Phytochemical Study of the Geranium L. in Kurdistan Region-Iraq

Sirwan Hassan Salih *

Department of Biology, college of Education, University of Garmian, Kalar, Kurdistan Region, Iraq.

*Correspondent author: sirwan.hassan@garmian.edu.krd

Supplementary I: Retention Time of Standard Phenolic Compounds (HPLC)

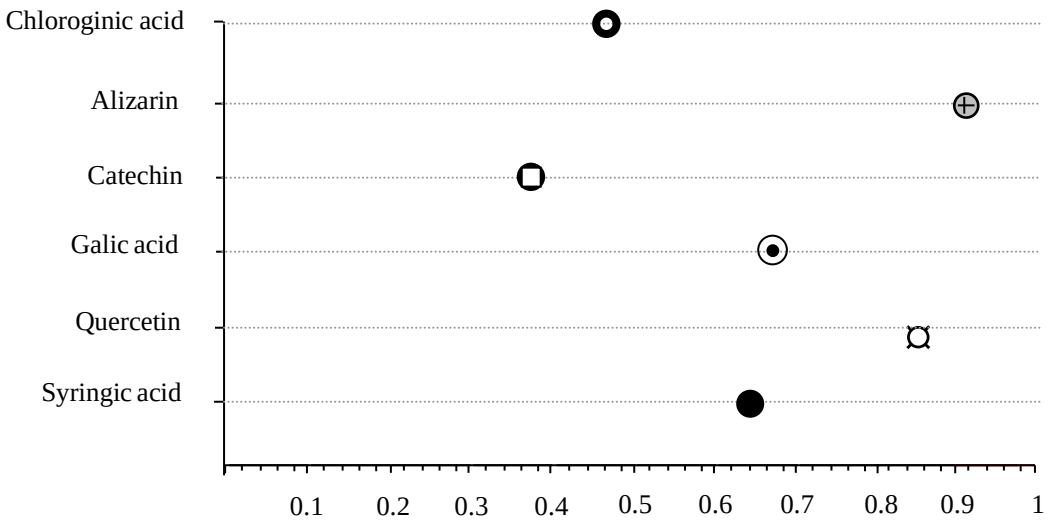
No.	Compound names	Retention time (minutes)
1	Solver ethanol	1.887
2	Caffeine	2.167
3	Coumarin	2.334
4	Vanillin	2.717
5	4-Methylenophenole	2.933
6	2-6 Dimethyl phenol	3.631
7	Salicylic acid	3.850
8	P-Cresol	4.700
9	Eugenol	9.710
	4-Allyl anisole	6.700

Supplementary II: Retardation Factor (Rf) of used Standard Phenolic Compounds (TLC)

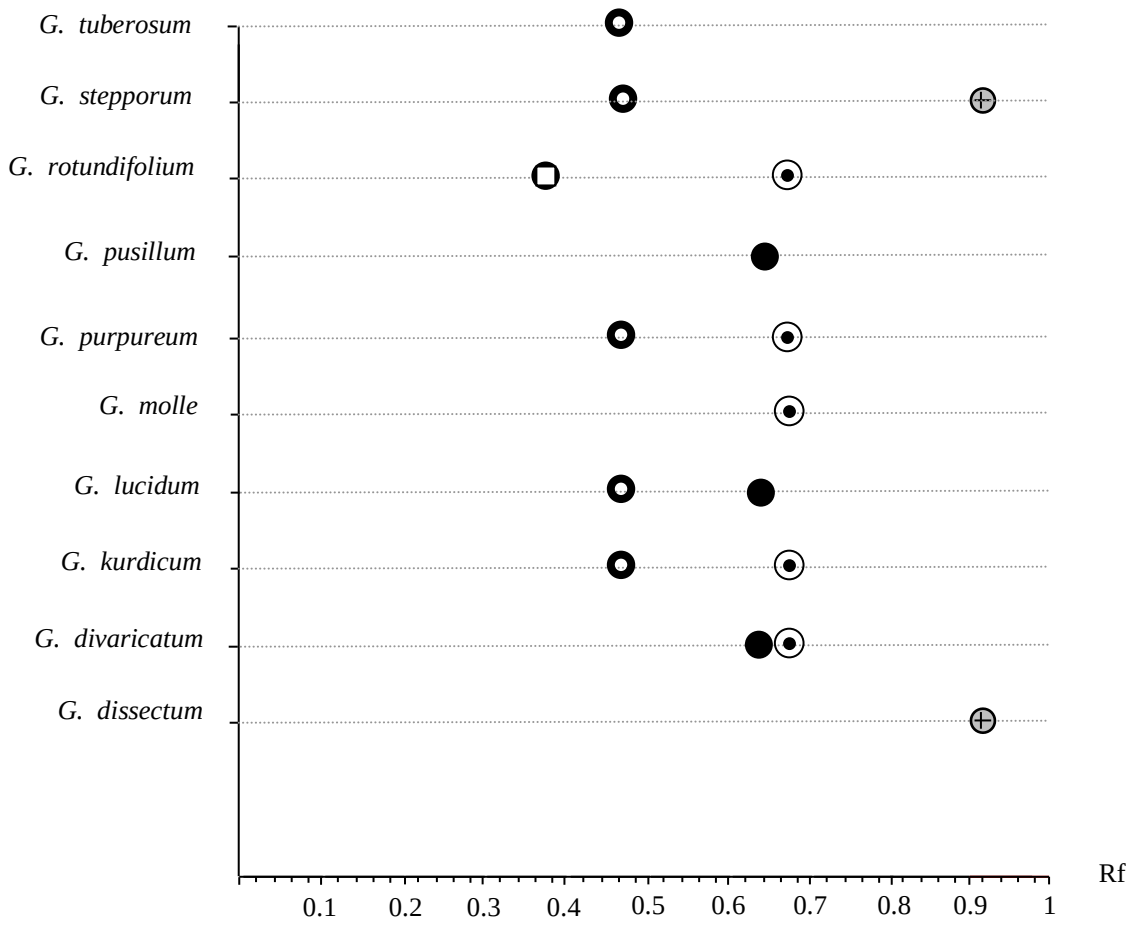
No.	Compounds name	Rf	code
10	Alizarin	0.92	⊕
11	Catechin	0.38	▢
12	Chlorogenic acid	0.47	○
13	Galic acid	0.67	⊙
14	Syringic acid	0.64	●
	Quercetin	0.85	¤

Supplementary III: Number of phenolic compounds in studied species.

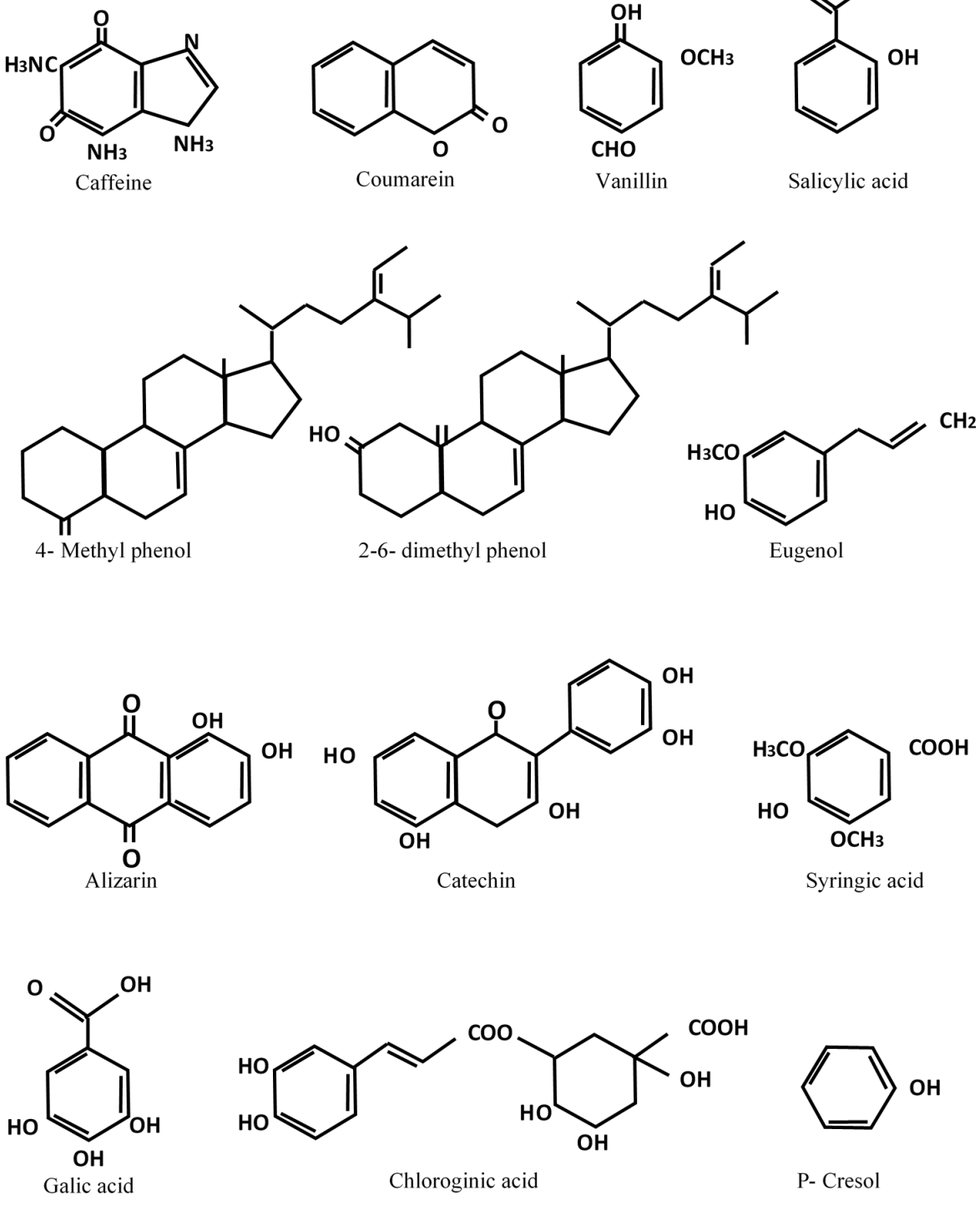
Species	Phenolic compounds														Number of compounds
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
G. dissectum	X						X			X					3
G. divaricatum	X		X	X									X	X	5
G. kurdicum	X				X	X						X	X		5
G. lucidum	X				X		X					X		X	5
G. molle						X							X		2
G. purpureum	X	X										X	X		4
G. pusillum				X	X									X	3
G. rotundifolium					X	X					X		X		5
G. stepporum					X			X		X		X			3
G. tuberosum							X		X			X			3
No. of species	6	1	1	3	5	3	3	2	1	2	1	6	5	3	-



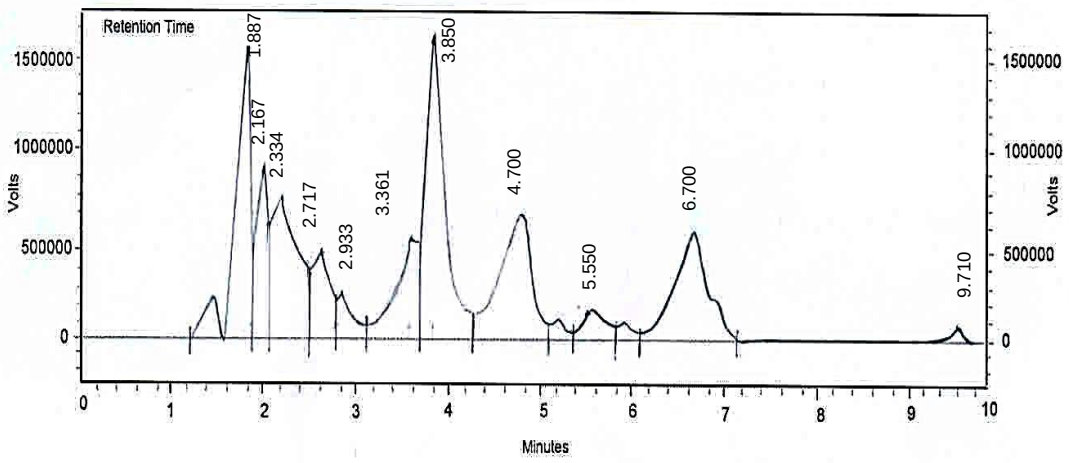
Supplementary IV: Retardation factor (relation flow) of used standard phenolic compounds



Supplementary V: Situation of standard phenolic compounds in studied species via TLC



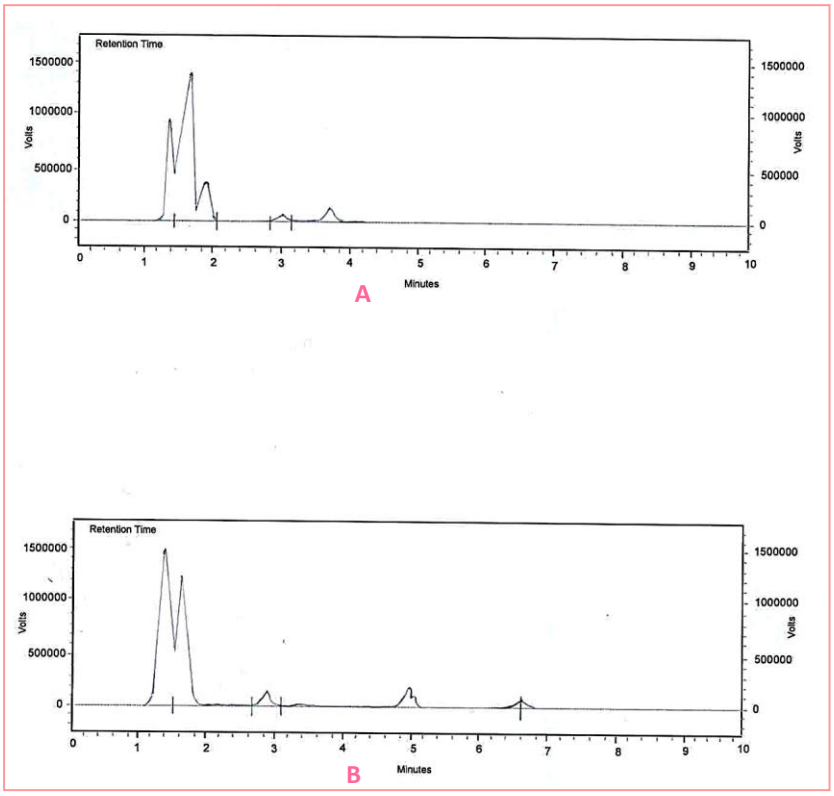
Supplementary VI: Chemical structures of used standard phenolic compounds [1,2].



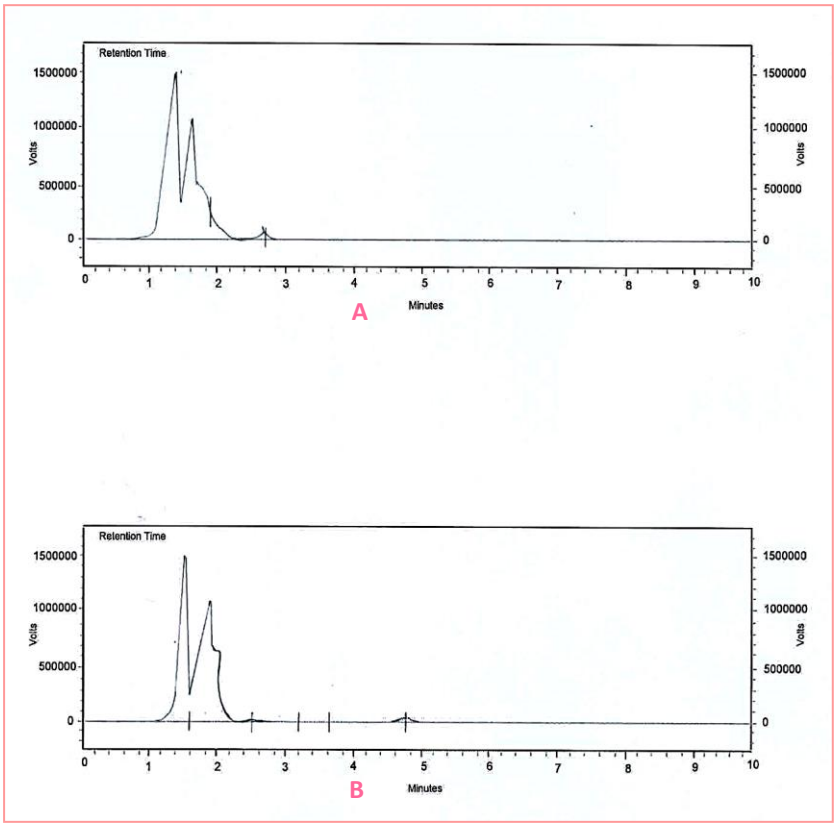
UV detector S
2500 Results

Standards	Retention time
Solver = Ethanol	1.887
Caffeine	2.167
Coumarein	2.334
Vanillin	2.717
4- Methyl phenol	2.933
2, 6-Dimethyl phenol	3.631
Salicylic acid	3.850
P-Cresol	4.700
4- Allyl anisole	6.700
Eugenol	9.710

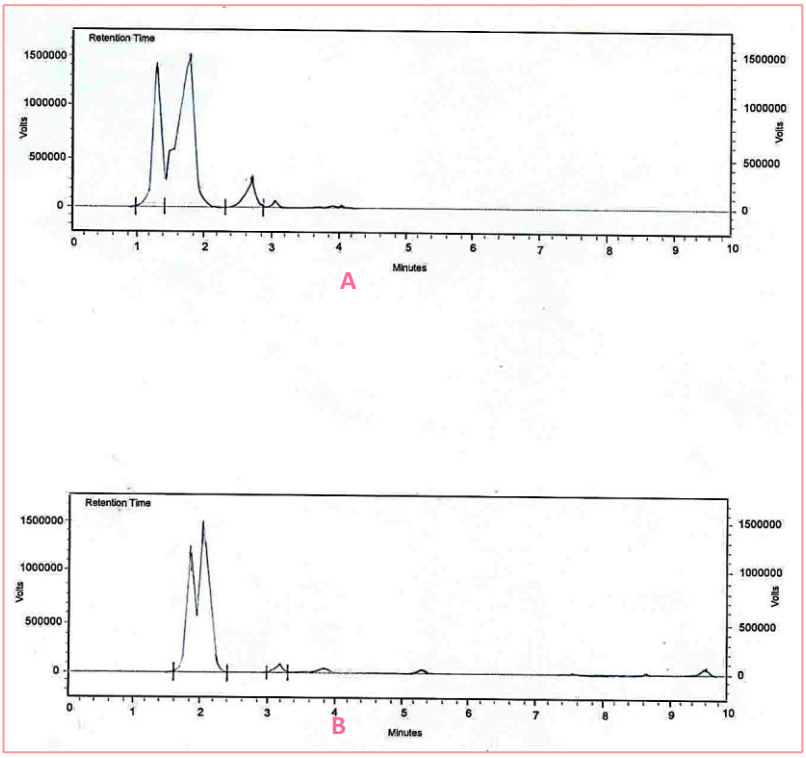
Supplementary VII: Diagram of standards phenolic compounds separated by HPLC



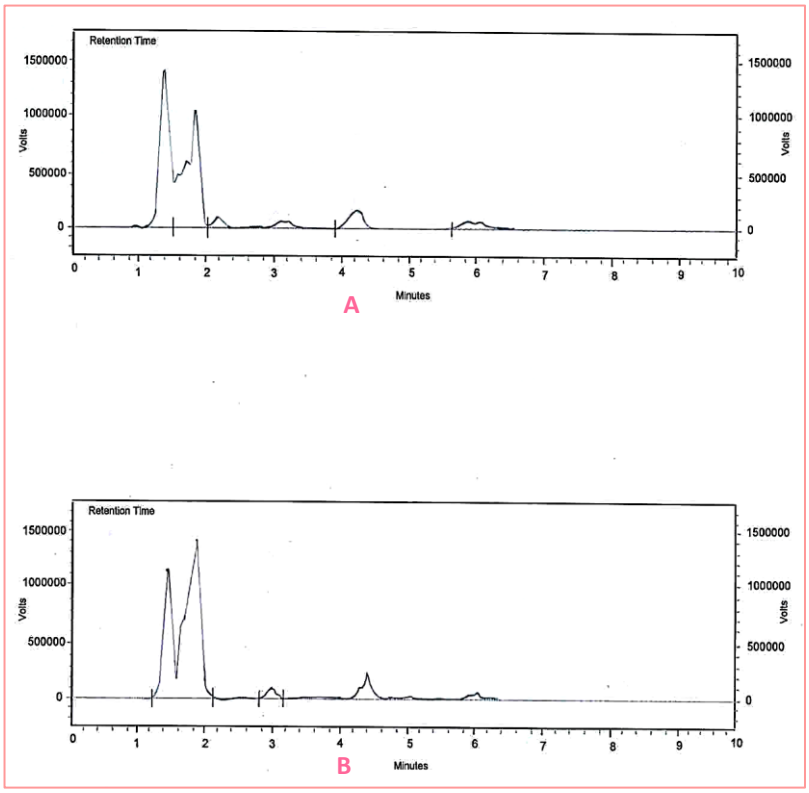
Supplementary VIII: Phenolic compounds by HPLC of: A- *G. dissectum* B- *G. stepporum*



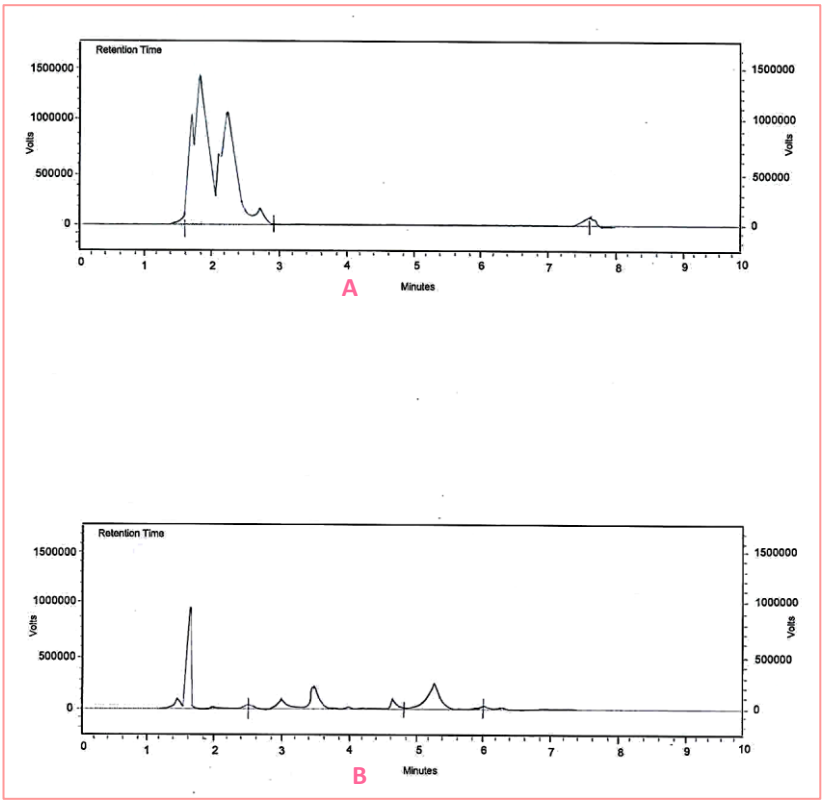
Supplementary IX: Phenolic compounds by HPLC of: A- *G. molle* B- *G. kurdicum*



Supplementary X: Phenolic compounds by HPLC of: A- *G. pusillum* B- *G. tuberosum*



Supplementary XI: Phenolic compounds by HPLC of: A- *G. purpureum* B- *G. lucidum*



Supplementary XII: Phenolic compounds by HPLC of: A- *G. divaricatum* B- *G. rotundifolium*