**Supplementary Materials**

# Inducing Intermediates in Biotransformation of Natural Polyacetylene and A Novel Spiro-γ-lactone from Red Ginseng by Solid Co-culture of Two Gut *Chaetomium globosum* and The Potential Bioactivity Modification by Oxidative Metabolism

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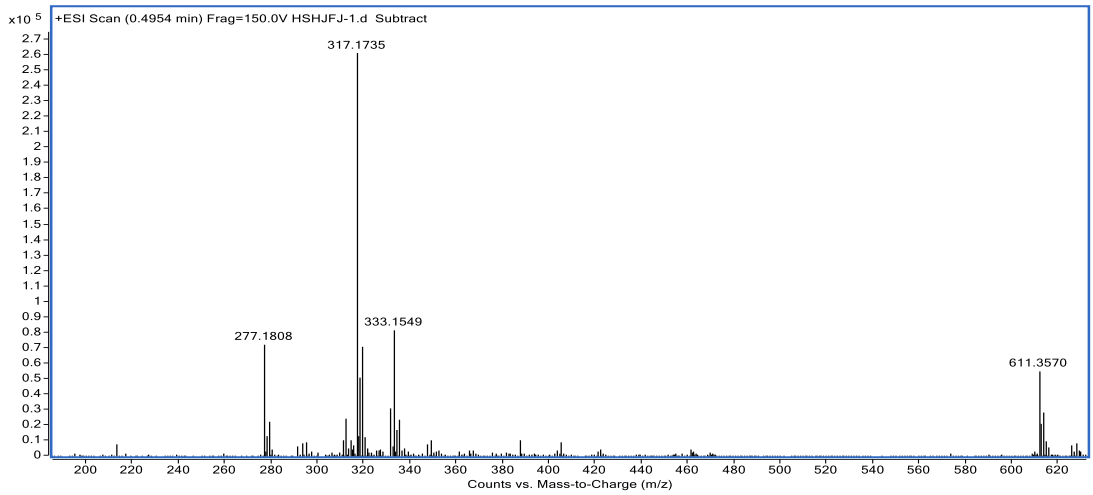



Figure S1. HRESIMS spectrum of compound **1**

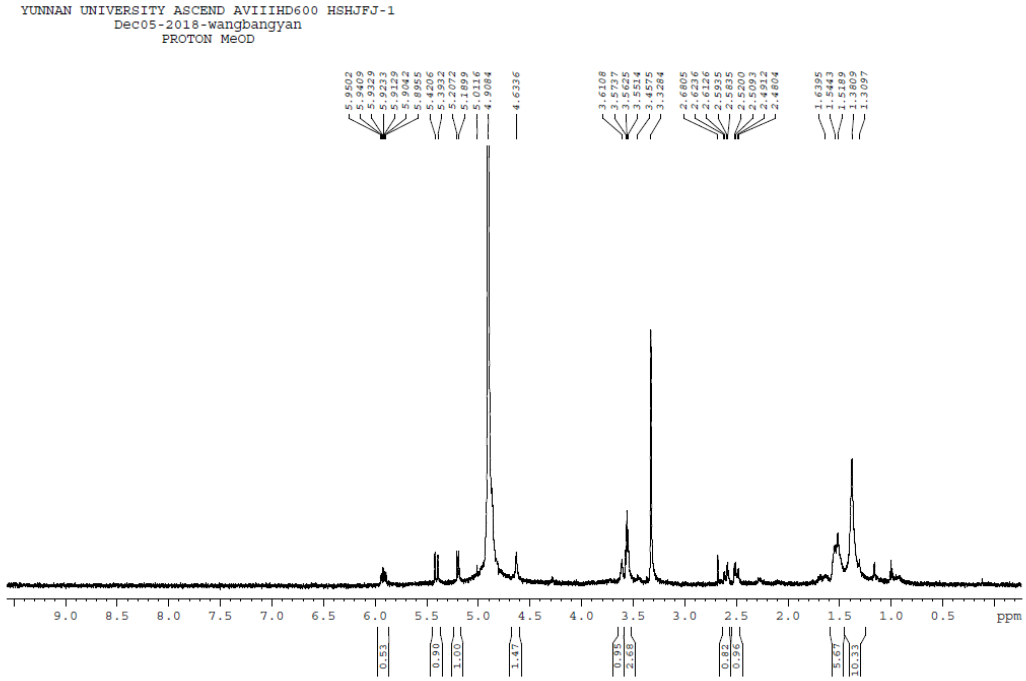



Figure S2. $^{1}$H NMR spectrum of compound **1** in MeOD (600MHz)

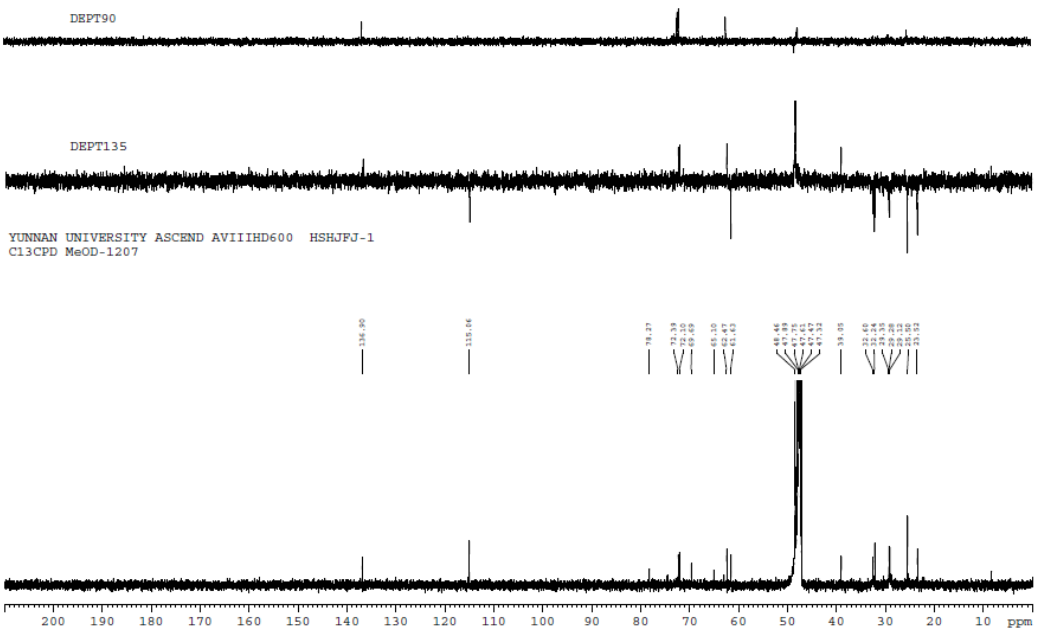



Figure S3. $^{13}$C NMR spectrum of compound **1** in MeOD (150MHz)

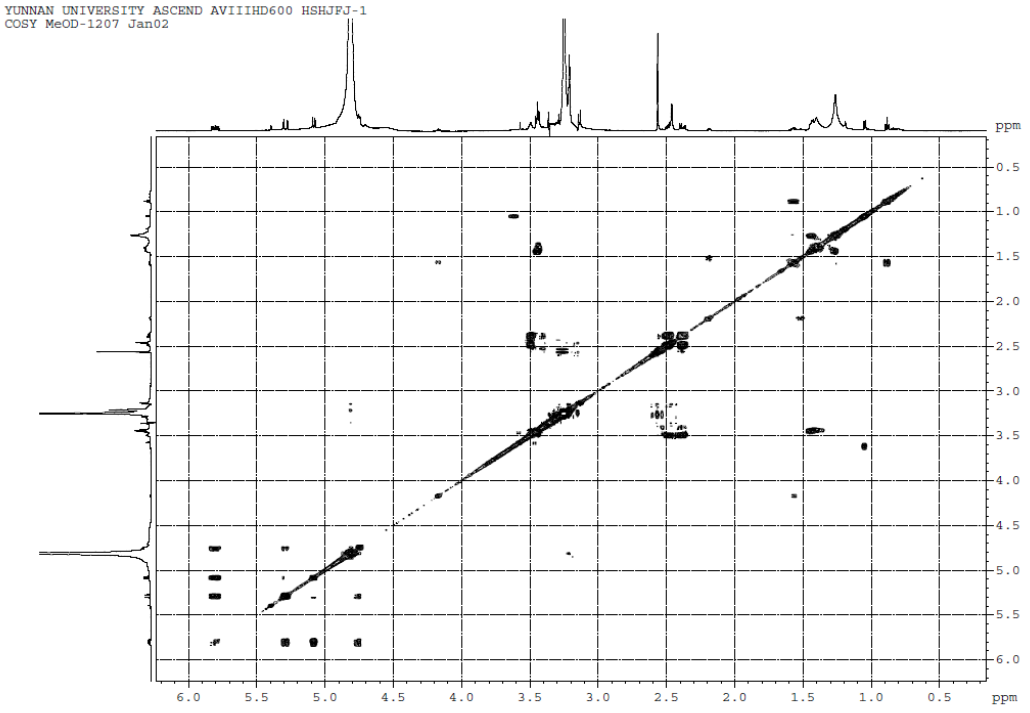



Figure S4. COSY spectrum of compound **1** in MeOD (600 MHz)

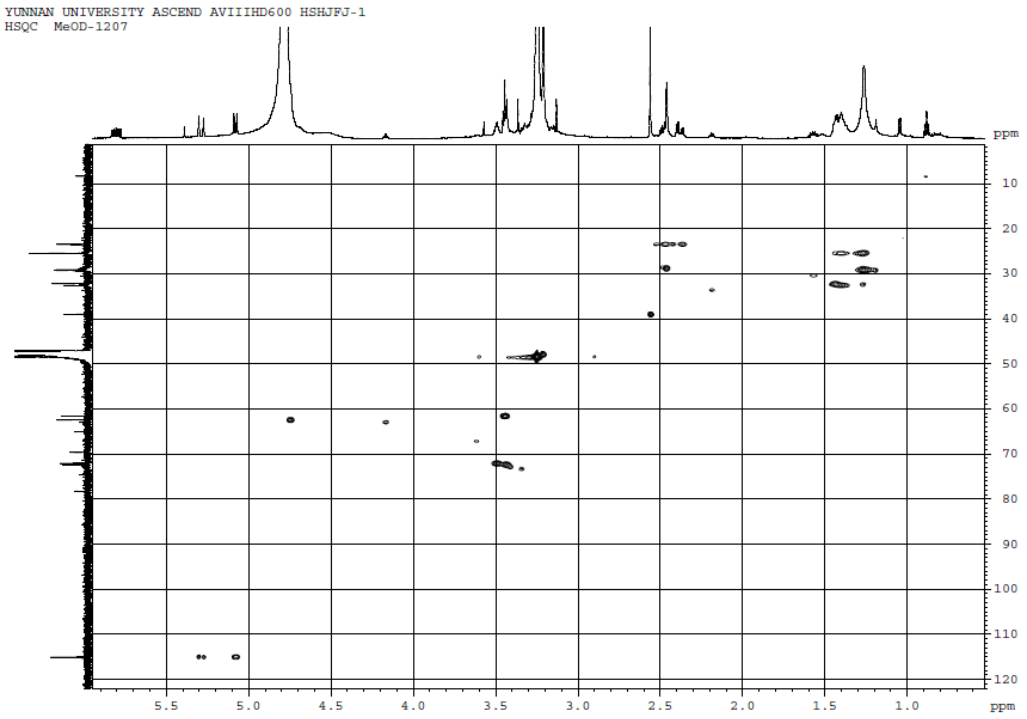



Figure S5. HSQC spectrum of compound **1** in MeOD (600 MHz)

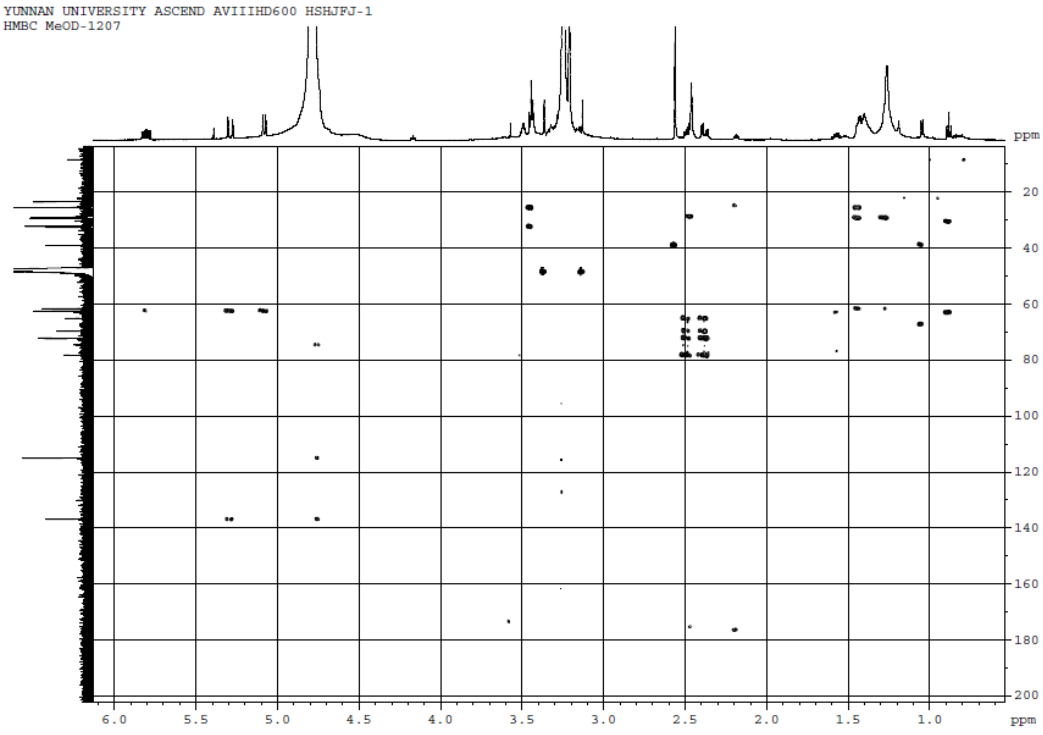



Figure S6. HMBC spectrum of compound **1** in $CDCl_3$ (500 MHz)

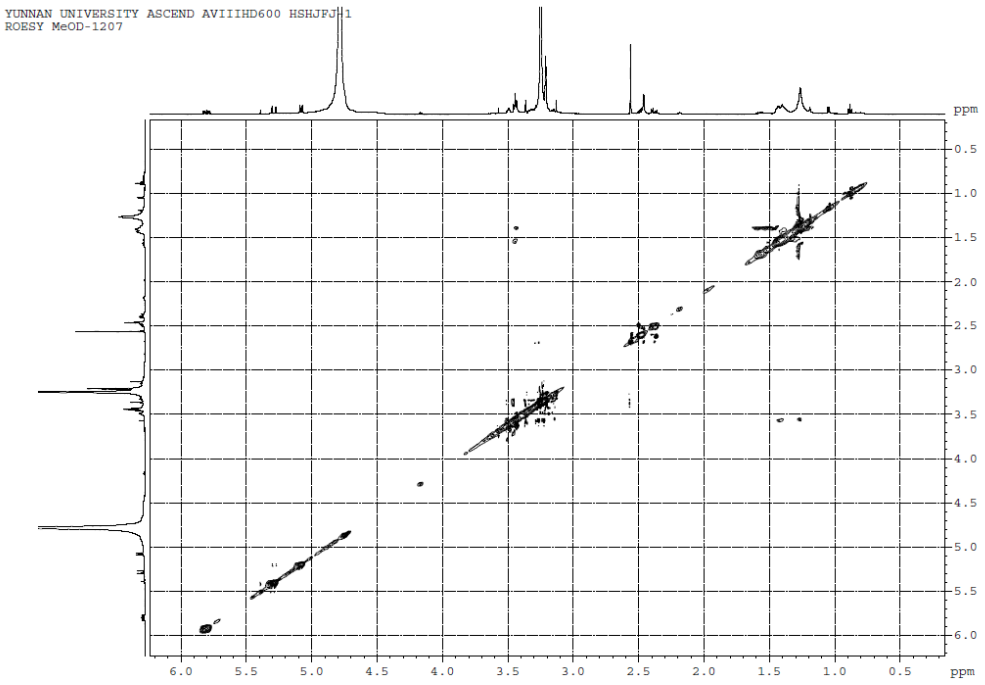



Figure S7. ROESY spectrum of compound **1** in $CDCl_3$ (500 MHz)

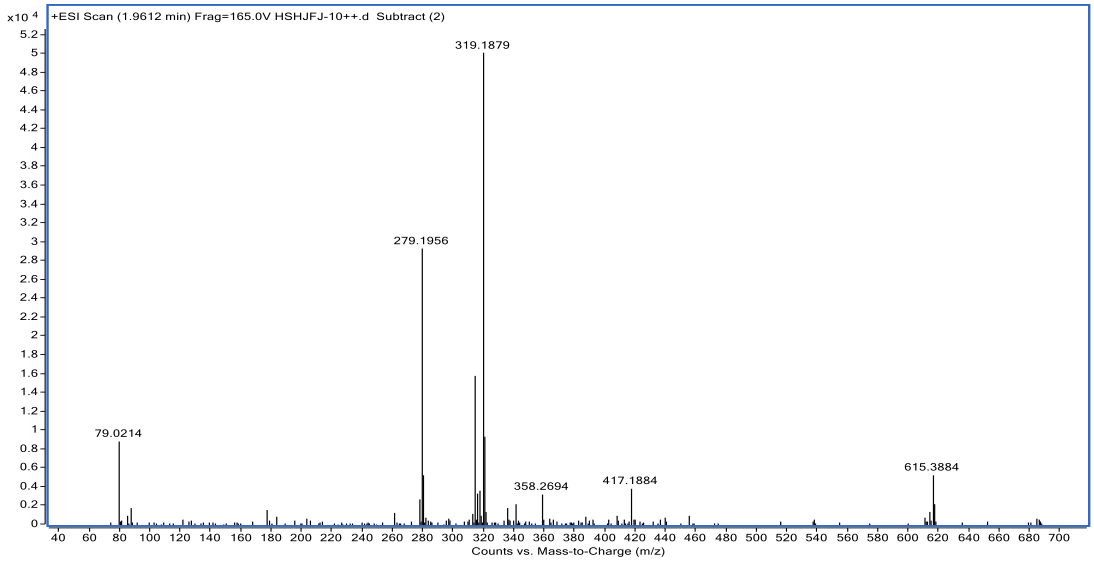



Figure S8. HRESIMS spectrum of compound **2**

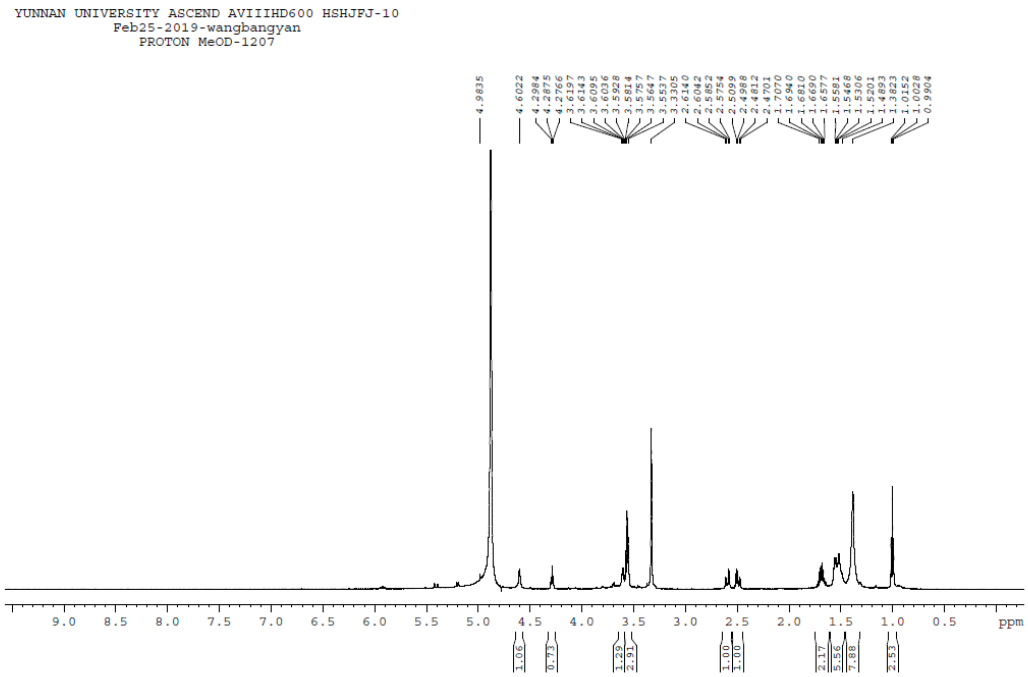



Figure S9. $^{1}$H NMR spectrum of compound **2** in MeOD (600MHz)

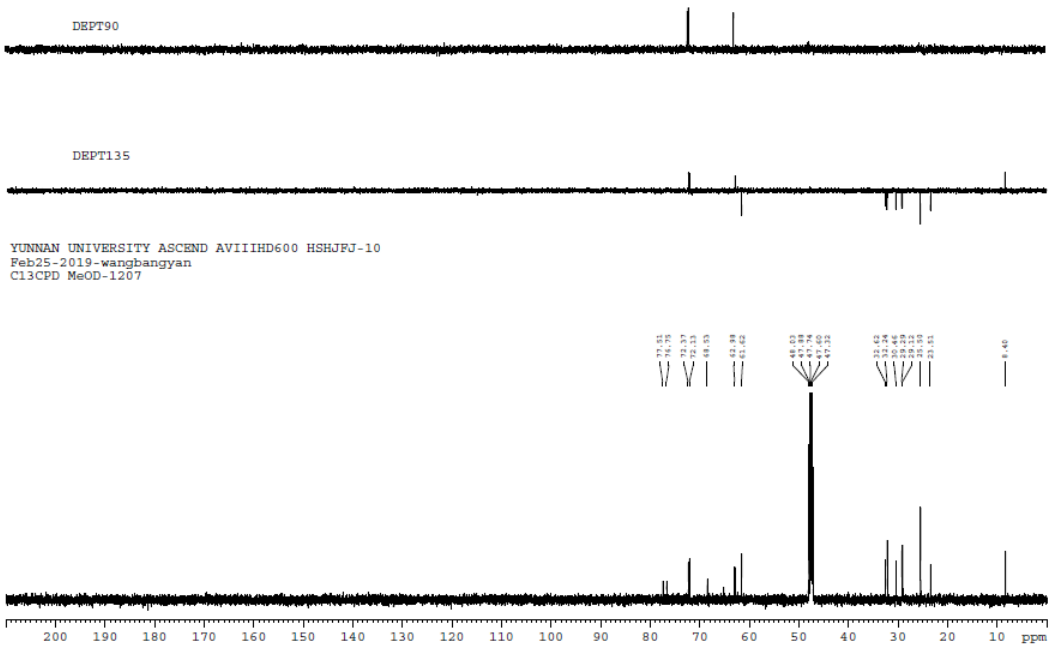



Figure S10. $^{13}$C NMR spectrum of compound **2** in MeOD (150MHz)

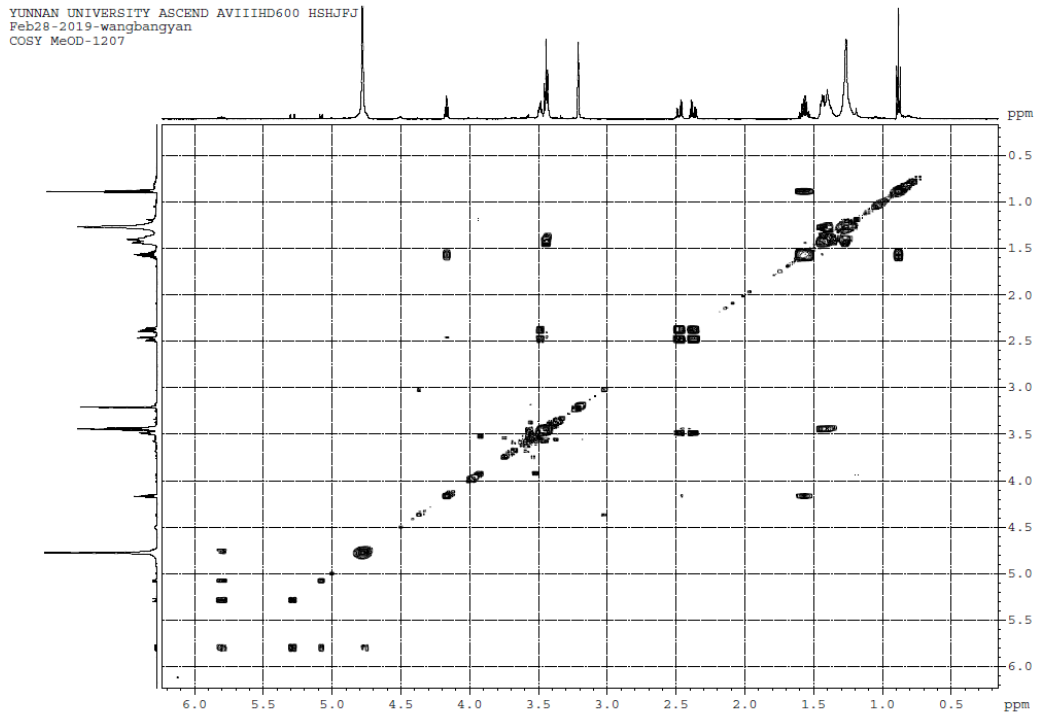



Figure S11.COSY spectrum of compound **2** in MeOD (600 MHz)

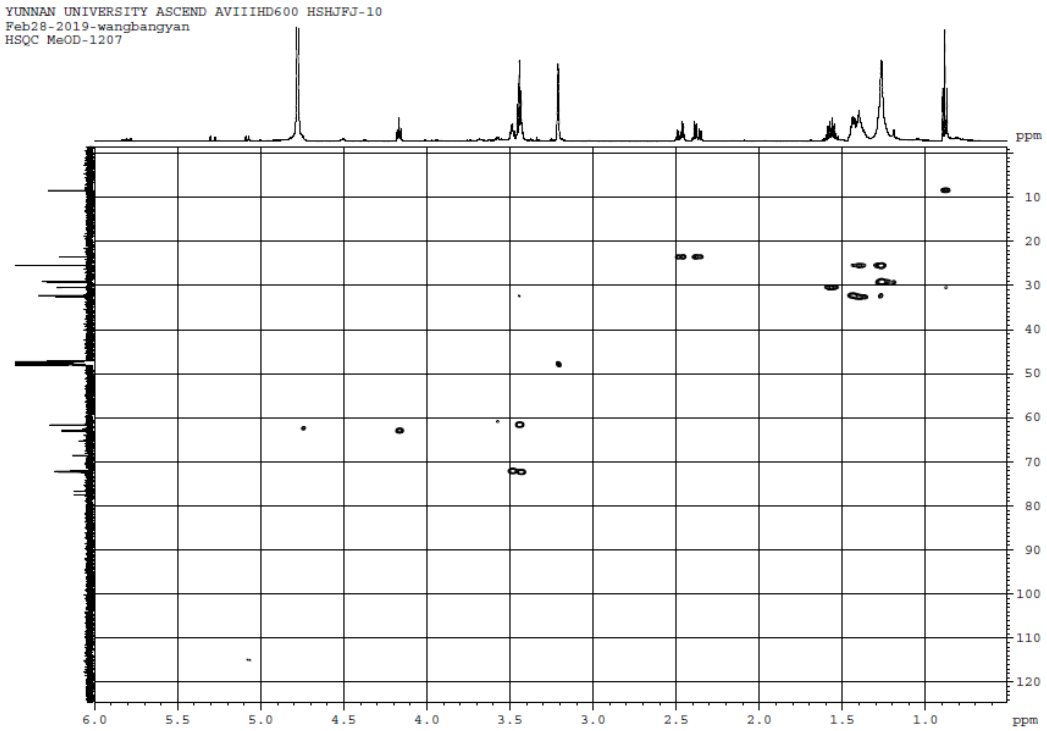



Figure S12. HSQC spectrum of compound **2** in MeOD (600 MHz)

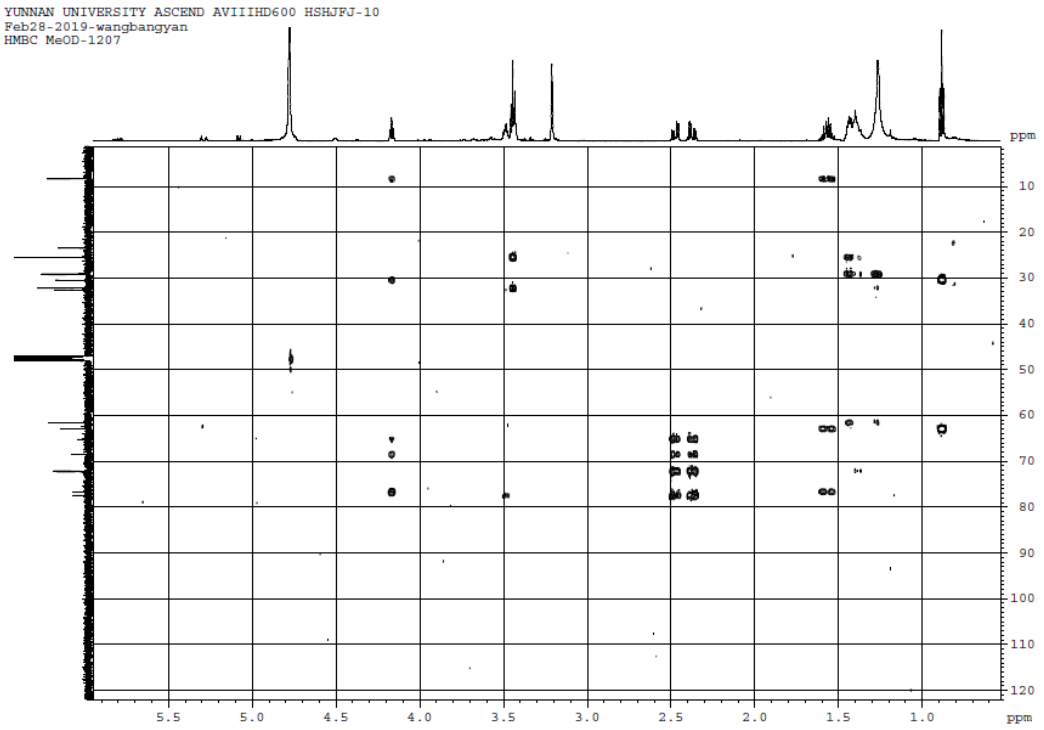



Figure S13. HMBC spectrum of compound **2** in $CDCl_3$ (600 MHz )

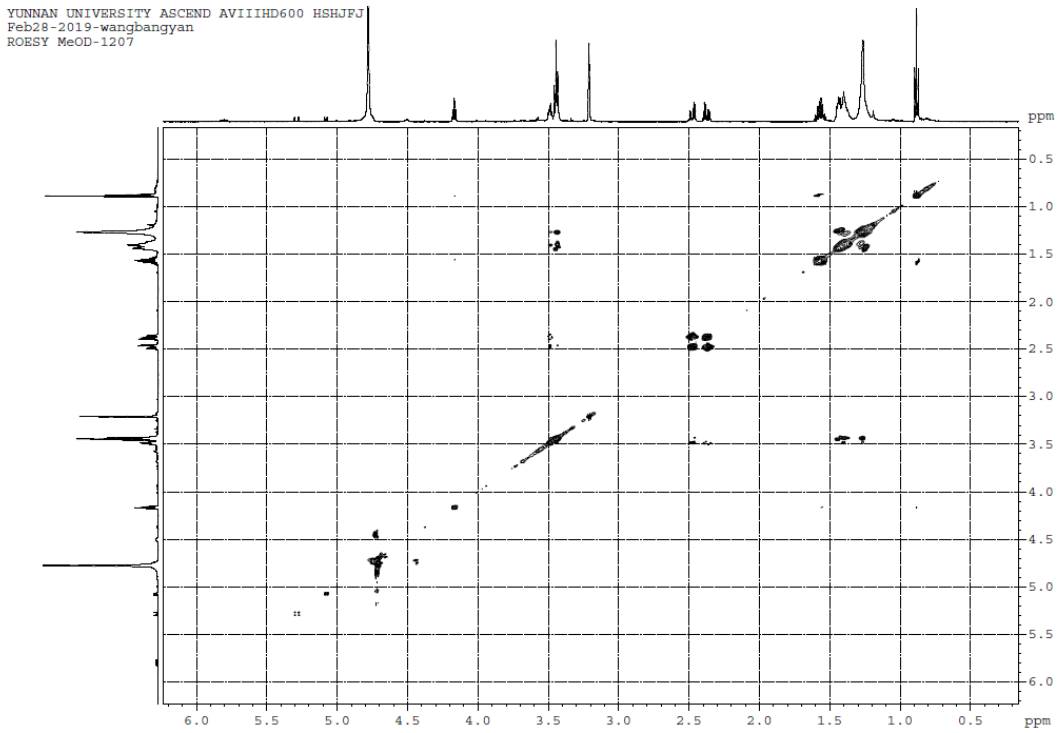



Figure S14. ROESY spectrum of compound **2** in MeOD (600 MHz)

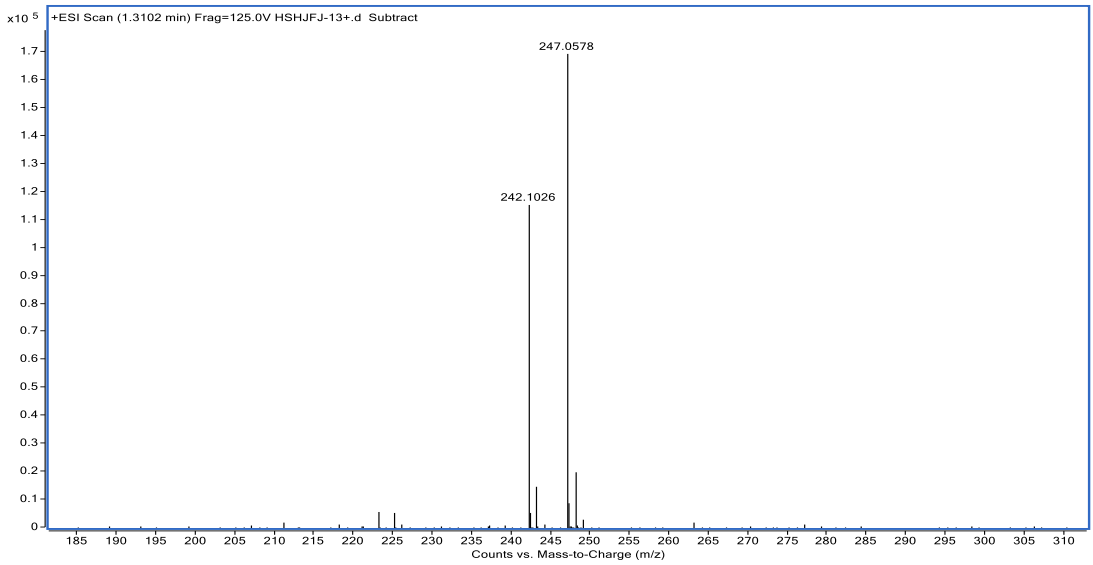



Figure S15. HRESIMS spectrum of compound **3**

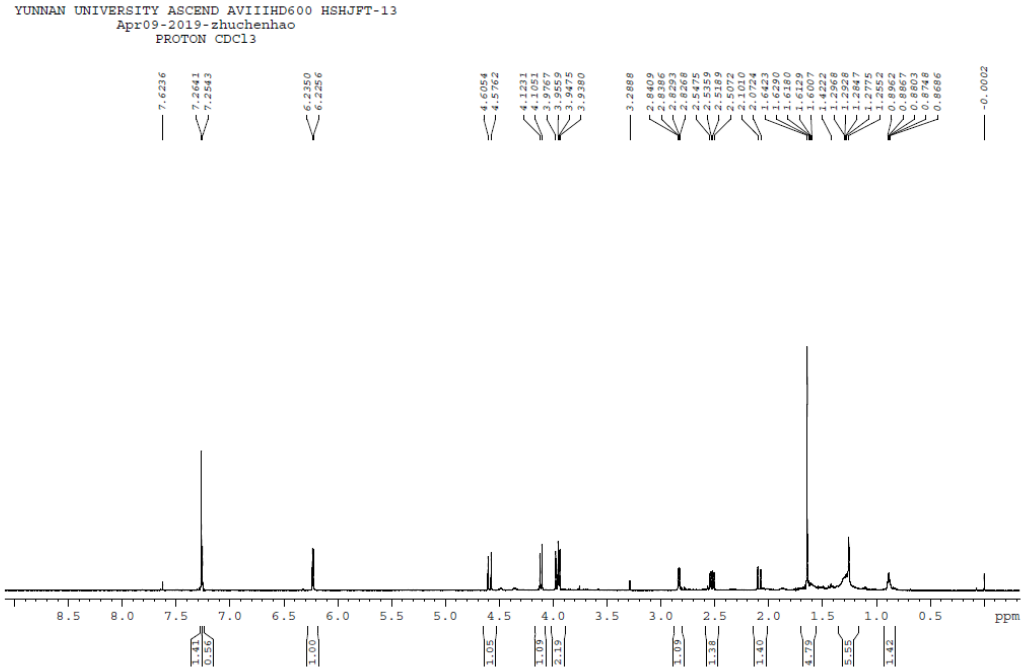



Figure S16. $^{1}H$ NMR spectrum of compound **3** in $CDCl_3$ (600MHz)

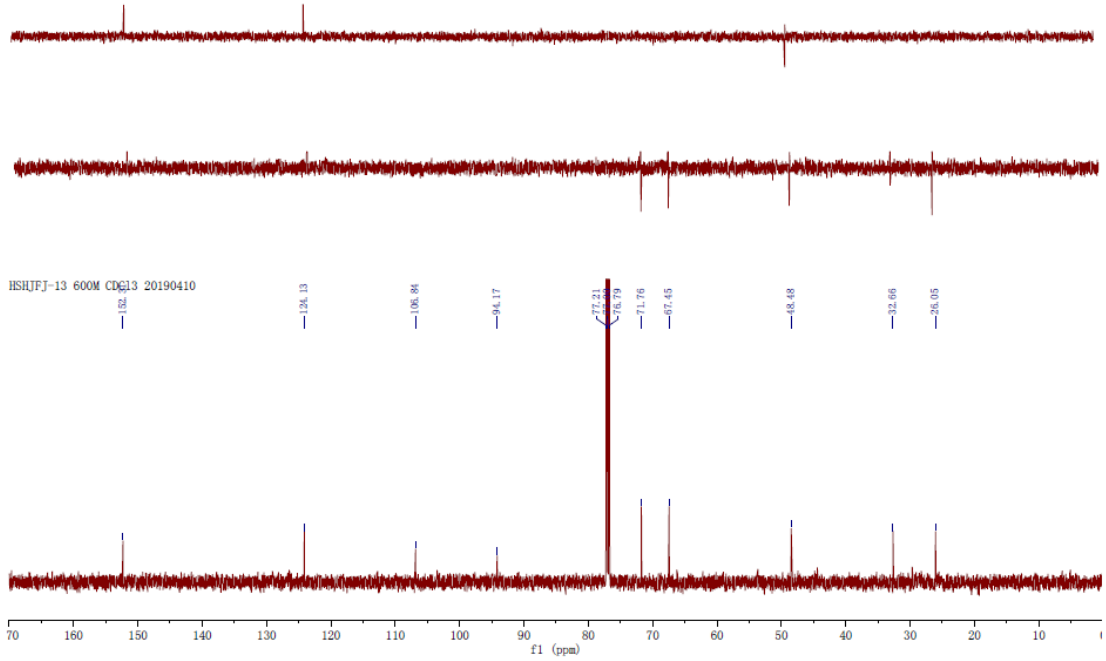



Figure S17. $^{13}C$ NMR spectrum of compound **3** in $CDCl_3$ (150MHz)

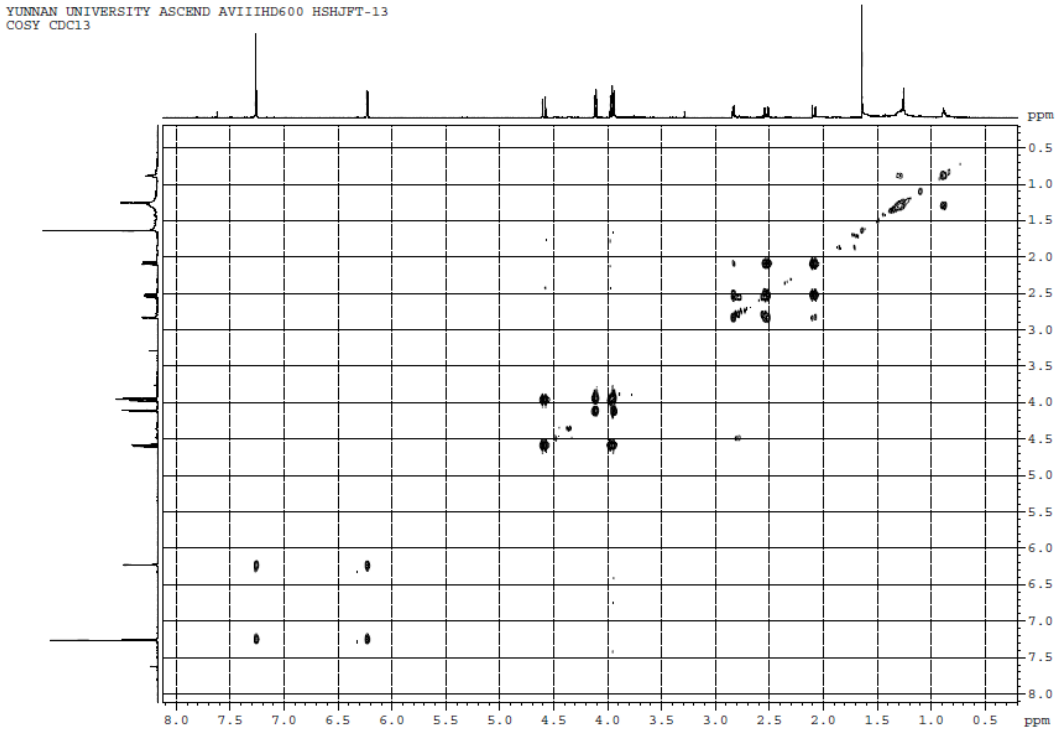



Figure S18. COSY spectrum of compound **3** in $CDCl_3$ (600 MHz)

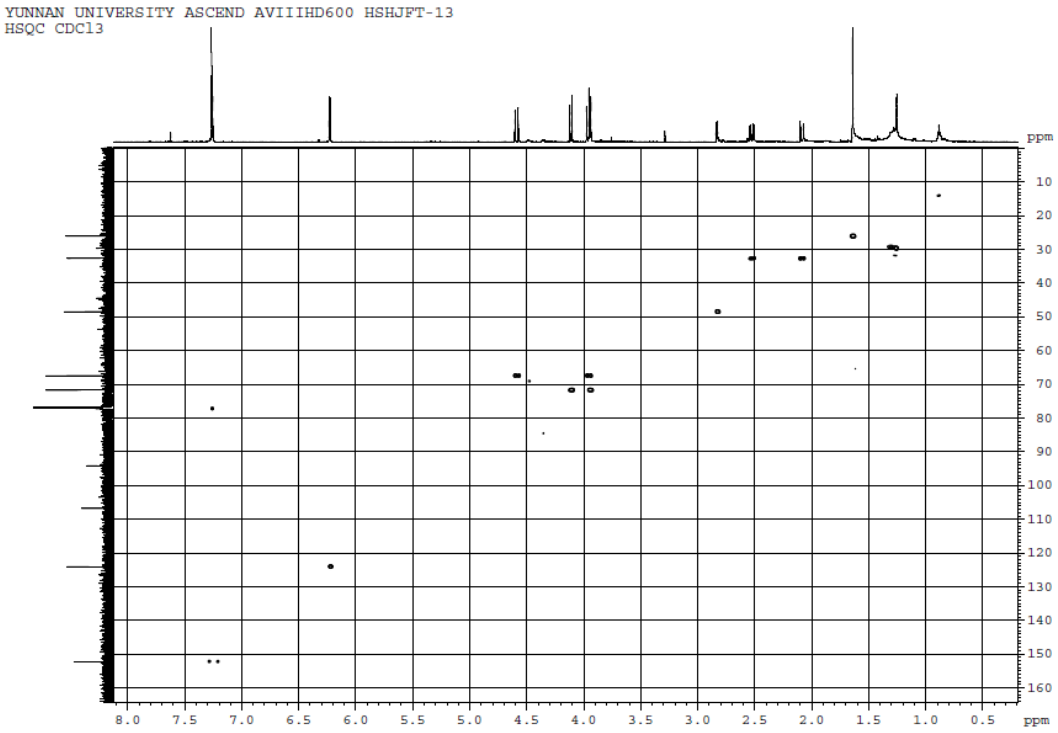



Figure S19. HSQC spectrum of compound **3** in $CDCl_3$ (600 MHz)

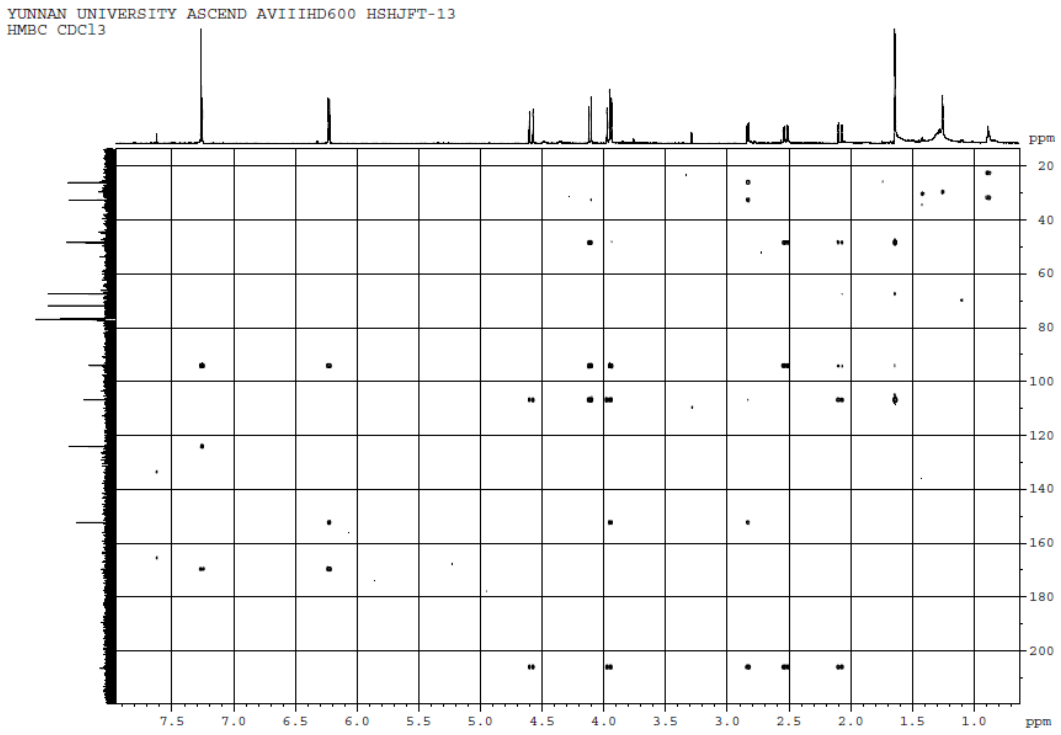



Figure S20. HMBC spectrum of compound **3** in $CDCl_3$ (600 MHz)

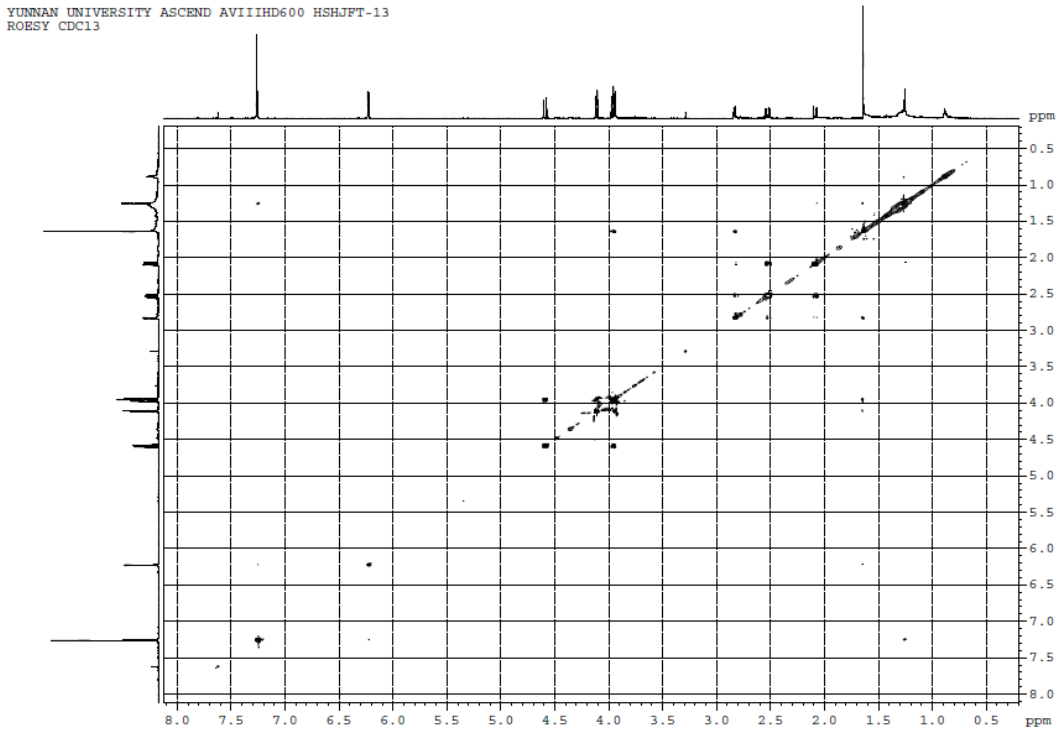



Figure S21. ROESY spectrum of compound **3** in $CDCl_3$ (600 MHz)

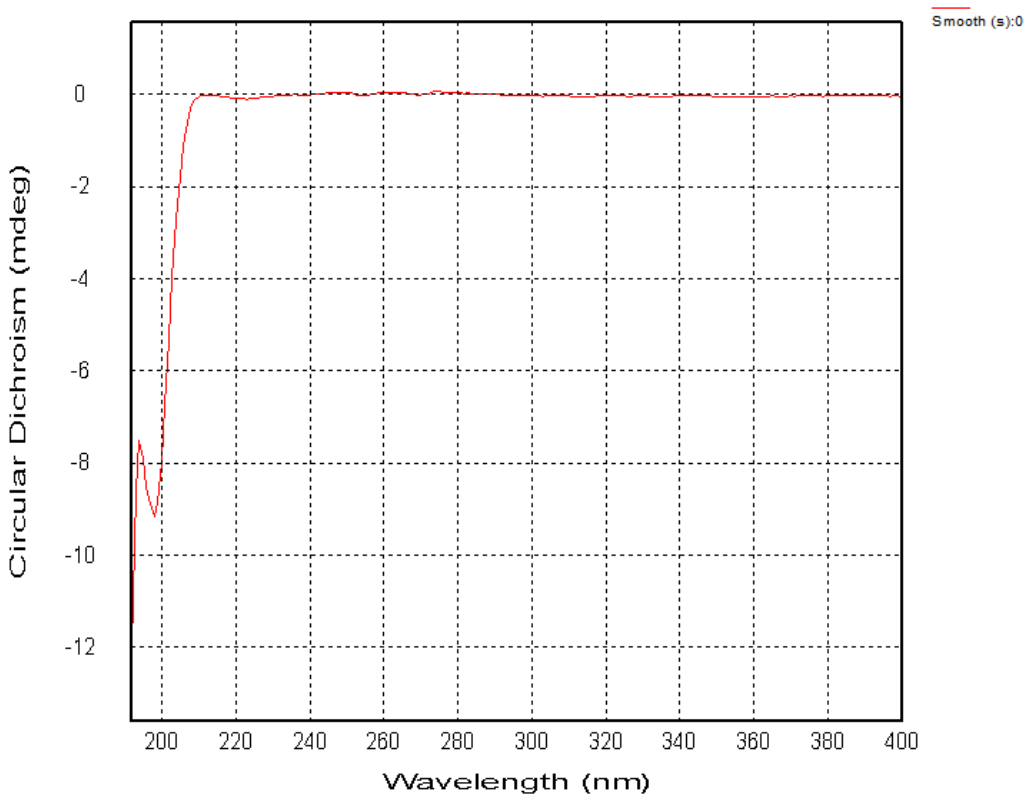



Figure S22. CD spectrum of compound **1**

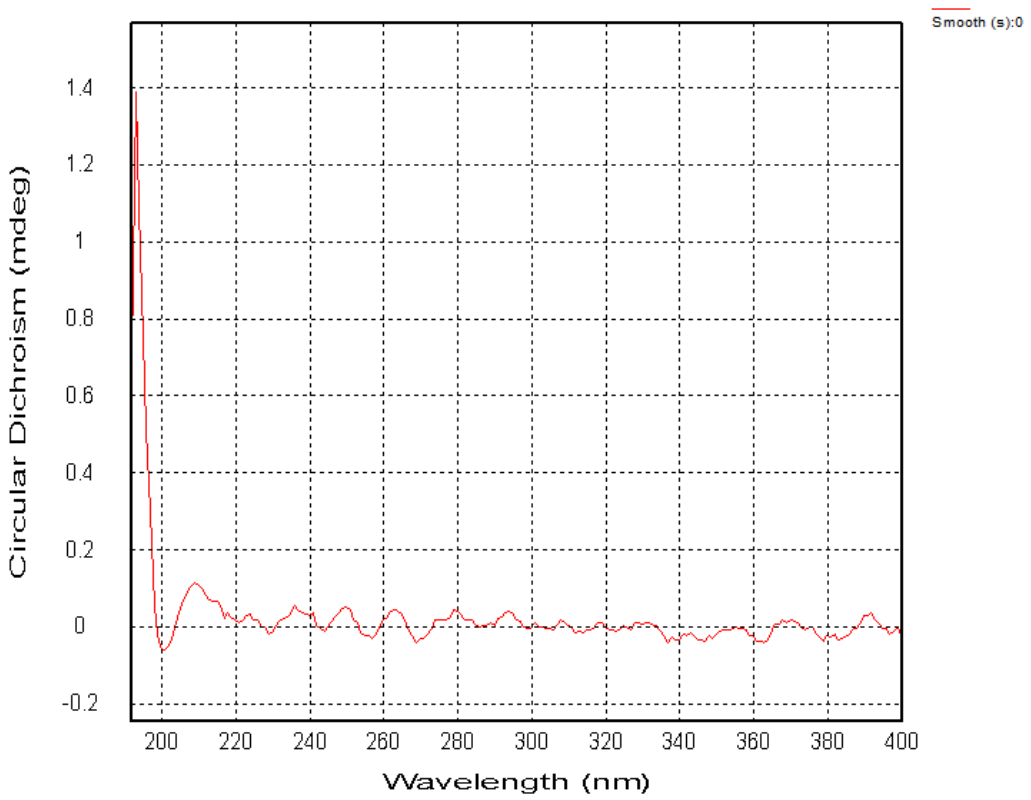



Figure S23. CD spectrum of compound **2**

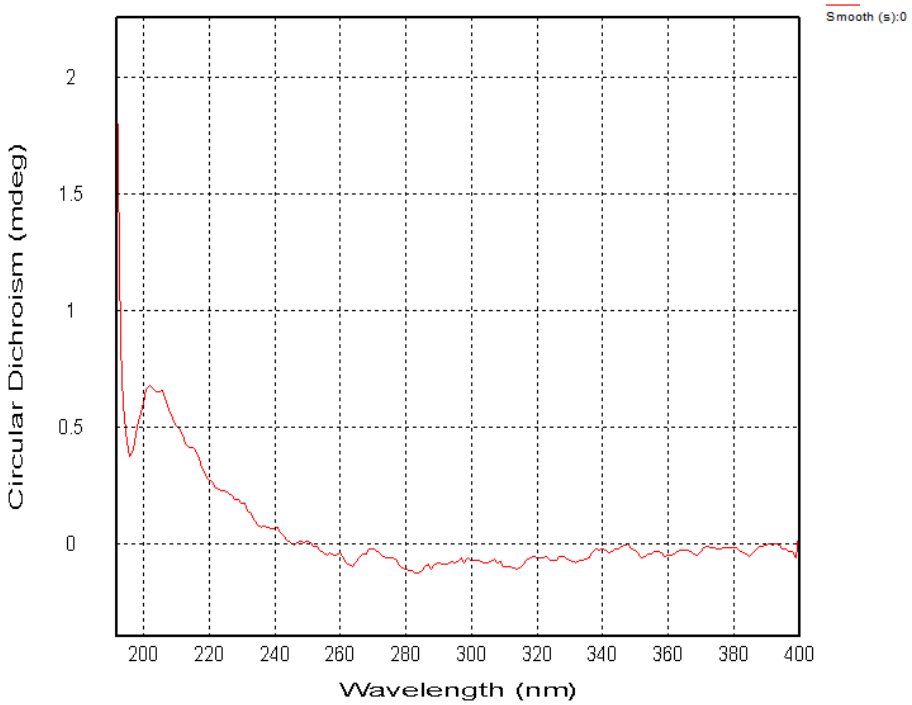



Figure S24. CD spectrum of compound **3**

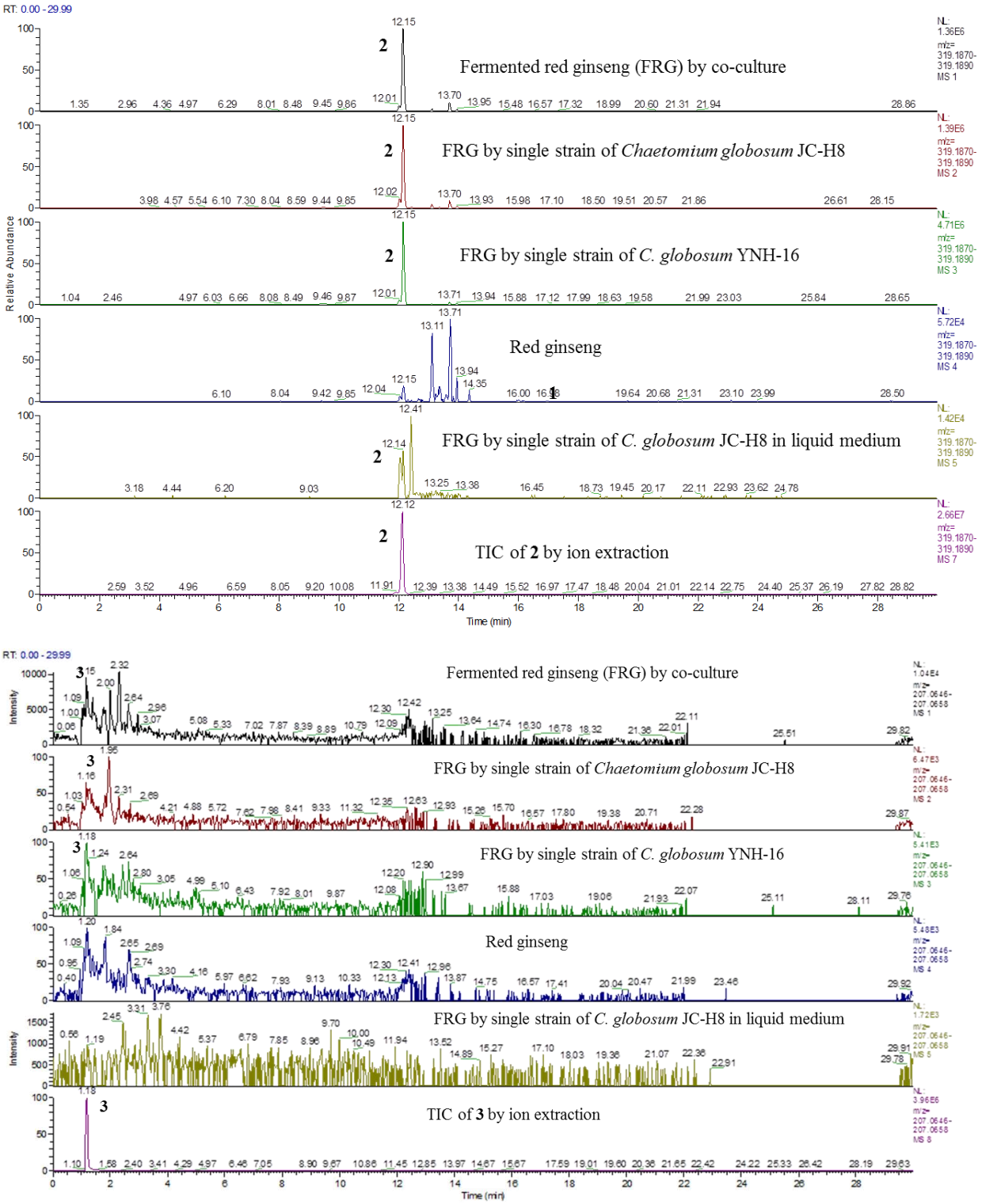
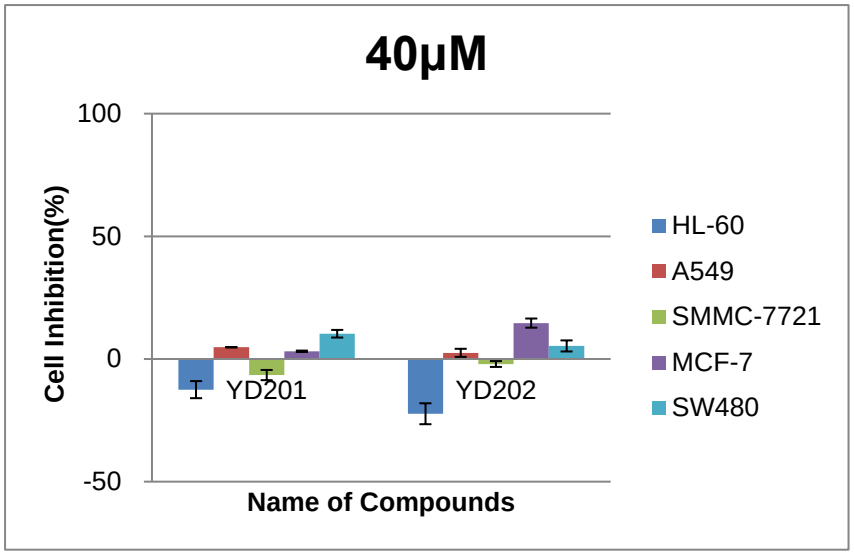



Figure S25. LC-HRMS finger-prints by ion extraction of co-culture, single strain, liquid medium of *C. globosum* fermentation products, red ginseng and compounds (**2**, **3**).




YD201=compound **1** YD202=compound **2**

Figure S26. Cytotoxicity of compounds **1**, **2** by MTS method