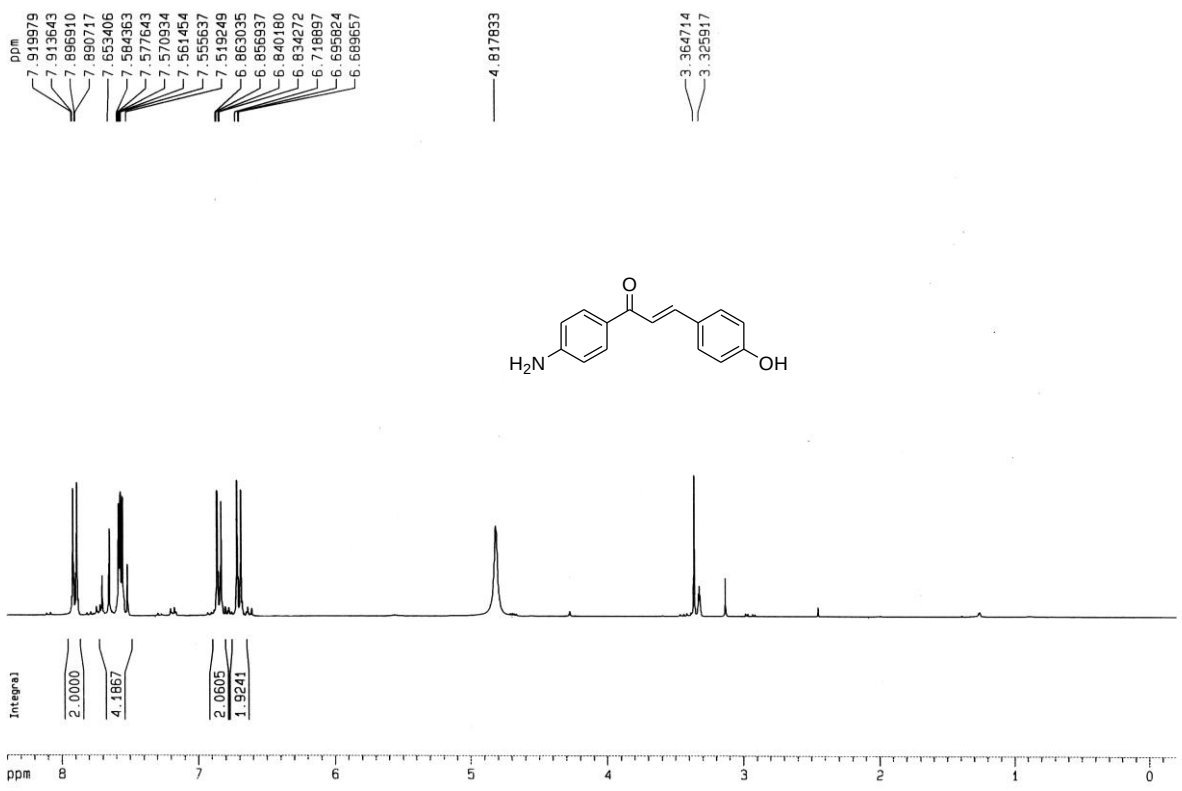
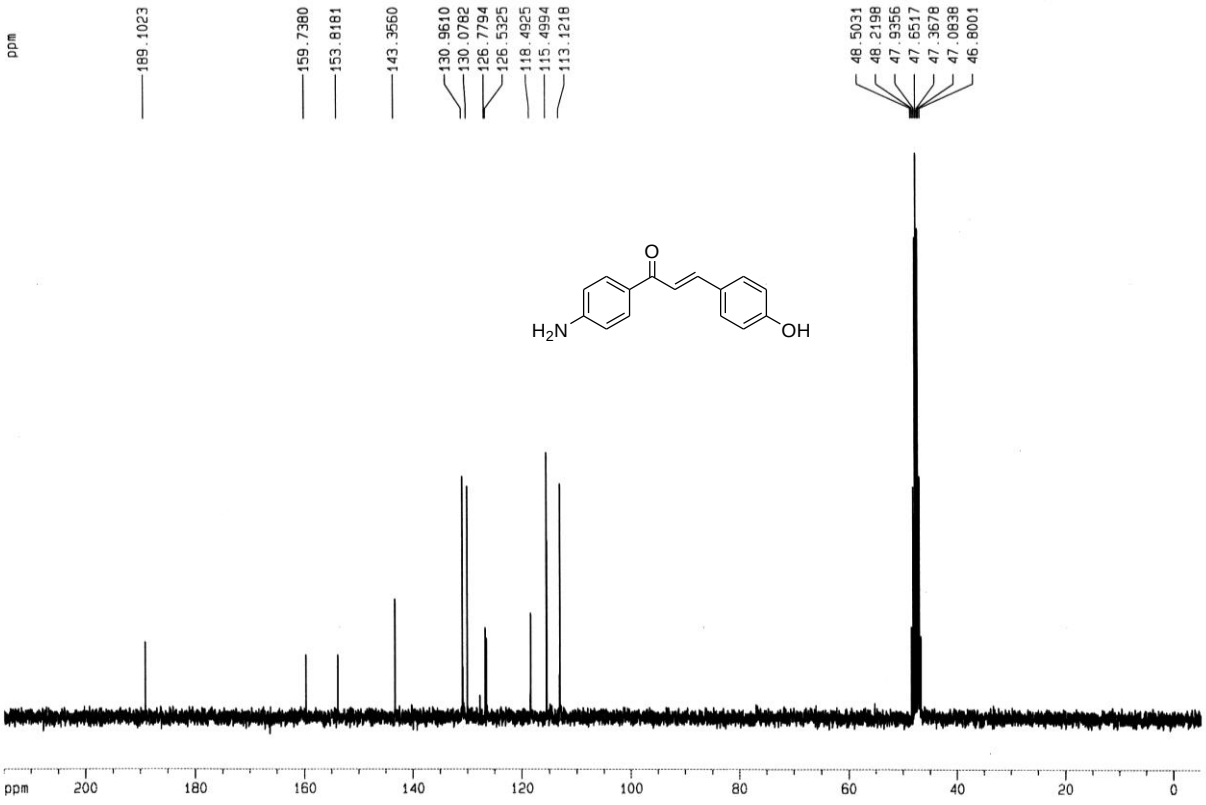
Supplementary Materials

Experimental Section & Characterization Data

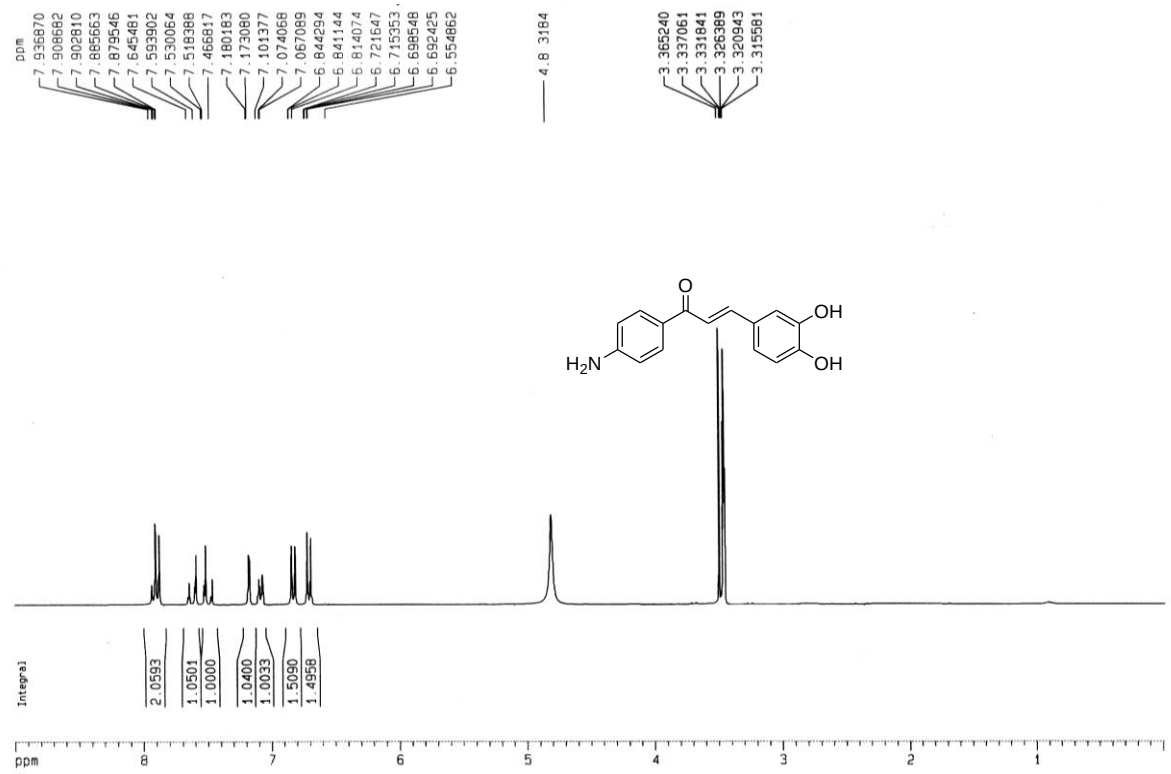
Spectra 1. ^{1}H-NMR of 4'-amino-4-hydroxychalcone (**1**).



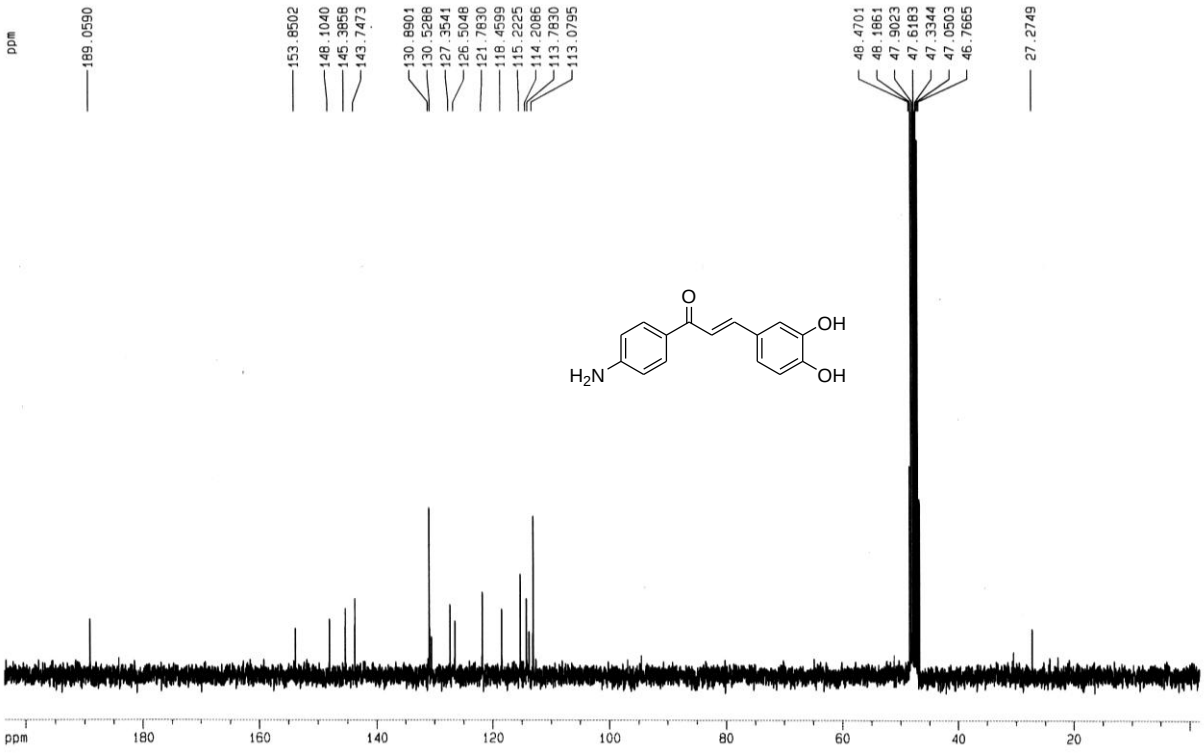
Spectra 2. ^{13}C-NMR of 4'-amino-4-hydroxychalcone (**1**).



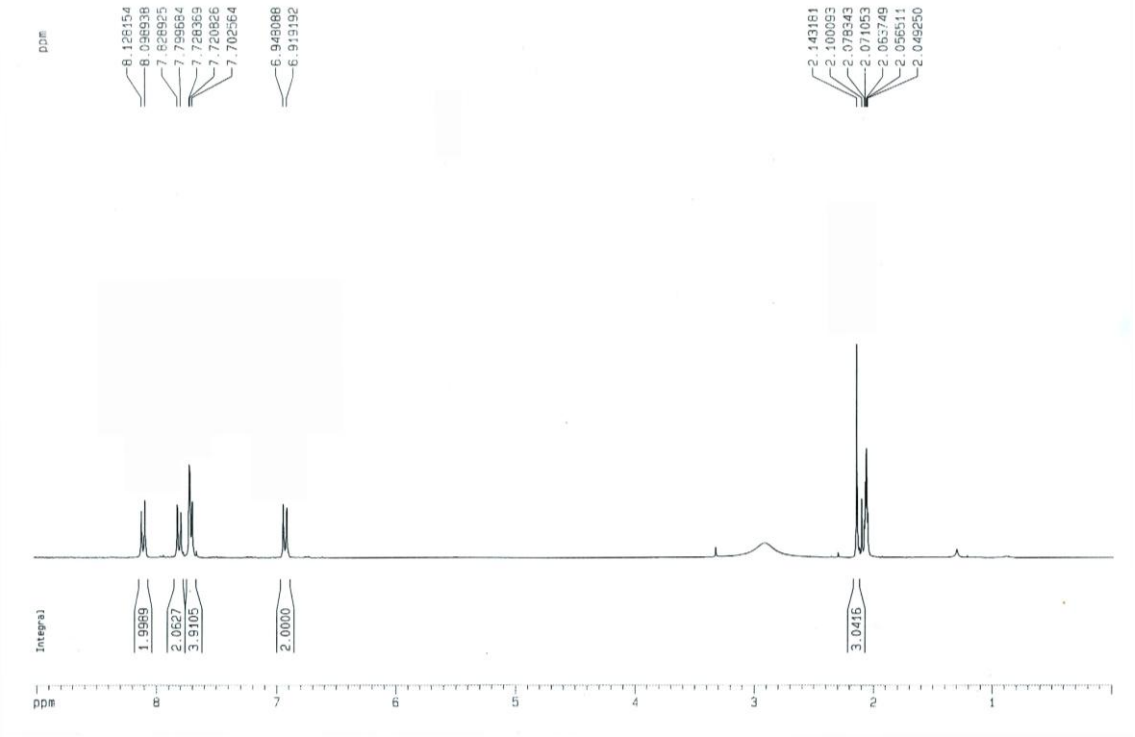
Spectra 3. ^{1}H-NMR of 4'-amino-3,4-dihydroxychalcone (**2**).



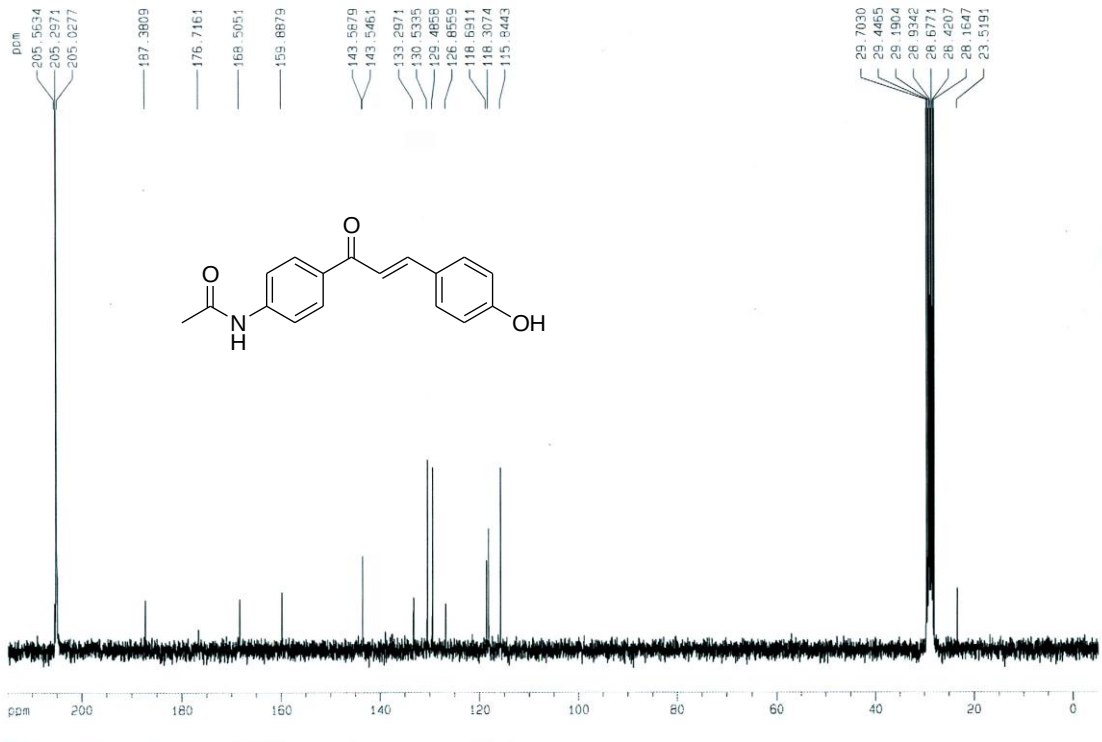
Spectra 4. ^{13}C-NMR of 4'-amino-3,4-dihydroxychalcone (**2**).



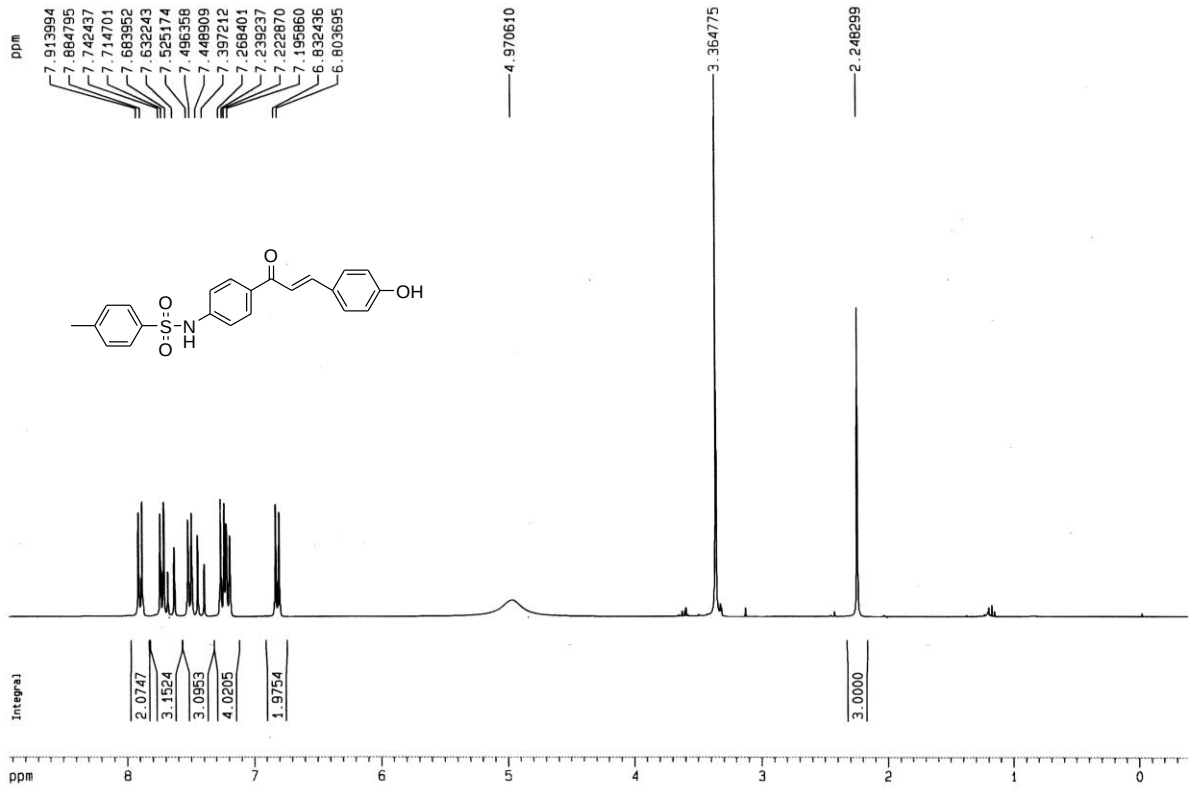
Spectra 5. ^{1}H-NMR of 4'-acetamido-4-hydroxychalcone (**3**).



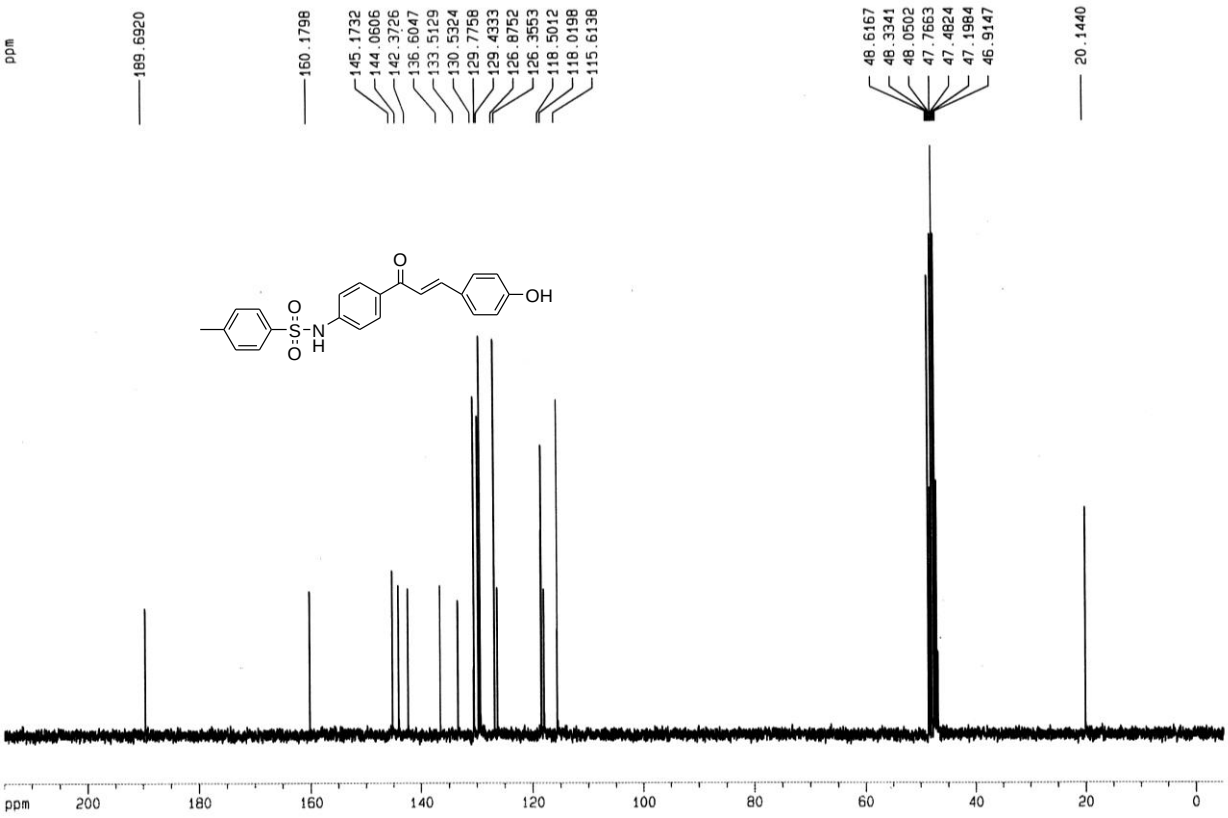
Spectra 6. ^{13}C-NMR of 4'-acetamido-4-hydroxychalcone (**3**).



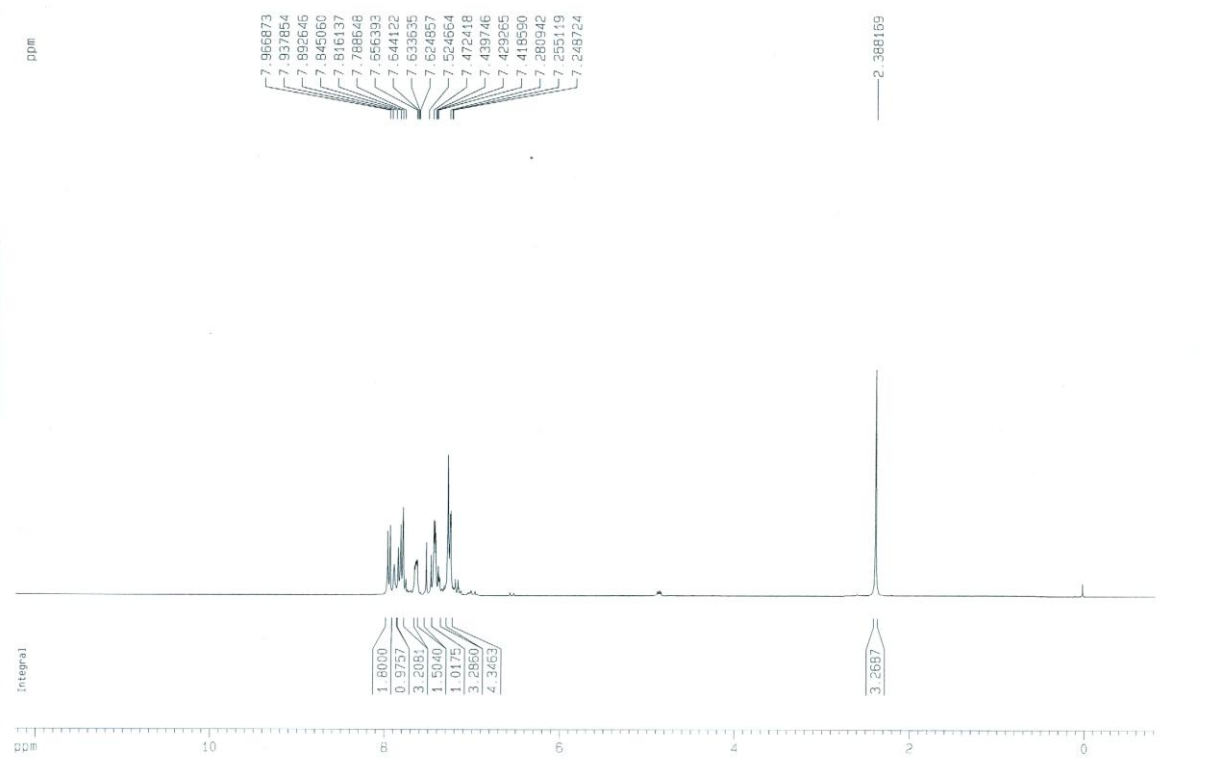
Spectra 7. ^{1}H-NMR of 4'-(*p*-toluenesulfonamide)-4-hydroxychalcone (**4a**).



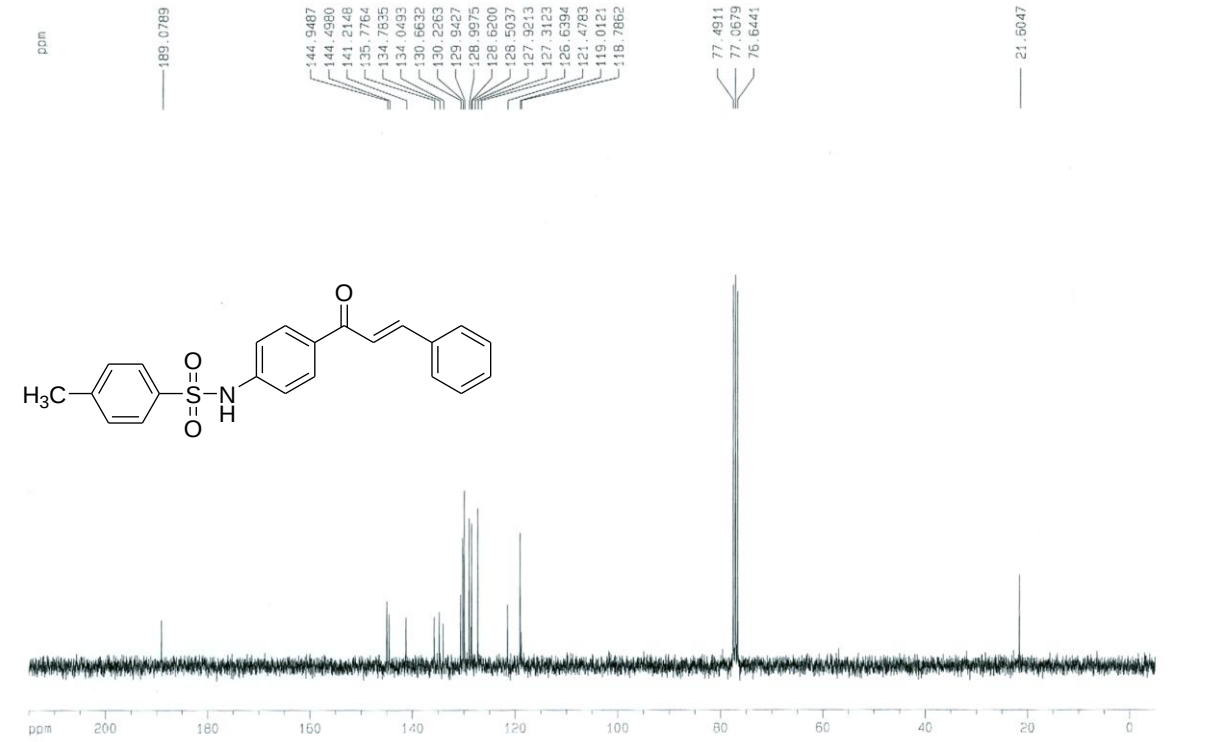
Spectra 8. ^{13}C-NMR of 4'-(*p*-toluenesulfonamide)-4-hydroxychalcone (**4a**).



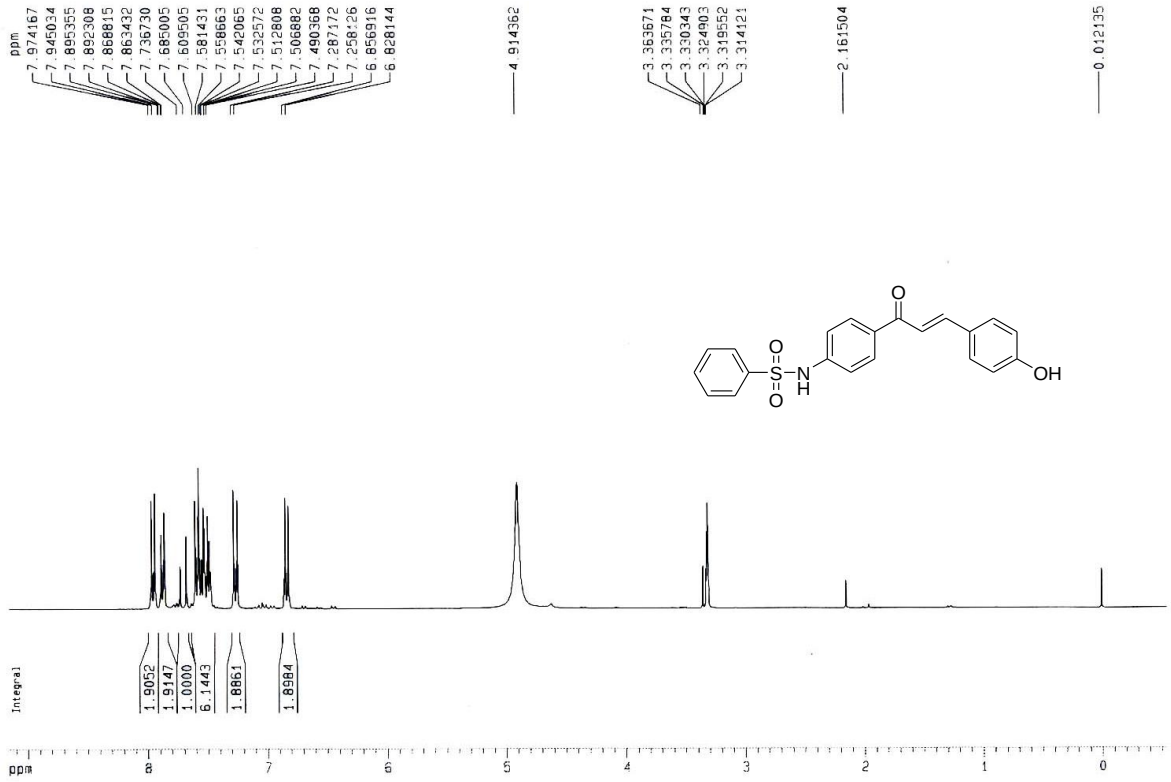
Spectra 9. ^{1}H-NMR of 4'-(4-toluenesulfonamide)-chalcone (**4b**).



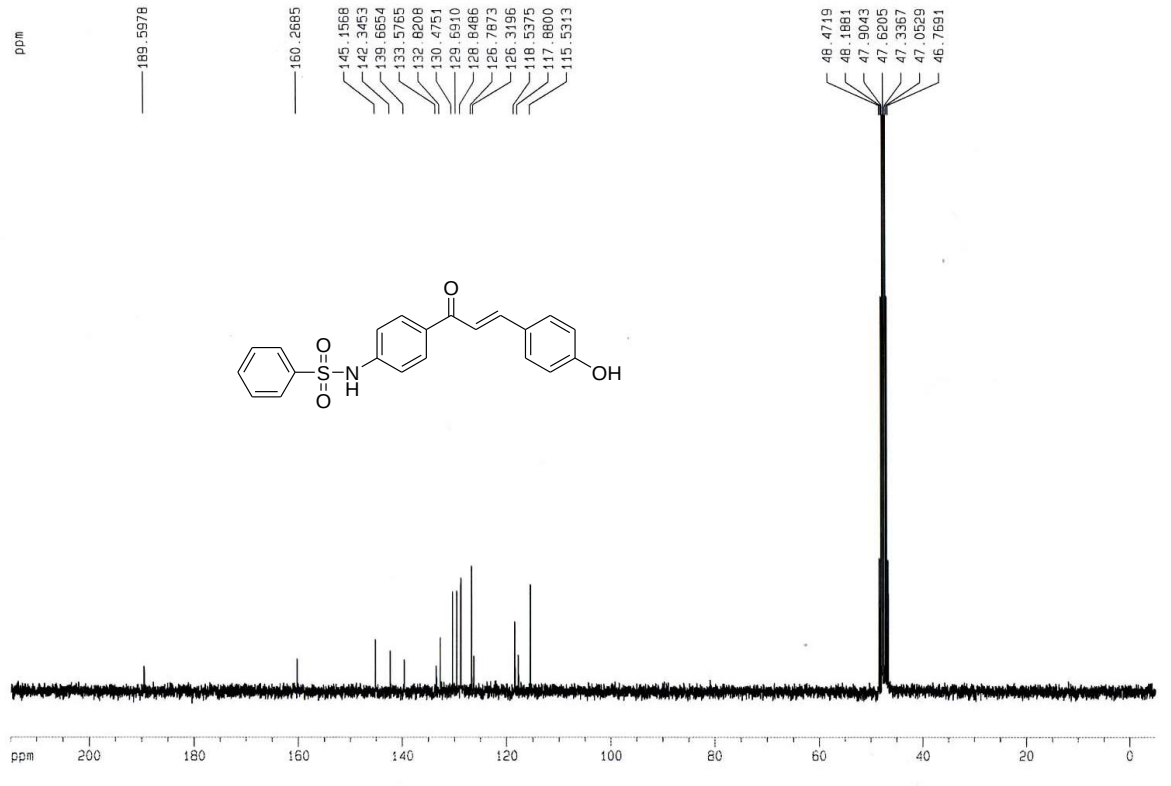
Spectra 10. ^{13}C-NMR of 4'-(4-toluenesulfonamide)-chalcone (**4b**).



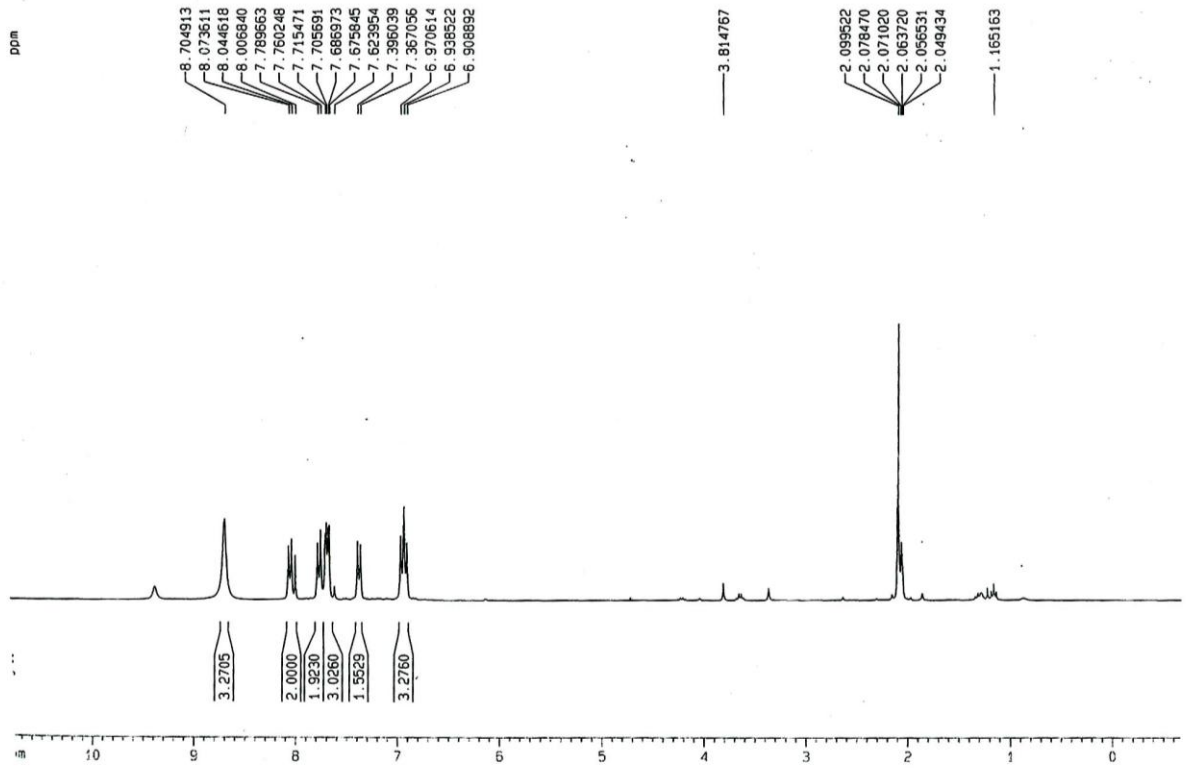
Spectra 11. ^{1}H-NMR of 4'-(benzensulfonamide)-4-hydroxychalcone (**4c**).



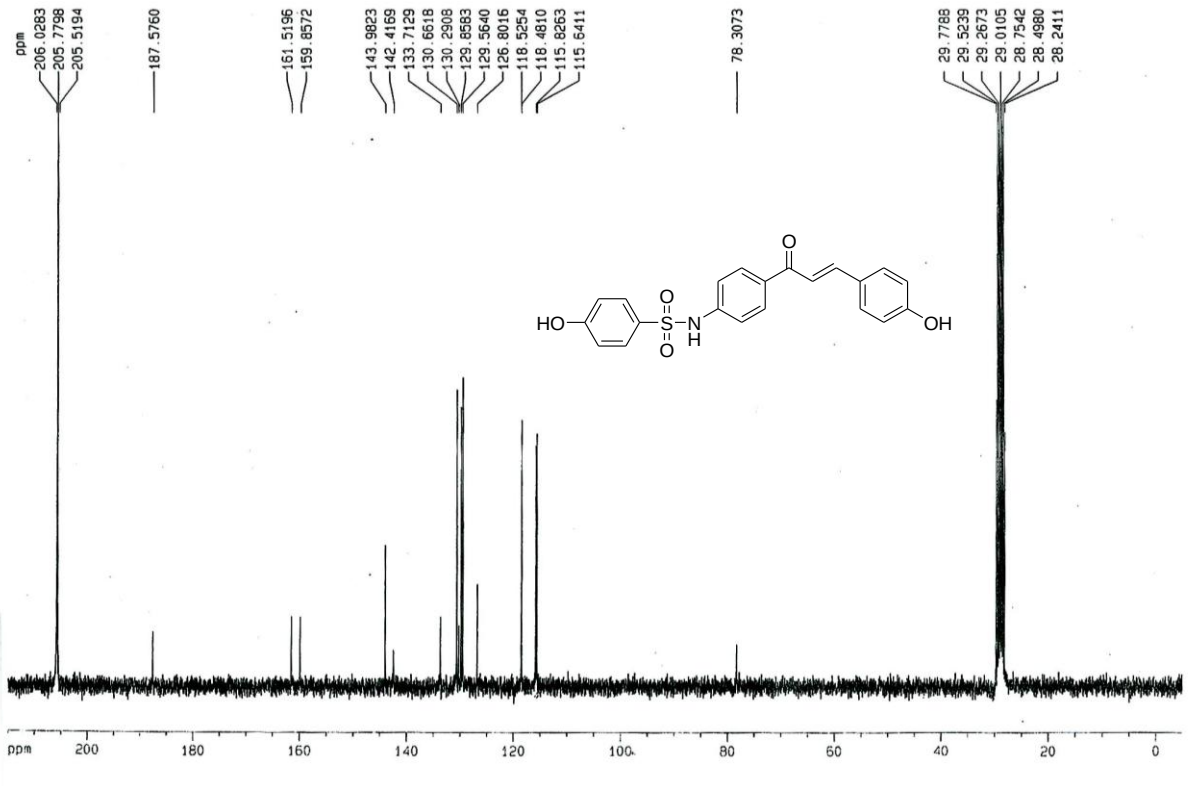
Spectra 12. ^{13}C-NMR of 4'-(benzensulfonamide)-4-hydroxychalcone (**4c**).



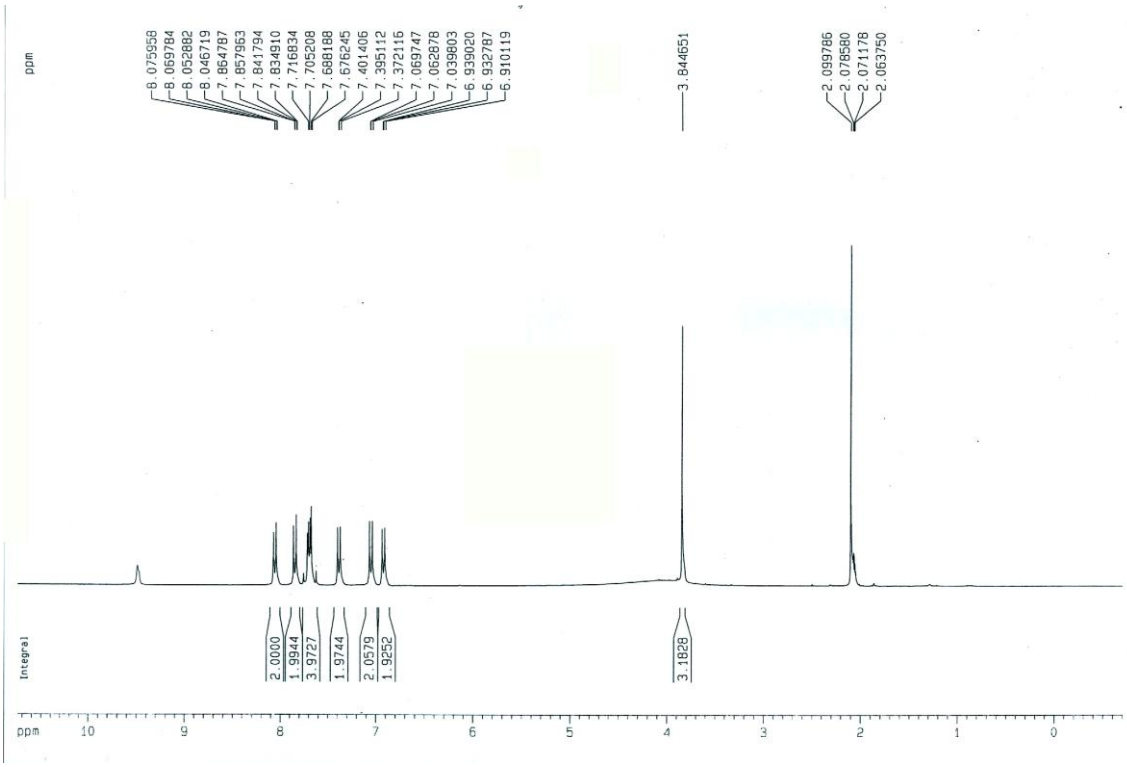
Spectra 13. ^{1}H-NMR of 4'-(4-hydroxybenzensulfonamide)-4-hydroxychalcone (**4d**).



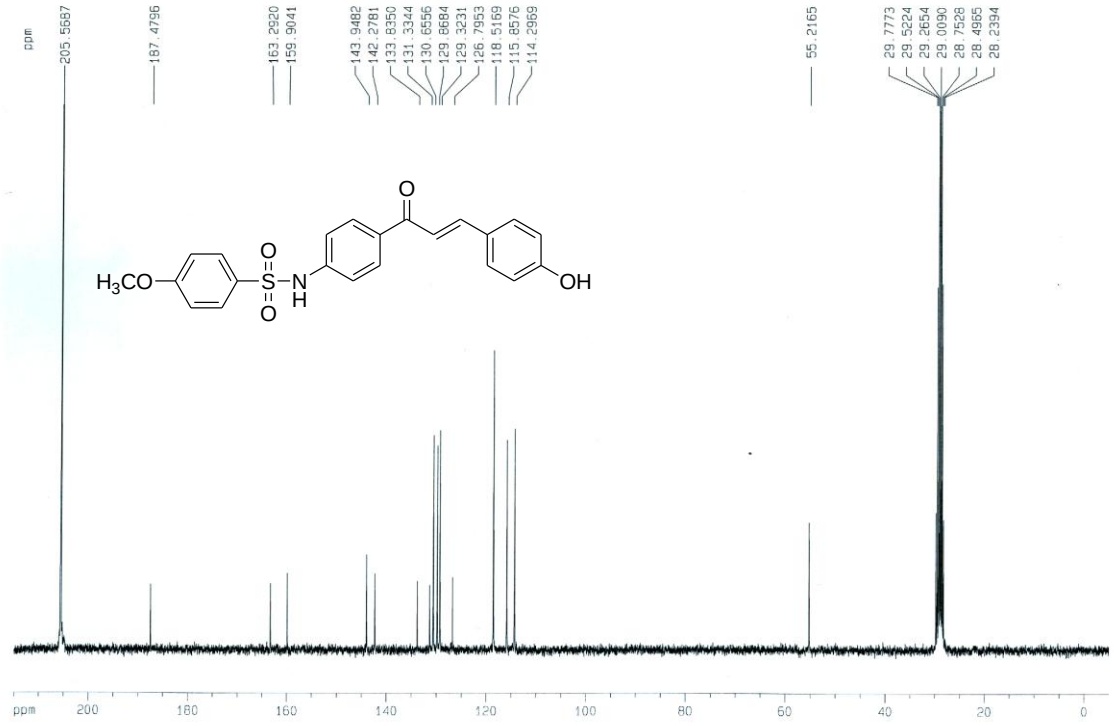
Spectra 14. ^{13}C-NMR of 4'-(4-hydroxybenzensulfonamide)-4-hydroxychalcone (**4d**).



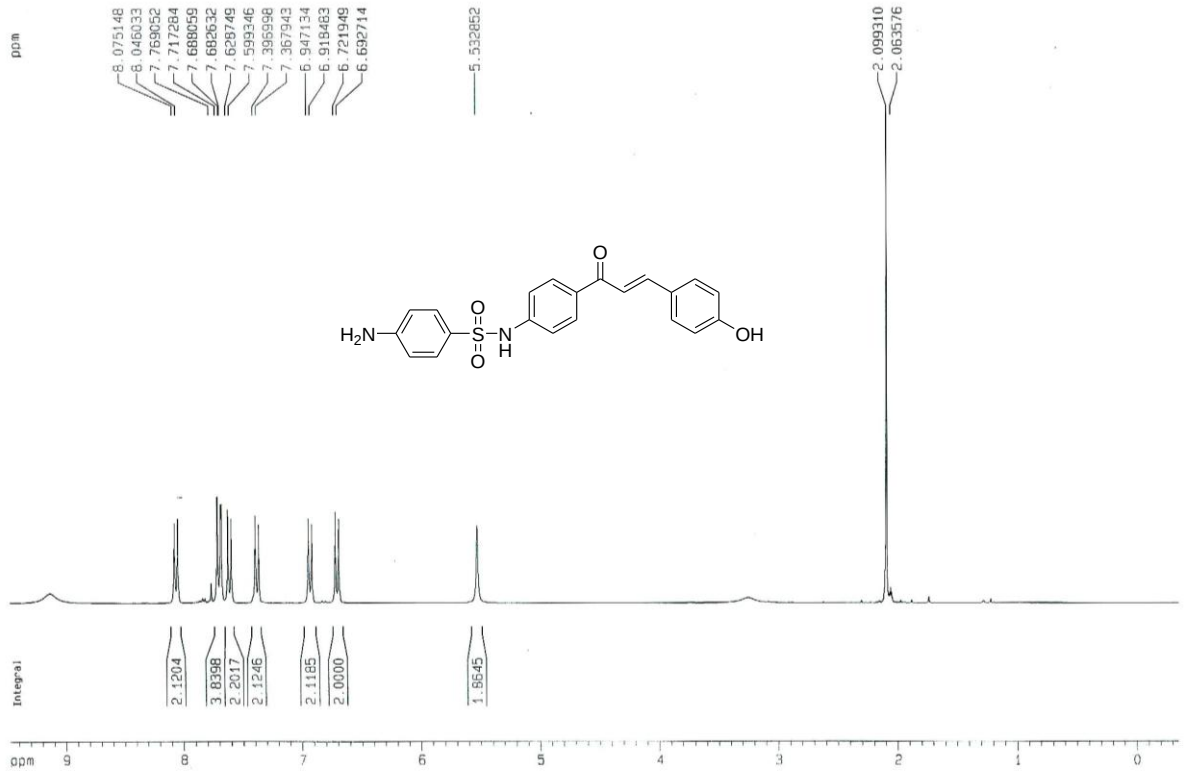
Spectra 15. ^{1}H-NMR of 4'-(4-methoxybezenesulfonamido)-4-hydroxychalcone (**4e**).



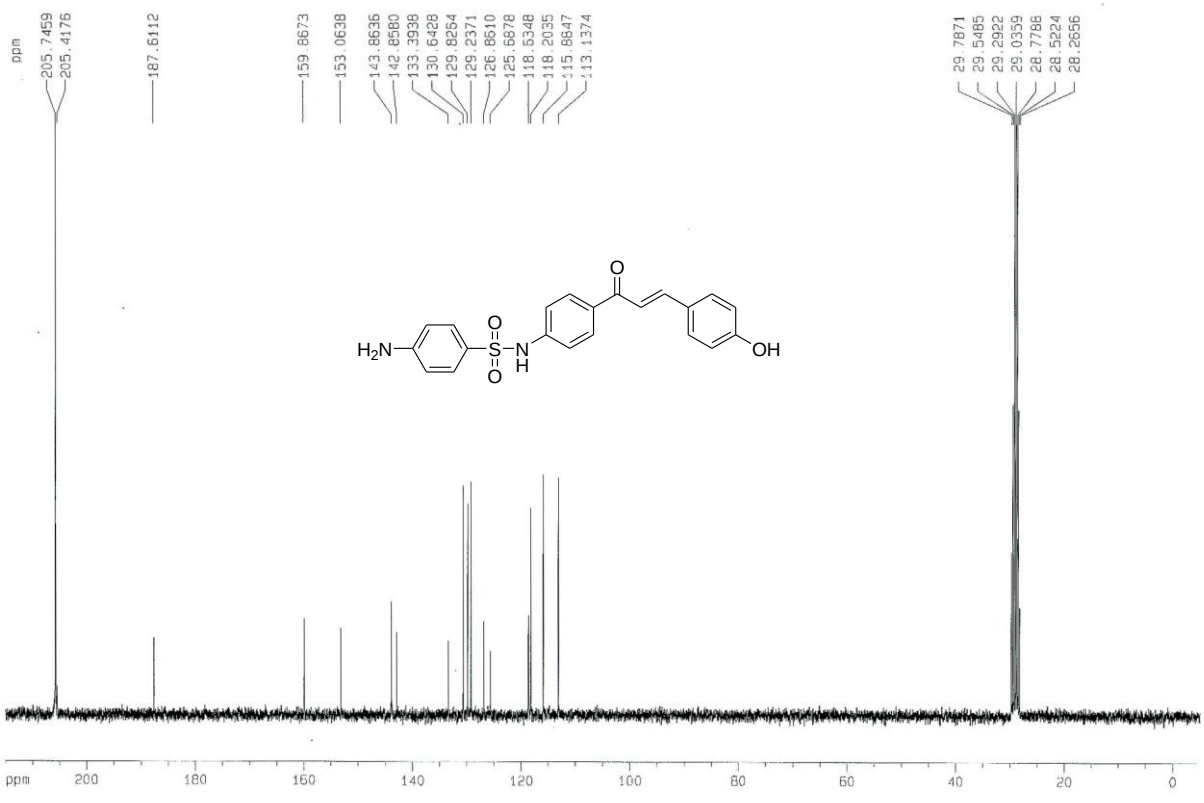
Spectra 16. ^{13}C-NMR of 4'-(4-methoxybezenesulfonamido)-4-hydroxychalcone (**4e**).



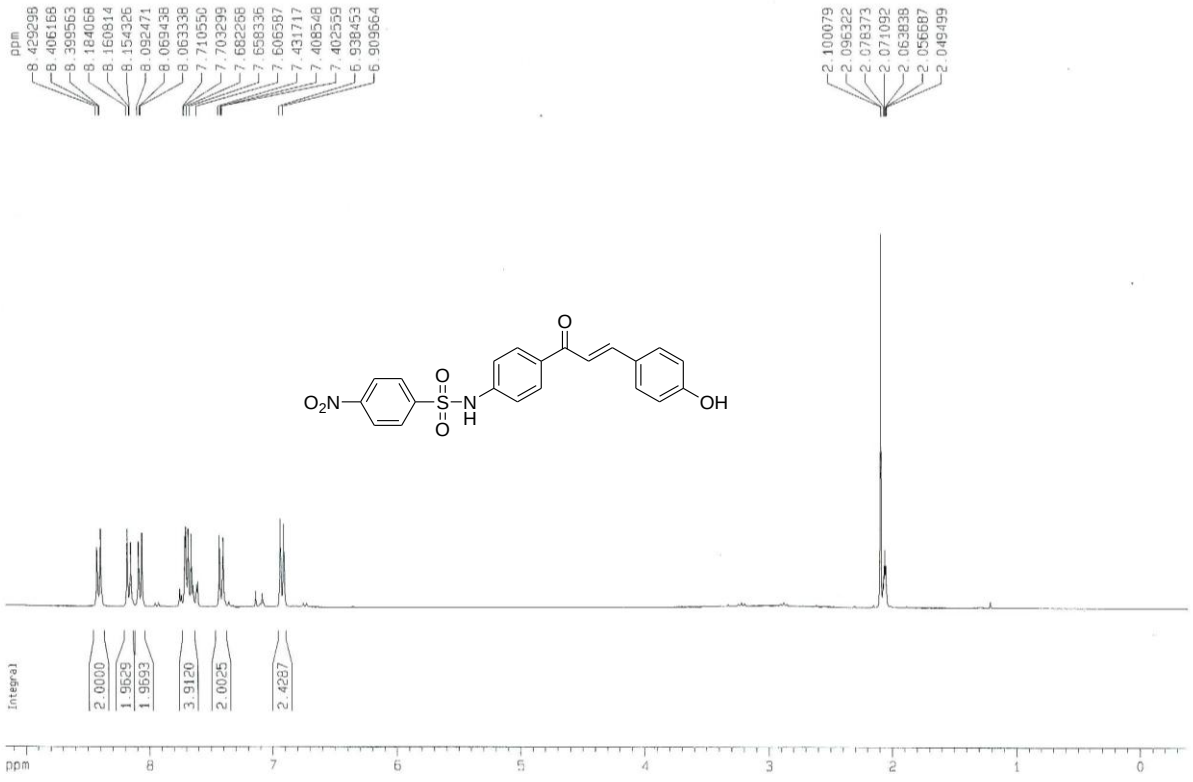
Spectra 17. ^{1}H-NMR of 4'-(4-aminobenzensulfonamide)-4-hydroxychalcone (**4f**).



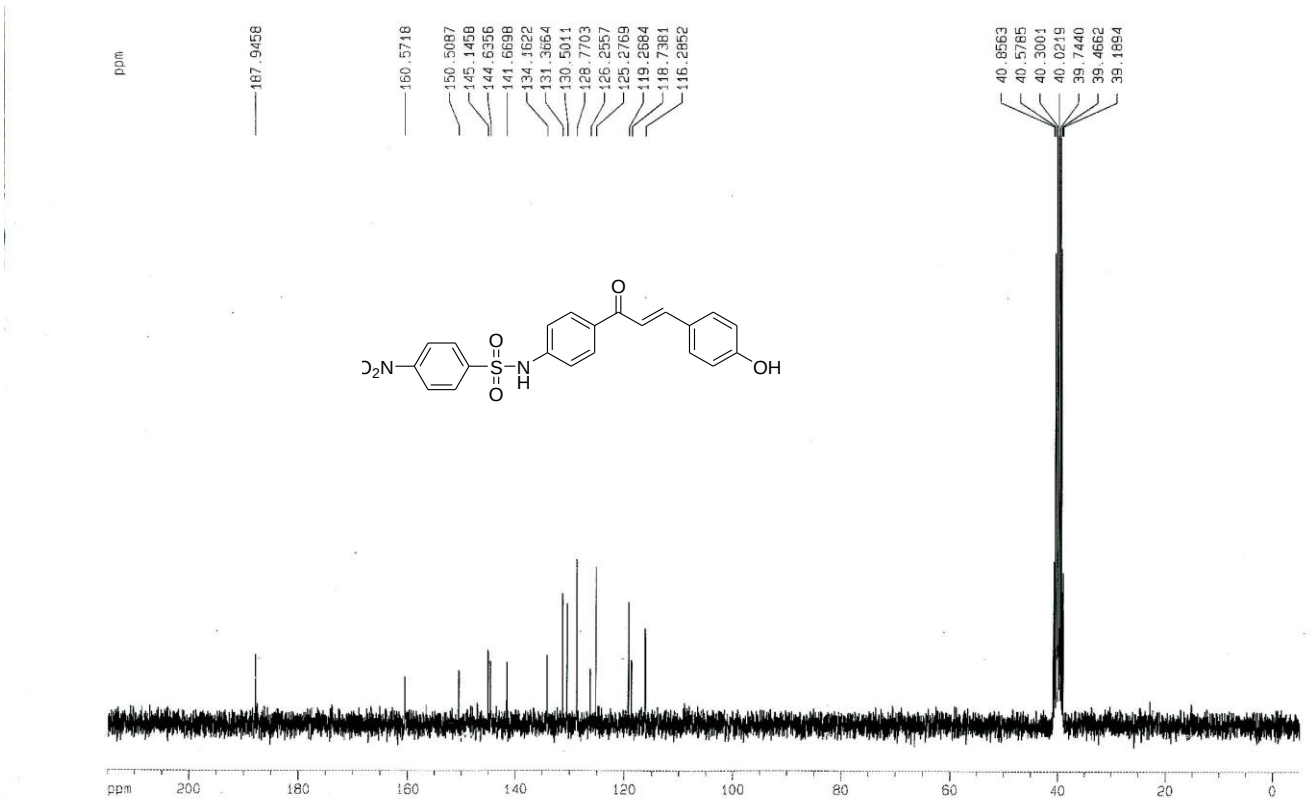
Spectra 18. ^{13}C-NMR of 4'-(4-aminobenzensulfonamide)-4-hydroxychalcone (**4f**).



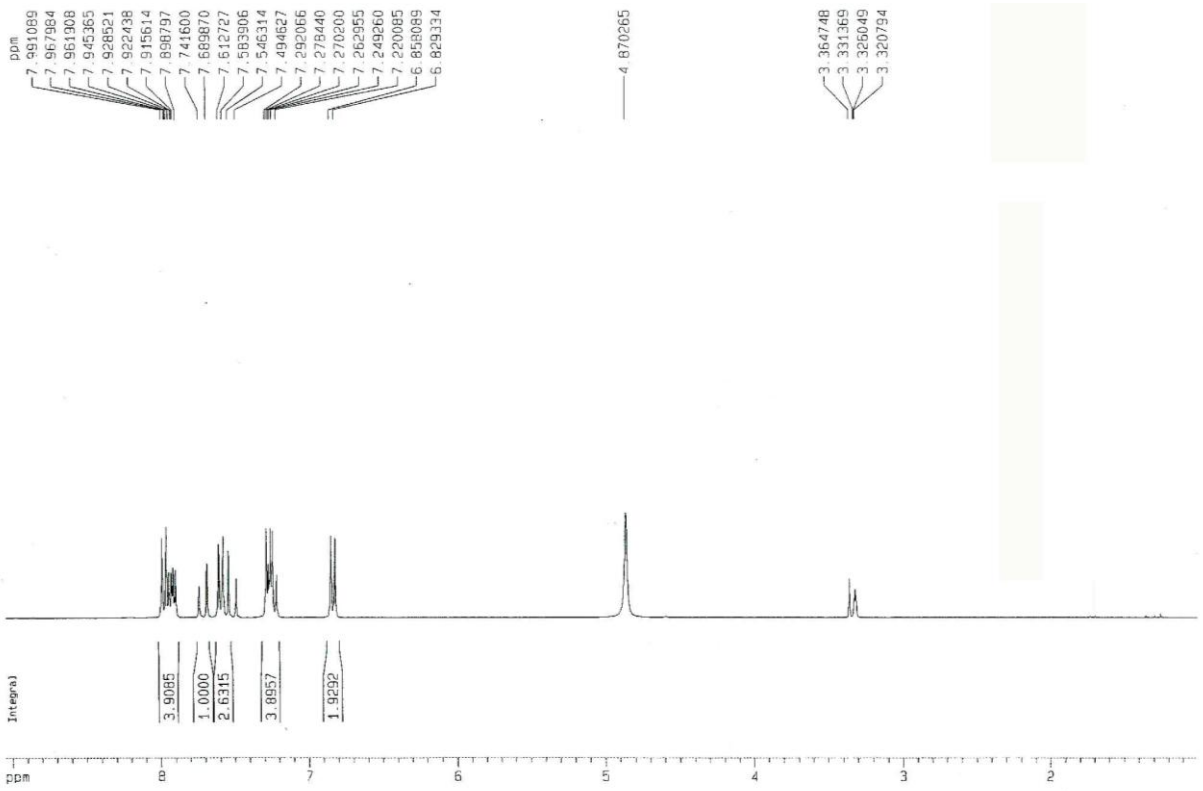
Spectra 19. ^{1}H-NMR of 4'-(4-nitrobenzensulfonamide)-4-hydroxychalcone (**4g**).



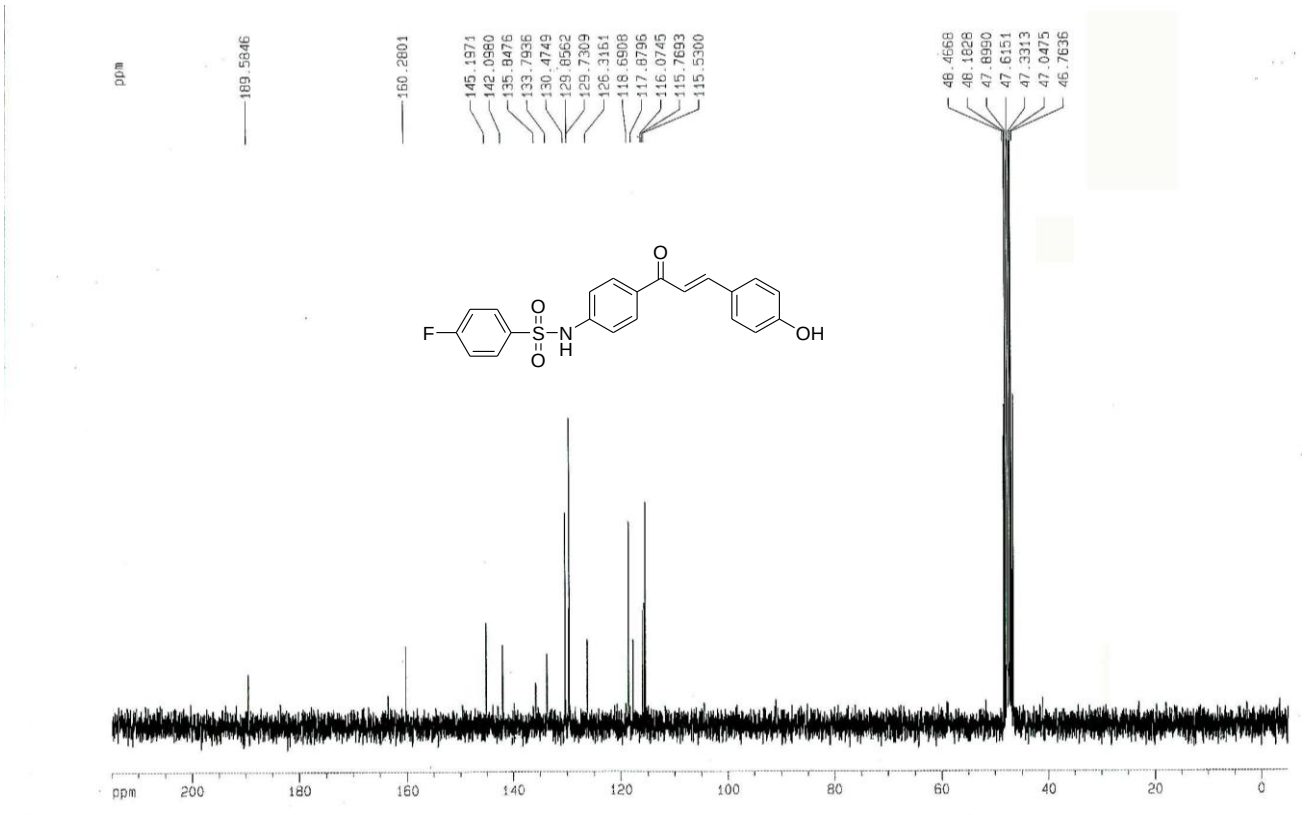
Spectra 20. ^{13}C-NMR of 4'-(4-nitrobenzensulfonamide)-4-hydroxychalcone (**4g**).



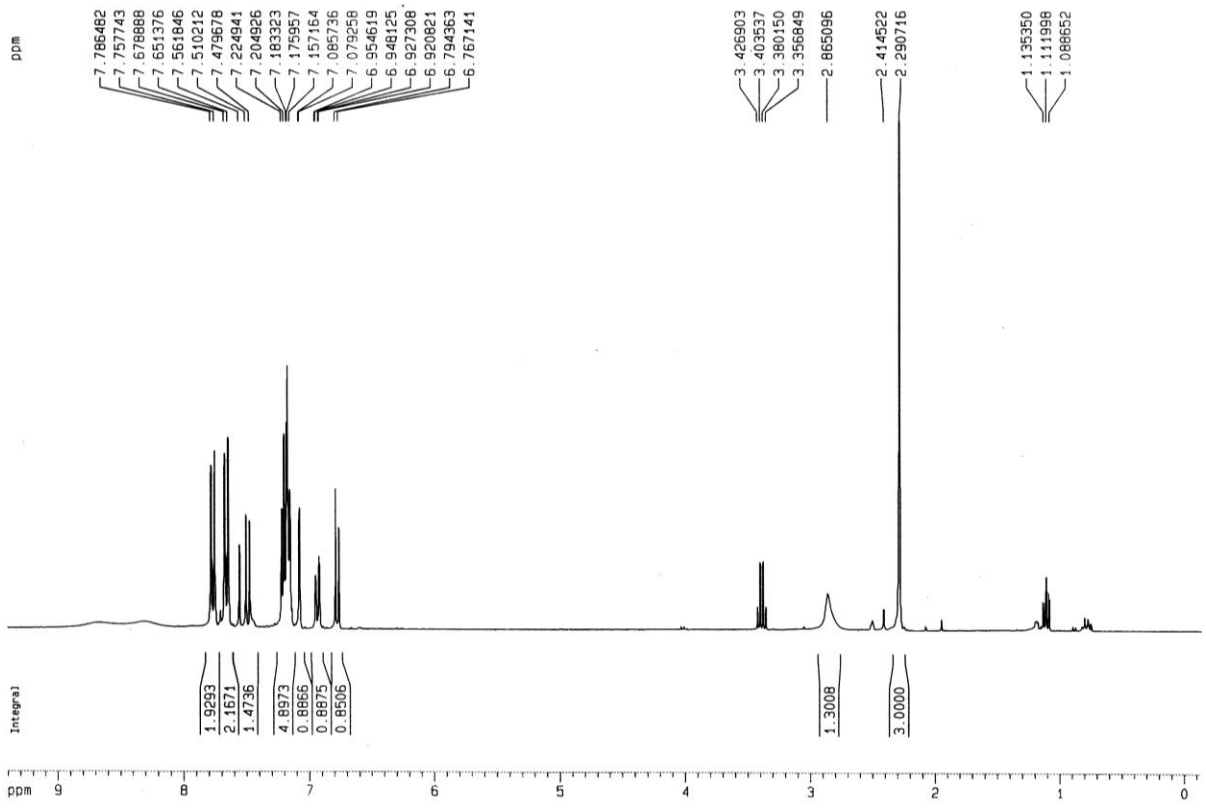
Spectra 21. ^{13}C-NMR of 4'-(4-fluorobenzensulfonamide)-4-hydroxychalcone (**4h**).



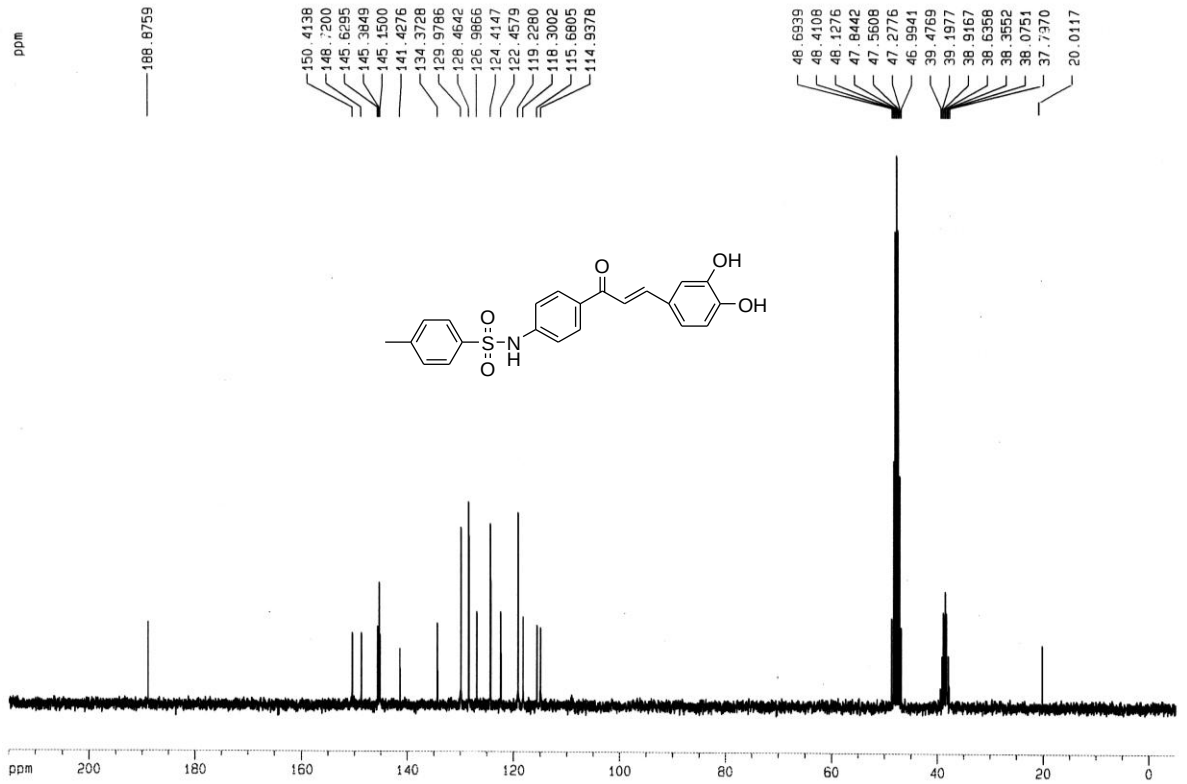
Spectra 22. ^{13}C-NMR of 4'-(4-fluorobenzensulfonamide)-4-hydroxychalcone (**4h**).



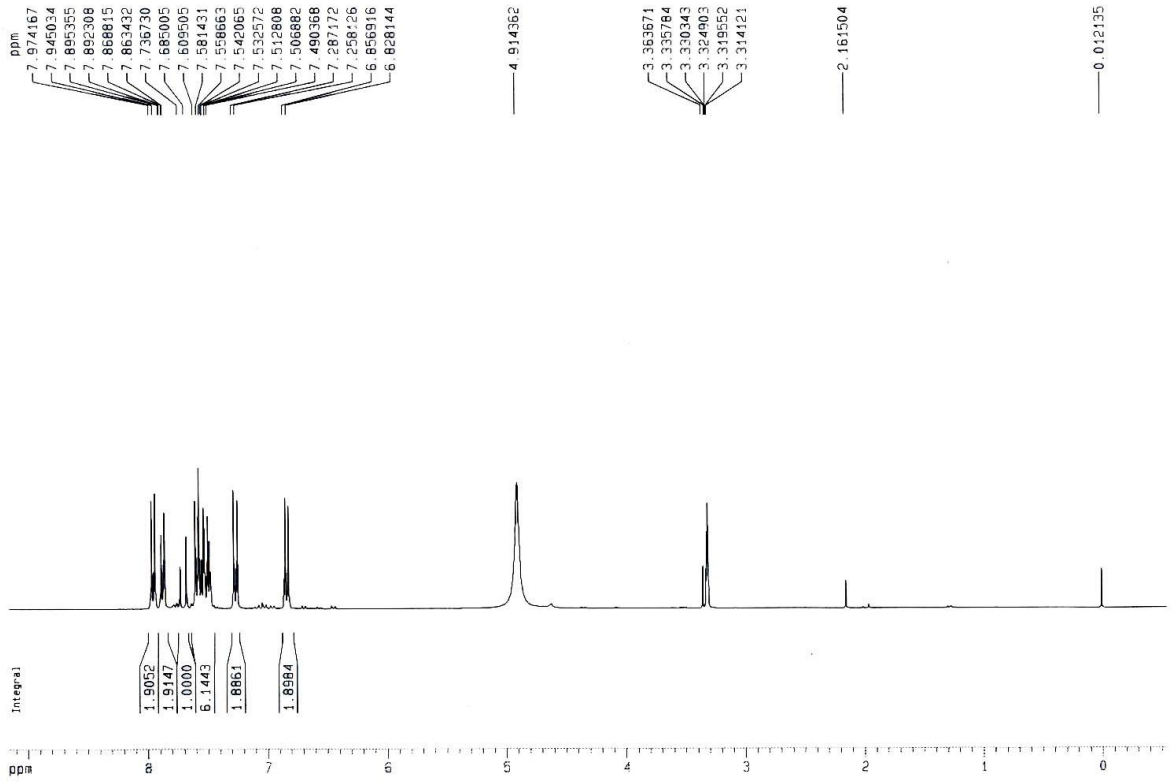
Spectra 23. ^{1}H-NMR of 4'-(*p*-toluenesulfonamide)-3,4-dihydroxychalcone (**5a**).



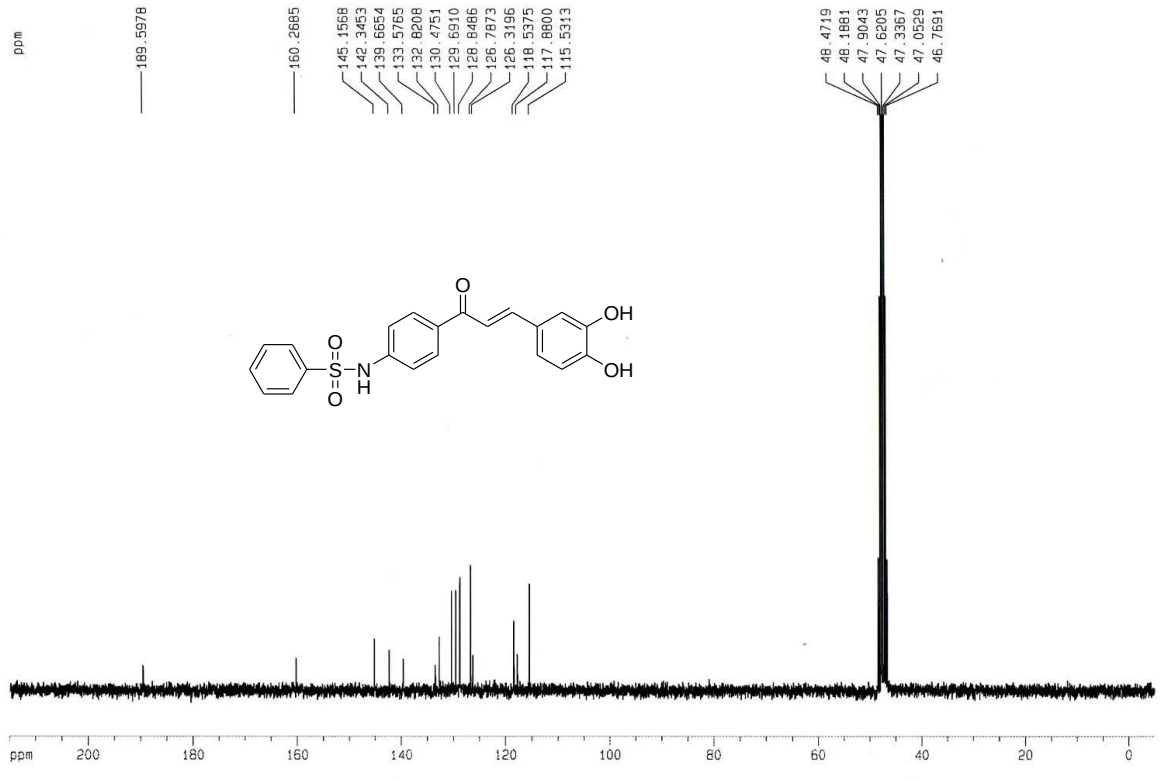
Spectra 24. ^{13}C-NMR of 4'-(*p*-toluenesulfonamide)-3,4-dihydroxychalcone (**5a**).



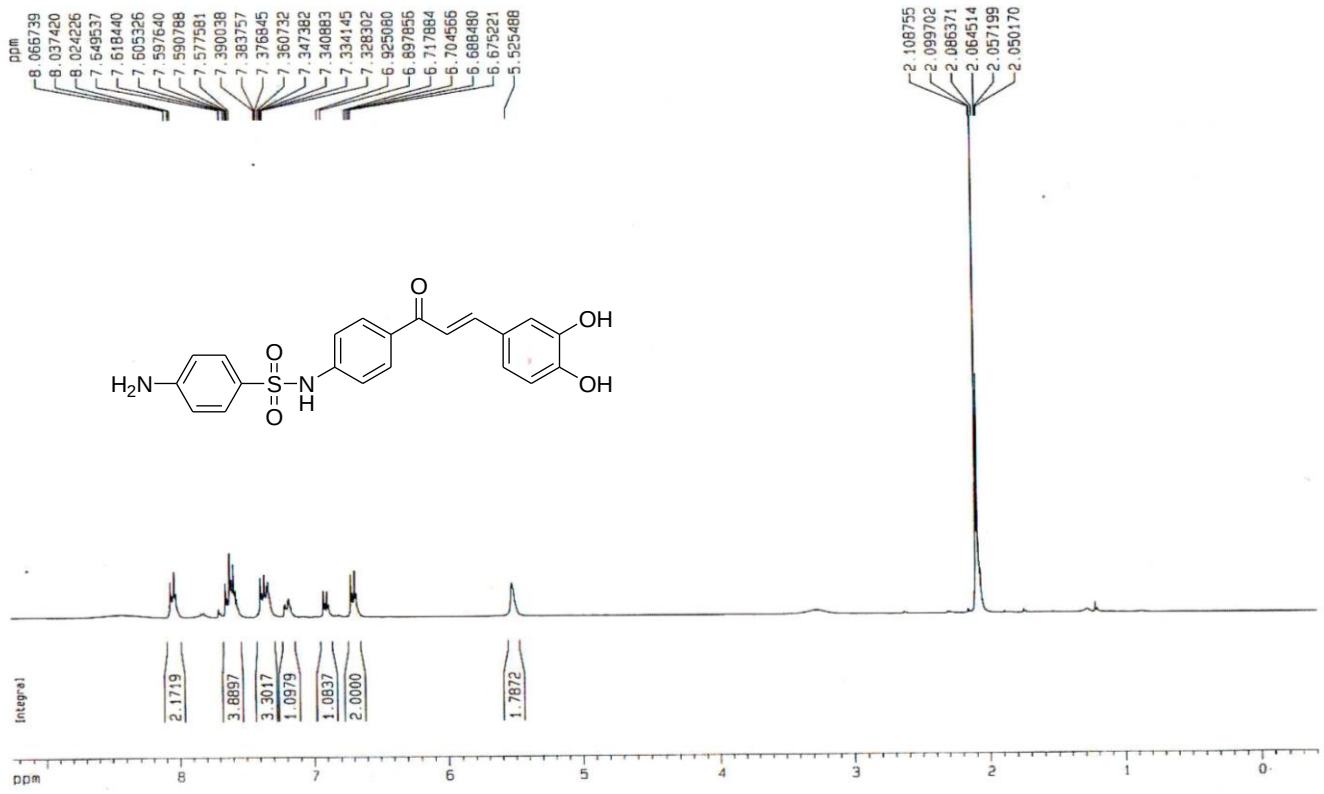
Spectra 25. ^{1}H-NMR of 4'-(benzensulfonamide)-3,4-dihydroxychalcone (**5b**).



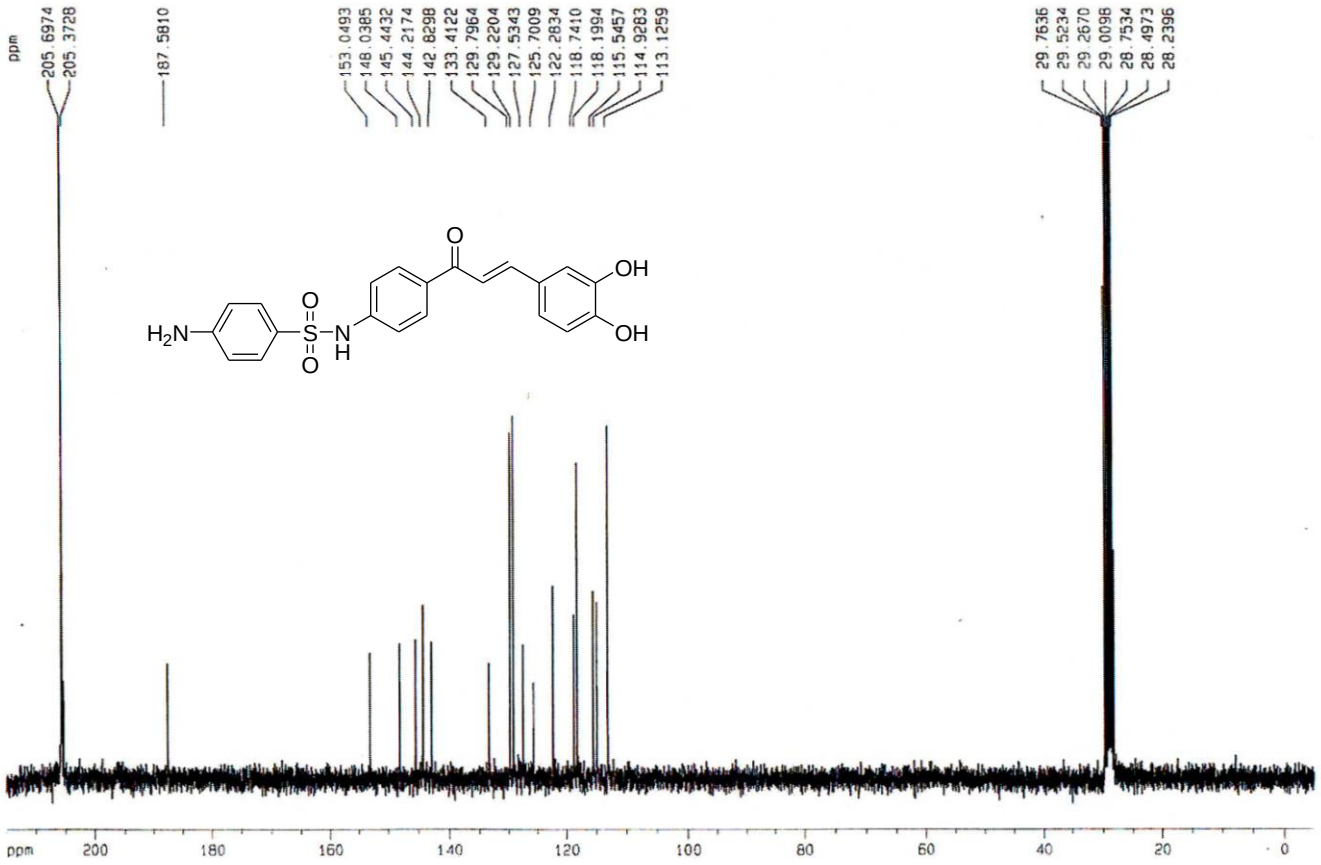
Spectra 26. ^{13}C-NMR of 4'-(benzensulfonamide)-3,4-dihydroxychalcone (**5b**).



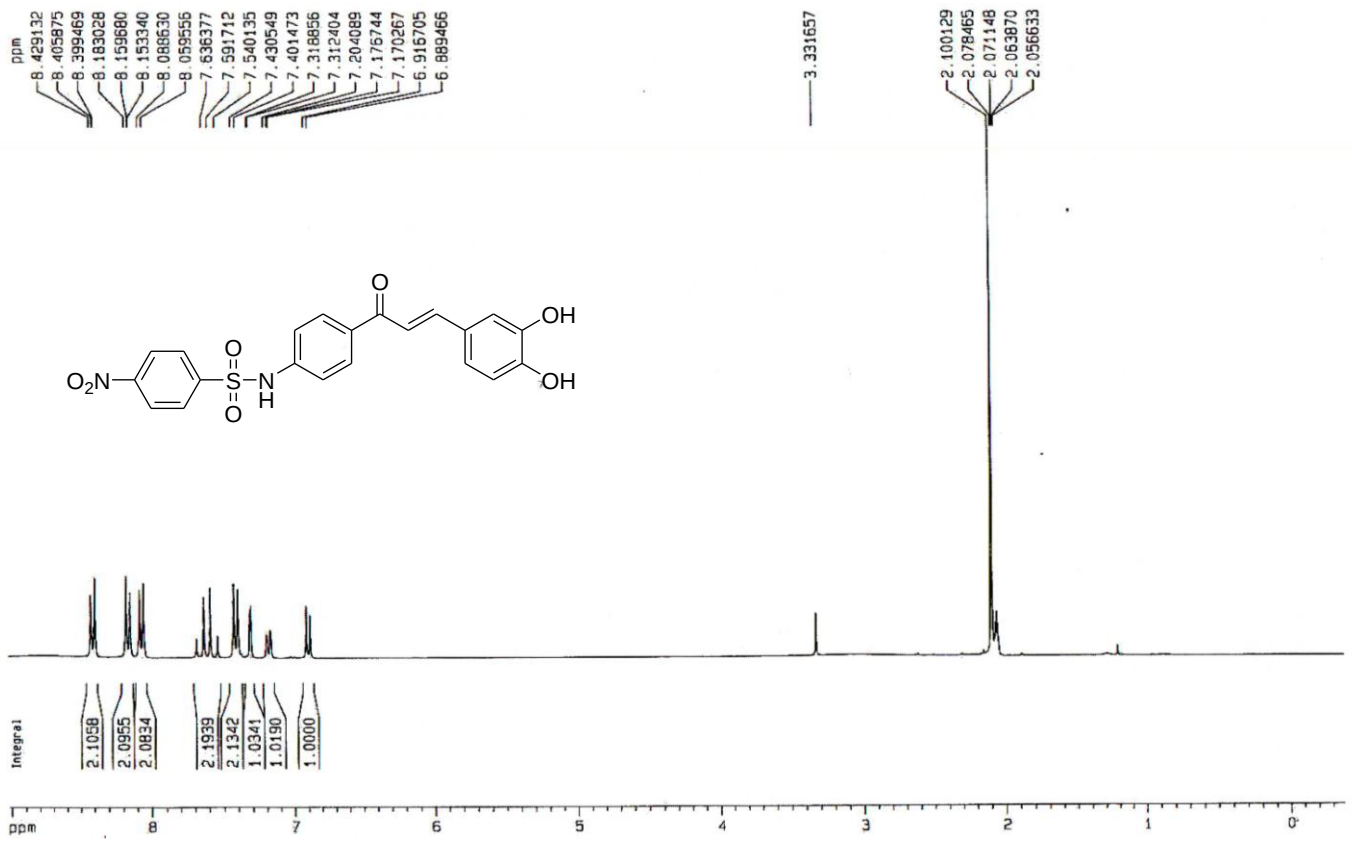
Spectra 27. ^{1}H-NMR of 4'-(4-aminobenzensulfonamide)-3,4-dihydroxychalcone (**5d**).



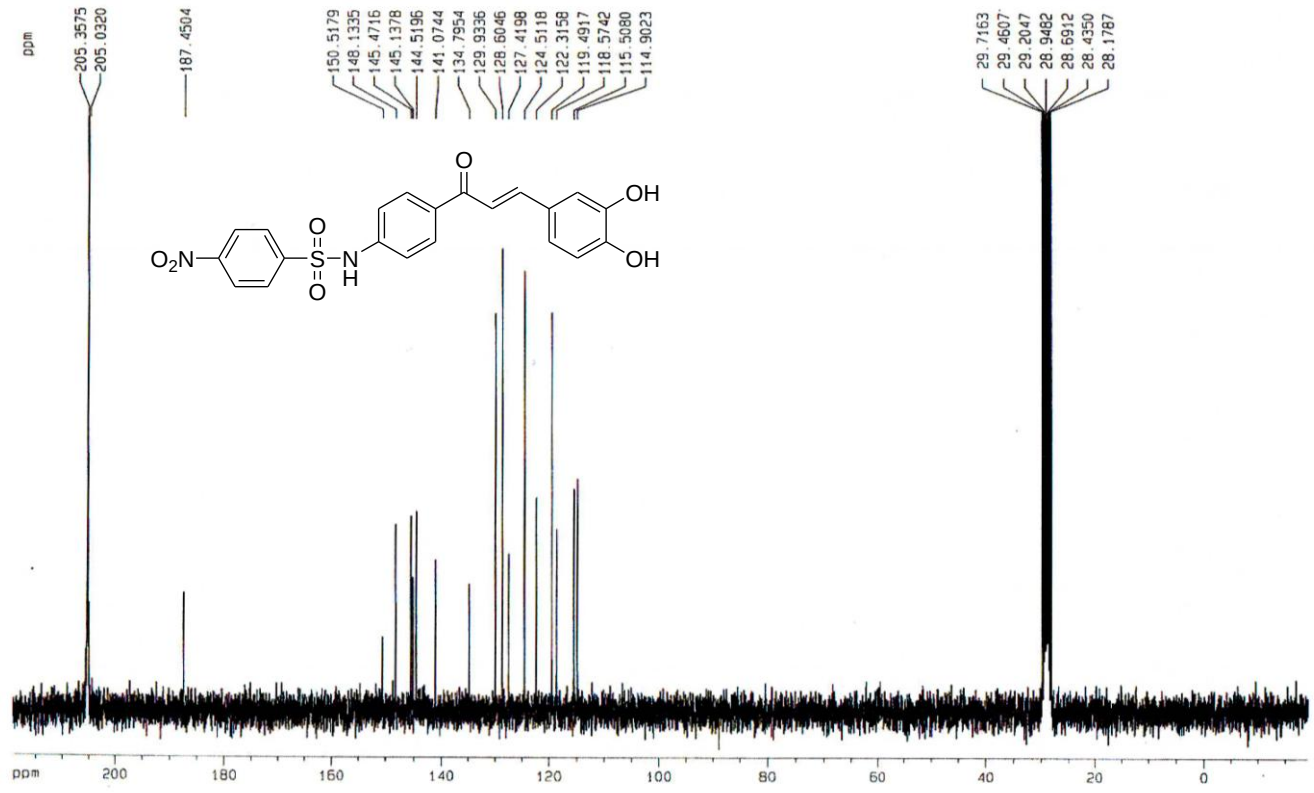
Spectra 28. ^{13}C-NMR of 4'-(4-aminobenzensulfonamide)-3,4-dihydroxychalcone (**5d**).



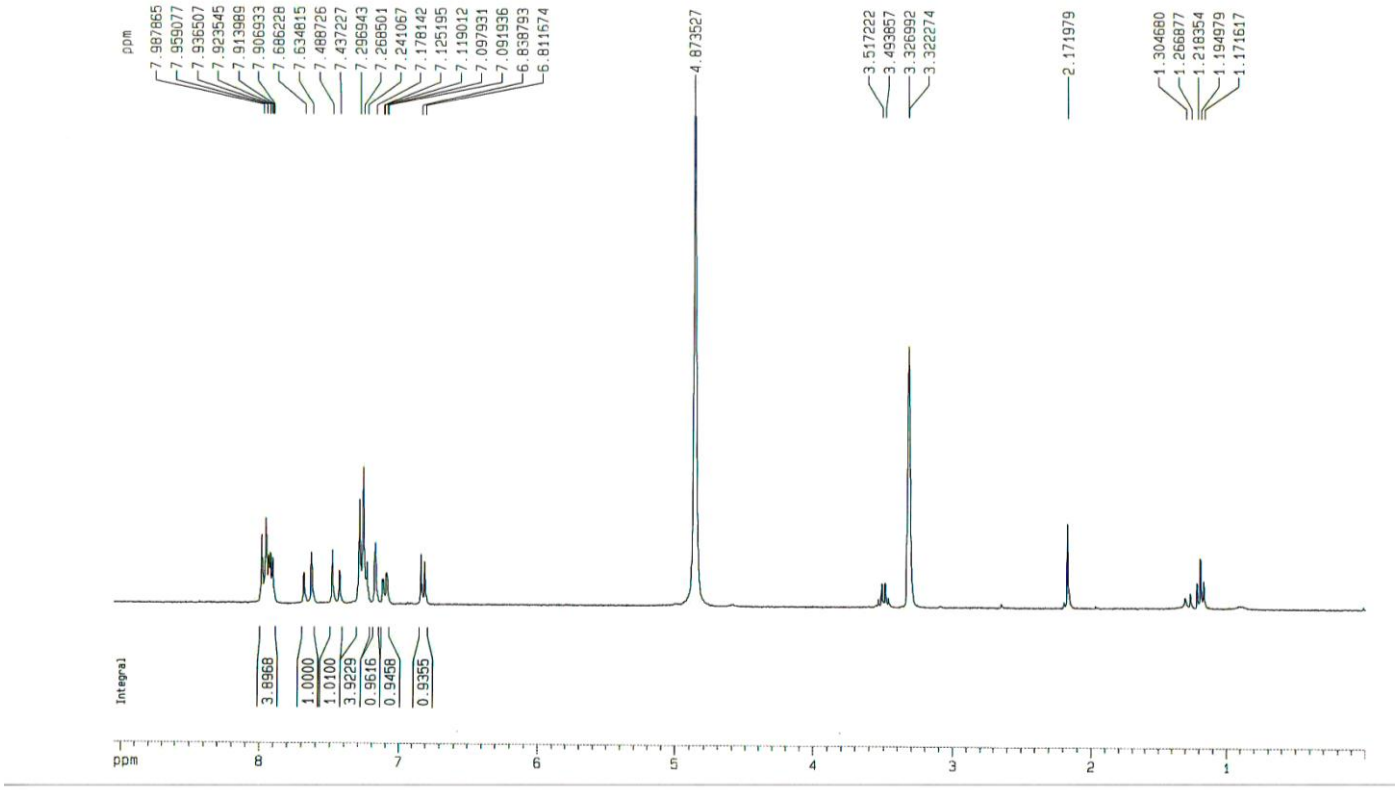
Spectra 29. ^{1}H-NMR of 4'-(4-nitrobenzensulfonamide)-3,4-dihydroxychalcone (**5e**).



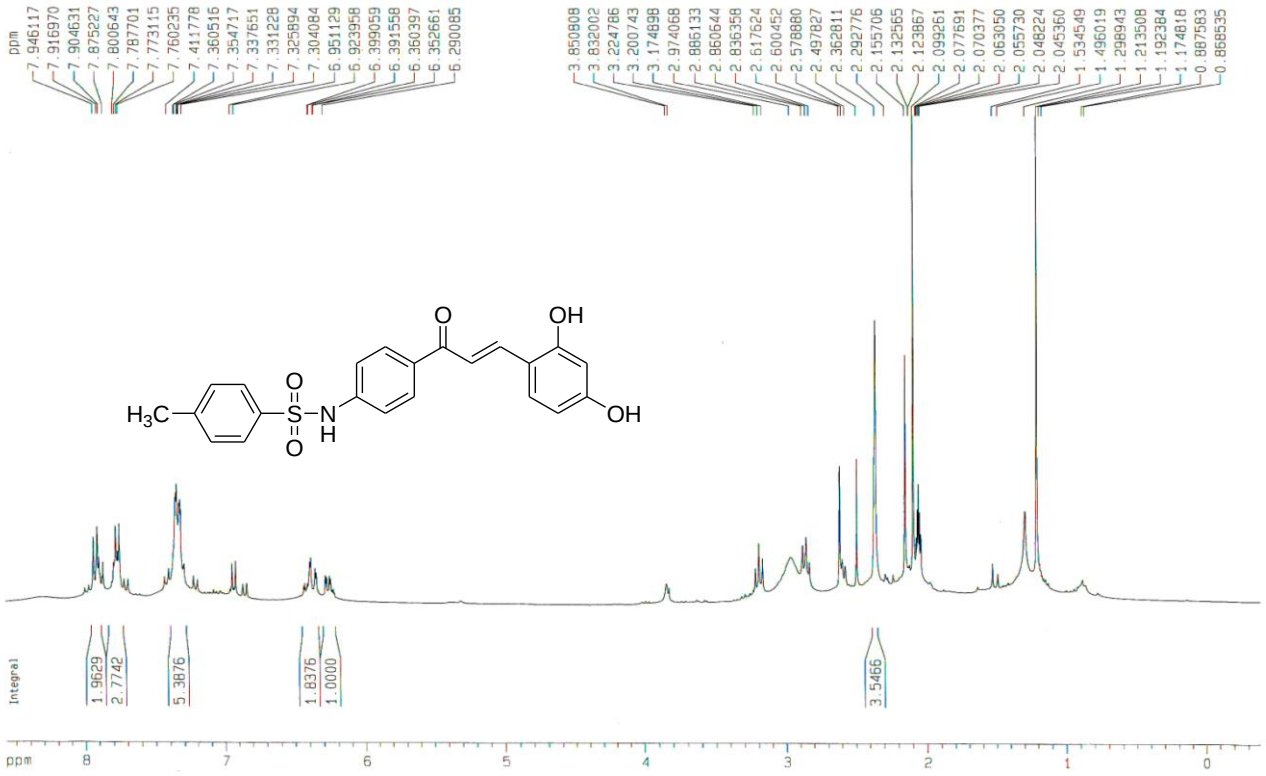
Spectra 30. ^{13}C-NMR of 4'-(4-nitrobenzensulfonamide)-3,4-dihydroxychalcone (**5e**).



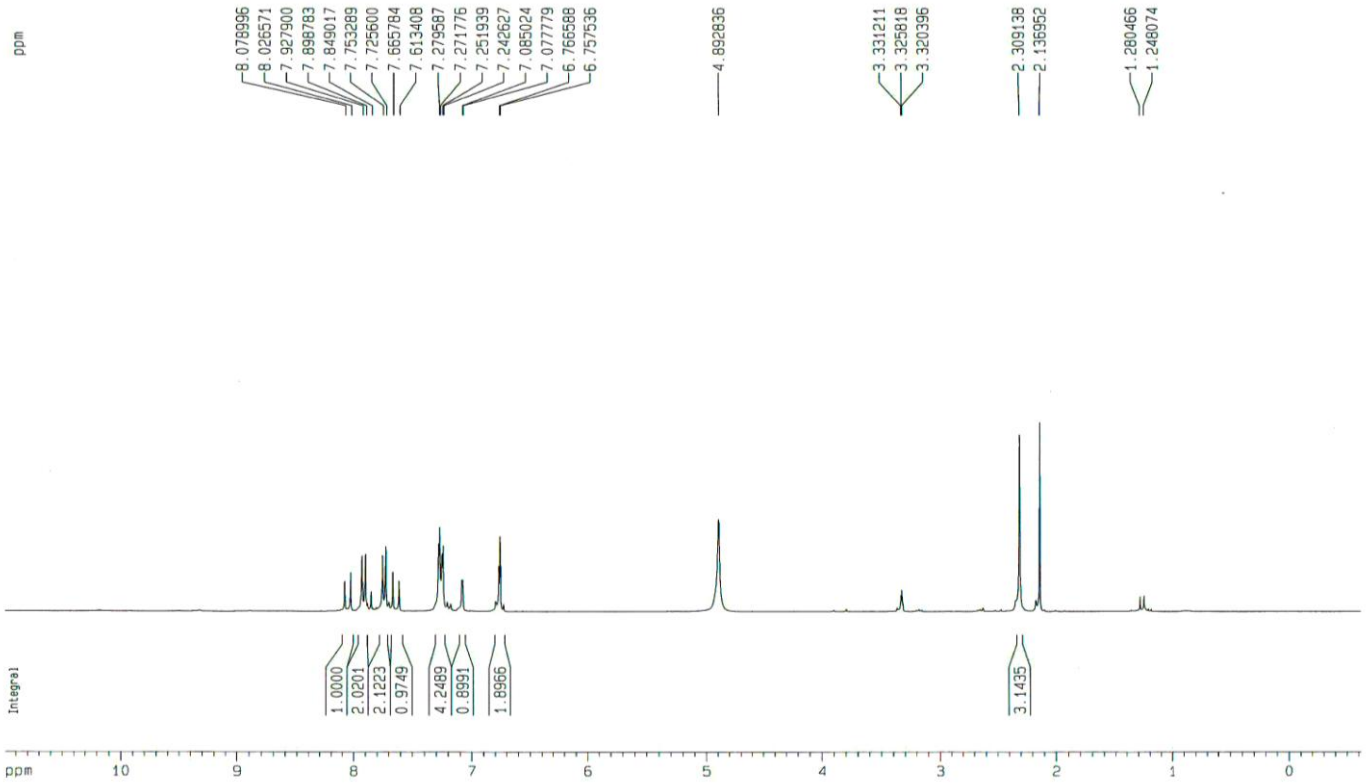
Spectra 31. [1]H-NMR of 4'-(4-fluoroenzensulfonamide)-3,4-dihydroxychalcone (**5f**).



Spectra 32. [1]H-NMR of 4'-(*p*-toluenesulfonamide)-2,4-dihydroxychalcone (**6**).



Spectra 33. [1]H-NMR of 4'-(*p*-toluenesulfonamide)-2,5-dihydroxychalcone (**7**).



Spectra 34. [13]C-NMR of 4'-(*p*-toluenesulfonamide)-2,5-dihydroxychalcone (**7**).

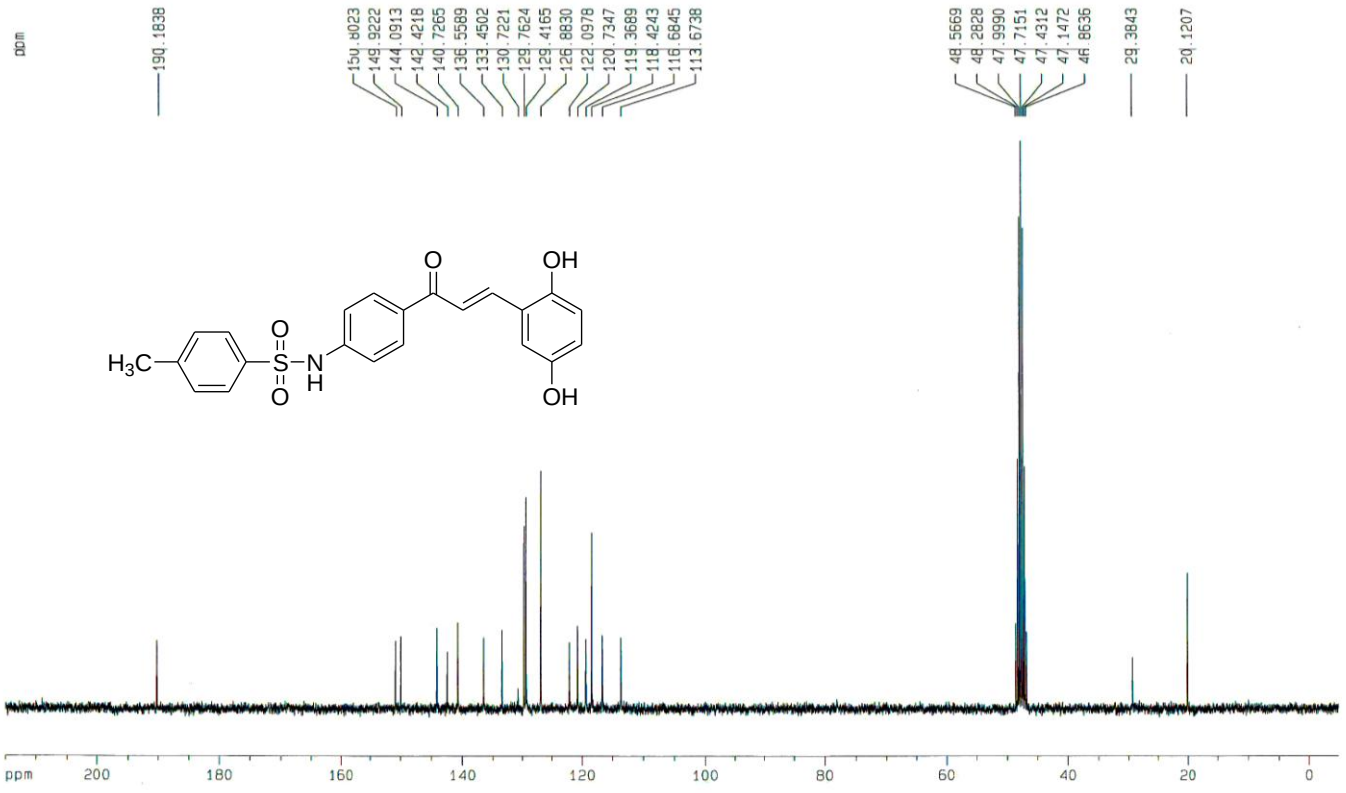


Figure 1. Effect of compounds **1**, **2**, **4a**,**c**, and **5d** on the hydrolytic activity of BACE1. K_m values as a function of the concentrations of **1**, **2**, **4a**,**c**, and **5d**. (Inset) Dependence of the values of V_{max} on the concentration of compounds **1**, **2**, **4a**,**c**, and **5d**.

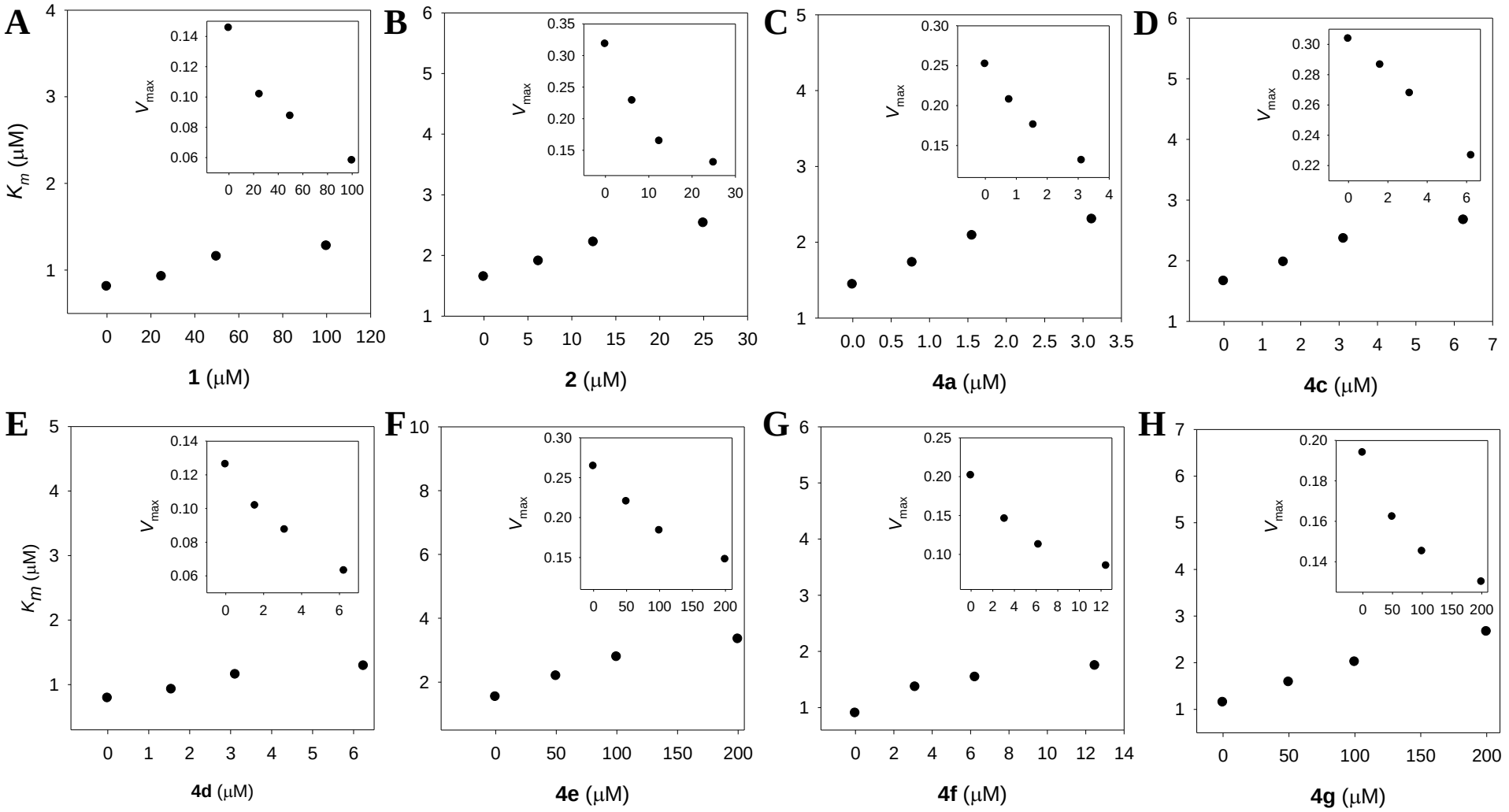


Figure 2. Effect of compounds **1**, **2**, **4a**,**c**, and **5d** on the hydrolytic activity of BACE1. Dixon plots for the inhibition of compounds **1**, **2**, **4a**,**c**, and **5d** on BACE1 catalyzed proteolysis of substrate.

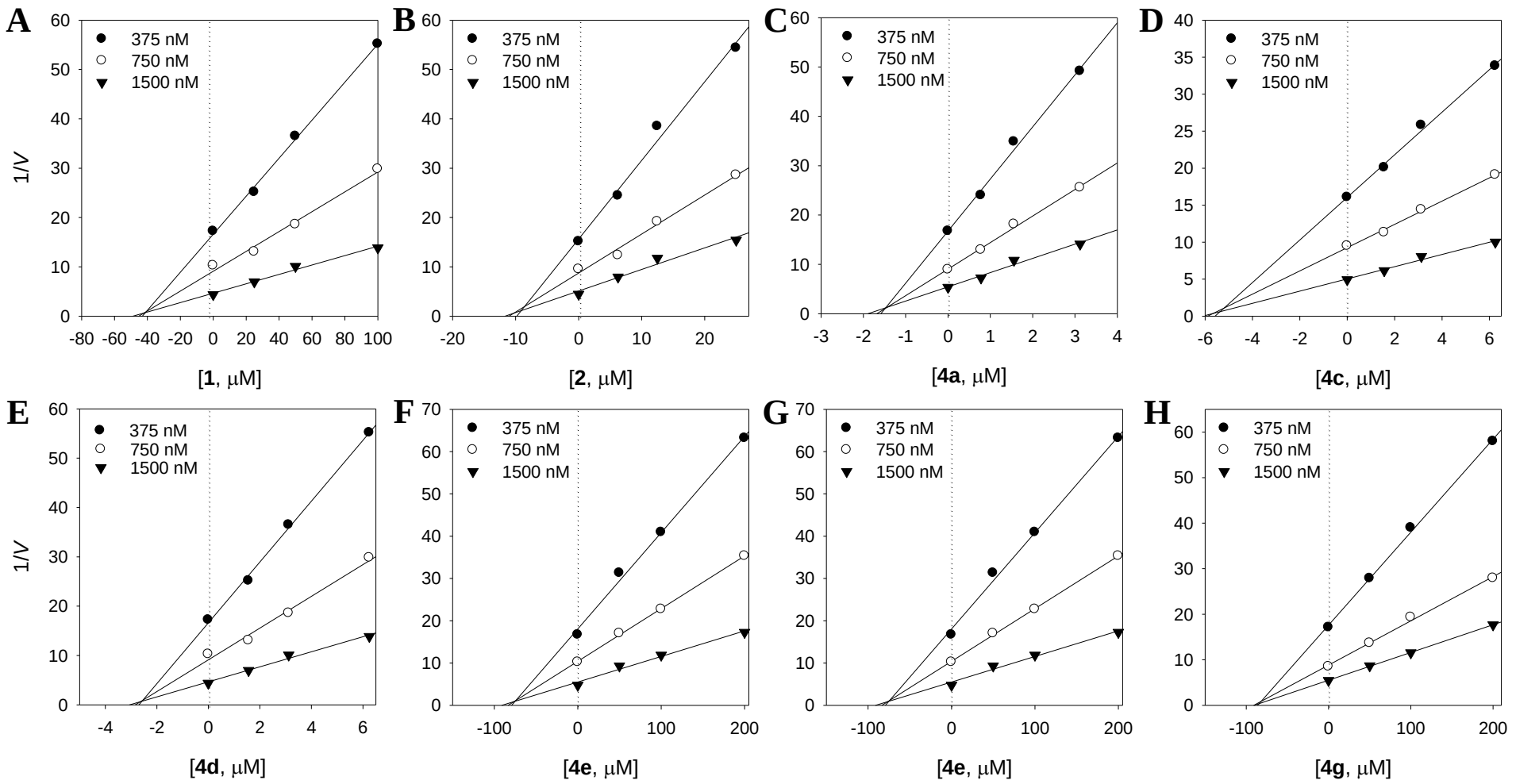


Figure 3. Effect of compounds **5a**–**d** on the hydrolytic activity of BACE1. K_m values as a function of the concentrations of **5a**–**d**. (Inset) Dependence of the values of V_{max} on the concentration of compounds **5a**–**5d**.

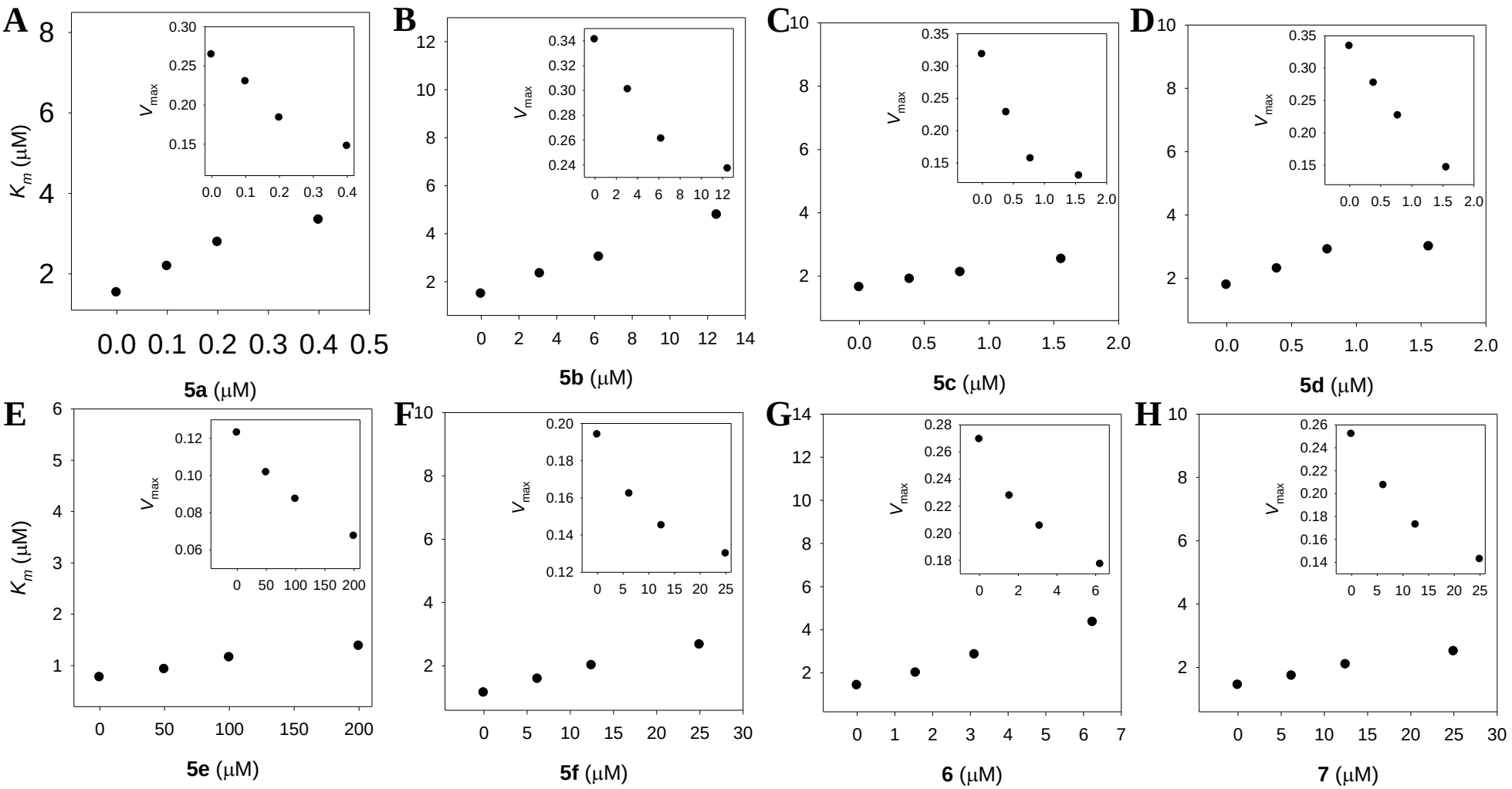


Figure 4. Effect of compounds **5a–d** on the hydrolytic activity of BACE1. Dixon plots for the inhibition of compounds **5a–d** on BACE1 catalyzed proteolysis of substrate.

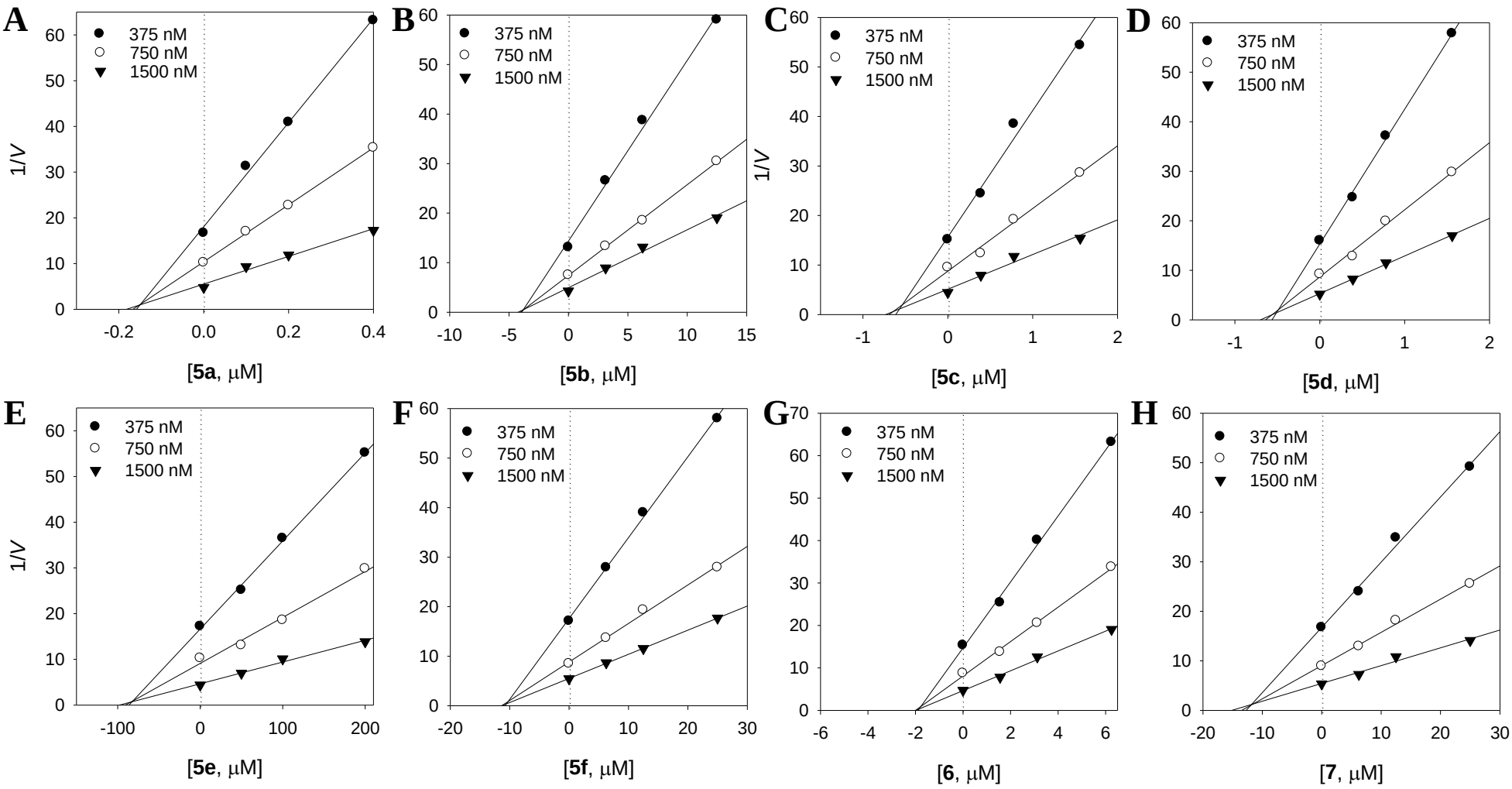


Figure 5. Acetylcholinesterase kinetic data of compounds **4a**,**f**, and **5b**,**d**.

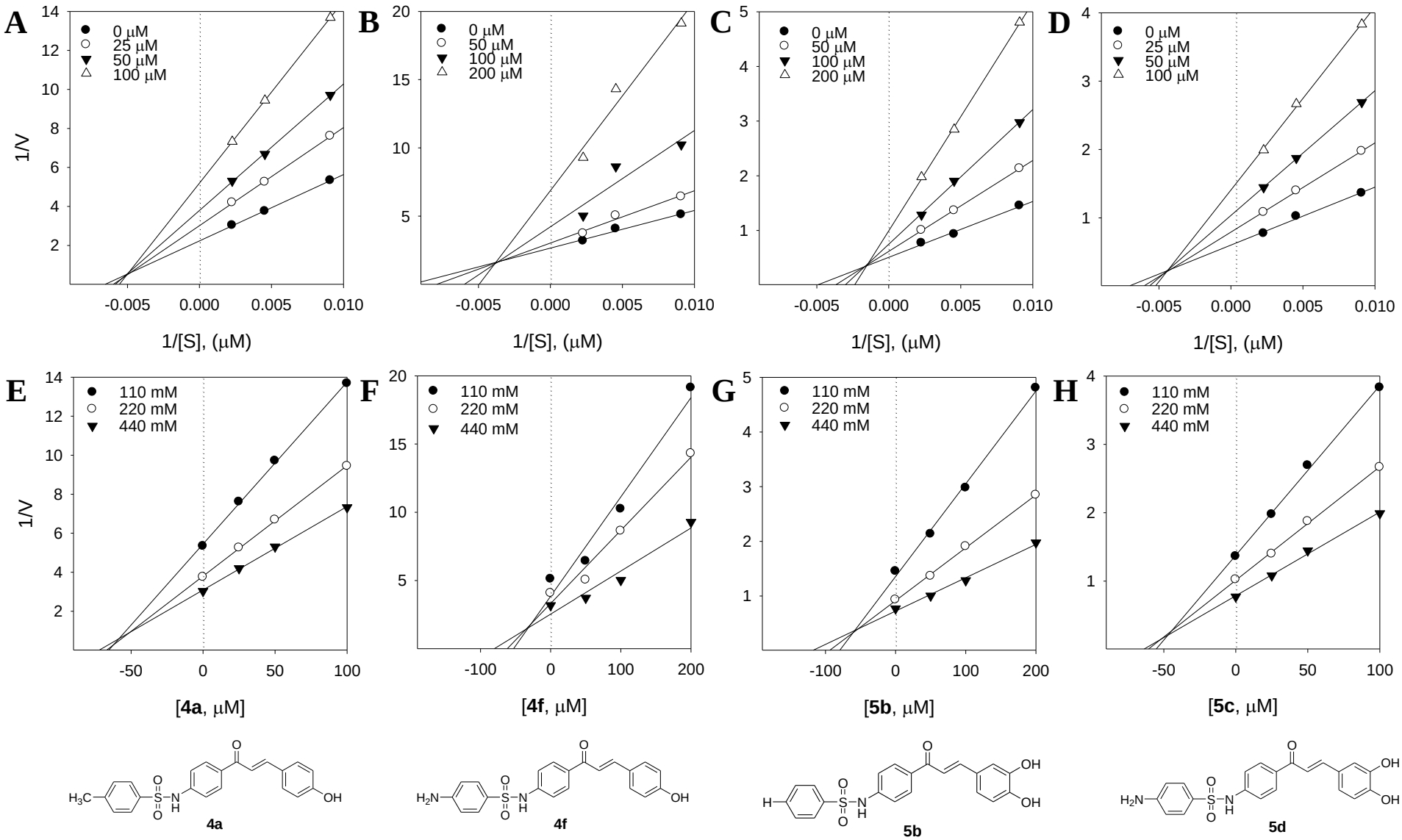


Figure 6. Butyrylcholinesterase kinetic data of compounds **4a,f**, and **5b,d**.