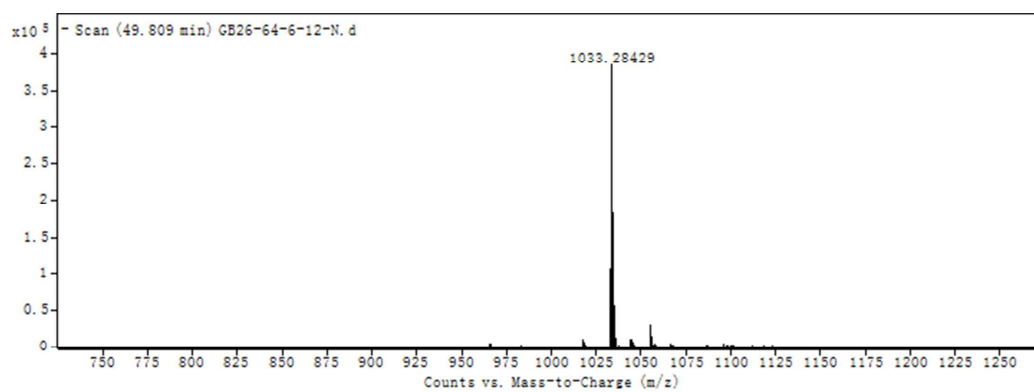


Figure S10. ESI-HR-MS⁻ spectrum of compound **1**

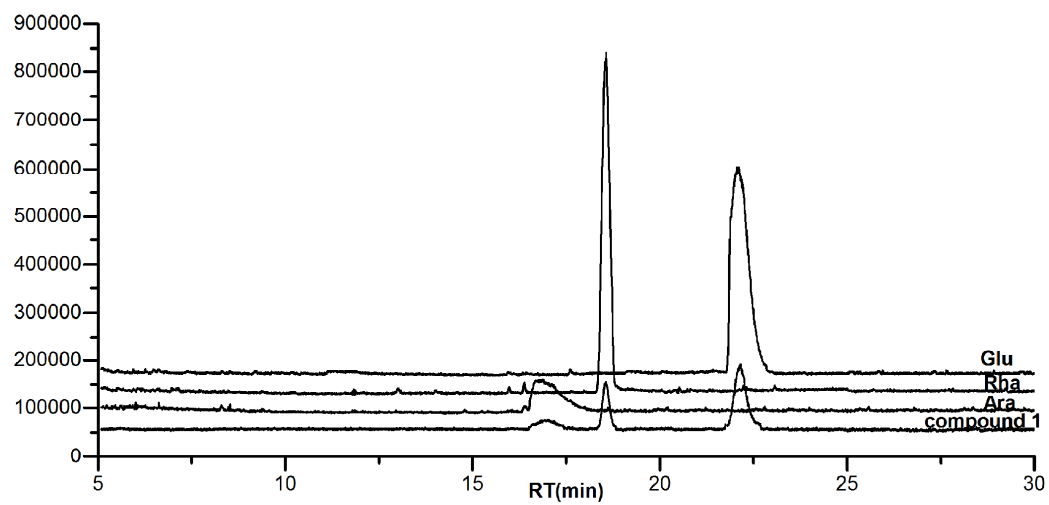


Figure S11. GC spectral comparison of the sugar units (The cruve from above to below were D-glucose (Glu), L-rhamnose (Rha), L-arabinose (Ara) and compound 1.)

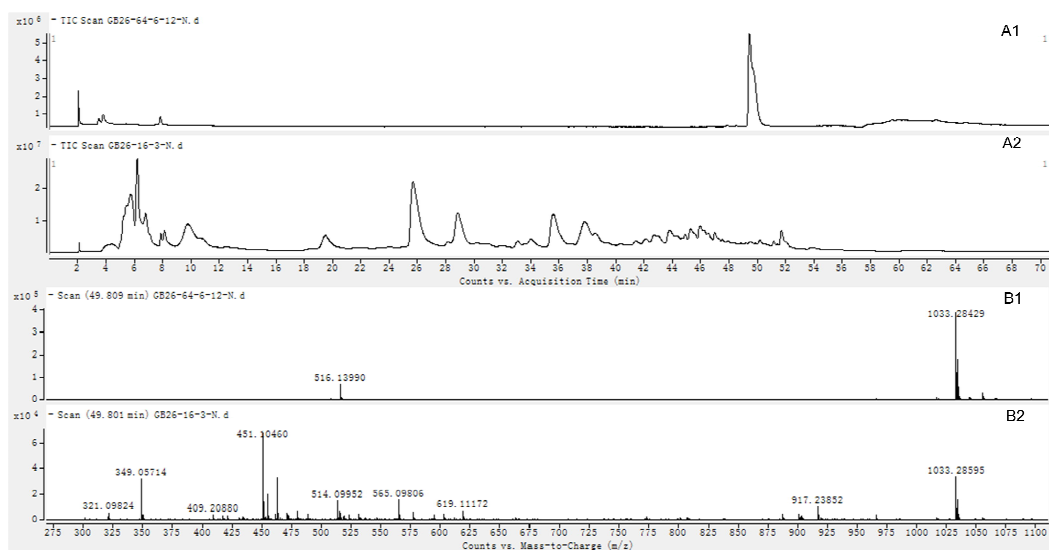


Figure S12. ESI-HR-MS⁻ spectrum of compound **1** and Lu'an GuaPian tea (A1:Lu'an GuaPian tea detected with ESI-HR-MS; A2:compound **1** detected with ESI-HR-MS⁻; B1:Mass spectra of compound **1** at 49.8 min; B2:Mass spectra of Lu'an GuaPian tea, the peak we detected at 49.8 min had the same m/z 1033.28 with compound **1**.)