Supplementary Materials for

Tuliposides H–J and Bioactive Components from the Bulb of *Amana edulis*

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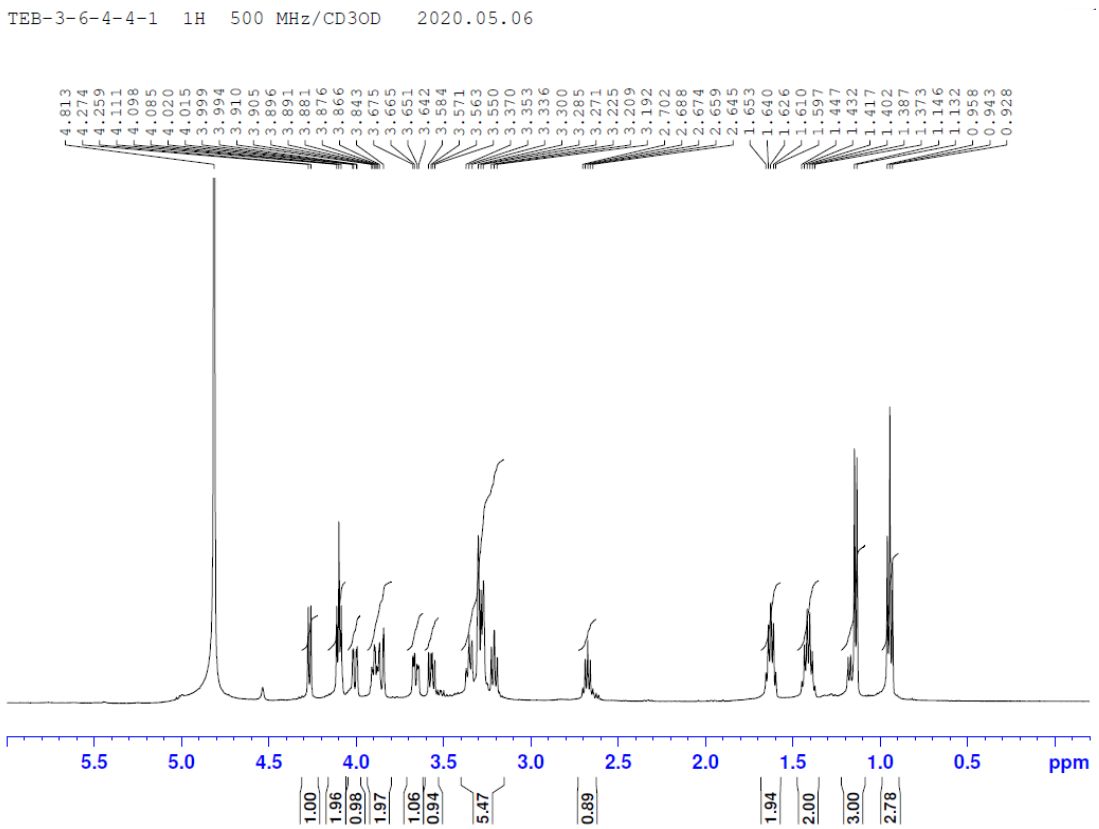


Figure S1. ^{1}H NMR (500 MHz, CD_3OD) of compound **1**.

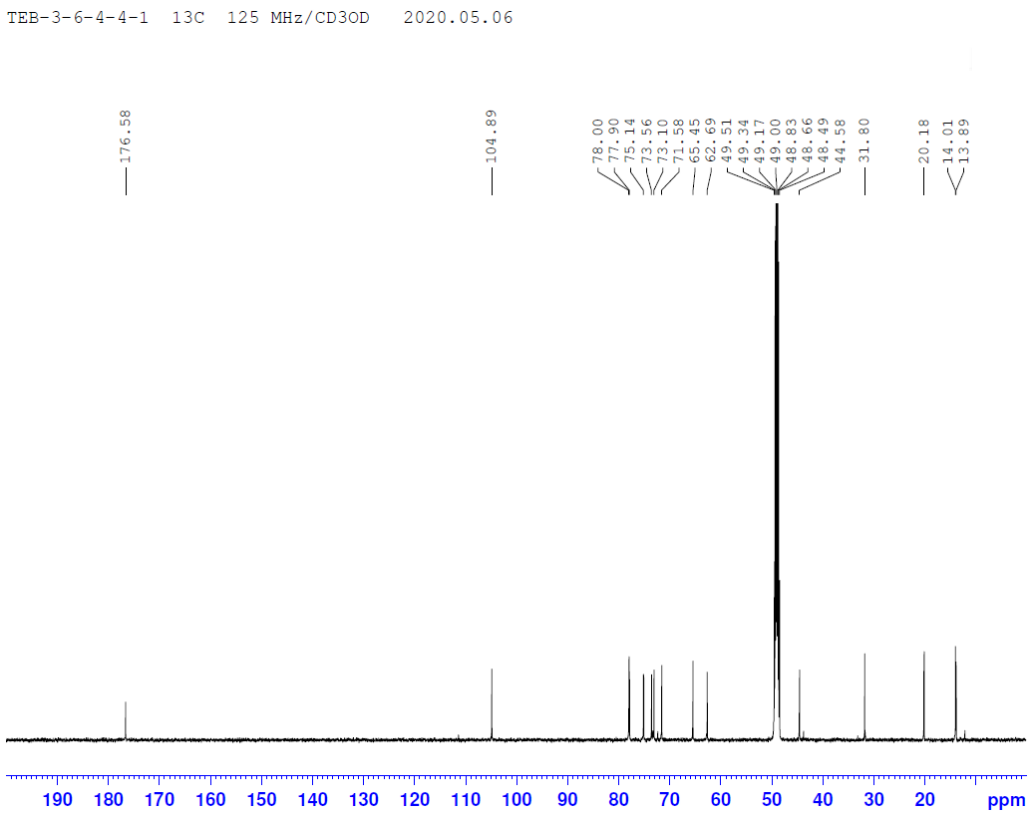


Figure S2. ^{13}C NMR (125 MHz, CD_3OD) of compound **1**.

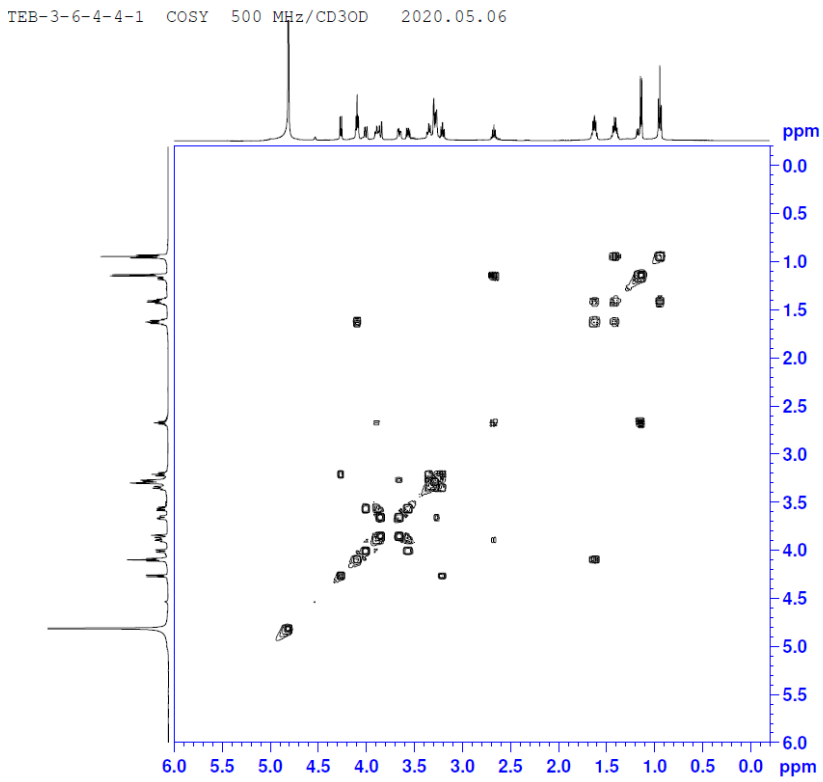


Figure S3. COSY spectrum (500 MHz, CD_3OD) of compound **1**.

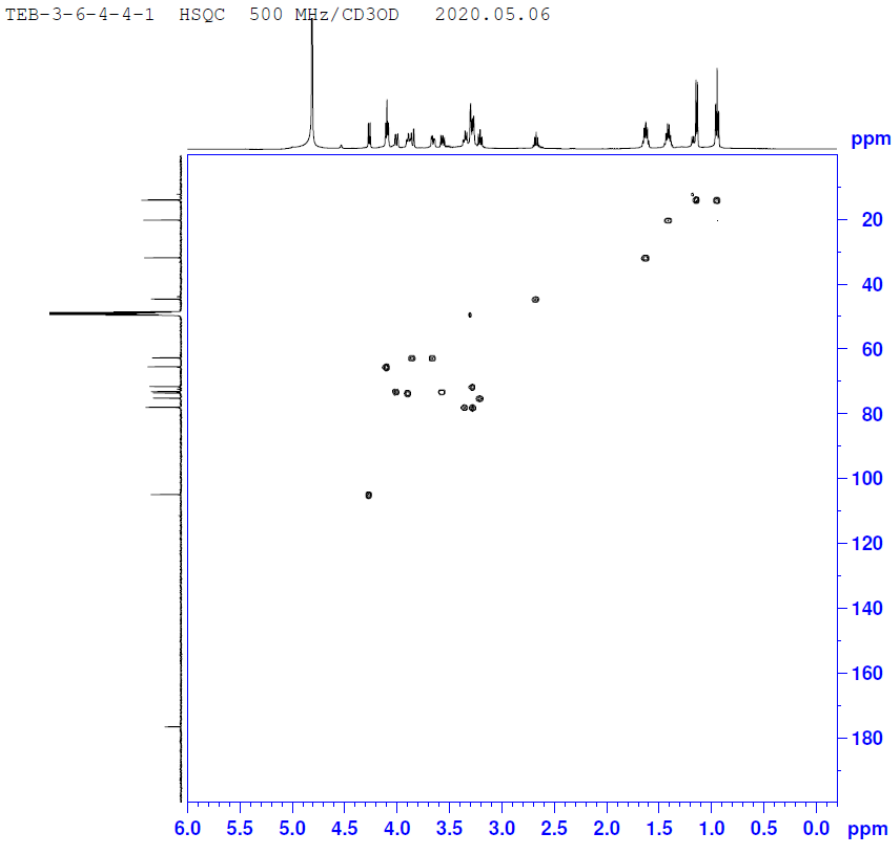


Figure S4. HSQC spectrum (500 MHz, CD_3OD) of compound **1**.

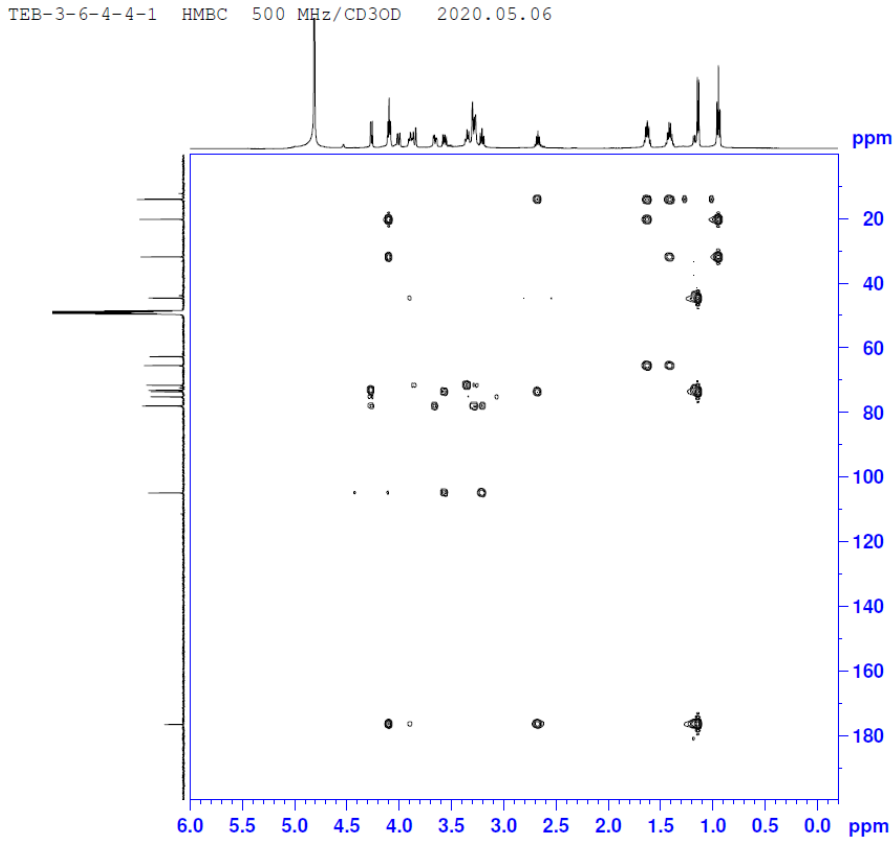


Figure S5. HMBC spectrum (500 MHz, CD_3OD) of compound **1**.

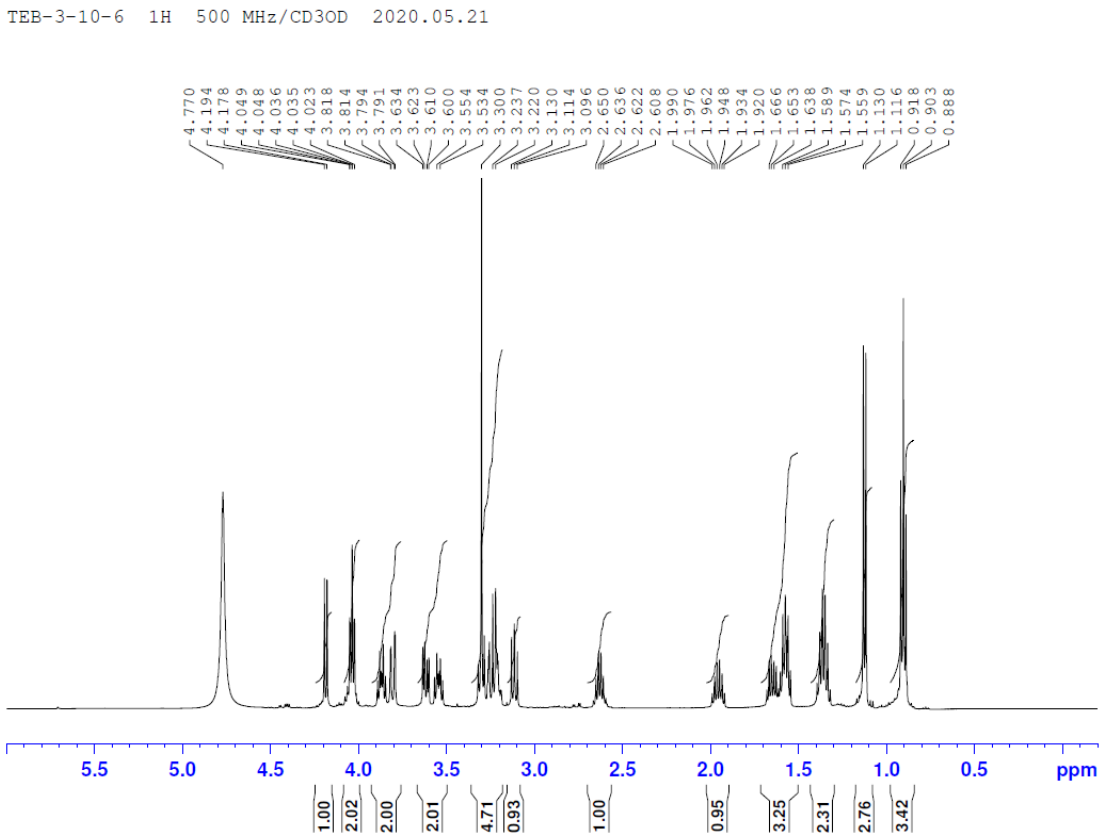


Figure S6. ^1H NMR (500 MHz, CD_3OD) of compound **2**.

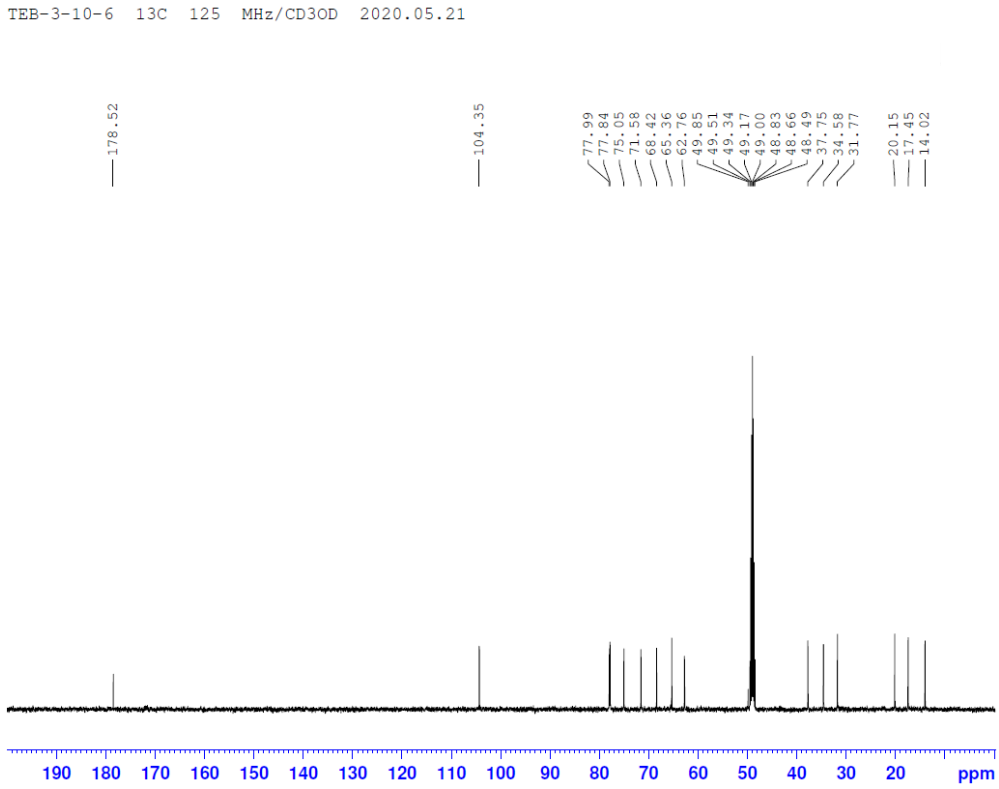


Figure S7. ^{13}C NMR (125 MHz, CD_3OD) of compound **2**.

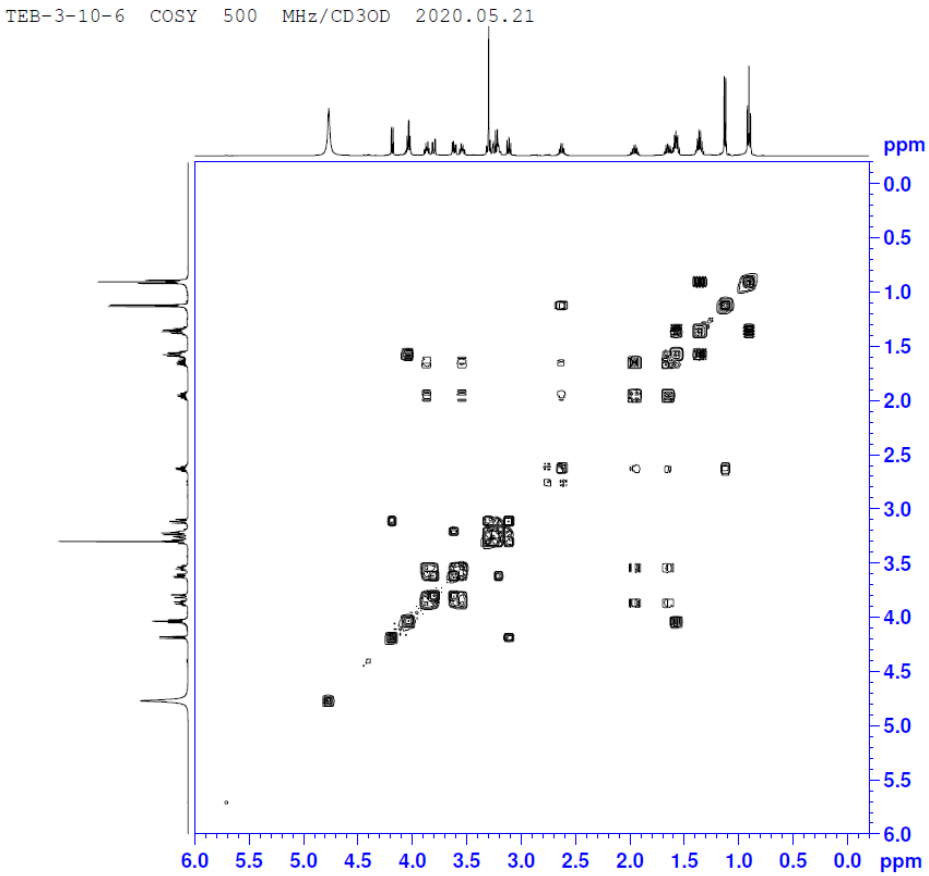


Figure S8. COSY spectrum (500 MHz, CD_3OD) of compound **2**.

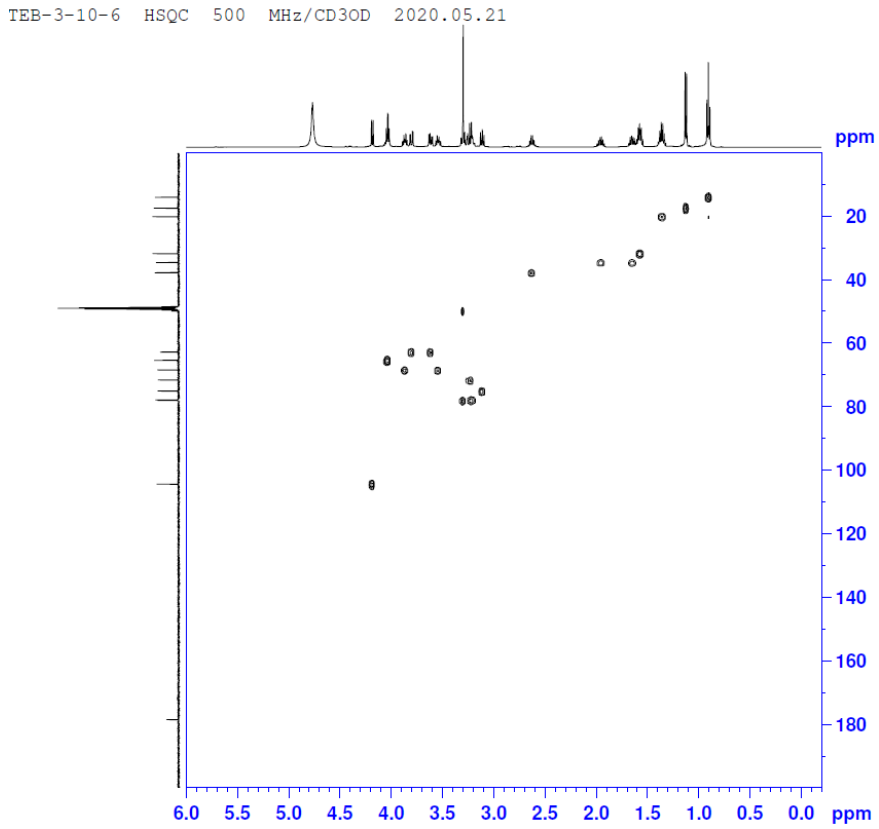


Figure S9. HSQC spectrum (500 MHz, CD_3OD) of compound **2**.

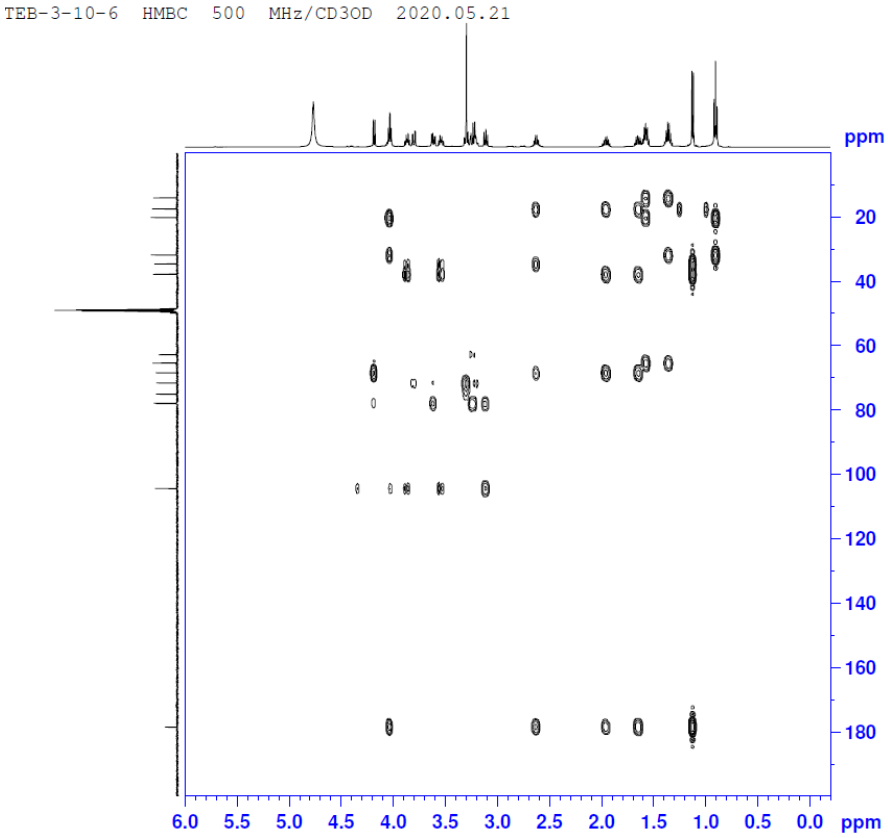


Figure S10. HMBC spectrum (500 MHz, CD_3OD) of compound **2**.

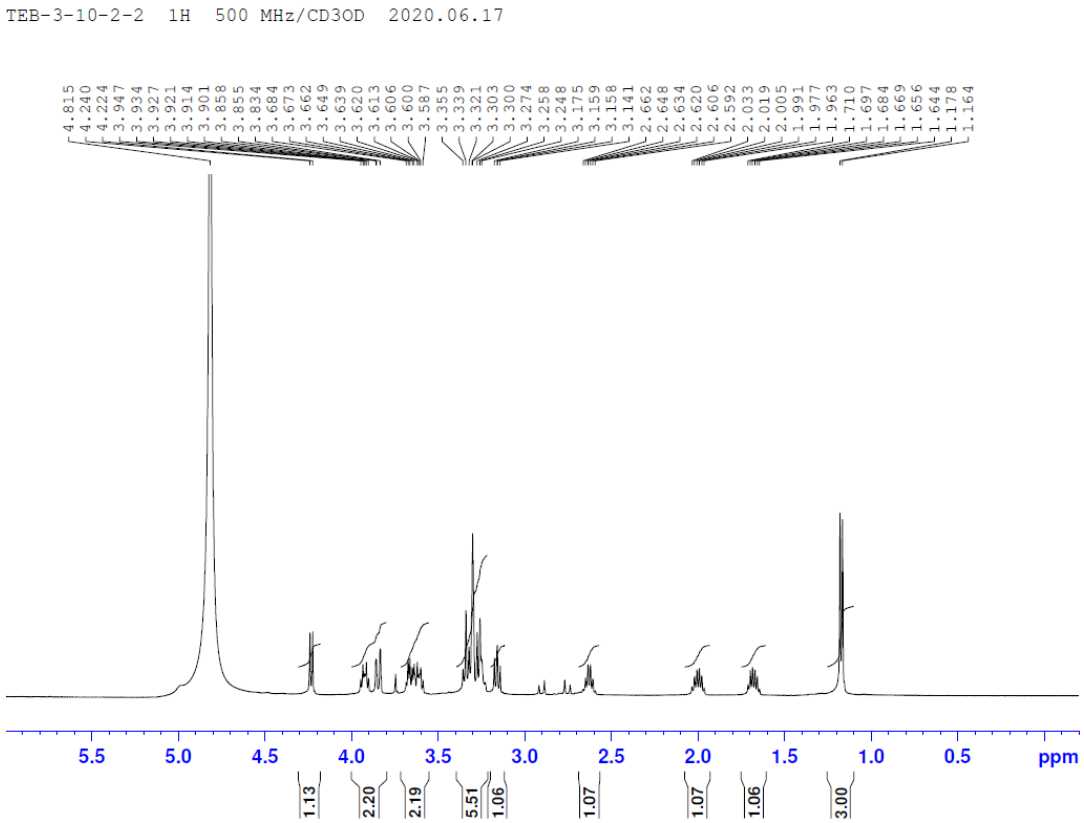


Figure S11. ^{1}H NMR (500 MHz, CD_3OD) of compound **3**.

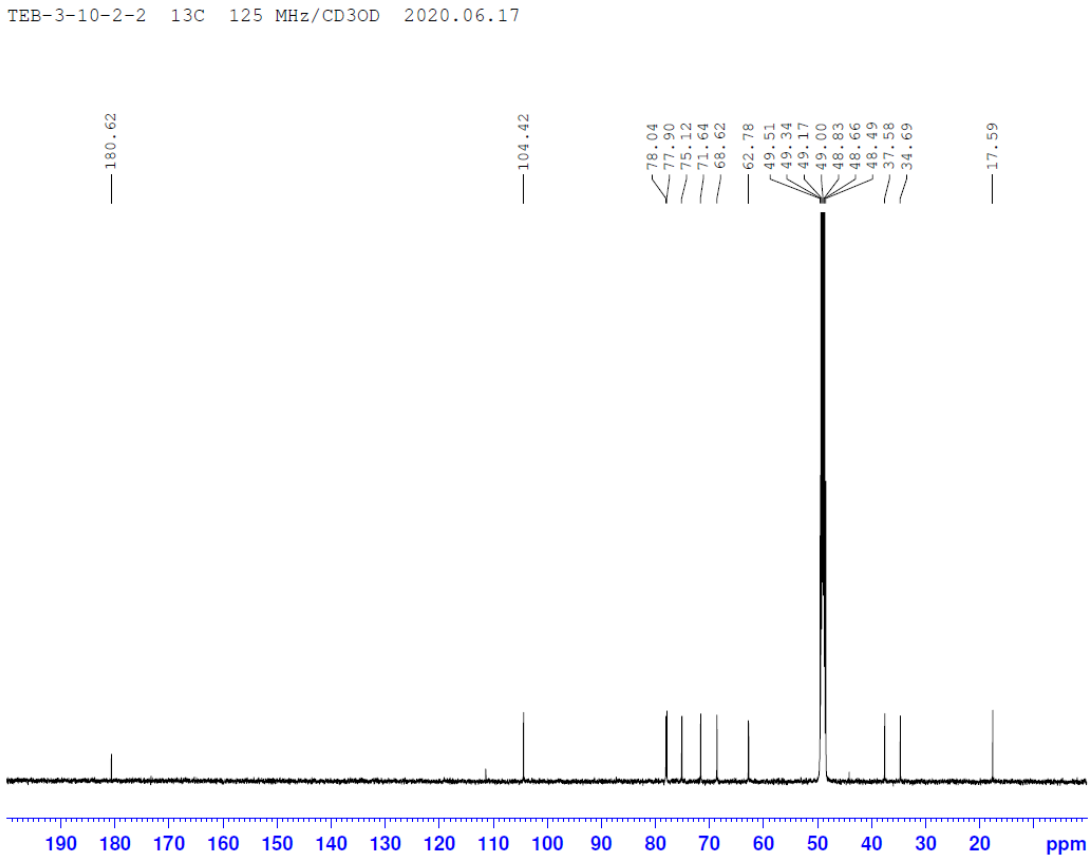


Figure S12. ^{13}C NMR (125 MHz, CD_3OD) of compound **3**.

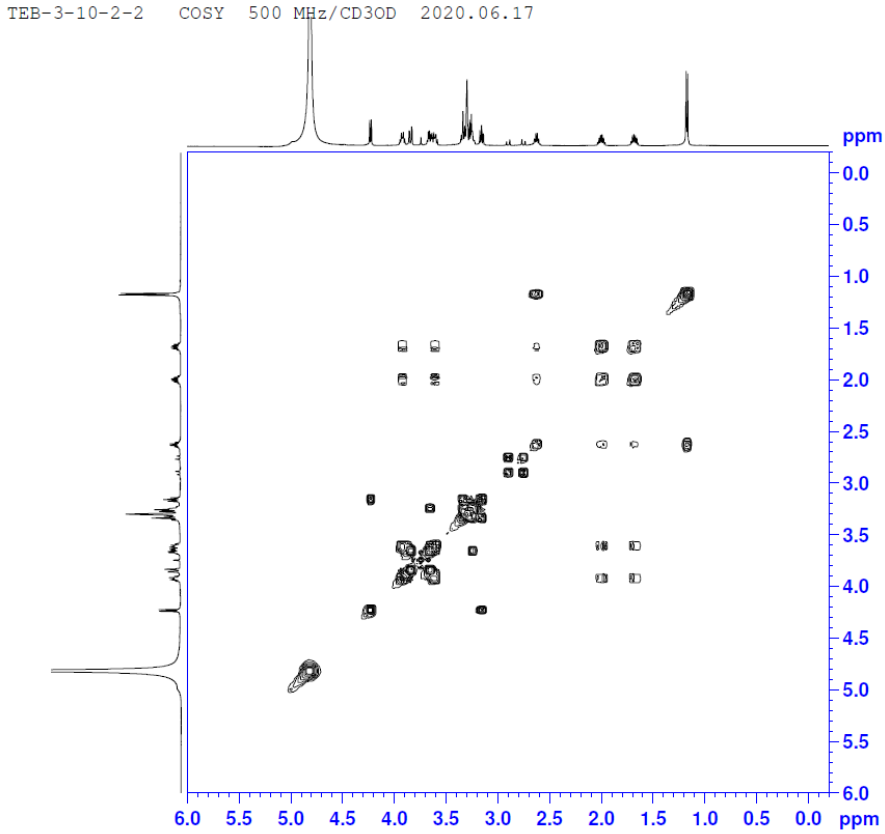


Figure S13. COSY spectrum (500 MHz, CD_3OD) of compound **3**.

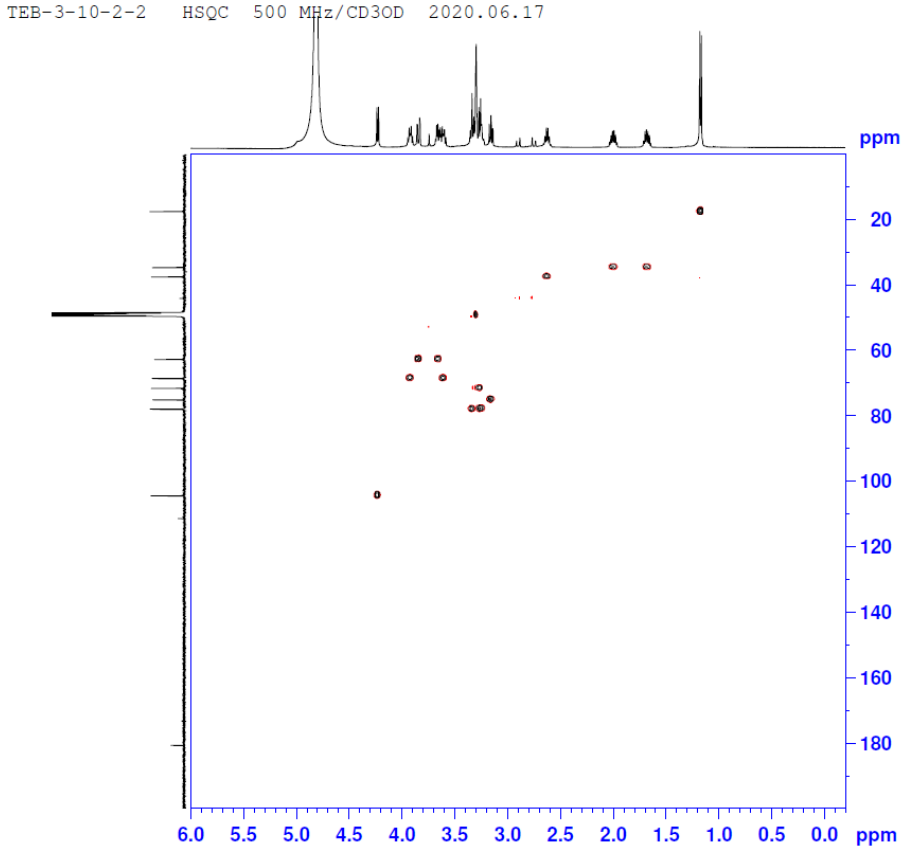


Figure S14. HSQC spectrum (500 MHz, CD_3OD) of compound **3**.

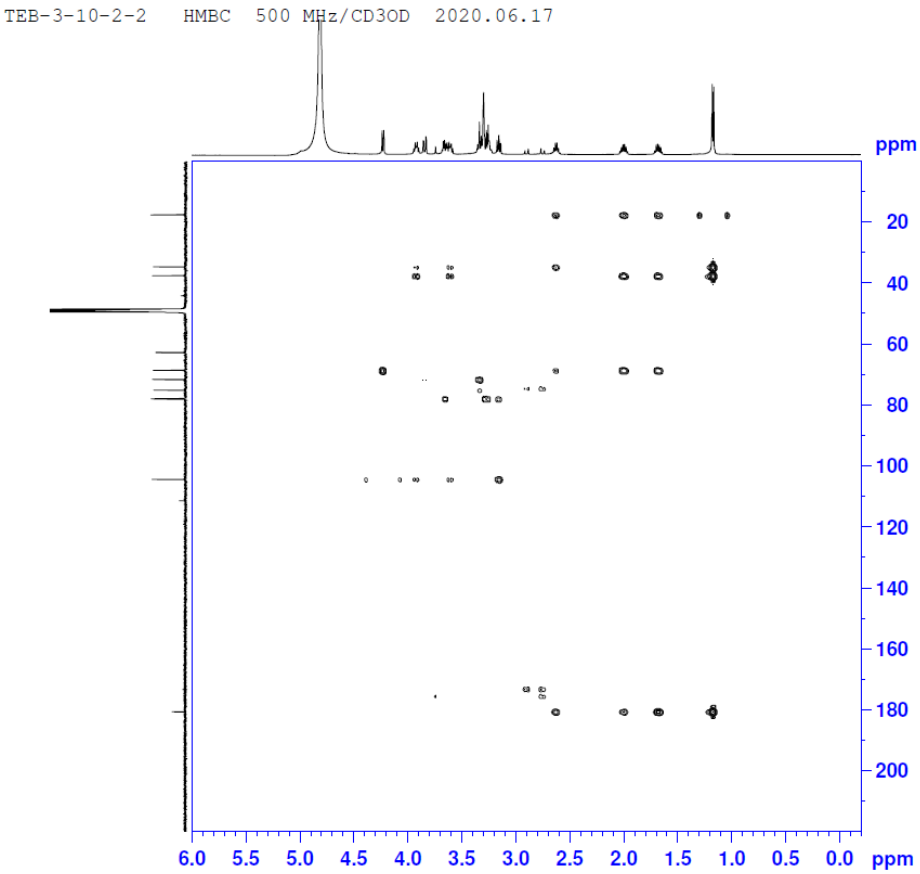


Figure S15. HMBC spectrum (500 MHz, C_5D_5N) of compound **3**.

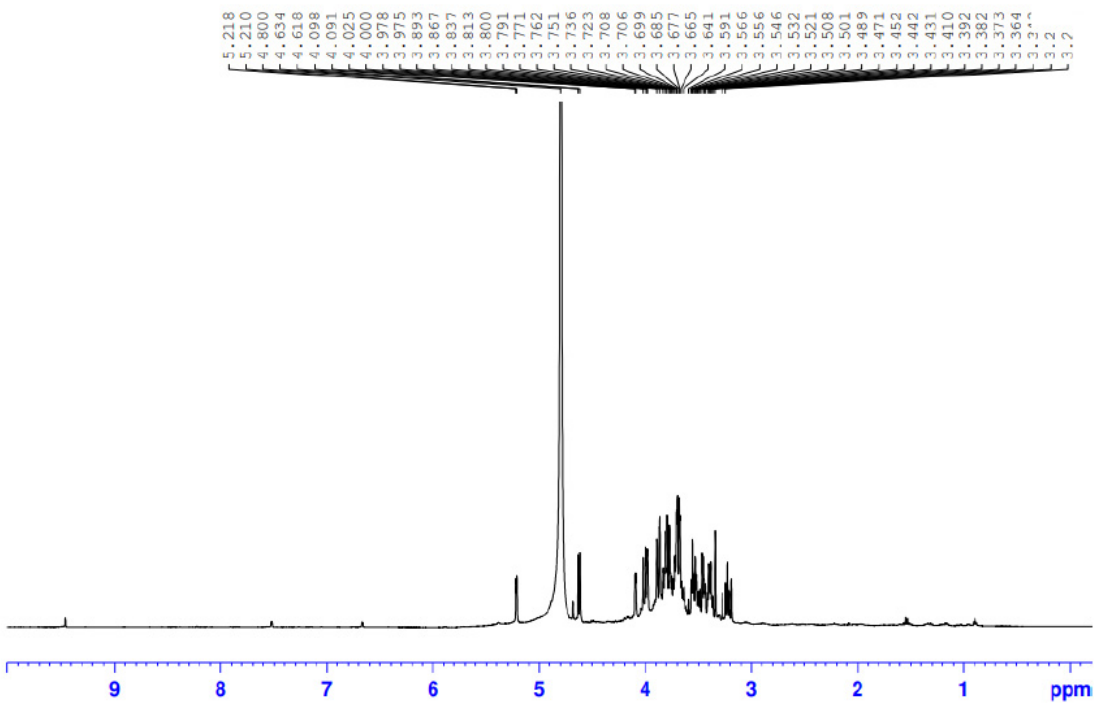


Figure S16. ^{1}H NMR (500 MHz, D_2O with 1 drop CD_3OD) of TEW crude fraction.

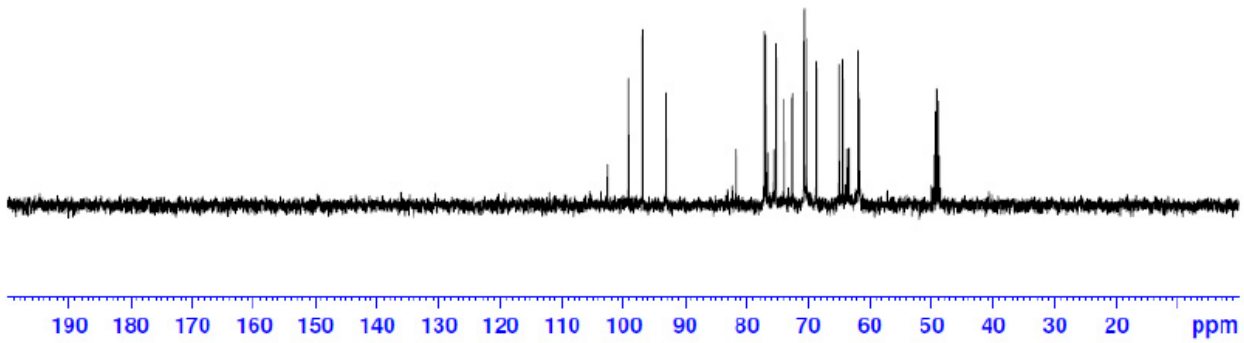


Figure S17. ^{13}C NMR (125 MHz, D_2O with 1 drop CD_3OD) of TEW crude fraction.

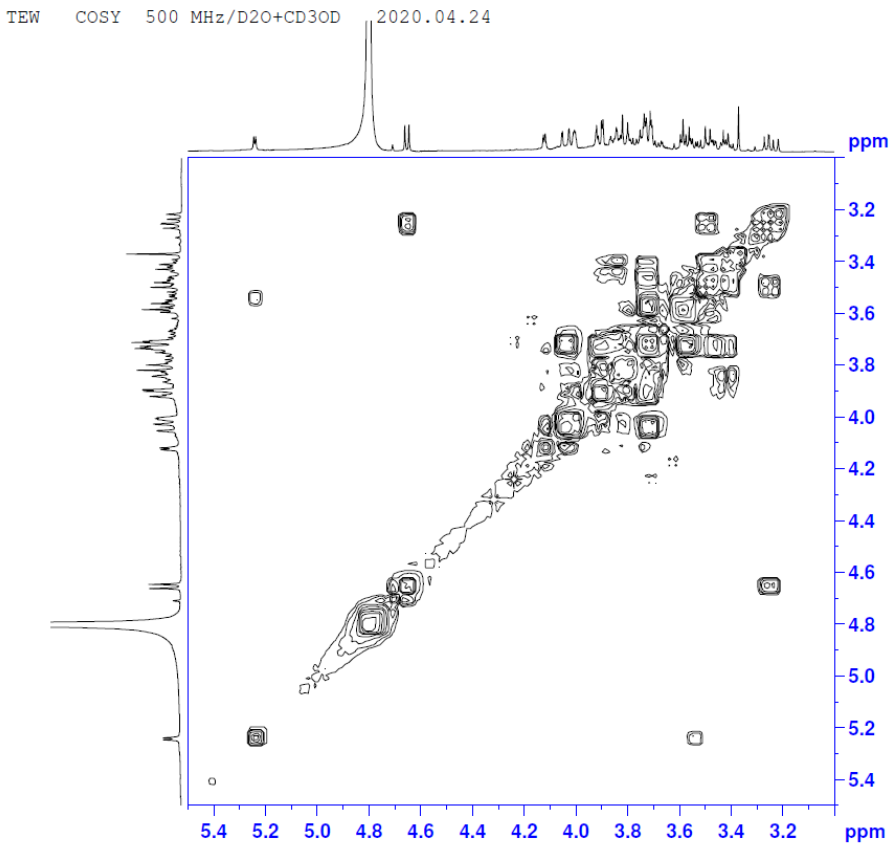


Figure S18. COSY spectrum (500 MHz, D_2O with 1 drop CD_3OD) of TEW crude fraction.

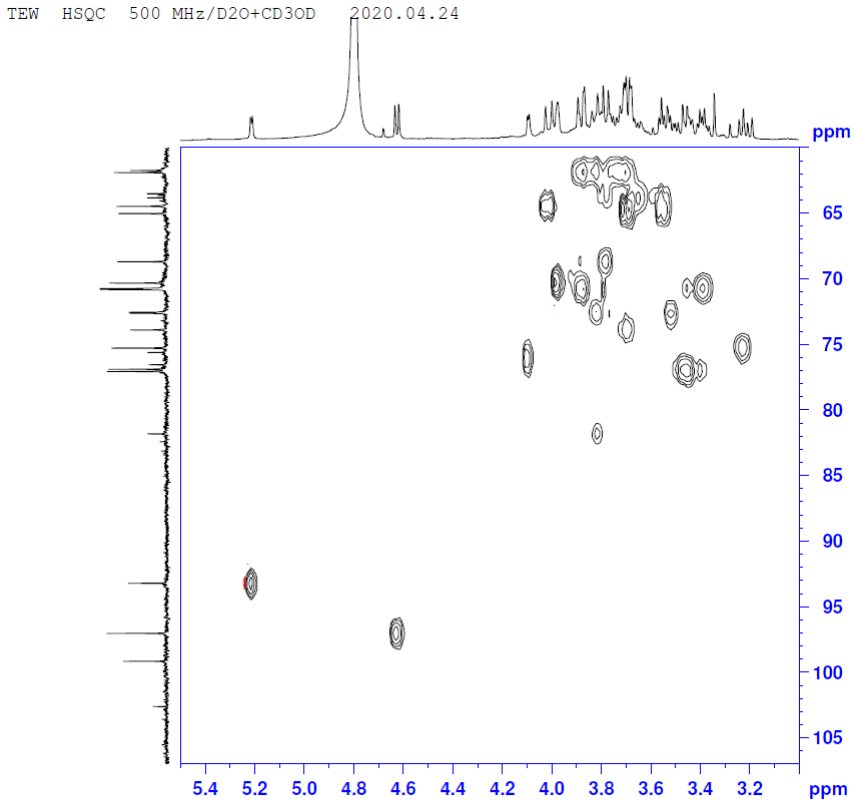


Figure S19. HSQC spectrum (500 MHz, D_2O with 1 drop CD_3OD) of TEW crude fraction.

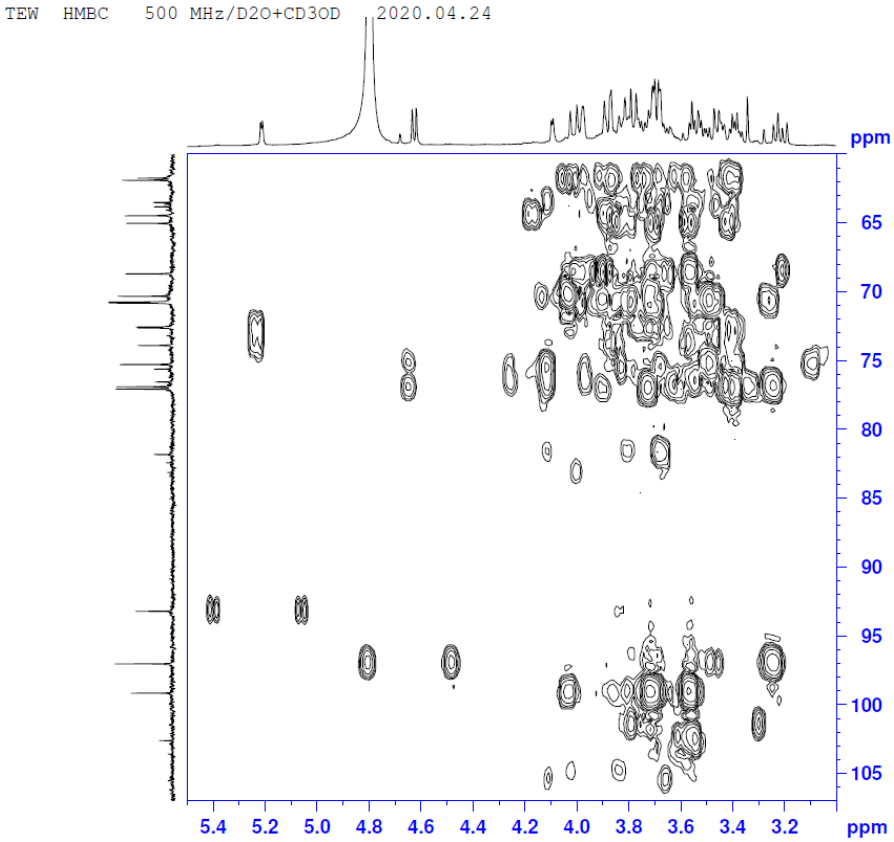


Figure S20. HMBC spectrum (500 MHz, D_2O with 1 drop CD_3OD) of TEW crude fraction.

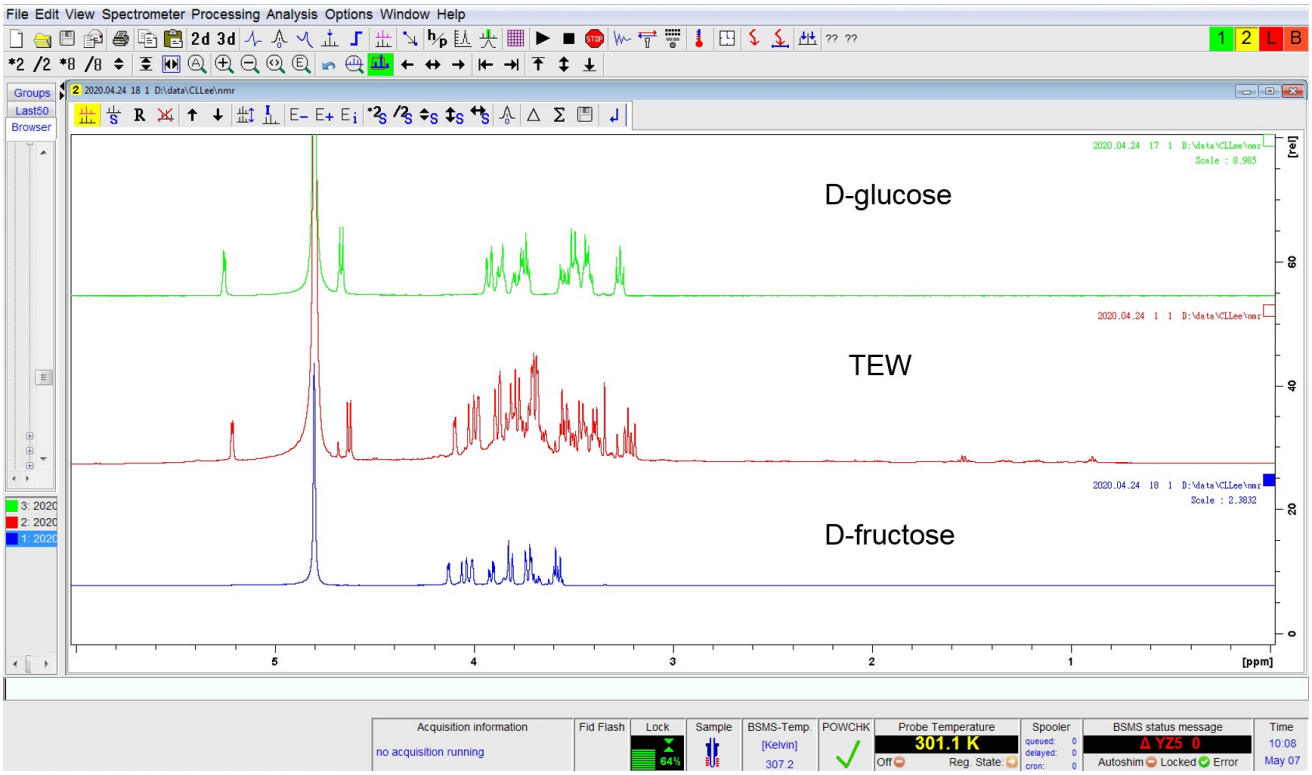


Figure S21. ^{1}H NMR (500 MHz, D_2O with 1 drop CD_3OD) of D-glucose standard, TEW, and D-fructose standard, respectively.

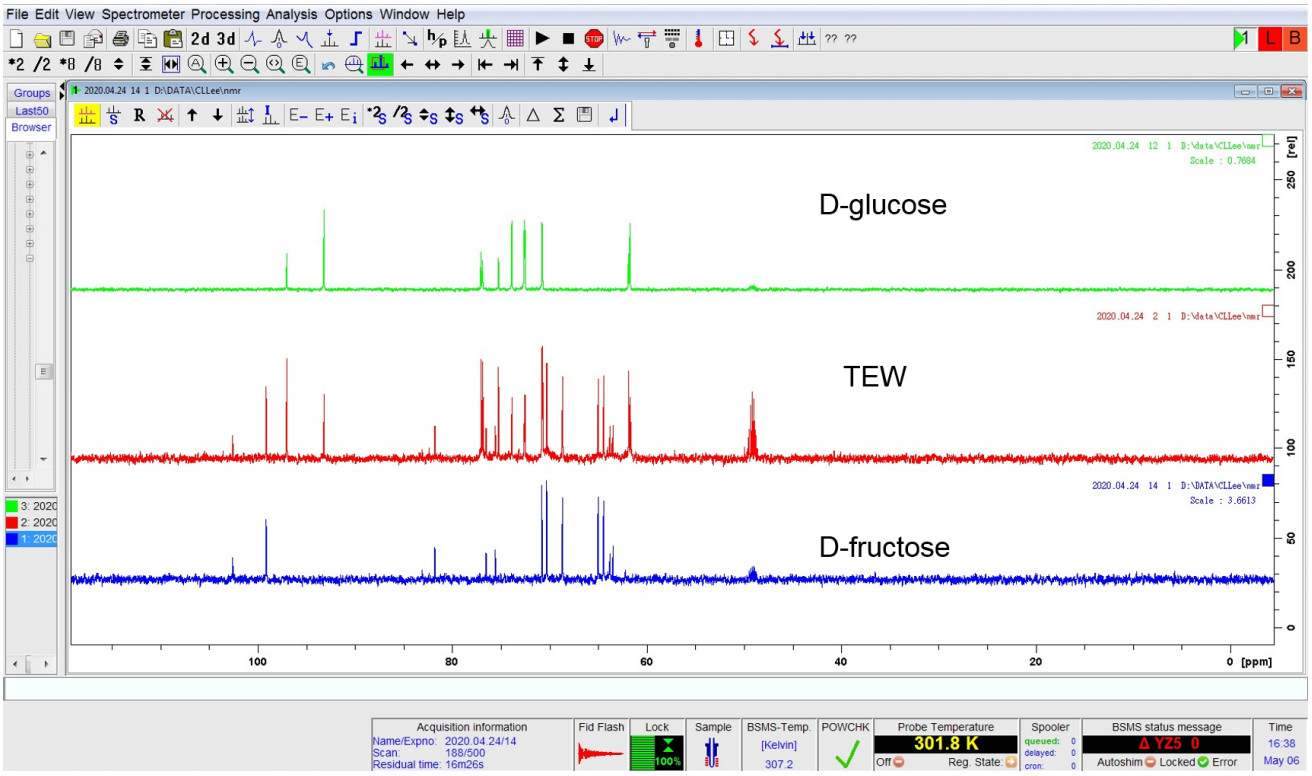


Figure S22. ^{13}C NMR (125 MHz, D_2O with 1 drop CD_3OD) of D-glucose standard, TEW, and D-fructose standard, respectively.

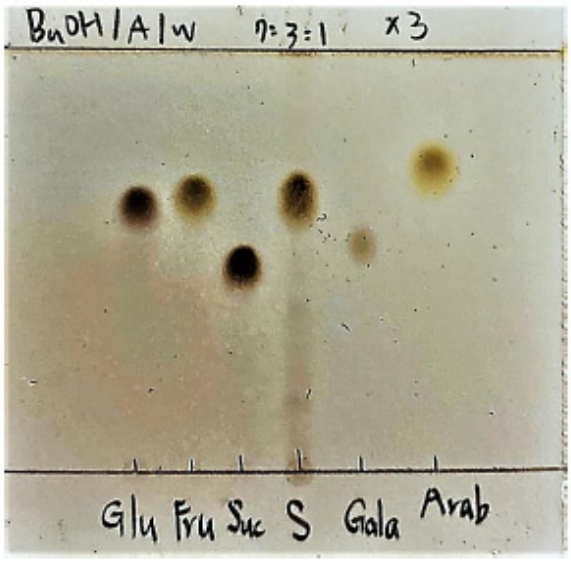


Figure S23. TLC analysis of TEW (S) were compared against glucose (Glc), fructose (Fruc), sucrose (Suc), galactose (Gala), and arabinose (Arab). Stationary phase: silica gel; Mobile phase: *n*-butanol/acetone/water, 7:3:1 for developing with three times. Being stained by spraying with 5% (v/v) sulfuric acid in MeOH solution before heating on a hot plate.

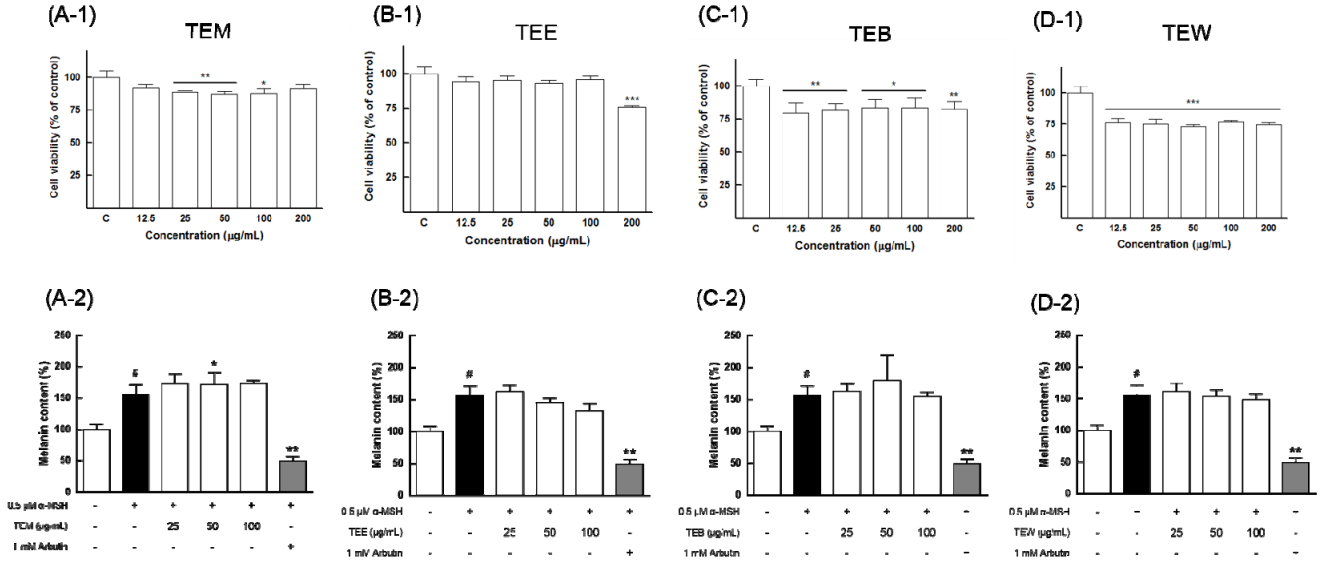


Figure S24. Cytotoxicity toward B16 (A-1 to D-1) and the regulation of melanogenesis effects in B16 cells (A-2 to D-2) of crude extract TEM, fractions TEE, TEB, and TEW, respectively. The data shown are representative of three independent experiments. #, $p < 0.001$ compared with control group, and *, $p < 0.05$, **, $p < 0.01$, and ***, $p < 0.001$ compared with the control group (A-1 to D-1) or α-MSH treated group (A-2 to D-2).

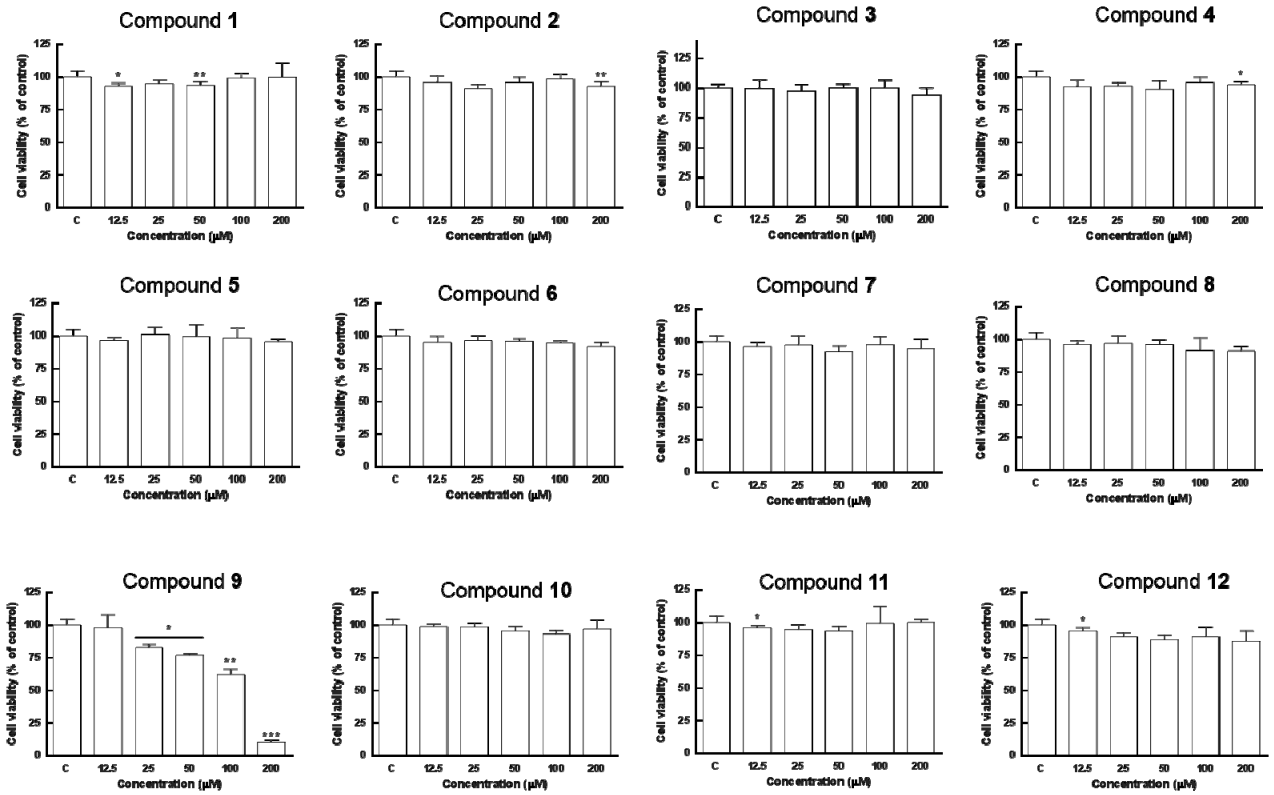


Figure S25. Cytotoxicity data of compounds **1**–**12** toward B16 cells. The data shown are representative of three independent experiments. *, $p < 0.05$, **, $p < 0.01$, and ***, $p < 0.001$ compared with the control group. Compound **9** has a cytotoxic IC_{50} value of 81.9 ± 1.3 μM.

Table S1. Tyrosinase activity effects of compounds **4**, **6**, **10**, and **12**.

Compd		Tyrosinase activity (%)	Compd		Tyrosinase activity (%)
	Control	100.0 ± 16.0		Control	100.0 ± 13.7
	α-MSH (0.5 μM)	254.3 ± 5.3		α-MSH (0.5 μM)	282.7 ± 19.2
	Arbutin (1 mM)	152.0 ± 14.2		Arbutin (1 mM)	145.2 ± 13.0
	10 μM	290.1 ± 7.1		10 μM	327.5 ± 8.9
4	20 μM	306.8 ± 16.5	**6**	20 μM	343.3 ± 17.6
	40 μM	309.9 ± 13.2		40 μM	344.5 ± 12.0
Compd		Tyrosinase activity (%)	Compd		Tyrosinase activity (%)
	Control	100.0 ± 13.3		Control	100.0 ± 13.7
	α-MSH (0.5 μM)	260.1 ± 10.2		α-MSH (0.5 μM)	305.5 ± 9.8
	Arbutin (1 mM)	140.2 ± 7.2		Arbutin (1 mM)	129.2 ± 12.4
	10 μM	282.1 ± 13.2		10 μM	328.3 ± 11.6
10	20 μM	288.6 ± 8.2	**12**	20 μM	339.3 ± 15.1
	40 μM	294.1 ± 9.2		40 μM	341.7 ± 14.9

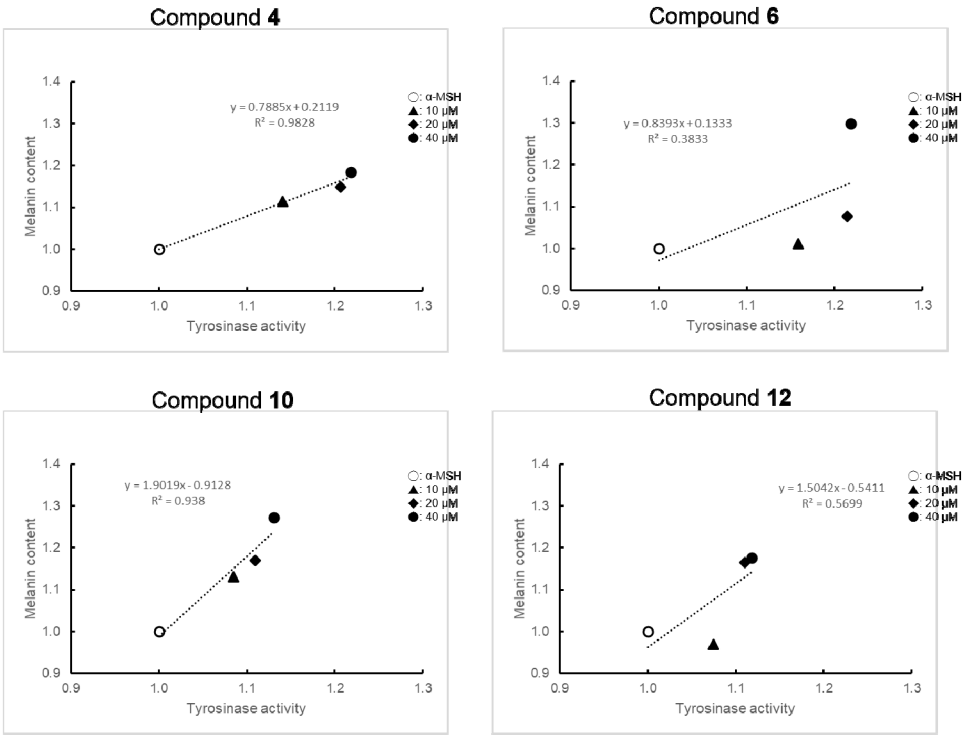


Figure S26. A correlation graph between the cellular melanin contents and the effects on tyrosinase of compounds **4**, **6**, **10**, and **12**.

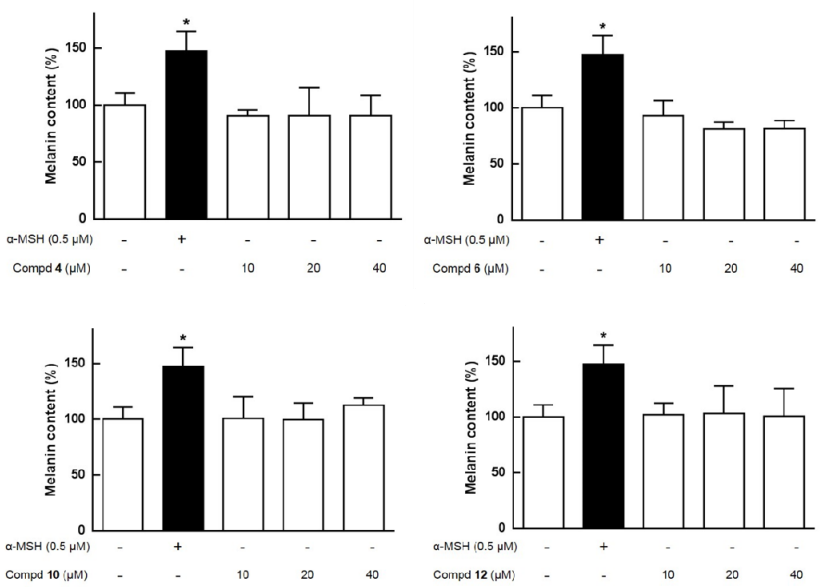
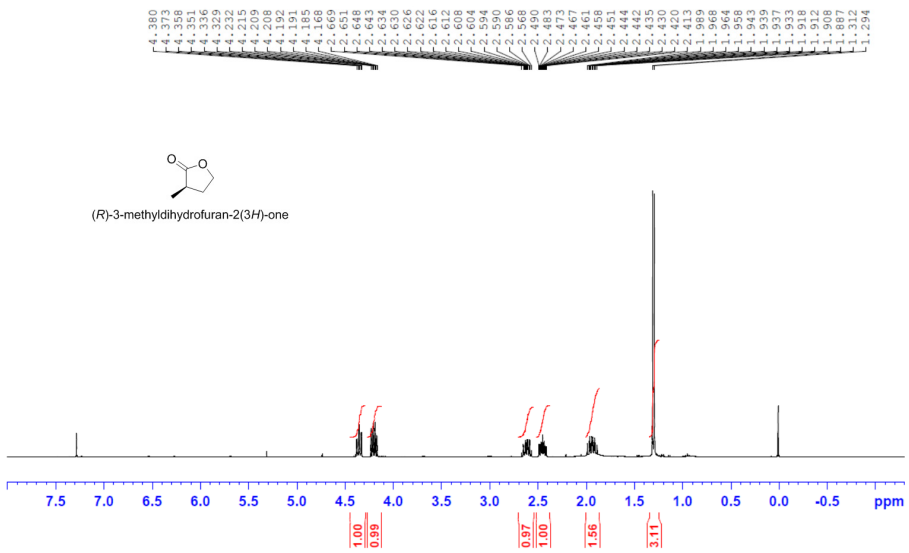
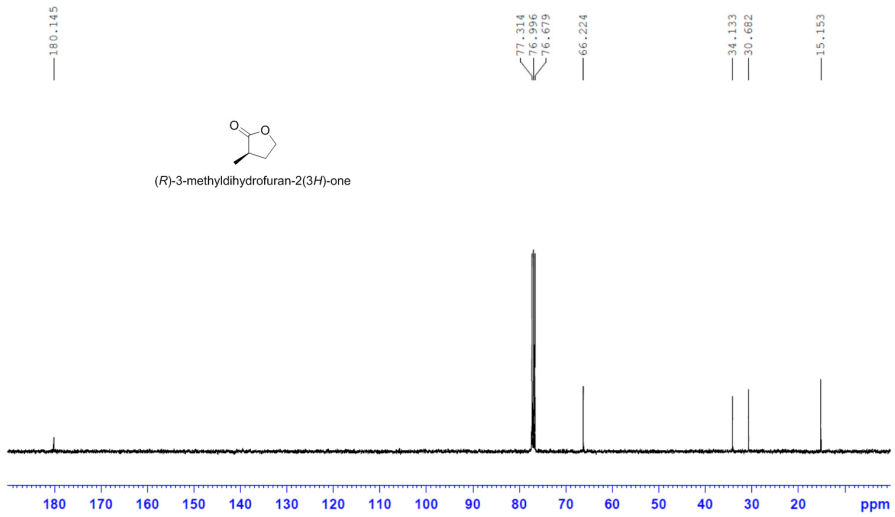


Figure S27. Effects of compounds **4**, **6**, **10**, and **12** without co-treated α-MSH on melanin content of B16 melanoma cells. *, $p < 0.05$ compared with control group.

(A)



(B)



(C)

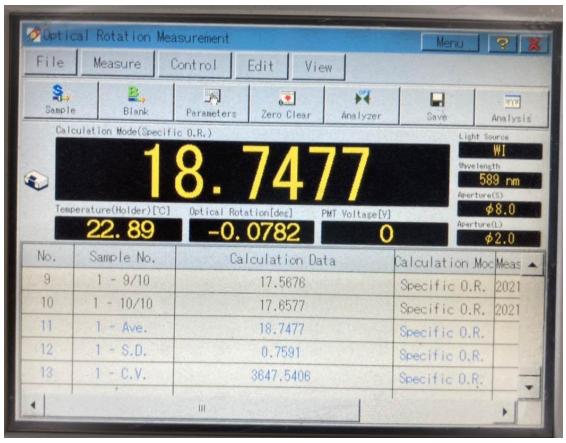


Figure S28. ^{1}H NMR (400 MHz, $CDCl_3$) (A), ^{13}C NMR (100 MHz, $CDCl_3$) (B), and optical rotation data (C) of the product, 3-methyldihydrofuran-2(3*H*)-one obtained from acid hydrolysis of compound **2**.

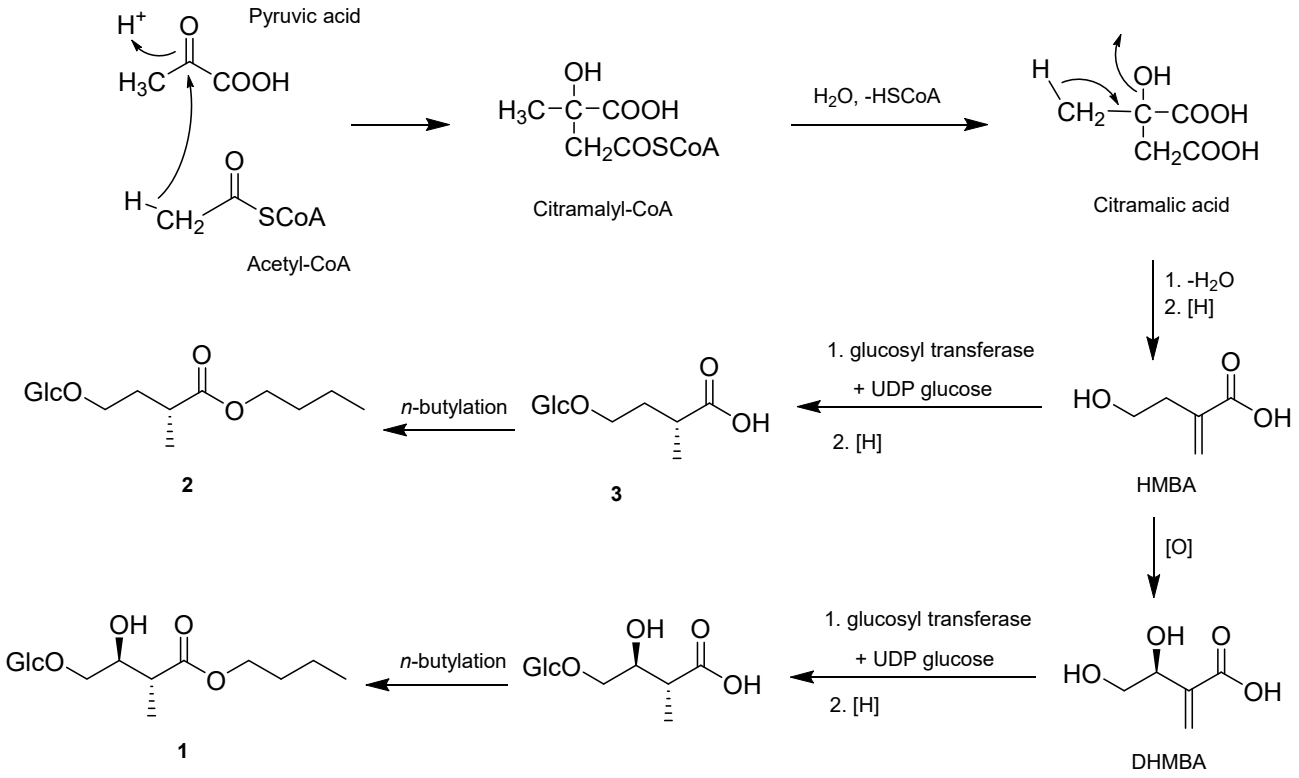


Figure S29. The possible biosynthesis of compounds **1**−**3** from D-glucose (Glc) and 4-hydroxy-2-methylenebutanoic acid (HMBA) and/or (*S*)-3,4-dihydroxy-2-methylenebutanoic acid (DHMBA). The UDP glucose and [H] mean uridine diphosphate glucose and chemical reduction, respectively.