

SUPPLEMENTARY MATERIAL

Flavonoids with hepatoprotective activity from the leaves of *Cleome viscosa* L.

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Abstract: One new flavonol glycoside named visconoside C (**1**), together with seven known flavonol glycosides, quercetin 3-O- β -D-glucopyranoside 7-O- α -L-rhamnopyranoside (**2**), quercetin 7-O- α -L-rhamnopyranoside (**3**), astragalin (**4**), kaempferol 3-O-(4-O-acetyl)- α -L-rhamnopyranoside (**5**), kaempferol 7-O- α -L-rhamnopyranoside (**6**), kaempferitrin (**7**) and kaempferol 3-O- β -D-glucopyranoside 7-O- α -L-rhamnopyranoside (**8**) were isolated by various chromatography methods from the leaves of *Cleome viscosa* L. Their structures were elucidated by IR, UV, HR-ESI-MS, NMR (1D & 2D) experiments. The cytotoxicity and hepatoprotective activities using HepG2 human hepatoma cell line of **1** were measured by MTT assay. At the concentration of 25 μ M and 50 μ M, **1** showed cytotoxic activity against HepG2 cells (cell viability was decreased 22.2 % and 23.0 %, respectively, compared with doxorubicin control) while at the concentration of 100 μ M, **1** showed hepatoprotective activity against CCl₄ induced hepatotoxicity on HepG2 cells (34.3 %, compared with quercetin control).

Keywords: *Cleome viscosa*; Capparaceae; Visconoside C; cytotoxicity activity, hepatoprotective activity

List of supporting information

Table S1. The cytotoxicity and hepatoprotective activities using HepG2 of **1**.

Figure S1. Chemical structures and selected HMBC and COSY correlations of **1**

Figure S2. $^1\text{H-NMR}$ spectrum (500 MHz) of compound **1** in $\text{DMSO-}d_6$.

Figure S3. $^{13}\text{C-NMR}$ spectrum (125 MHz) of compound **1** in $\text{DMSO-}d_6$.

Figure S4. DEPT spectrum of compound **1** in $\text{DMSO-}d_6$.

Figure S5. COSY spectrum of compound **1** in $\text{DMSO-}d_6$.

Figure S6. HSQC spectrum of compound **1** in $\text{DMSO-}d_6$.

Figure S7. HMBC spectrum of compound **1** in $\text{DMSO-}d_6$.

Figure S8. HR-ESI-MS spectrum of compound **1** in CD_3OD .

Table S1. The cytotoxicity and hepatoprotective activities using HepG2 of **1**.

The cytotoxicity activity					
Sample	Concentration (μM)	OD ₅₇₀ ± SEM		Control	Percentage of control (%)
1	25	0.149 ± 0.009		0.194 ± 0.010	77.0
	50	0.140 ± 0.009		0.177 ± 0.010	78.8
	100	0.188 ± 0.010		0.161 ± 0.003	116.8
Quercetin	10	0.183 ± 0.004		0.191 ± 0.003	95.8
Doxorubicin	10	0.100 ± 0.006		0.191 ± 0.003	52.4
The hepatoprotective activity					
Sample	Concentration (μM)	OD ₅₇₀ ± SEM			Prevention percentage (%)
		Control	CCl ₄ 2 mM	CCl ₄ 2 mM + Sample	
1	100	0.161 ± 0.003	0.119 ± 0.004*	0.134 ± 0.004	34.3
Quercetin	10	0.191 ± 0.003	0.157 ± 0.010*	0.184 ± 0.004	80.3

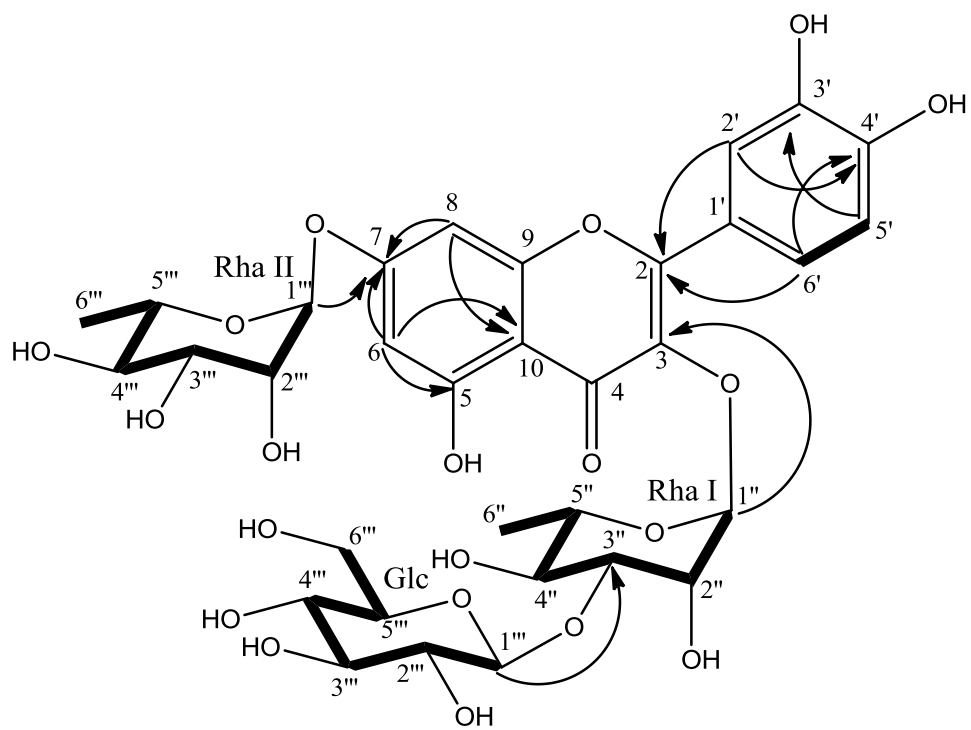


Figure S1. Chemical structures and selected HMBC and COSY correlations of **1**.

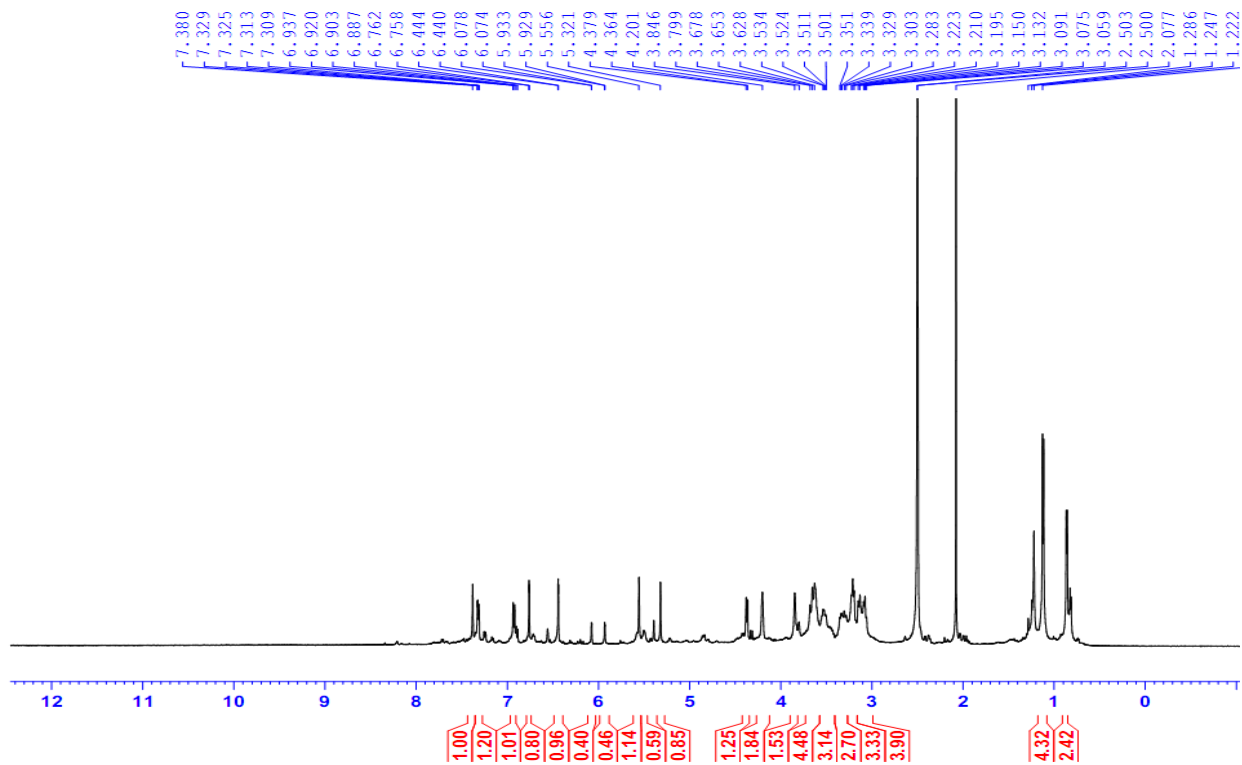


Figure S2. ^1H -NMR spectrum (500 MHz) of compound **1** in $\text{DMSO-}d_6$.

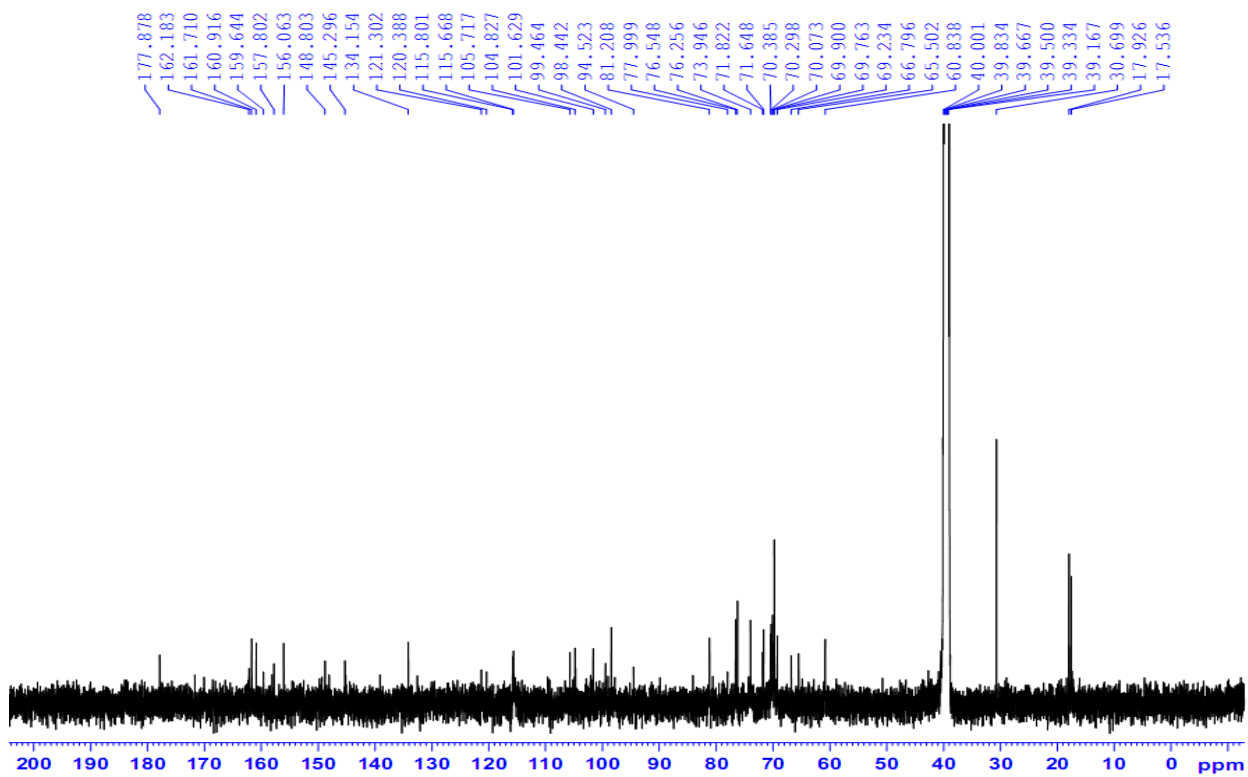


Figure S3. ^{13}C -NMR spectrum (125 MHz) of compound **1** in $\text{DMSO-}d_6$.

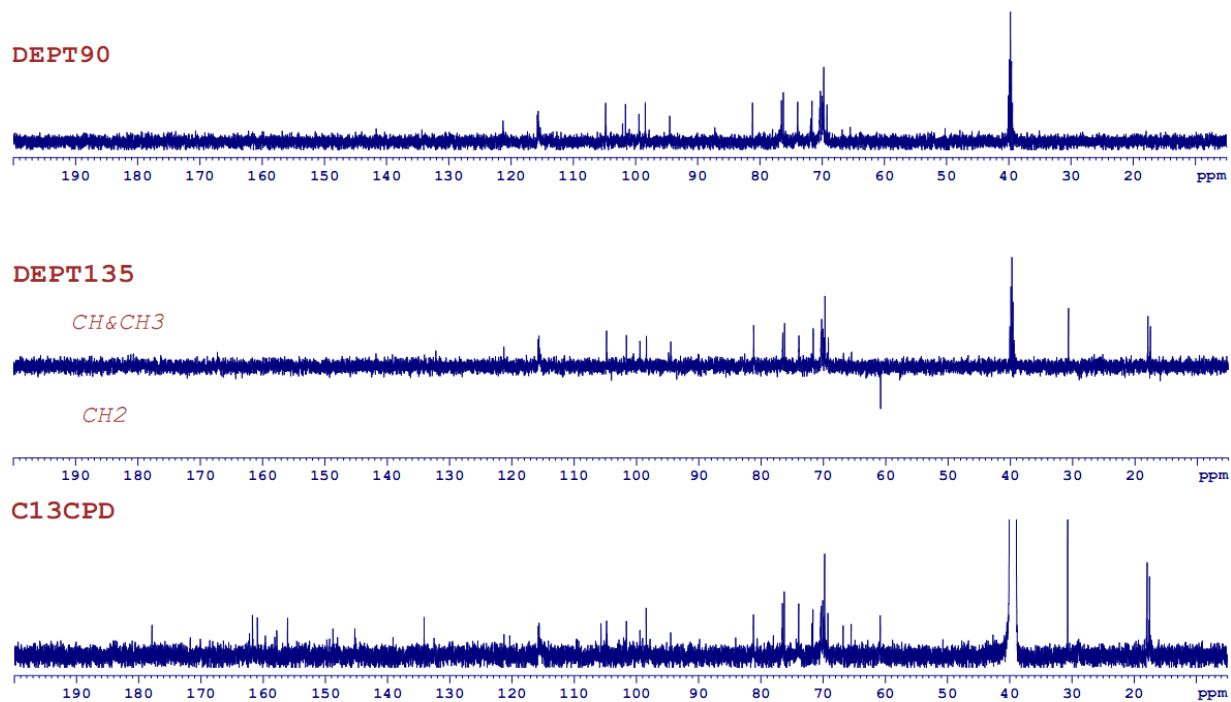


Figure S4. DEPT spectrum of compound **1** in DMSO- d_6 .

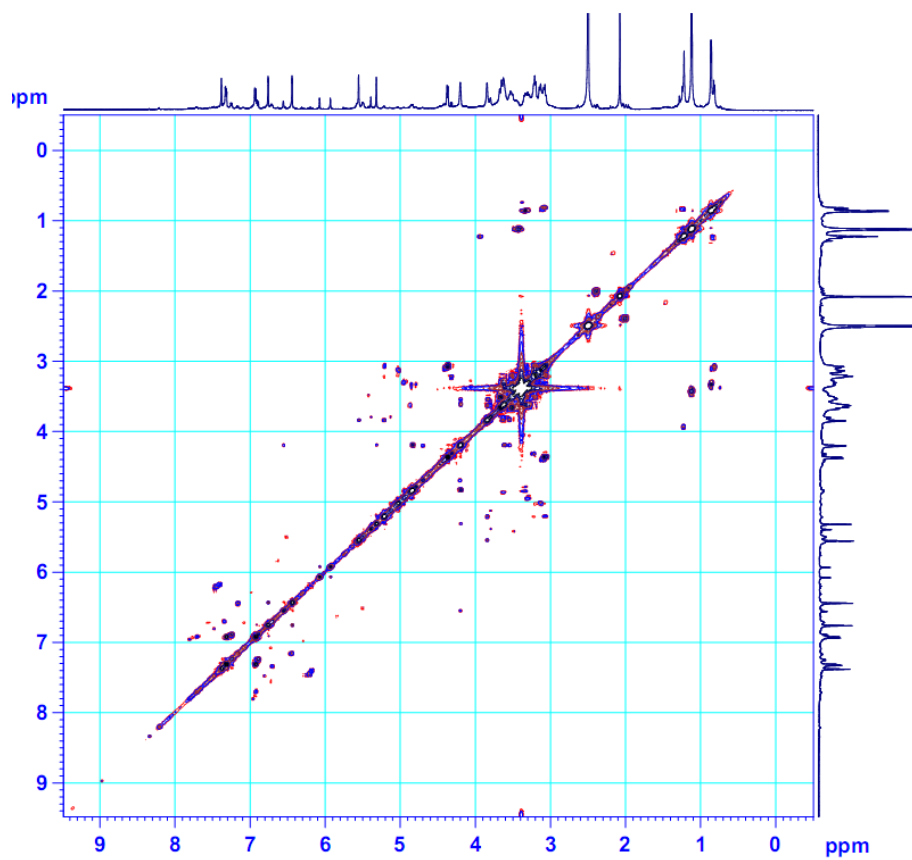


Figure S5. COSY spectrum of compound **1** in DMSO- d_6 .

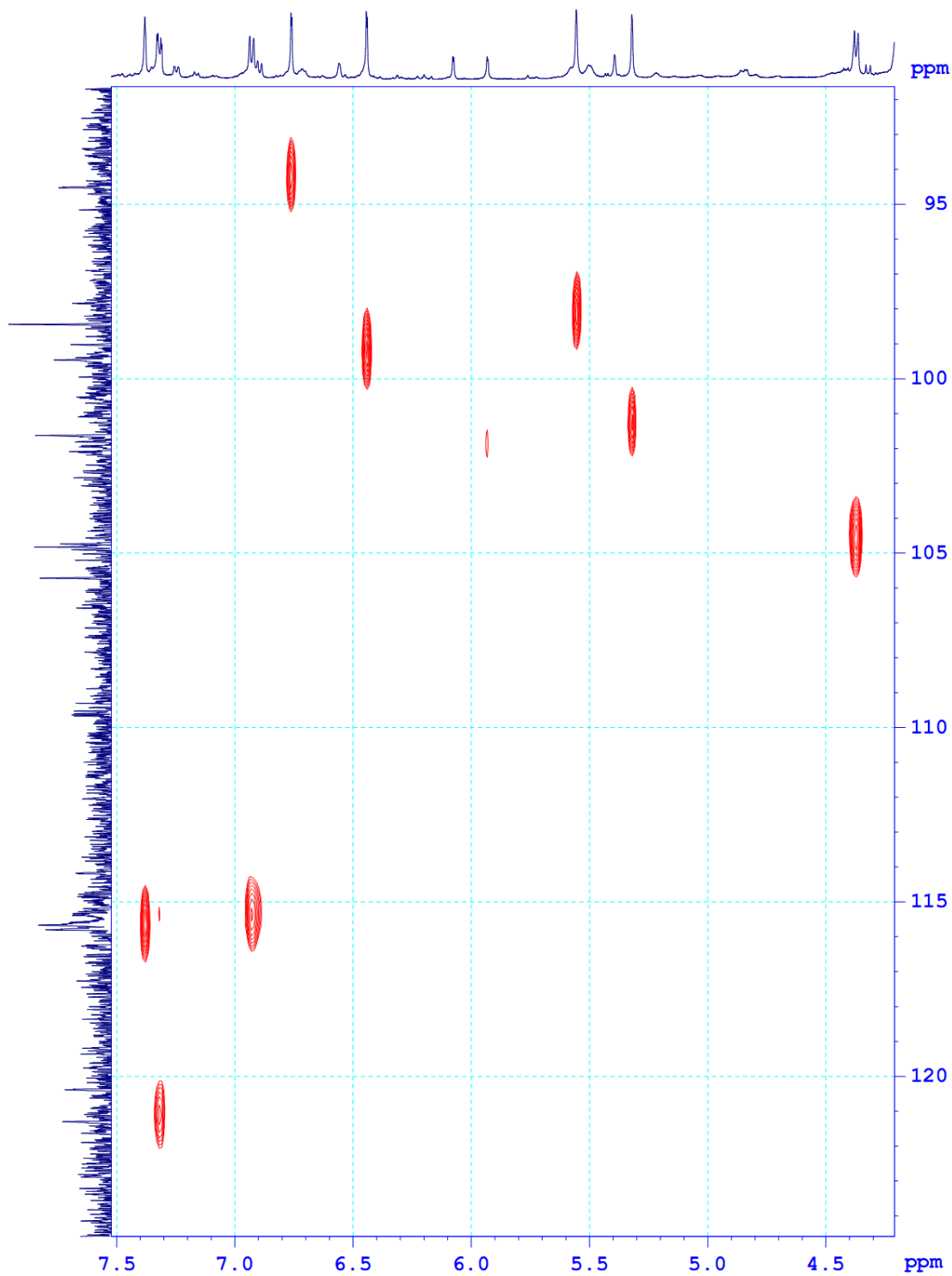


Figure S6. HSQC spectrum of compound **1** in $\text{DMSO-}d_6$.

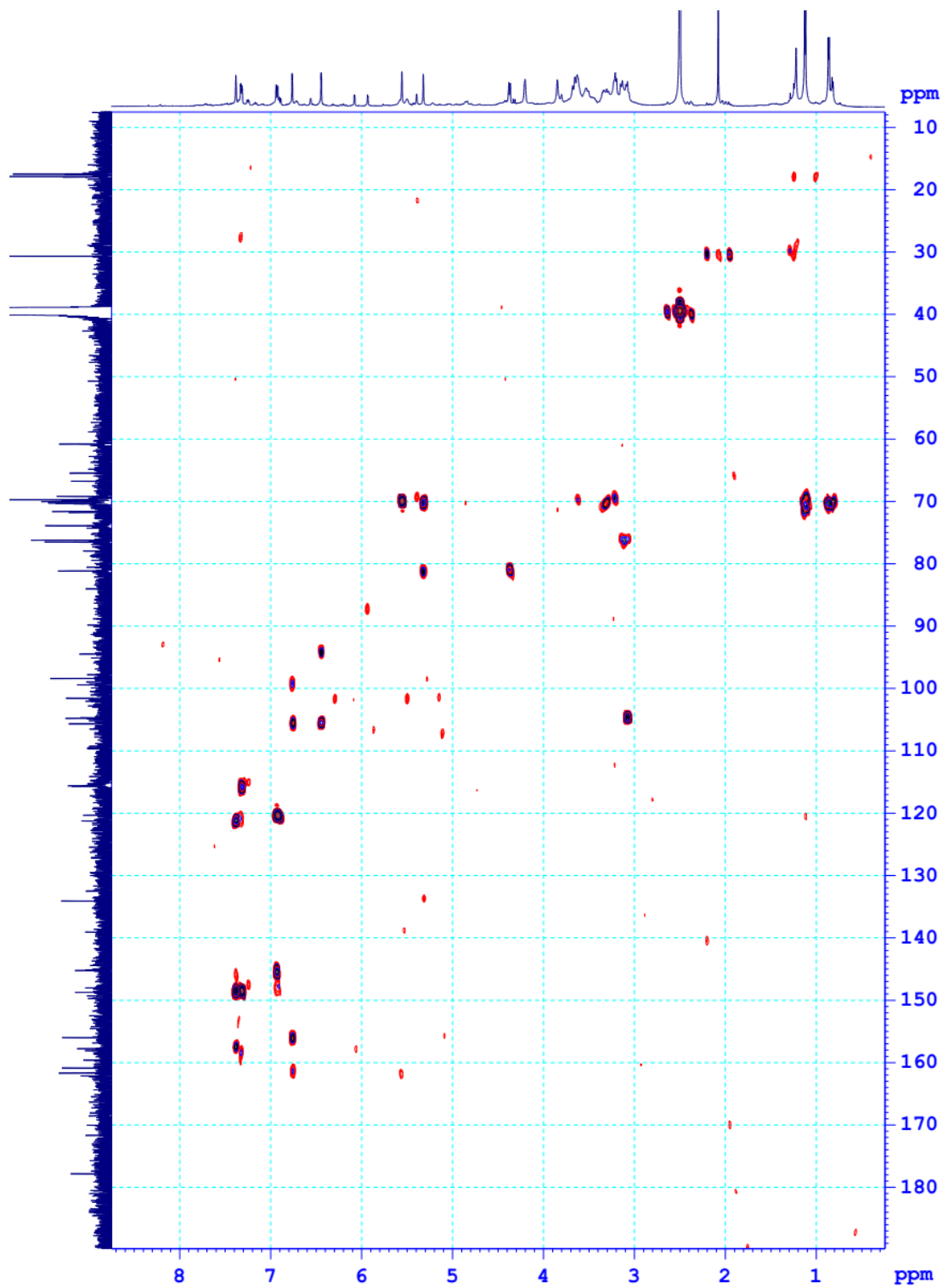


Figure S7. HMBC spectrum of compound **1** in DMSO- d_6 .

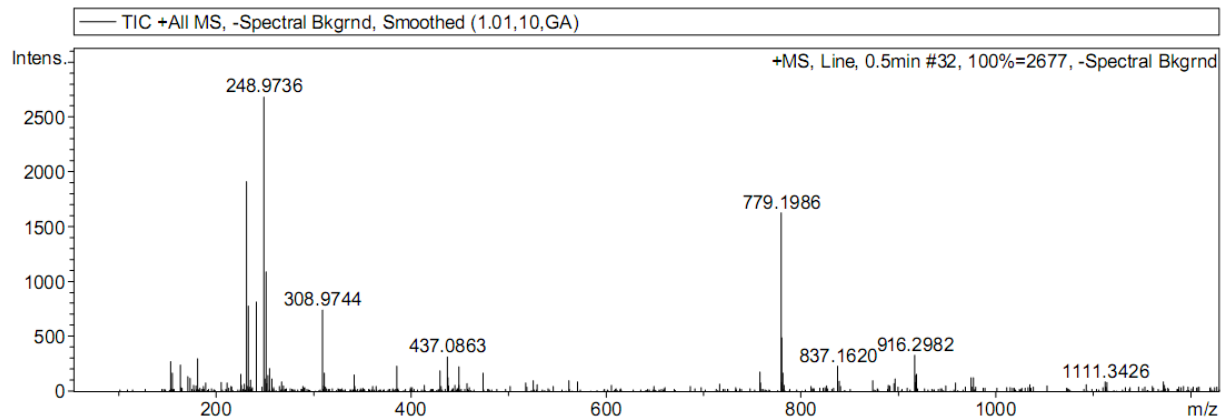


Figure S8. HR-ESI-MS spectrum of compound **1** in CD₃OD.