

Supplementary file 1

Phytochemical profiling and bioactivity assessment of crude methanolic extracts from different parts of *Merremia emarginata*: Antibacterial, antioxidant, thrombolytic, and cytotoxic evaluations

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Table S1. TPC (mg GAE/g) determination

Trial	Leaf extract	Root extract	Stalk extract
1	349.112	59.171	260.355
2	431.952	136.094	159.763
3	254.437	65.834	213.017
Mean±SD	345 ± 89	87 ± 43	210 ± 50

Statistical test outputs: df: 2 (Between Groups), 6 (Within Groups) and, F: 12.257, p-value: 0.008

Data are presented as mean ± standard deviation (SD), where n = 3. Total phenolic content (TPC) is expressed as mg gallic acid equivalents (GAE) per gram (mg GAE/g), with mean ± SD values reported to two significant figures. The ANOVA results show a significant difference between the groups. This means there is a statistically significant difference in TPC levels among the three samples.

Table S2. TFC (mg QE/g) determination

Trial	Leaf extract	Root extract	Stalk extract
1	224.719	157.303	196.629
2	275.28	230.337	286.516
3	230.337	191.011	191.011
Mean±SD	243 ± 28	193 ± 37	225 ± 54

Statistical test outputs: df: 2 (Between Groups), 6 (Within Groups) and, F: 1.182, p-value: 0.369

Data are presented as mean $\pm$ standard deviation (SD), where n = 3. Total flavonoid content (TFC) is expressed as mg quercetin equivalents (QE) per gram (mg QE/g), with mean $\pm$ SD values reported to two significant figures. The p-value is greater than the typical significance level of 0.05, indicating that there are no statistically significant differences in TFC levels among the three groups.

Table S3. DPPH free radical Scavenging and IC₅₀ determination

Concentration ($\mu\text{g/mL}$)	Different sample															
	Leaf extract				Root extract				Stalk extract				Ascorbic acid			
	T-1	T-2	T-3	Mean $\pm$ SD	T-1	T-2	T-3	Mean $\pm$ SD	T-1	T-2	T-3	Mean $\pm$ SD	T-1	T-2	T-3	Mean $\pm$ SD
1.5625	43.99	44.59	44.29	44 $\pm$ 0.3	29.28	29.58	29.88	29.6 $\pm$ 0.3	31.38	31.68	31.38	31.5 $\pm$ 0.17	35.74	35.89	35.59	35.7 $\pm$ 0.2
3.125	45.8	46.1	45.65	46 $\pm$ 0.2	32.58	32.88	32.28	32.6 $\pm$ 0.3	35.89	35.59	35.44	35.6 $\pm$ 0.23	40.09	40.54	40.24	40.3 $\pm$ 0.2
6.25	46.1	46.4	45.95	46 $\pm$ 0.2	35.44	35.89	35.29	35.5 $\pm$ 0.3	38.59	38.29	37.99	38.3 $\pm$ 0.30	54.8	54.5	53.75	54.4 $\pm$ 0.5
12.5	50	50.3	50	50 $\pm$ 0.2	39.94	40.54	40.09	40.2 $\pm$ 0.3	41.29	40.84	41.14	41.1 $\pm$ 0.23	61.11	61.26	61.41	61.3 $\pm$ 0.2
25	51.8	52.1	51.95	52 $\pm$ 0.2	43.84	43.99	44.29	44.0 $\pm$ 0.2	43.54	43.69	43.54	43.6 $\pm$ 0.09	70.57	70.12	69.82	70.2 $\pm$ 0.4
50	53.75	54.05	54.35	54 $\pm$ 0.3	44.59	44.89	44.89	44.8 $\pm$ 0.2	46.1	45.8	45.35	45.8 $\pm$ 0.38	80.63	80.33	80.48	80.5 $\pm$ 0.2
100	55.41	55.86	55.11	55 $\pm$ 0.4	50.15	50.6	50.3	50.4 $\pm$ 0.2	51.8	52.1	51.65	51.9 $\pm$ 0.23	87.09	86.79	86.34	86.7 $\pm$ 0.4
IC ₅₀ ($\mu\text{g/mL}$)	14.62	14.30	12.88	13.93 $\pm$ 0.93	108.89	100.78	104.11	105 $\pm$ 4.1	89.30	96.50	90.07	92 $\pm$ 4.0	5.14	5.16	5.27	5.190 $\pm$ 0.070

Statistical test outputs for IC₅₀ value: df: 3 (Between Groups), 8 (Within Groups) and, F: 965.026, p-value: <.001
Data are presented as mean $\pm$ standard deviation (SD), where n = 3. T means trial. Inhibitory concentration 50% (IC₅₀) is expressed as $\mu\text{g/mL}$, with mean $\pm$ SD values reported to two significant figures. The ANOVA results indicate significant differences in IC₅₀ values across the sample groups and Post Hoc Tests confirm that all pairwise comparisons between the groups are statistically significant.

Table S4. Concentration-Dependent Cytotoxicity of Leaf, Root and Stalk Extracts, Standard, DMSO, and Artificial Seawater

Test Sample	Concentration ($\mu\text{g/mL}$)	No. of nauplii taken	Average no. of nauplii dead	Mortality % (Mean $\pm$ SD)	LC ₅₀ ($\mu\text{g/mL}$) (Mean $\pm$ SD)	Statistical test outputs for LC ₅₀ value
Leaf extract	5	10	4	40 $\pm$ 10	13 $\pm$ 6.1	
	10	10	4.67	46.7 $\pm$ 5.8		
	20	10	5.33	53.3 $\pm$ 5.8		
	40	10	6.33	63.3 $\pm$ 5.8		
	80	10	7.67	76.7 $\pm$ 5.8		

Stalk extract	5	10	2.67	26.7 ± 15	21±8.9	df: 3 (Between Groups), 8 (Within Groups) and, F: 6.69, p-value: 0.014
	10	10	3.33	33.3 ± 12		
	20	10	4.33	43.3 ± 5.8		
	40	10	6.67	66.7 ± 5.8		
	80	10	7.67	76.7 ± 5.8		
Root extract	5	10	2.33	23.3 ± 5.8	27±9.1	
	10	10	4	40 ± 10		
	20	10	4.67	46.7 ± 15		
	40	10	5.33	53.3 ± 5.8		
	80	10	6.67	66.7 ± 5.8		
Vincristine sulphate	5	10	6	60.0 ± 0	2.4±0.67	
	10	10	7.33	73.3 ± 5.8		
	20	10	7.67	76.7 ± 5.8		
	40	10	9.67	96.7 ± 5.8		
	80	10	10	100 ± 0		
DMSO	20 µL	10	1	10± 0	-	
	20 µL	10	1.33	13.3± 5.8		
	20 µL	10	1.33	13.3± 5.8		

Data are presented as mean ± standard deviation (SD), where n = 3. DMSO means dimethyl sulfoxide. Lethal concentration 50% (LC₅₀) is expressed as µg/mL, with mean ± SD values reported to two significant figures. The ANOVA results confirm that there are significant differences in LC₅₀ values among the groups.

Table S5. Effect of STK, Negative Control, and Methanolic Extracts of Leaf, Root, and Stalk of *M. emarginata* on Blood Clot.

Sample	Sample No.	Weight of the Empty Tube (A) gm	Weight of the tube with Clot (B) gm	Weight of clot C (B-A) gm	Weight after removal of clot lysis (D) gm	Weight of clot lysis E (B-D) gm	% of clot lysis	% of clot lysis (Mean ± SD)	Statistic al test outputs for clot lysis
DW	50-1	0.87	1.19	0.32	1.17	0.02	6.25	5.8 ± 1.9 ^a	For all 50 µL samples df: 5 (Between n Groups) ,12 (Within Groups) and, F: 20.628, p-value: <0.05
	50-2	0.84	1.11	0.27	1.1	0.01	3.7		
	50-3	0.85	1.12	0.27	1.1	0.02	7.4		
	100-1	0.84	1.19	0.35	1.17	0.02	5.71		
	100-2	0.87	1.23	0.36	1.22	0.01	2.77		
	100-3	0.83	1.27	0.44	1.23	0.04	9.09		
NS	50-1	0.84	1.18	0.34	1.16	0.02	5.88	3.9 ± 1.8 ^a	
	50-2	0.80	1.22	0.42	1.21	0.01	2.38		
	50-3	0.84	1.14	0.30	1.13	0.01	3.33		
	100-1	0.85	1.17	0.32	1.14	0.03	9.37		
	100-2	0.84	1.17	0.31	1.14	0.03	9.67		
	100-3	0.86	1.16	0.30	1.13	0.04	13.33		
STK	50-1	0.84	1.21	0.37	1.05	0.16	43.24	37 ± 9.3 ^c	
	50-2	0.80	1.33	0.53	1.19	0.14	26.41		
	50-3	0.85	1.21	0.36	1.06	0.15	41.66		
	100-1	0.81	1.18	0.37	1.00	0.17	45.94		

	100-2	0.84	1.17	0.33	1.00	0.17	51.51	52 ± 6.1 ^d	For all 100 µL samples
	100-3	0.86	1.17	0.31	0.99	0.18	58.06		
Leaf extract	50-1	0.85	1.18	0.33	1.15	0.03	9.09	9.3 ± 2.1 ^{ab}	df: 5 (Between n Groups), 12 (Within Groups) and, F: 41.147, p-value: <0.05
	50-2	0.86	1.12	0.26	1.09	0.03	11.53		
	50-3	0.81	1.22	0.41	1.19	0.03	7.31		
	100-1	0.85	1.14	0.29	1.09	0.05	17.24	19 ± 4.1 ^{bc}	
	100-2	0.84	1.16	0.32	1.13	0.05	15.62		
	100-3	0.86	1.16	0.30	1.09	0.07	23.33		
	Stalk extract	50-1	0.85	1.25	0.40	1.35	0.04	10.00	
50-2		0.80	1.18	0.38	1.28	0.05	13.10		
50-3		0.83	1.25	0.42	1.35	0.03	7.14		
100-1		0.87	1.27	0.4	1.32	0.6	15.00	21 ± 3.3 ^c	
100-2		0.86	1.2	0.34	1.25	0.07	20.58		
100-3		0.85	1.14	0.29	1.19	0.08	27.58		
Root extract	50-1	0.85	1.17	0.32	1.11	0.06	18.75	14 ± 4.7	
	50-2	0.85	1.18	0.33	1.14	0.04	12.12		
	50-3	0.80	1.32	0.52	1.27	0.05	9.62		
	100-1	0.85	1.05	0.2	1.03	0.02	10.00	14 ± 3.1	
	100-2	0.84	1.16	0.32	1.11	0.05	15.63		
	100-3	0.80	1.20	0.40	1.11	0.06	15.00		

Data are presented as mean ± standard deviation (SD), where n = 3. STK means Streptokinase NS means normal saline, DW means distilled water, and 50 and 100 means concentration amounts in µL with mean ± SD values reported to two significant figures. Different superscript letters indicate statistically significant differences between groups (P < 0.05), while groups sharing the same letter are not significantly different.