Synthesis, characterization and spectroscopic properties of water soluble coumarins substituted with oligomeric alkoxy functions

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Supplementary data

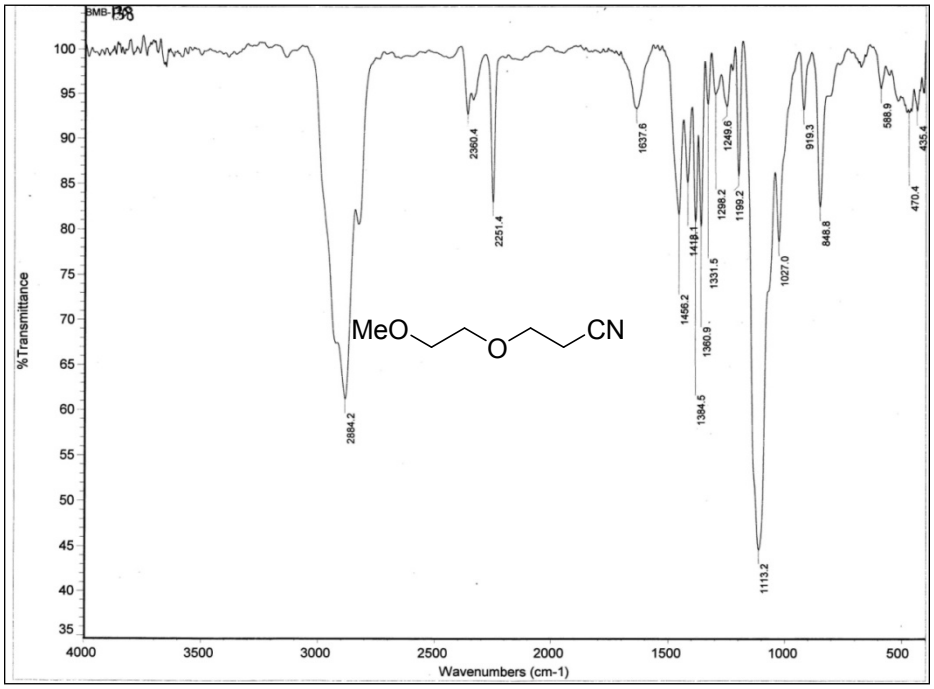

Figure 7. IR (KBr) spectrum of 3-(2-methoxyethoxy)propanenitrile **6a**.

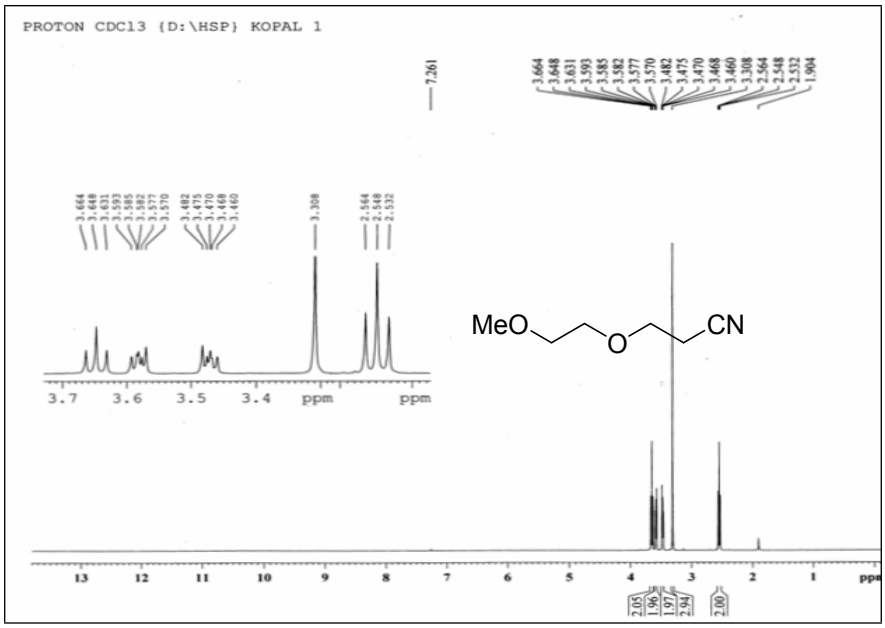

Figure 8. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 3-(2-methoxyethoxy)propanenitrile **6a**.

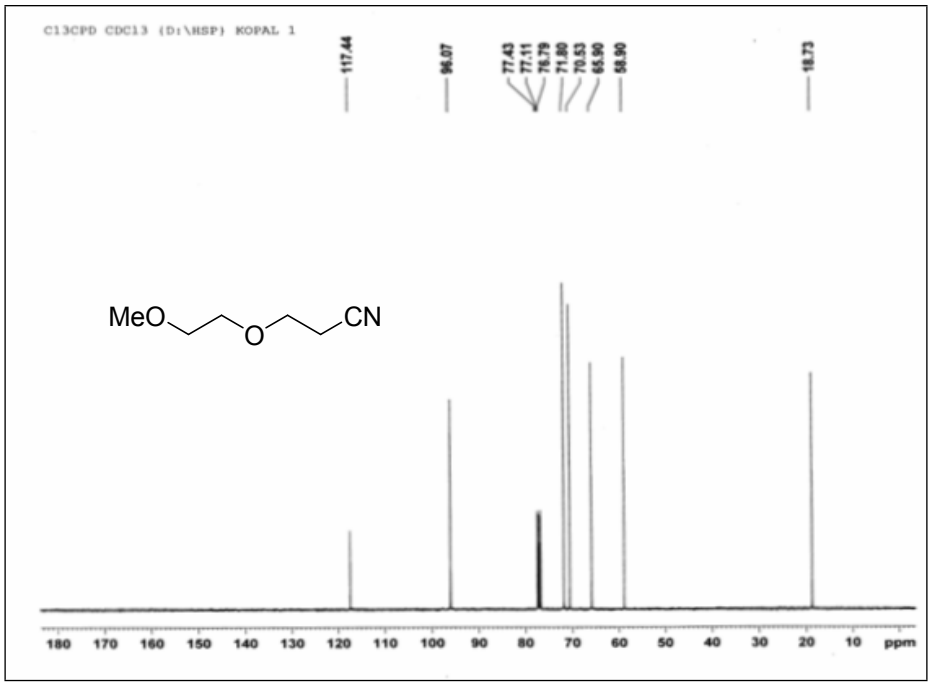

Figure 9. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 3-(2-methoxyethoxy)propanenitrile **6a**.

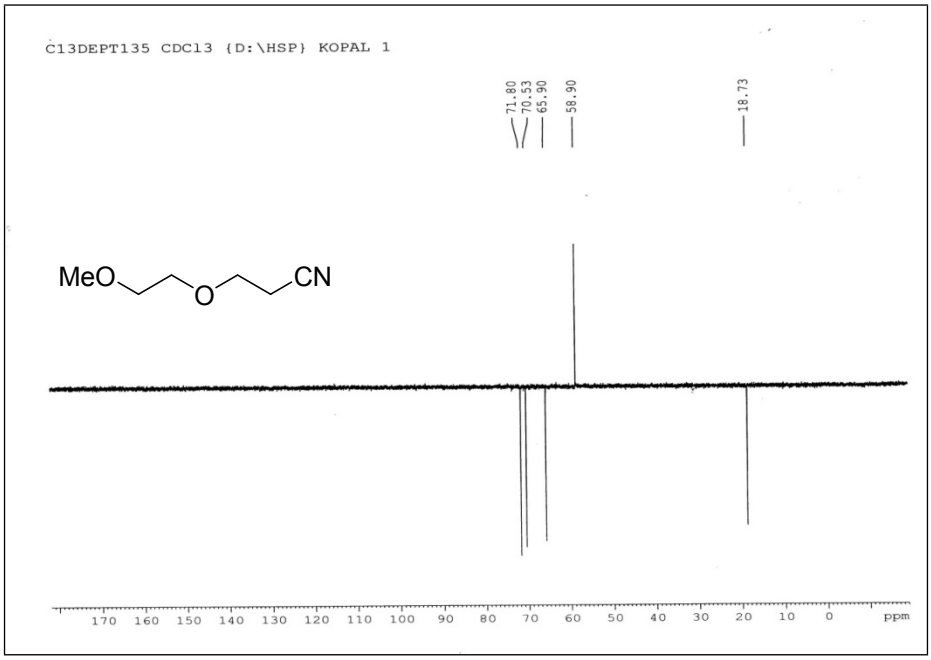

Figure 10. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 3-(2-methoxyethoxy)propanenitrile **6a**.

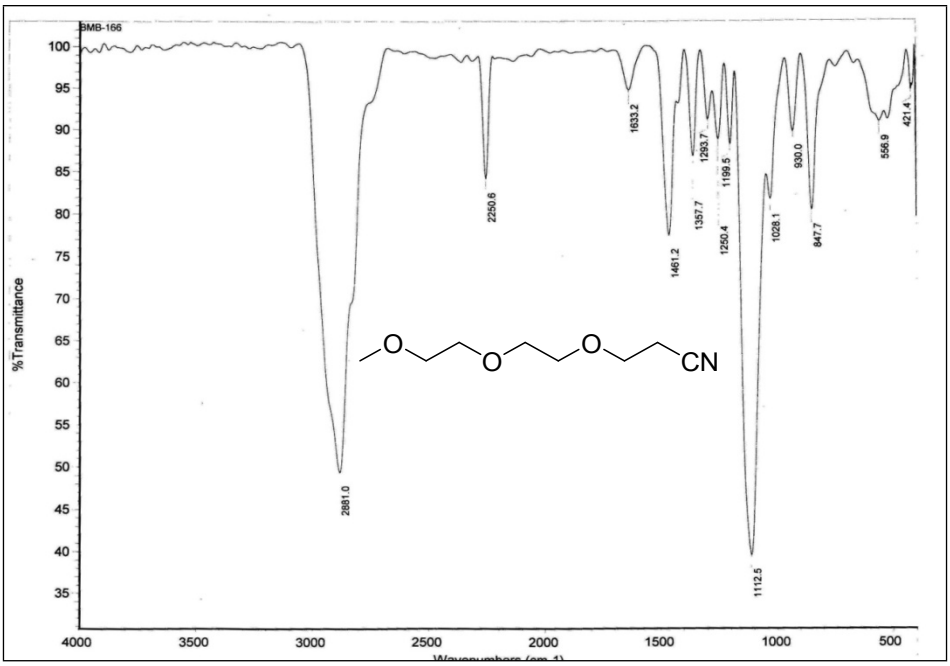

Figure 11. IR (KBr) spectrum of 3-(2-(2-methoxyethoxy)ethoxy)propanenitrile **6b**.

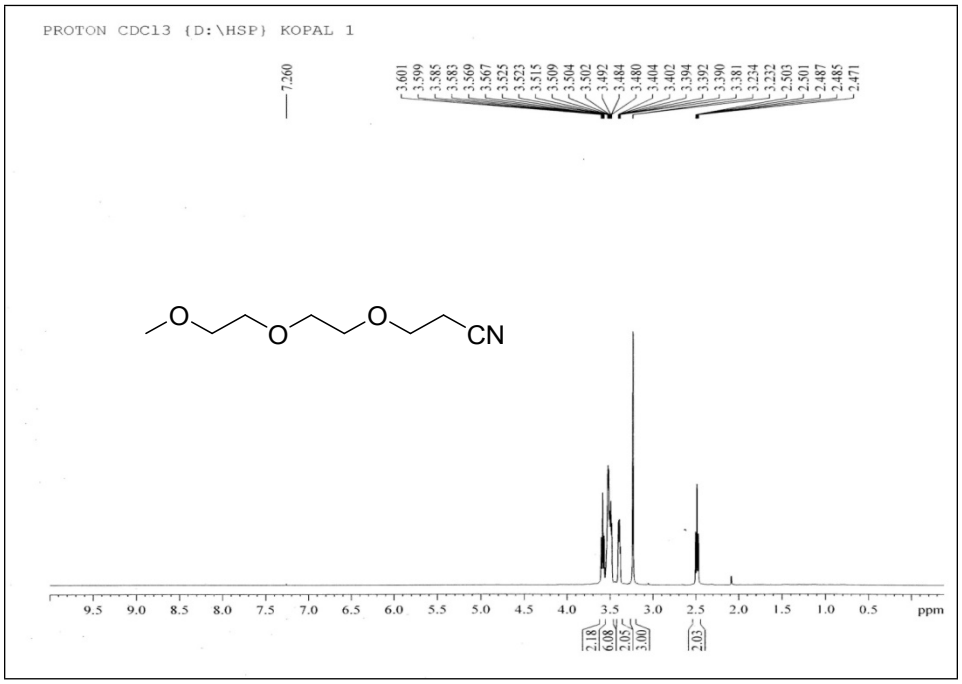

Figure 12. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 3-(2-(2-methoxyethoxy)ethoxy)propanenitrile **6b**.

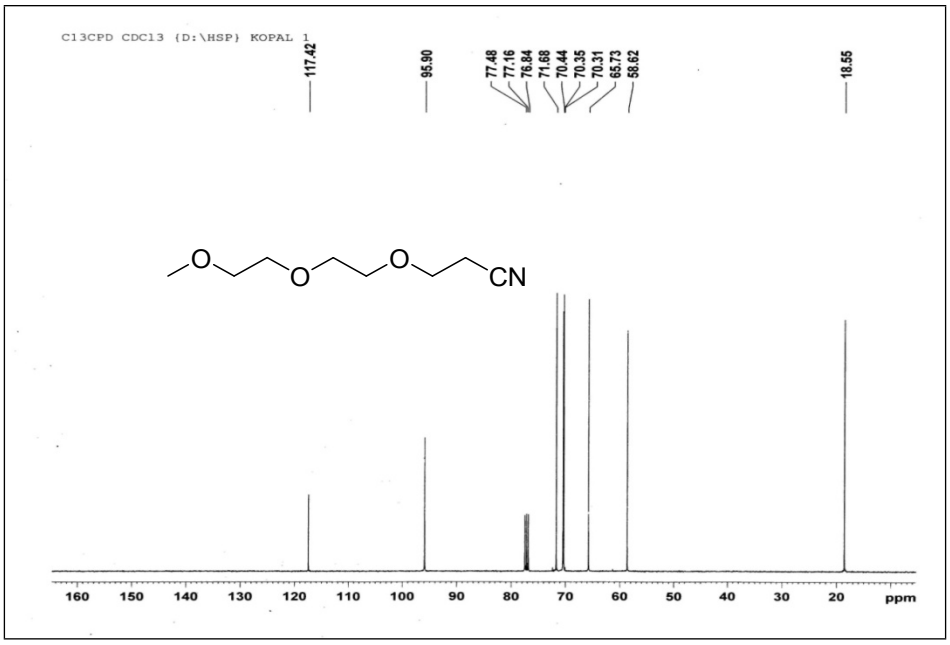

Figure 13. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 3-(2-(2-methoxyethoxy)ethoxy)propanenitrile **6b**.

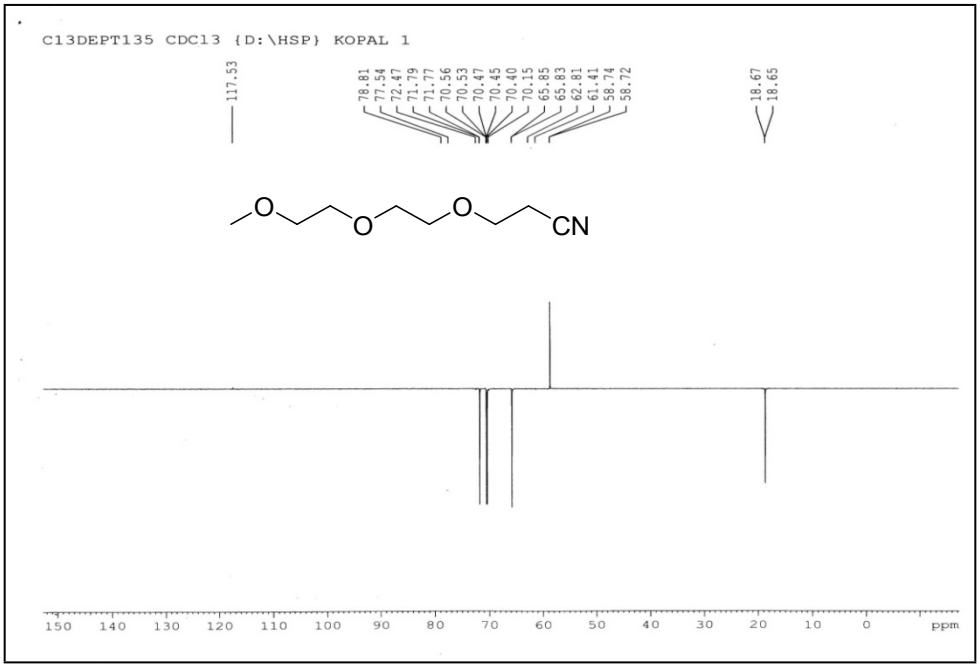

Figure 14. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of3-(2-(2-methoxyethoxy)ethoxy)propanenitrile **6b**.

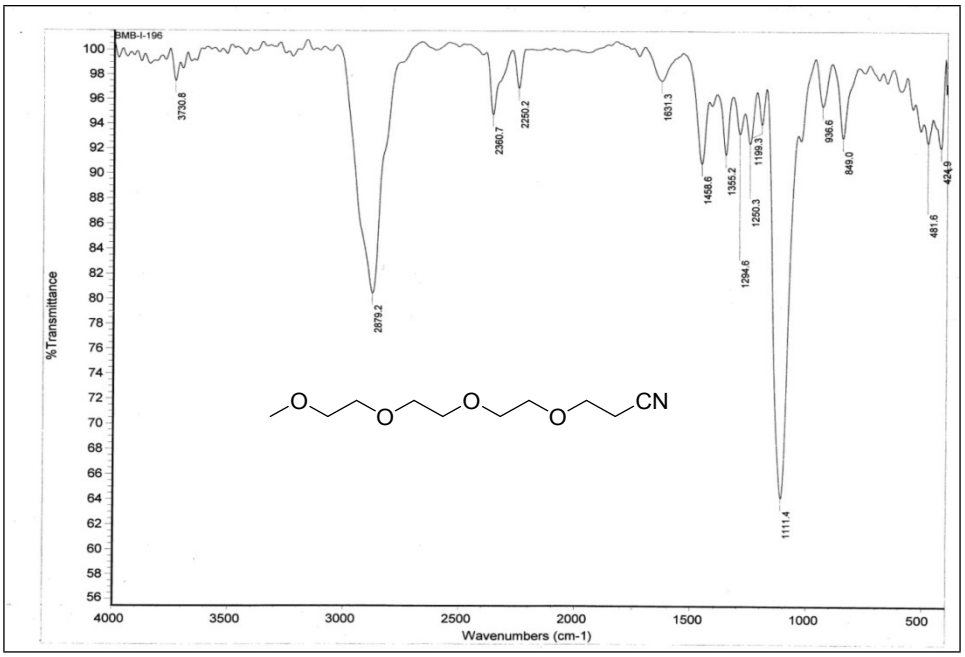

Figure 15.IR (KBr) spectrum of 2,5,8,11-tetraoxatetradecane-14-nitrile **6c**.

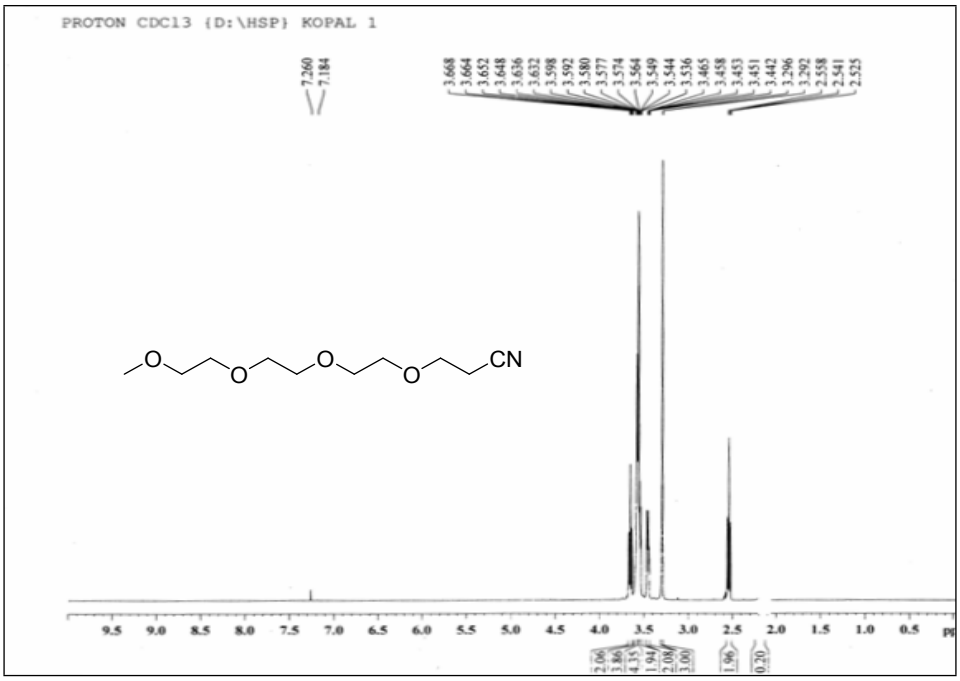

Figure 16. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11-tetraoxatetradecane-14-nitrile **6c**.

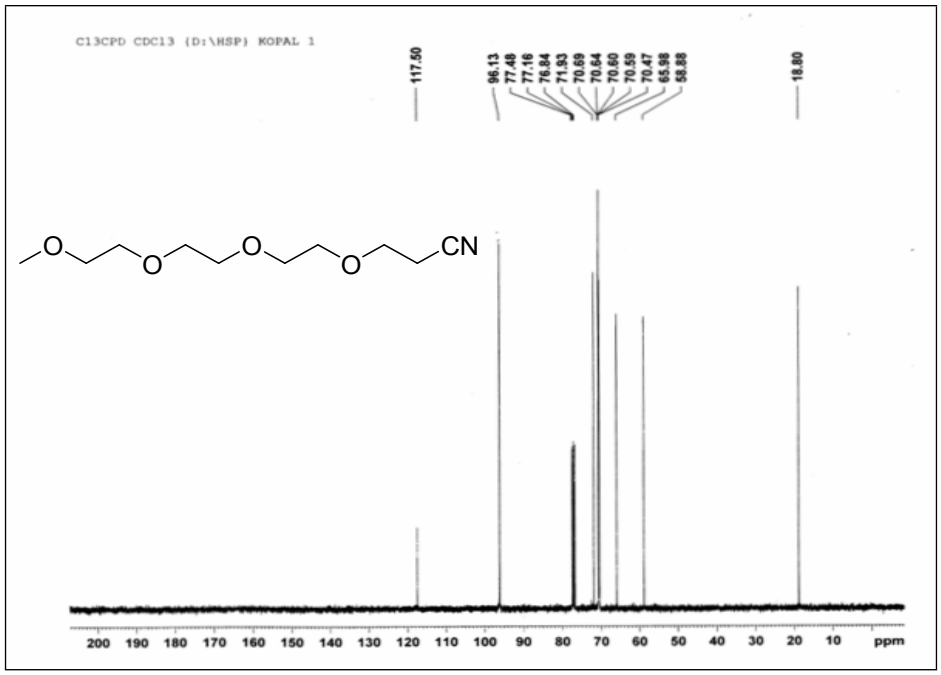

Figure 17. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11-tetraoxatetradecane-14-nitrile **6c**.

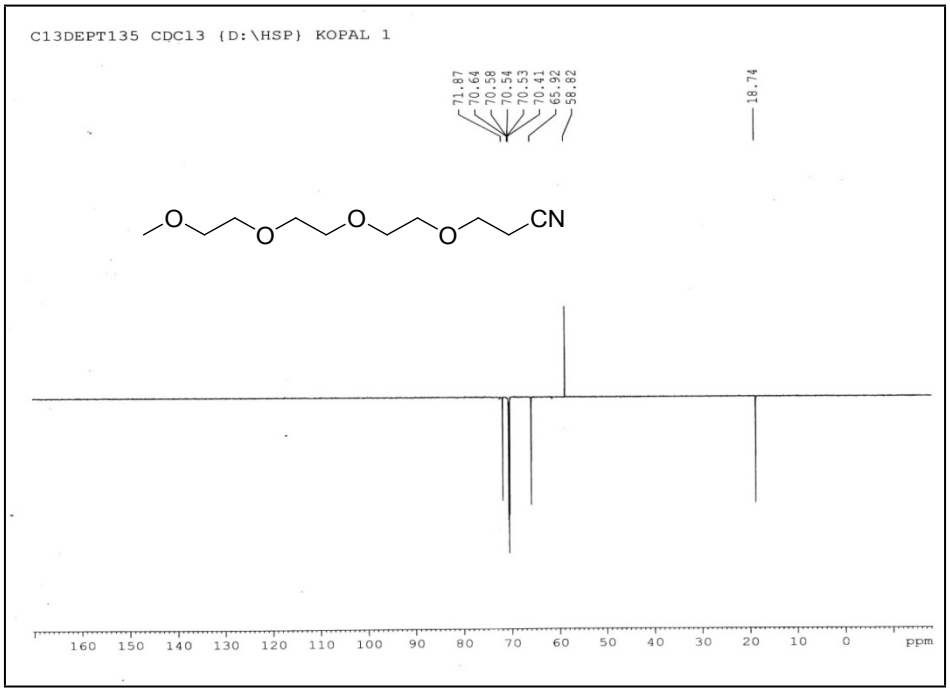

Figure 18. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11-tetraoxatetradecane-14-nitrile **6c**.

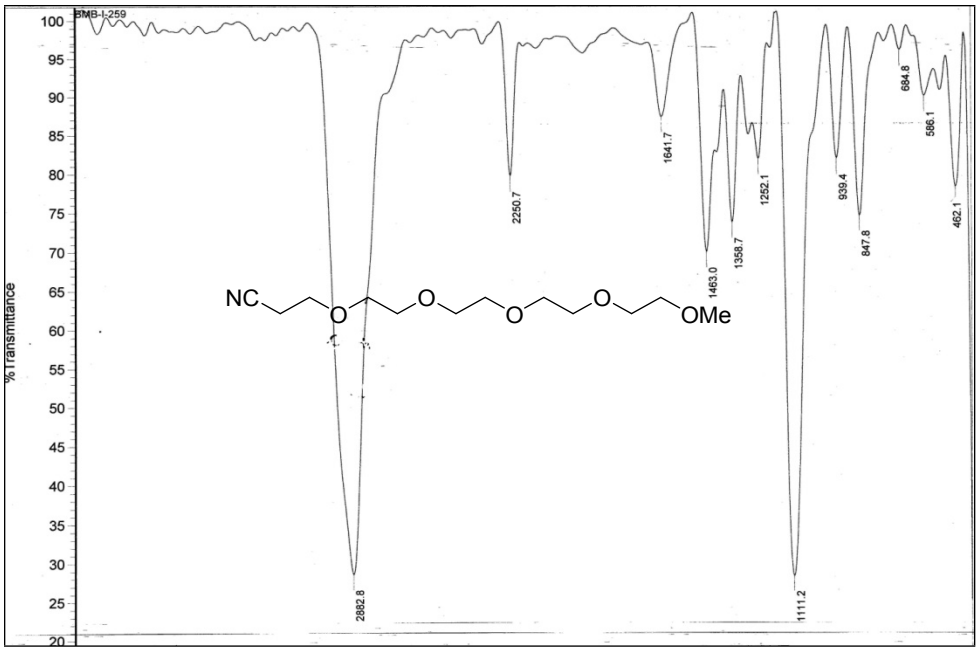

Figure 19. IR (KBr) spectrum of 2,5,8,11,14-pentaoxaheptadecane-17-nitrile **6d**.

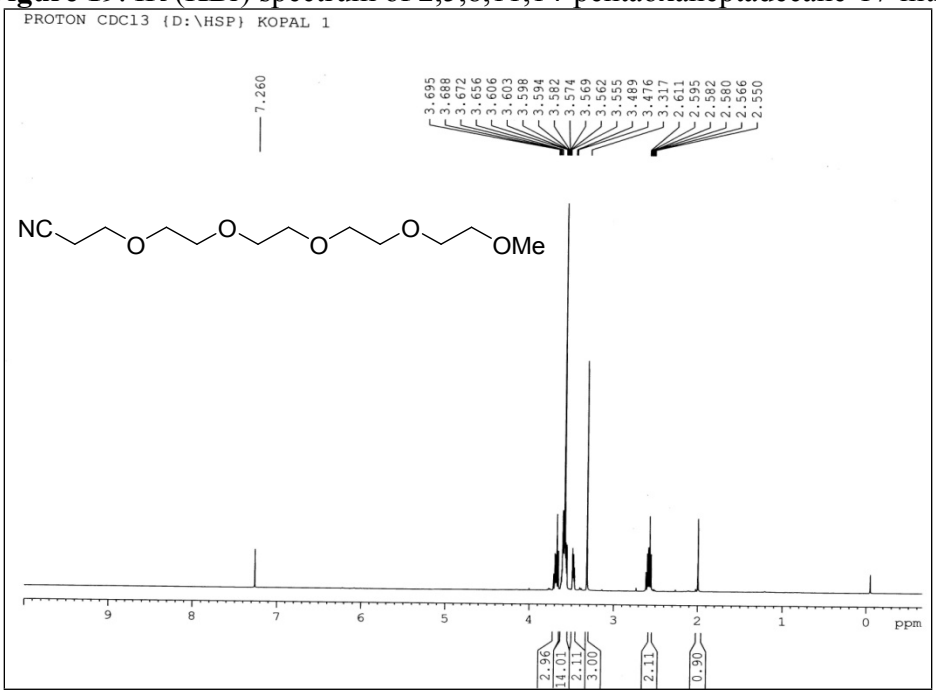

Figure 20. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11,14-pentaoxaheptadecane-17-nitrile **6d**.

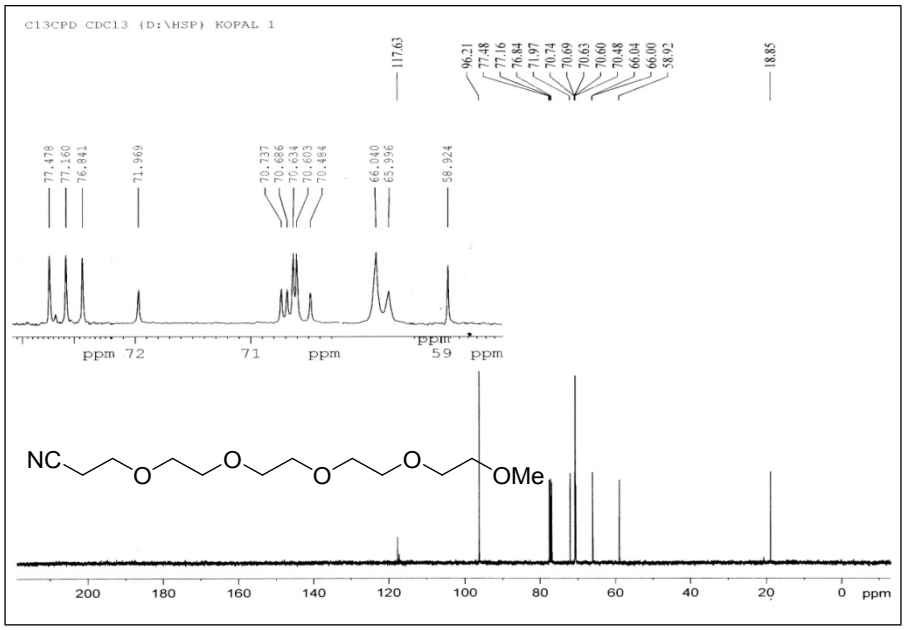

Figure 21. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11,14-pentaoxaheptadecane-17-nitrile **6d**.

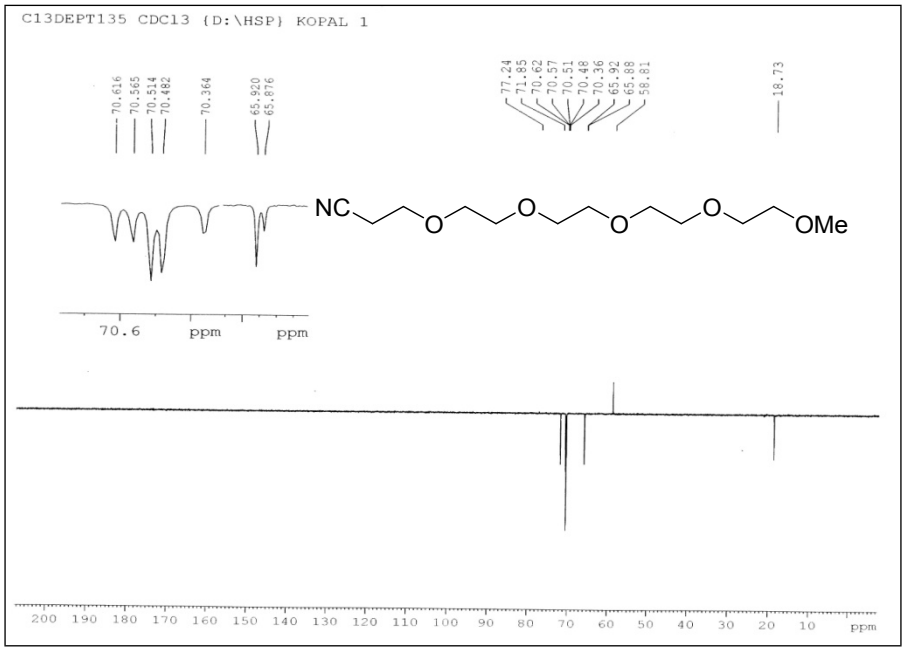

Figure 22. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 2,5,8,11,14-pentaoxaheptadecane-17-nitrile **6d**.

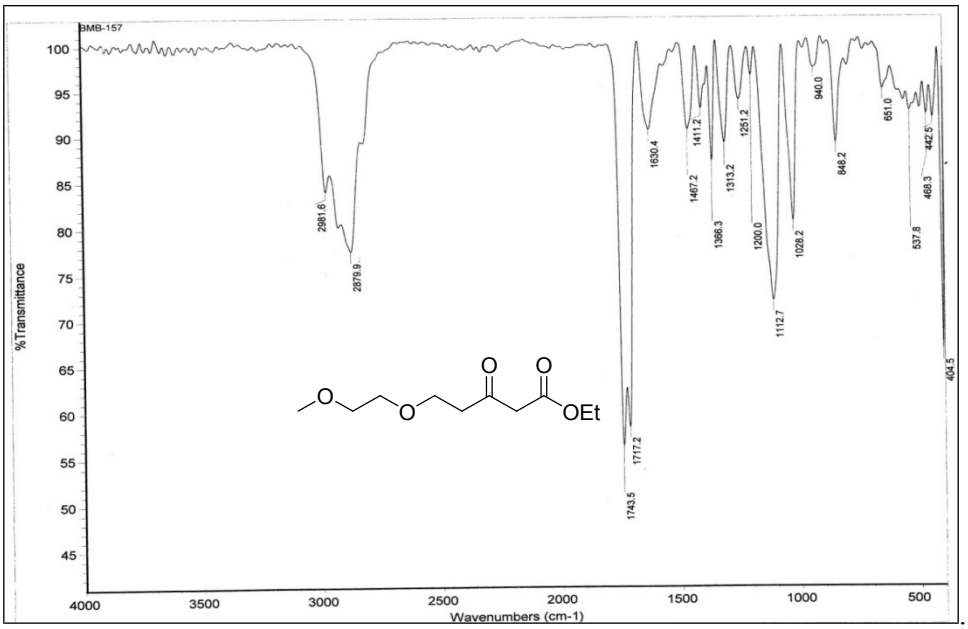

Figure 23. IR (KBr) spectrum of ethyl 5-(2-methoxyethoxy)-3- oxopentan oxopentanoate **7a**.

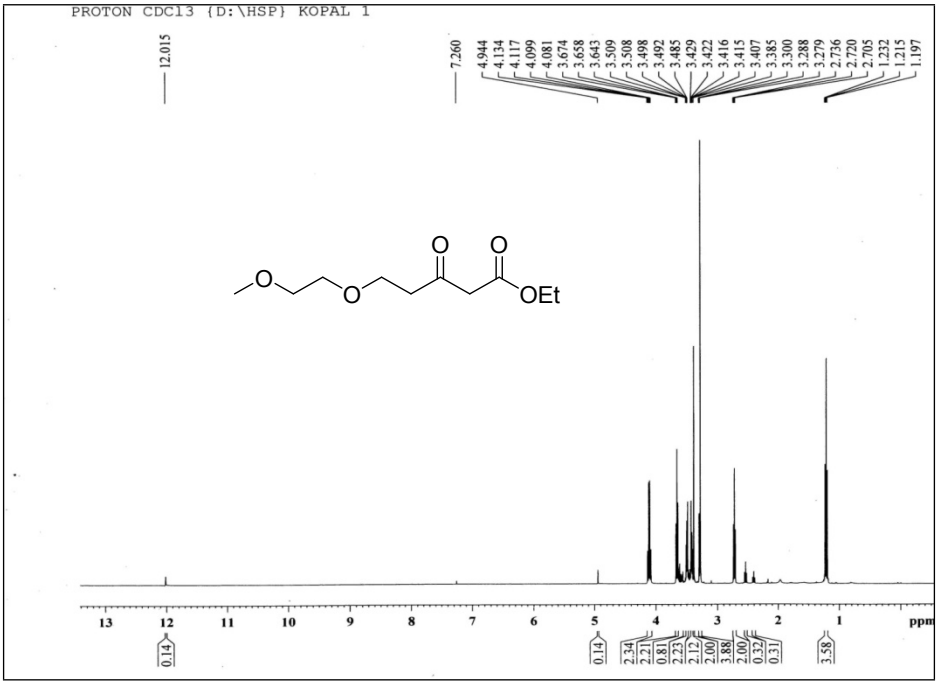

Figure 24.[1]H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 5-(2-methoxyethoxy)-3-oxopentanoate **7a**.

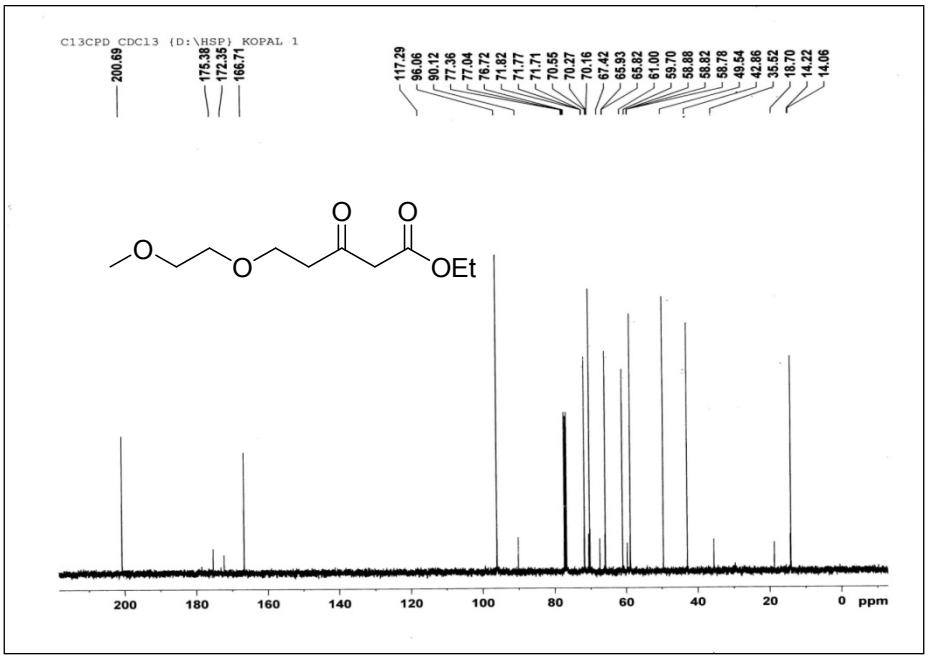

Figure 25. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 5-(2-methoxyethoxy)-3-oxopentanoate **7a**.

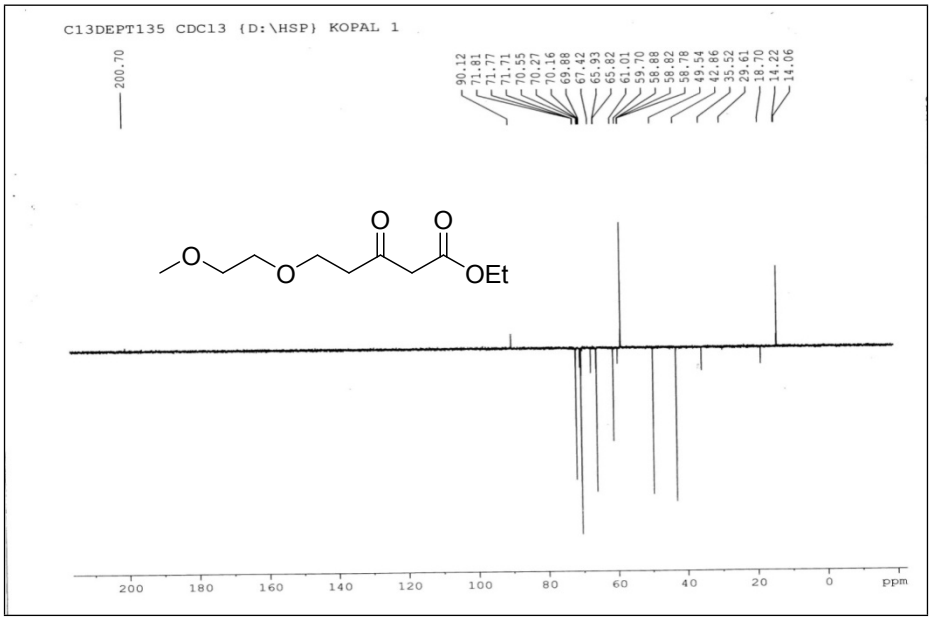

Figure 26. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 5- (2-methoxyethoxy)-3-oxopentanoate **7a**.

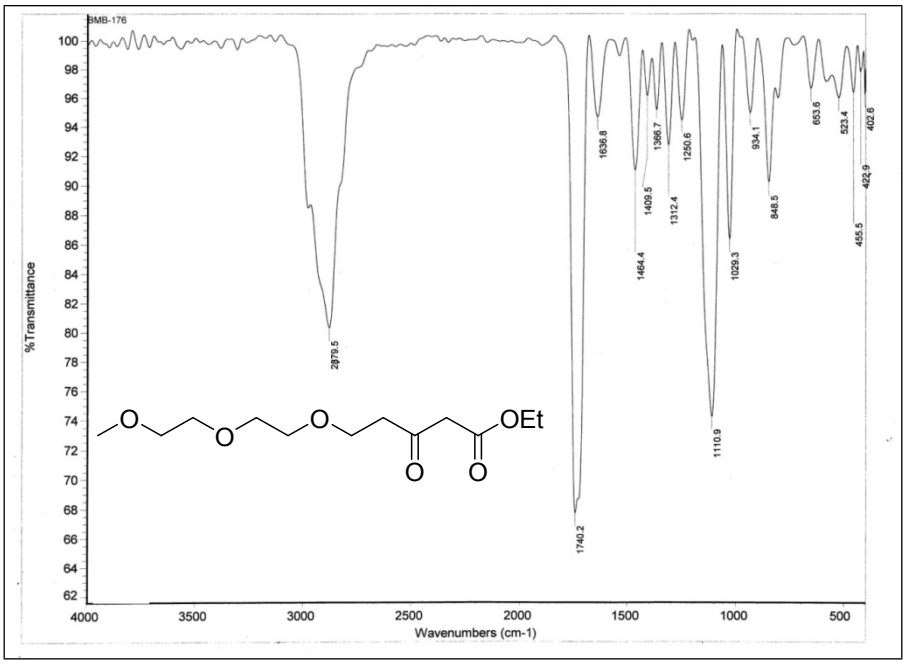

Figure 27. IR (KBr) spectrum of ethyl 5-(2-(2-methoxyethoxy)ethoxy)-3-oxopentanoate **7b**.

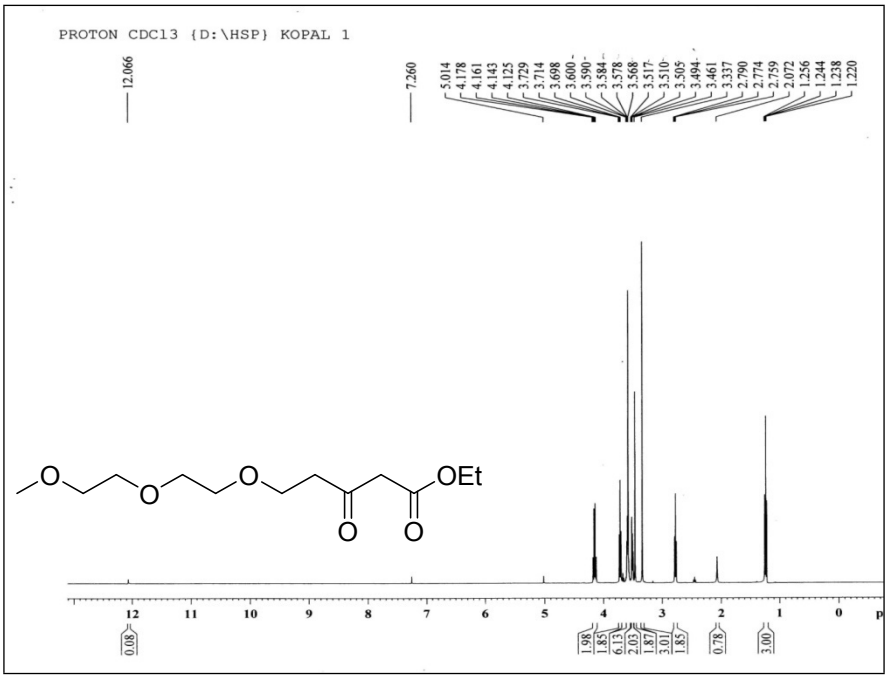

Figure 28. ^{1}H (400 MHz, $CCl_{4+}CDCl_3$, 1:1) spectrum of ethyl 5-(2-(2-methoxyethoxy)ethoxy)-3-oxopentanoate **7b**.

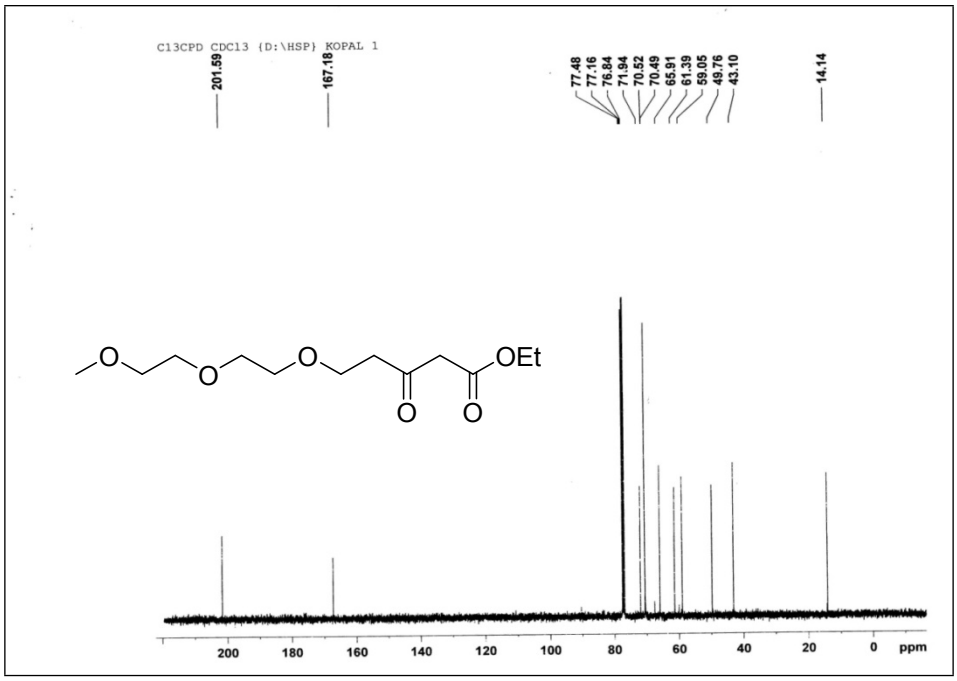

Figure 29. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 5-(2-(2-methoxyethoxy)ethoxy)-3-oxopentanoate **7b**.

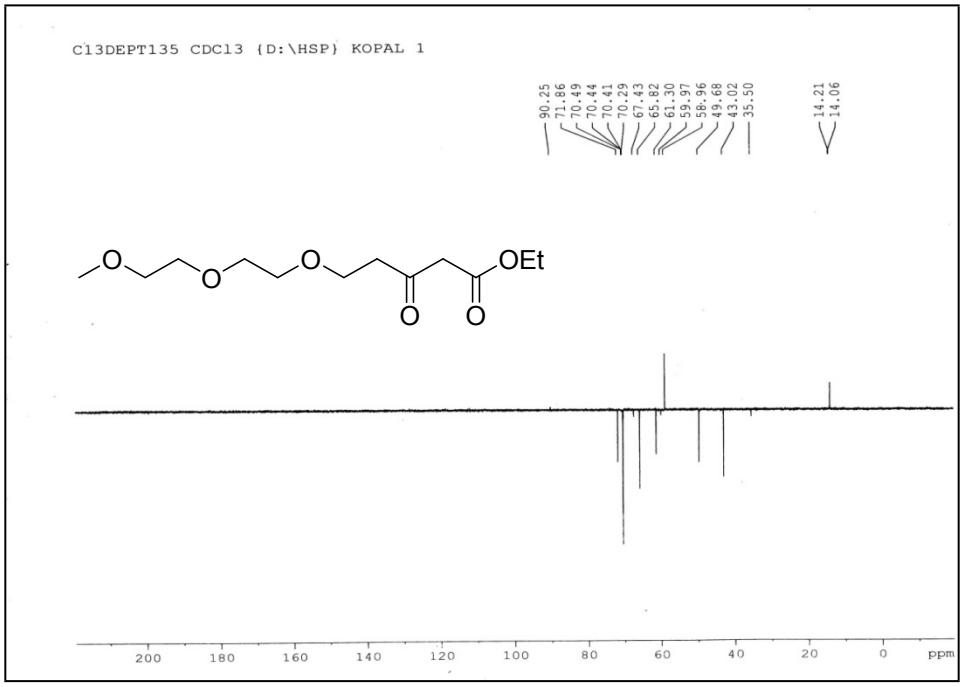

Figure 30. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 5-(2-(2-methoxyethoxy)ethoxy)-3-oxopentanoate **7b**.

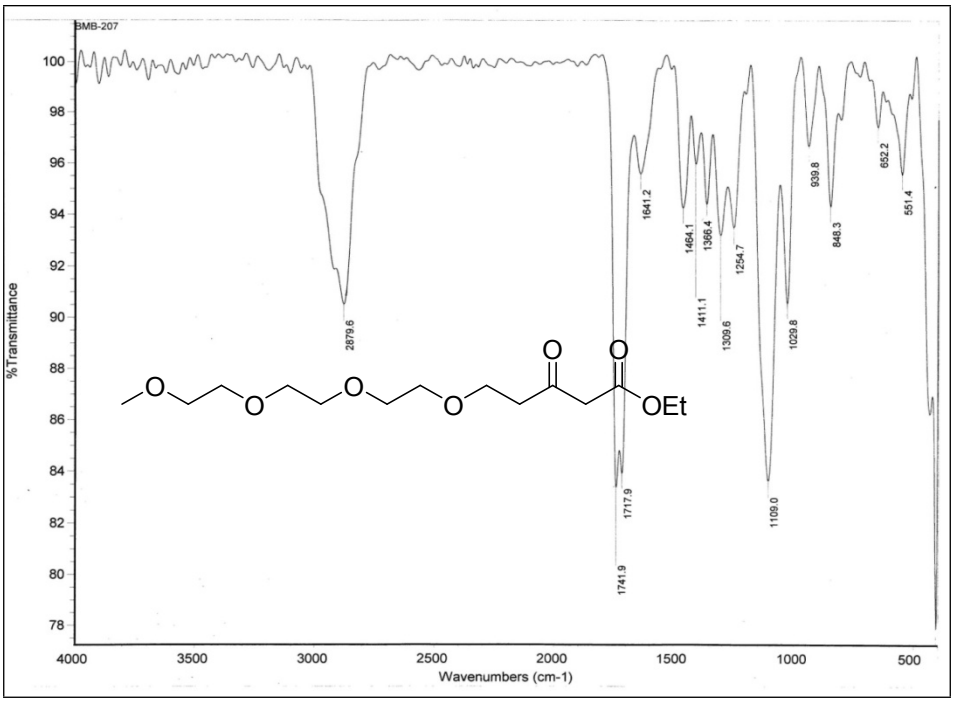

Figure 31. IR (KBr) spectrum of ethyl 14-oxo-2,5,8,11-tetraoxahexadecan-16-oate **7c**.

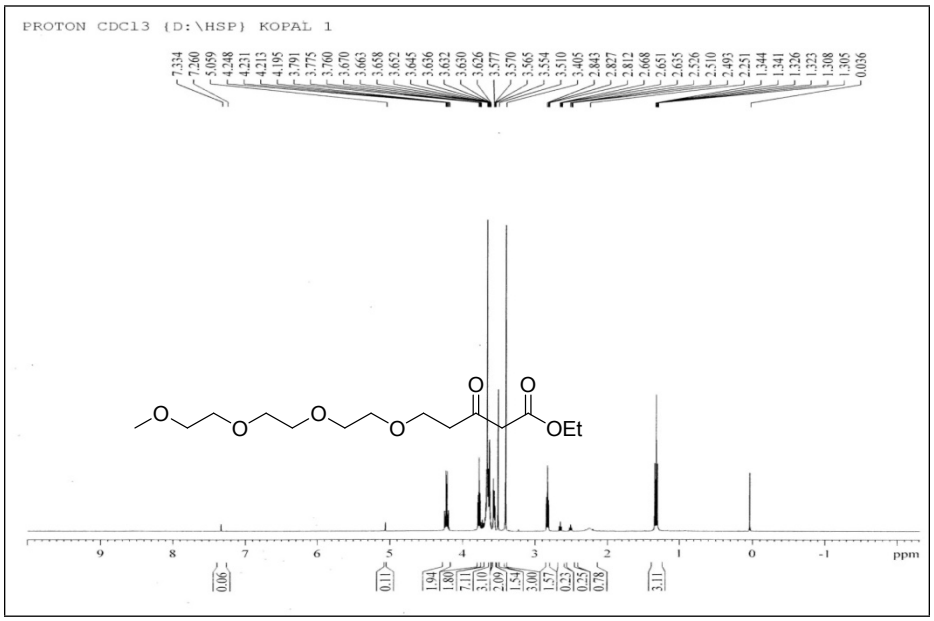

Figure 32. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 14-oxo-2,5,8,11-tetraoxahexadecan-16-oate **7c**.

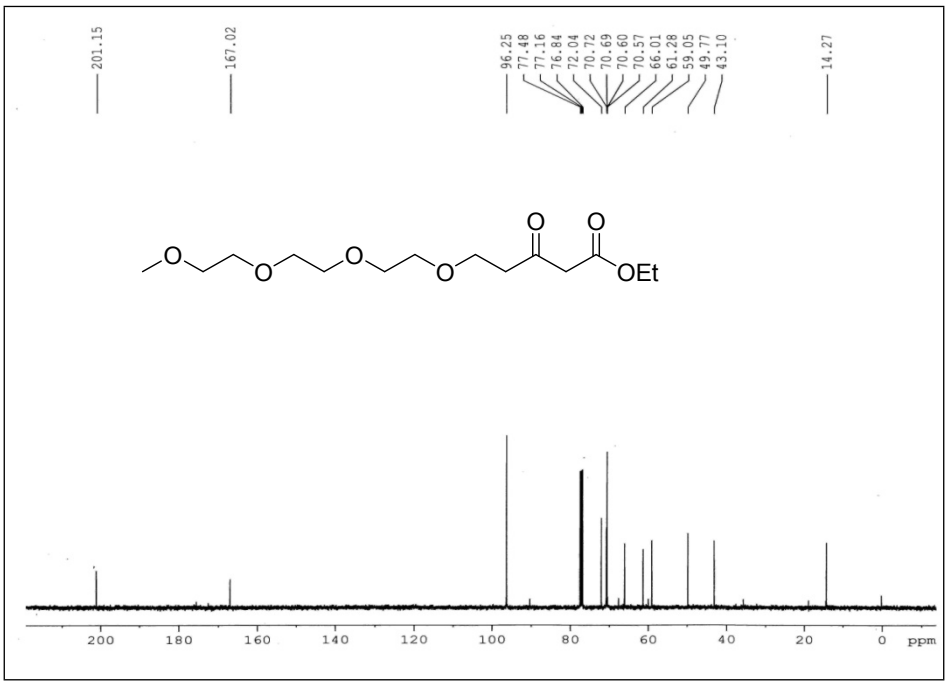

Figure 33. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 14-oxo-2,5,8,11-tetraoxahexadecan-16-oate **7c**.

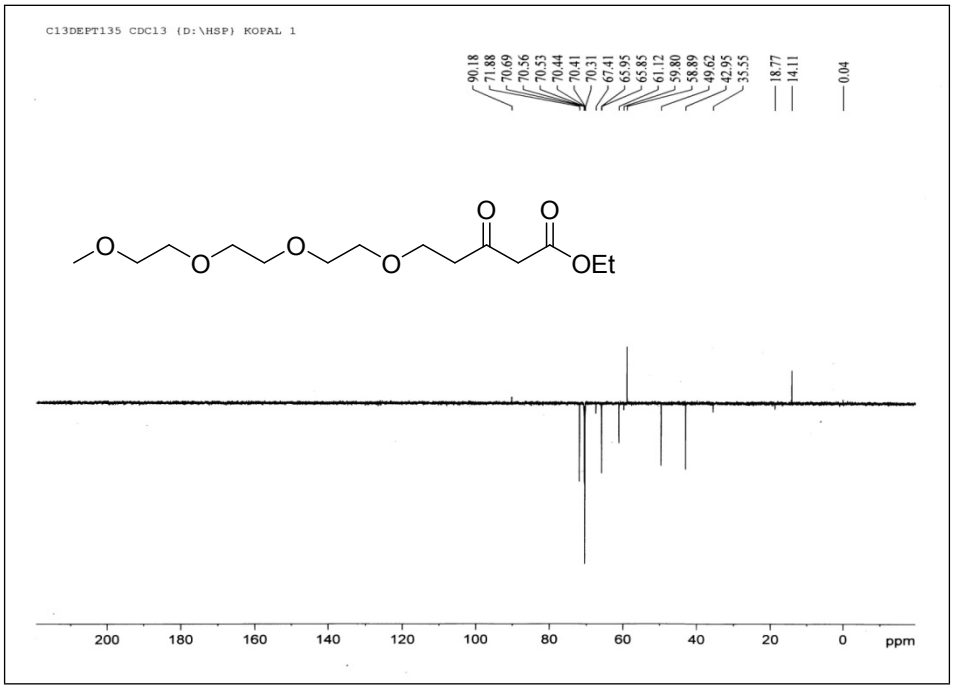

Figure 34. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 14-oxo-2,5,8,11-tetraoxahexadecan-16-oate **7c**.

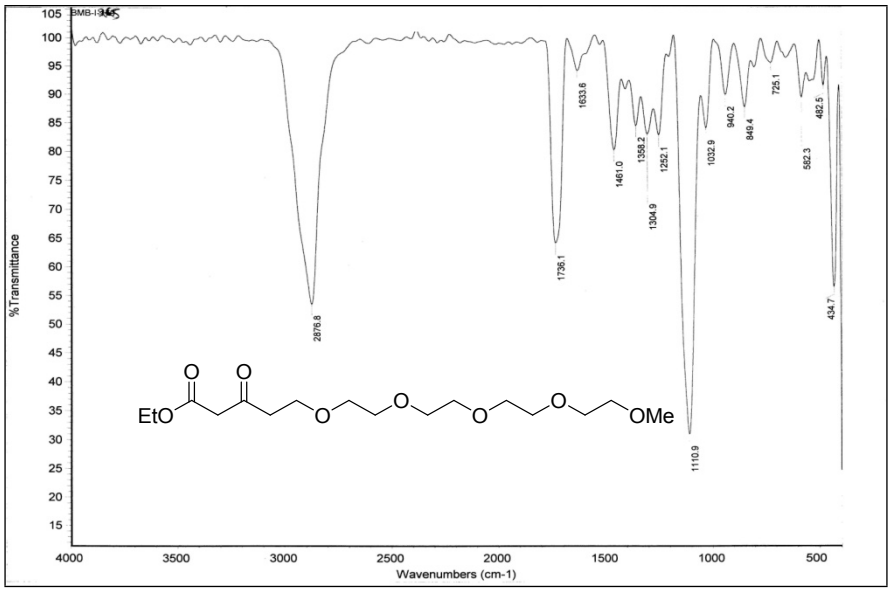

Figure 35. IR (KBr) spectrum of ethyl 17-oxo-2,5,8,11,14-pentaoxanonadecan-19-oate **7d**.

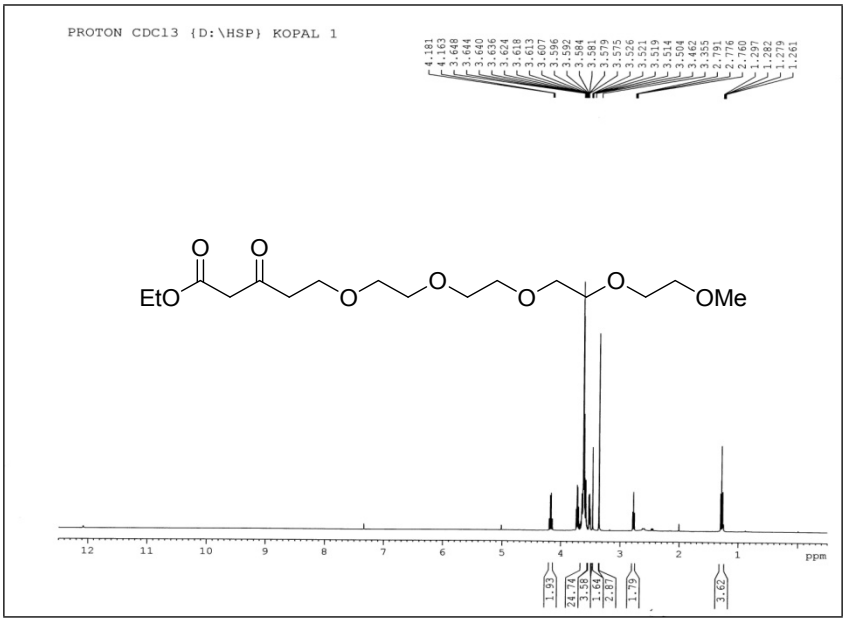

Figure 36. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 17-oxo-2,5,8,11,14-pentaoxanonadecan-19-oate **7d**.

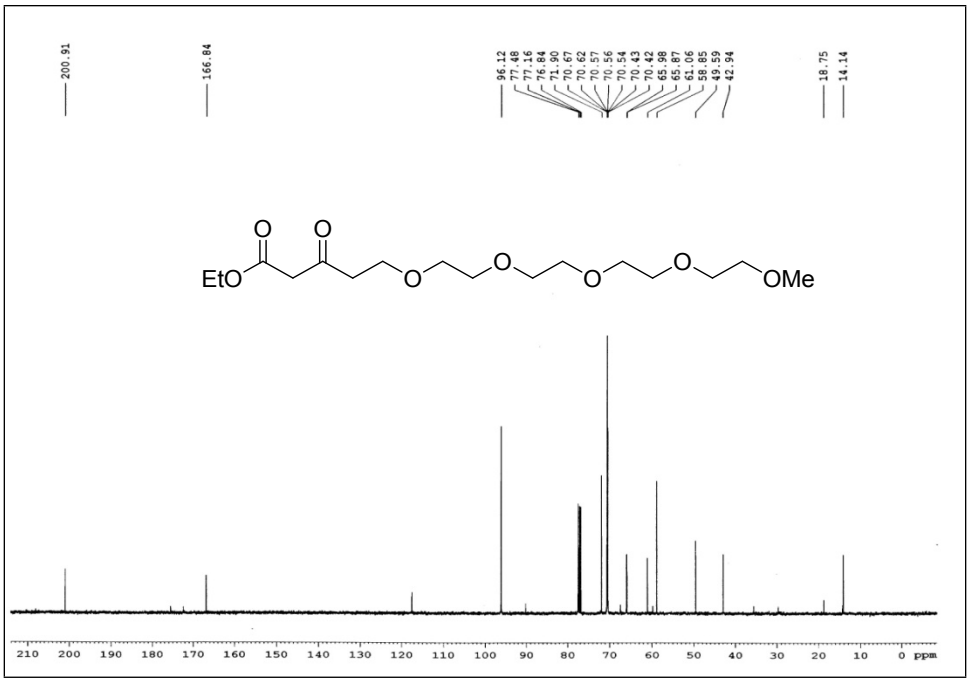

Figure 37. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 17-oxo-2,5,8,11,14-pentaoxanonadecan-19-oate **7d**.

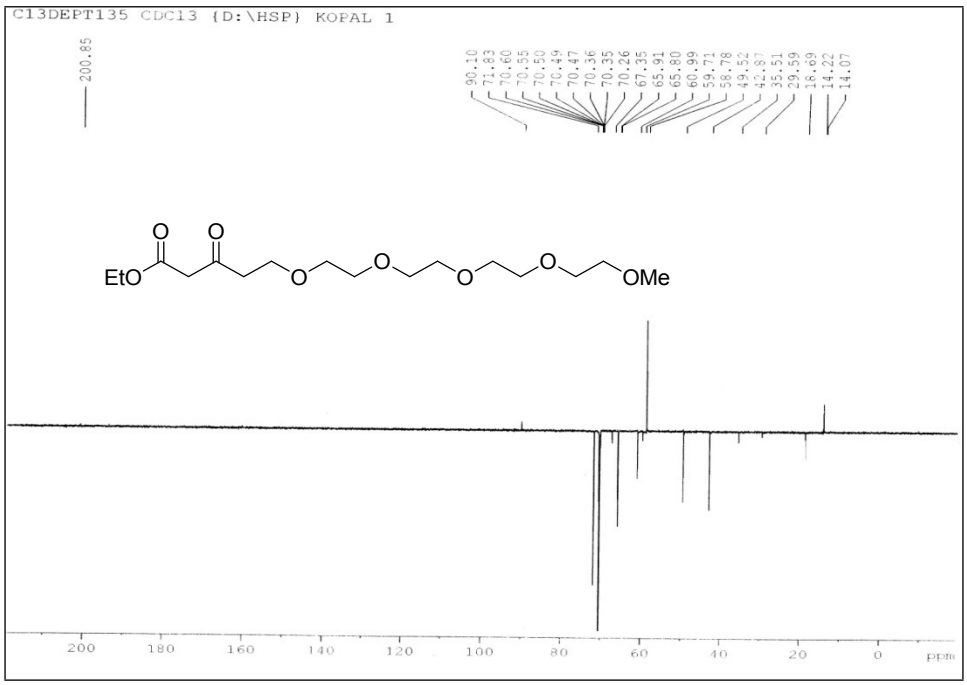

Figure 38. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of ethyl 17-oxo-2,5,8,11,14-pentaoxanonadecan-19-oate **7d.**

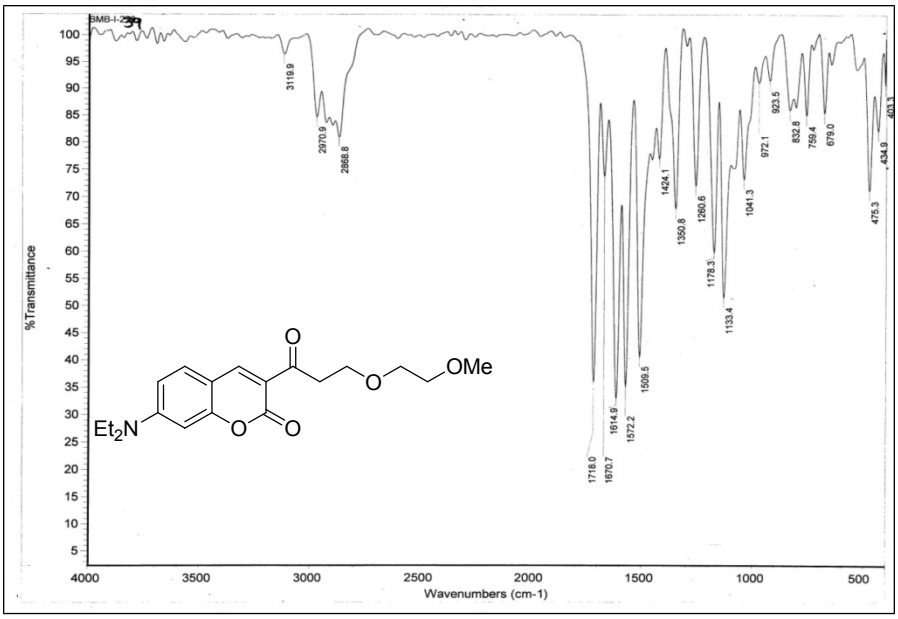

Figure 39. IR (KBr) spectrum of 7-(diethylamino)-3-[3-(2-methoxyethoxy)propanoyl]-2*H*-chromen-2-one **4a**.

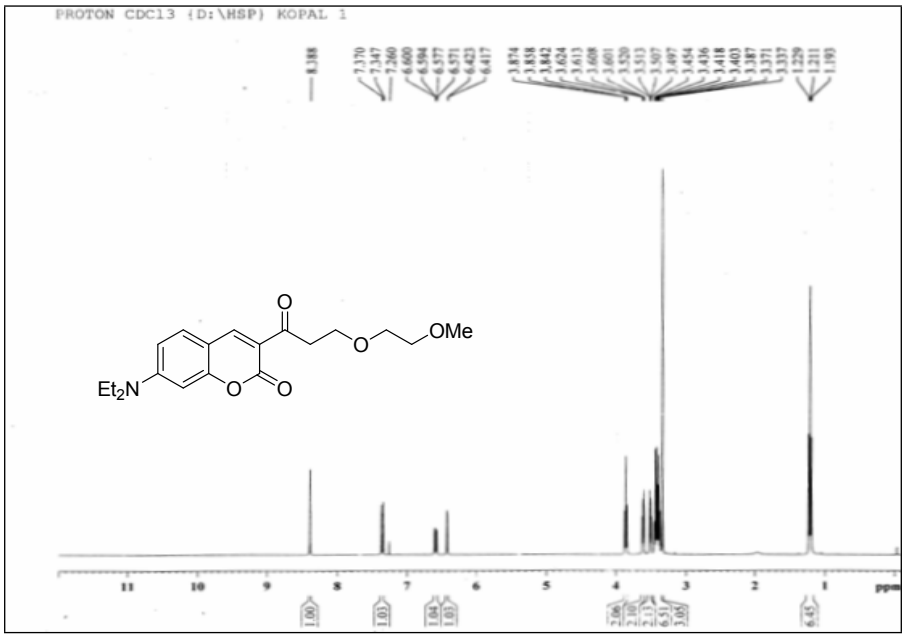

Figure 40. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-(2-methoxyethoxy)propanoyl]-2*H*-chromen-2-one **4a**.

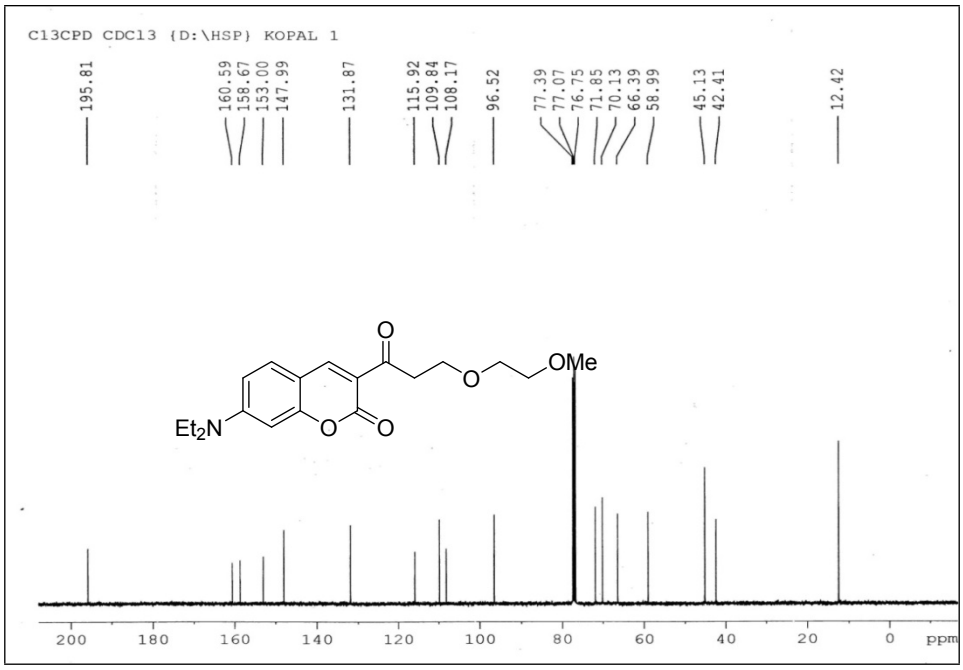

Figure 41. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-(2-methoxyethoxy)propanoyl]-2*H*-chromen-2-one **4a**.

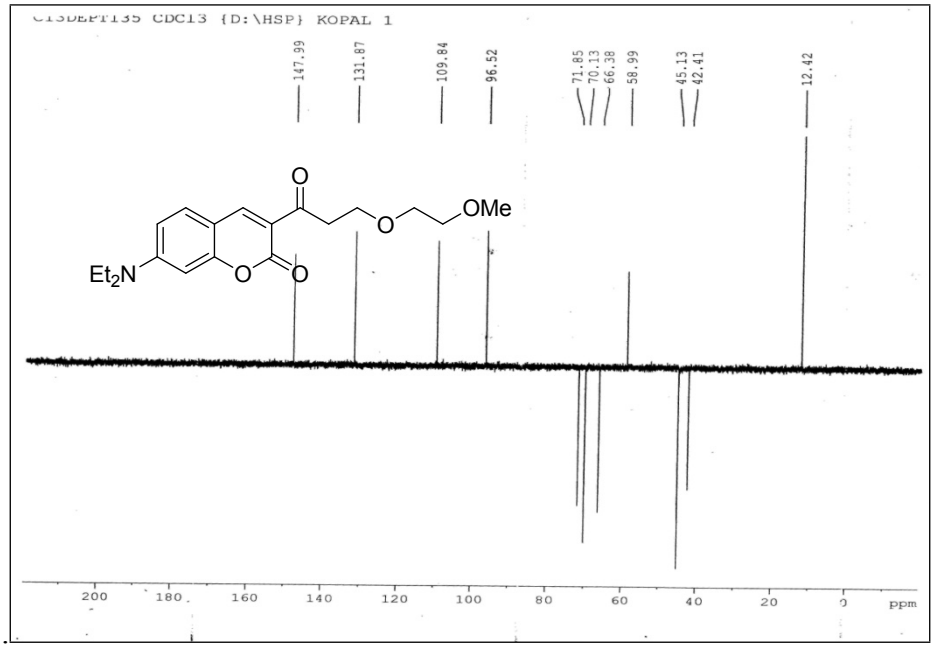

Figure 42. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-(2-methoxyethoxy)propanoyl]-2*H*-chromen-2- one **4a**.

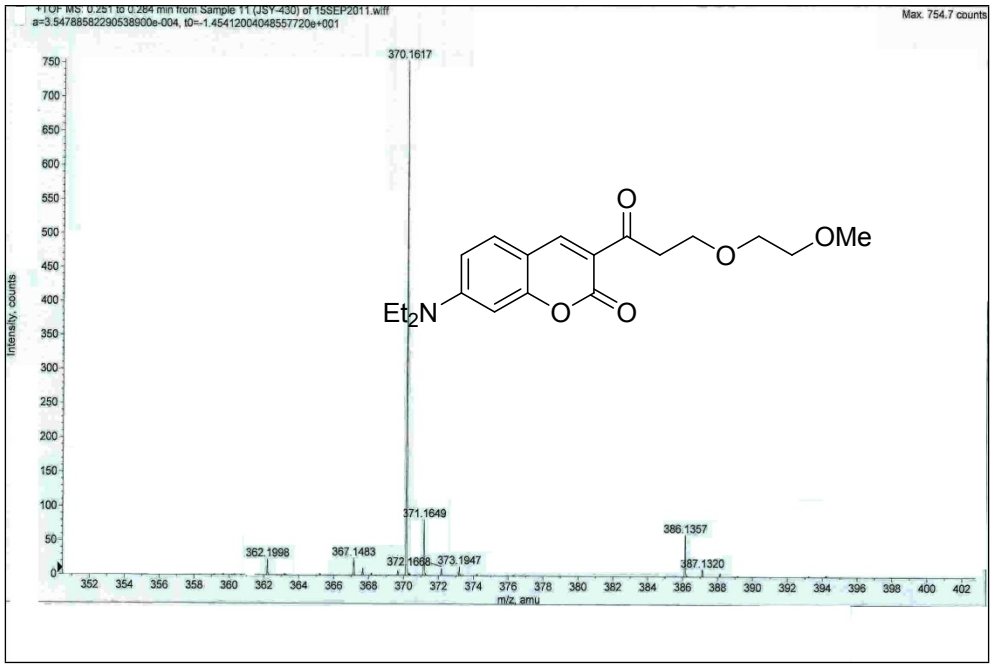

Figure 43. ESI-MS (HRMS) spectrum of 7-(diethylamino)-3-[3-(2-methoxyethoxy)propanoyl]-2*H*-chromen-2-one**4a**.

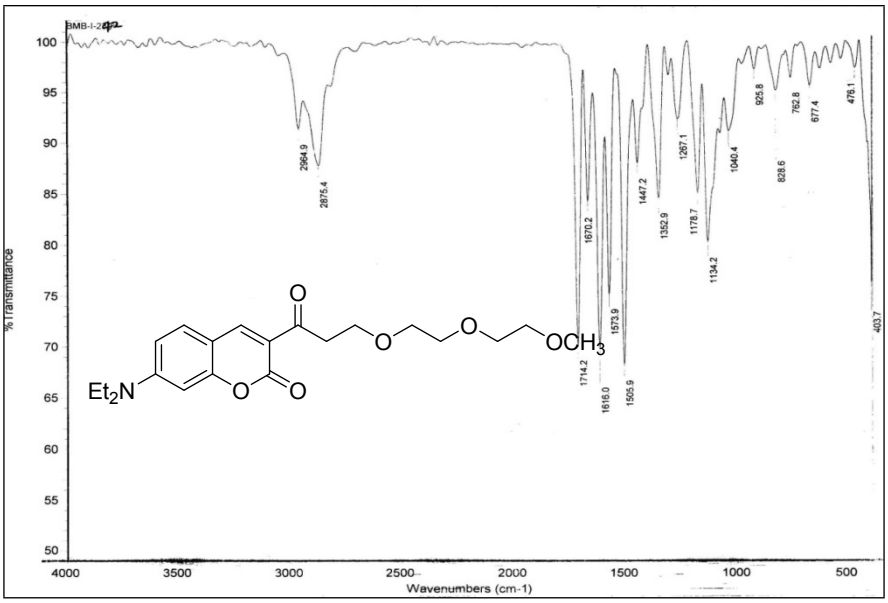

Figure 44. IR (KBr) spectrum of 7-(dimethylamino)-3-[3-[2-(2-methoxyethoxy)ethoxy]propanoyl]-2*H*-chromen-2-one **4b**.

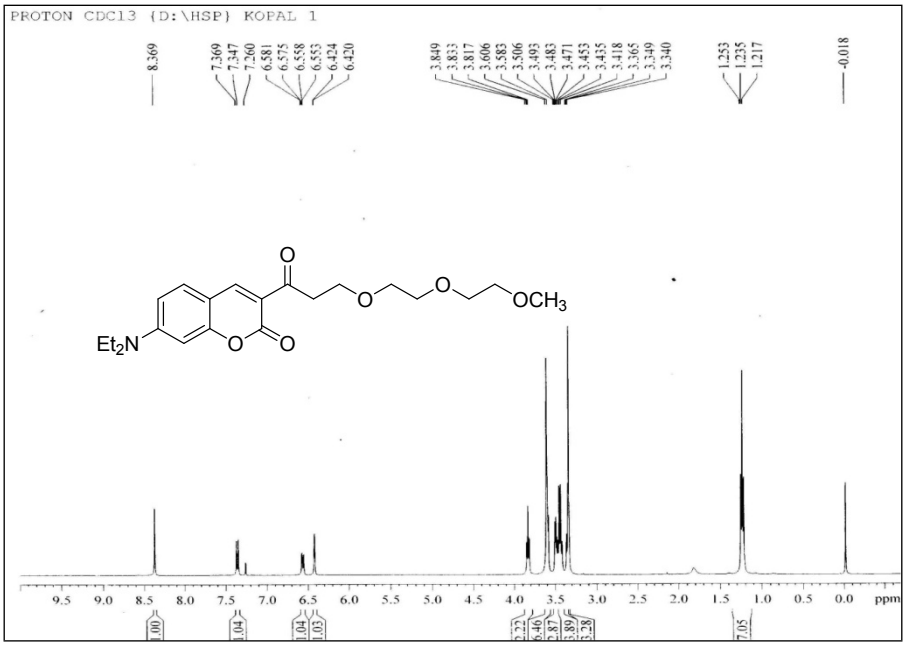

Figure 45. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(dimethylamino)-3-[3-[2-(2-methoxyethoxy)ethoxy]propanoyl]-2*H*-chromen-2-one **4b**.

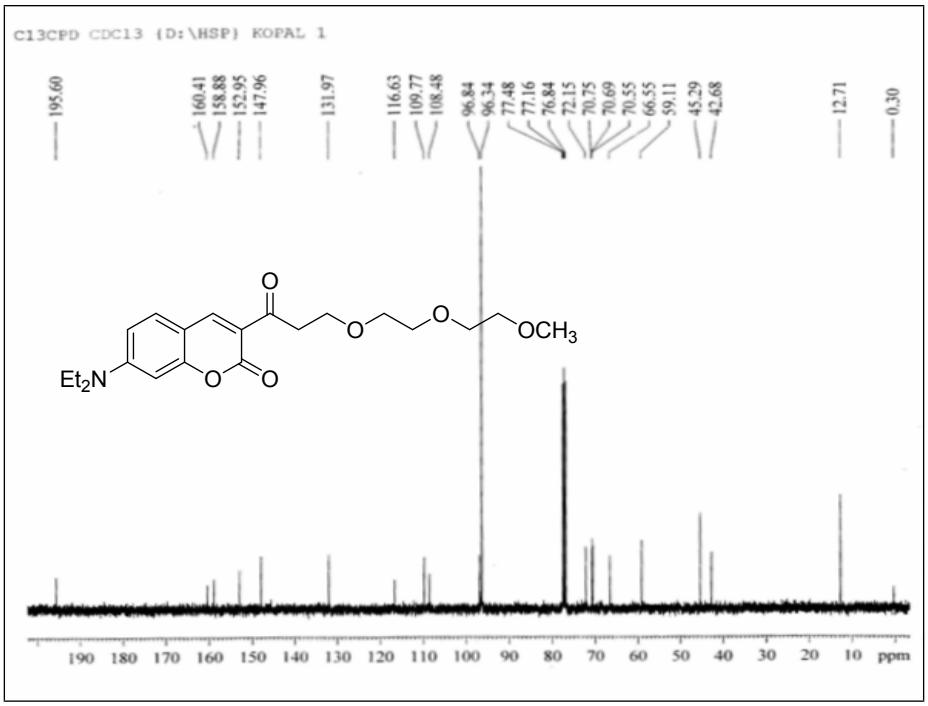

Figure 46. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(dimethylamino)-3-[3-[2-(2-methoxyethoxy)ethoxy]propanoyl]-2*H*-chromen-2-one **4b**.

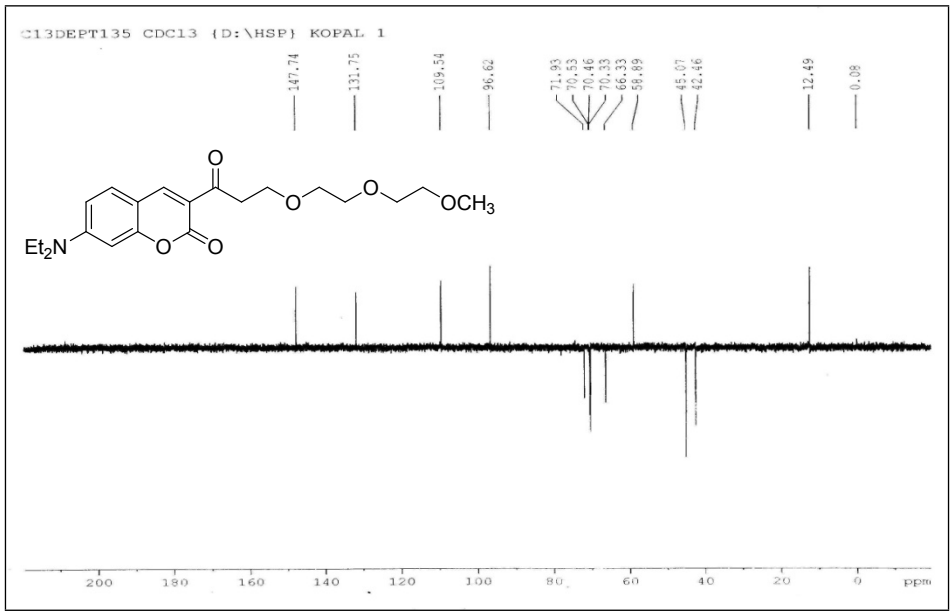

Figure 47. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(dimethylamino)-3-[3-[2-(2-methoxyethoxy)ethoxy]propanoyl]-2*H*-chromen-2-one **4b**.

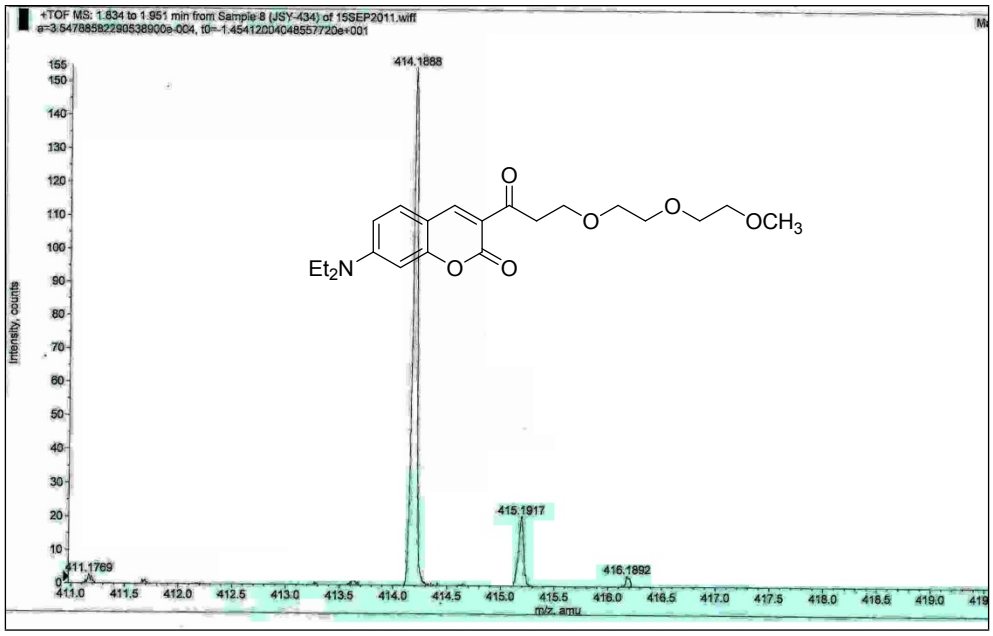

Figure 48. ESI-MS (HRMS) spectrum of 7-(dimethylamino)-3-[3-[2-(2-methoxyethoxy)ethoxy]propanoyl]-2*H*-chromen-2-one **4b**.

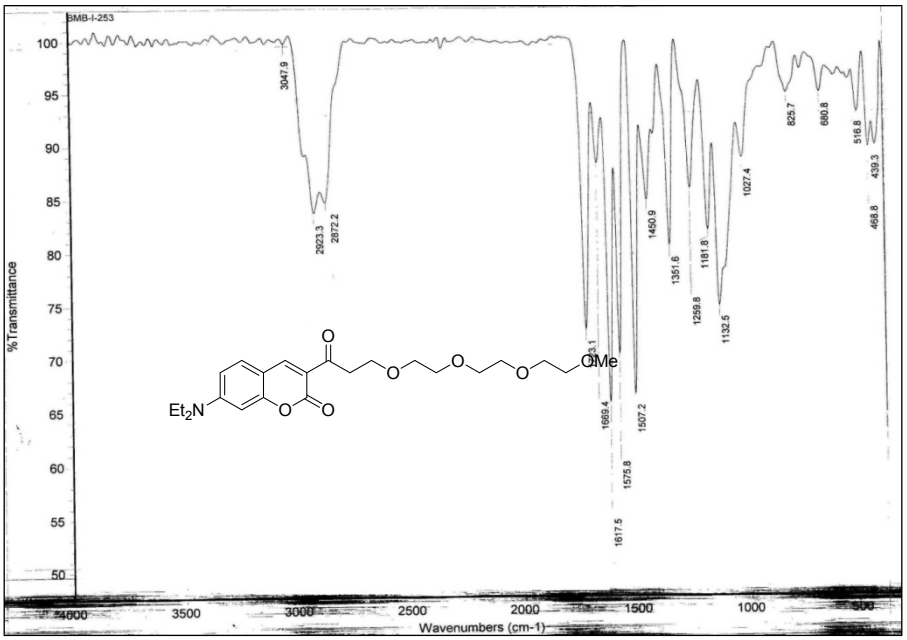

Figure 49. IR (KBr) spectrum of 7-(diethylamino)-3-[3-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4c**.

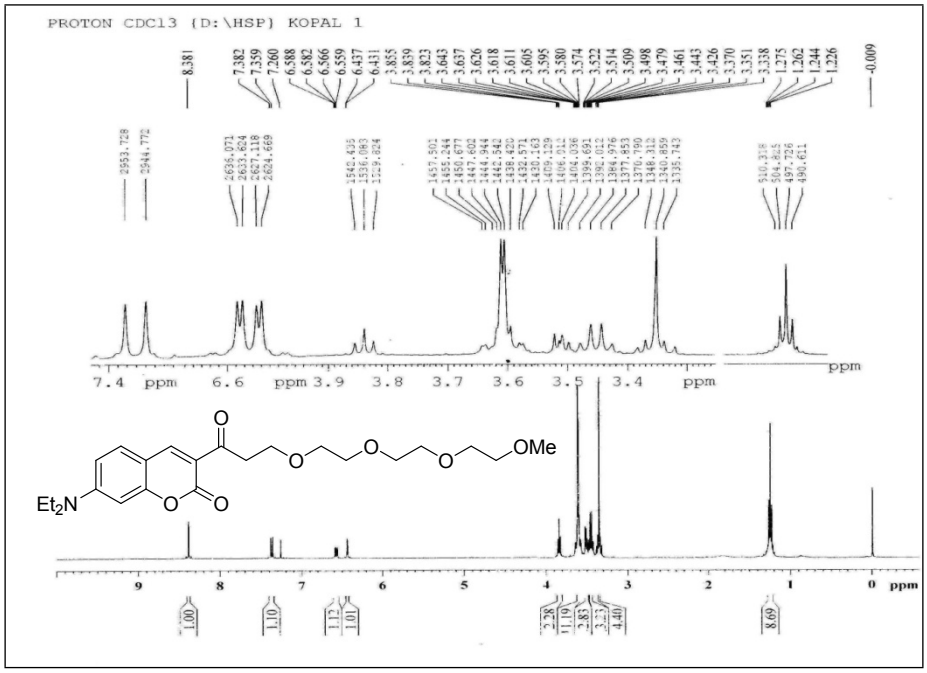

Figure 50. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4c**.

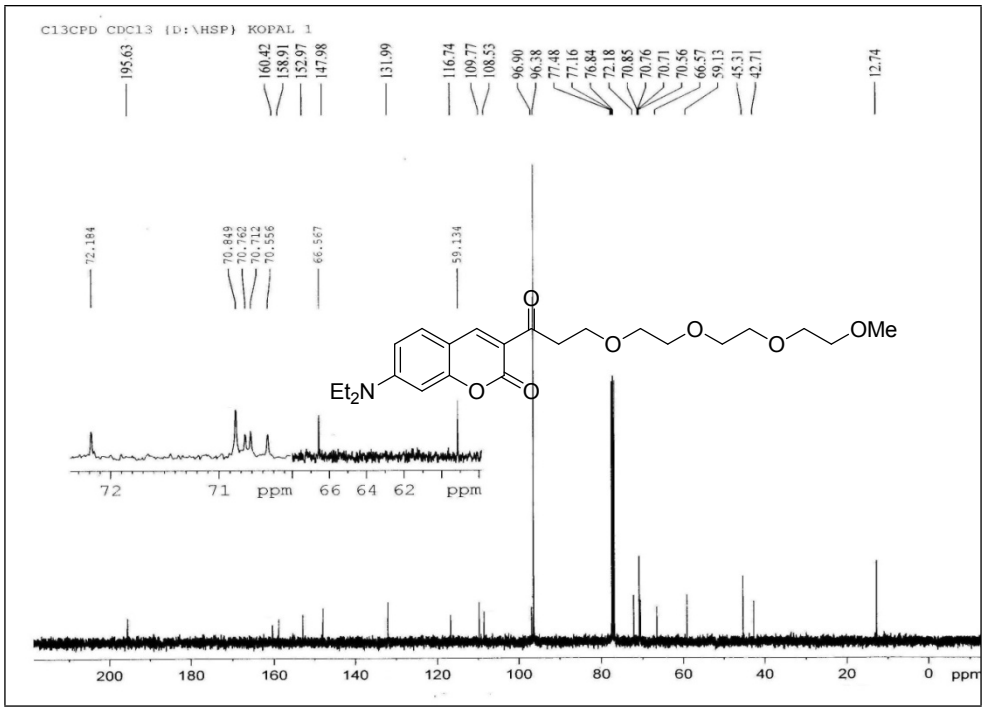

Figure 51. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4c**.

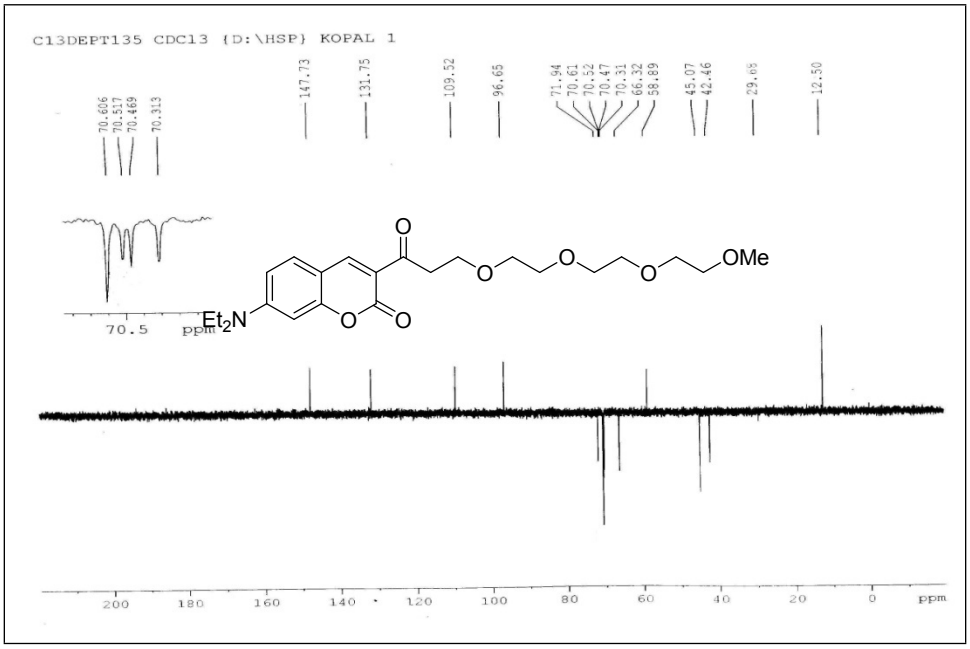

Figure 52. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4c**.

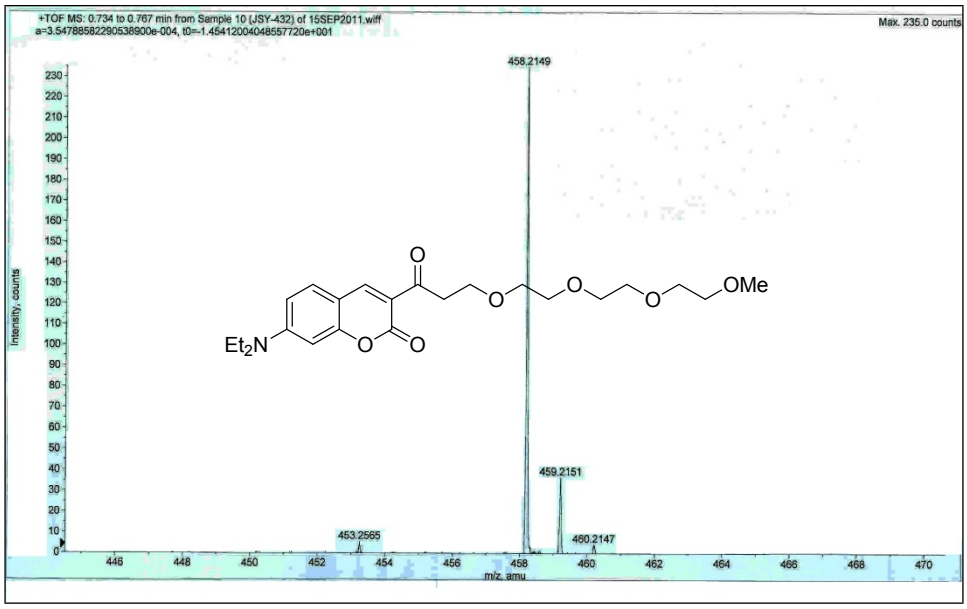

Figure 53. ESI-MS (HRMS) spectrum of 7-(diethylamino)-3-[3-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4c.**

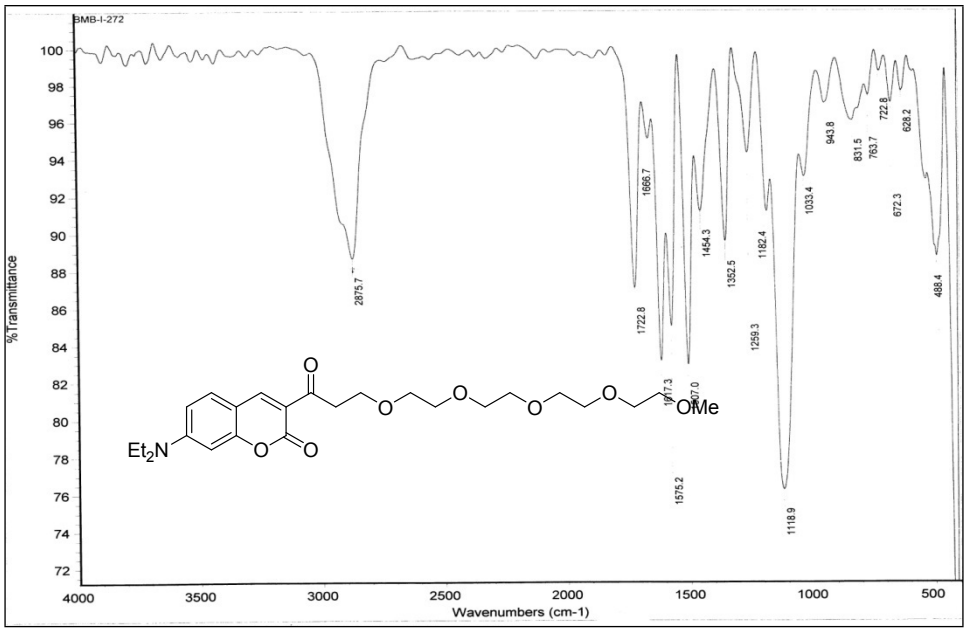

Figure 54. IR (KBr) spectrum of 7-(diethylamino)-3-[3-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4d**.

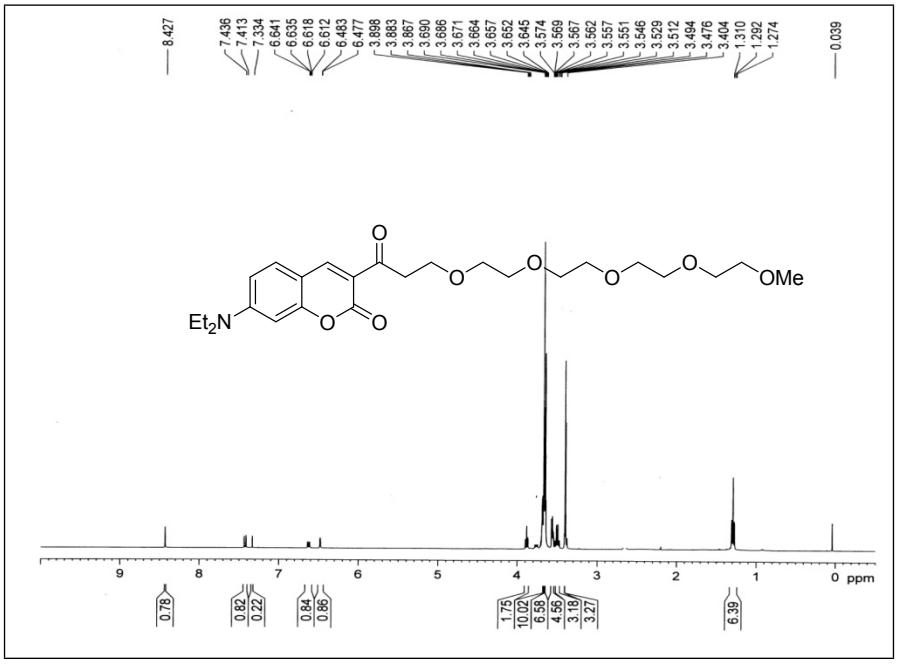

Figure 55. ^{1}H NMR (400 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4d**.

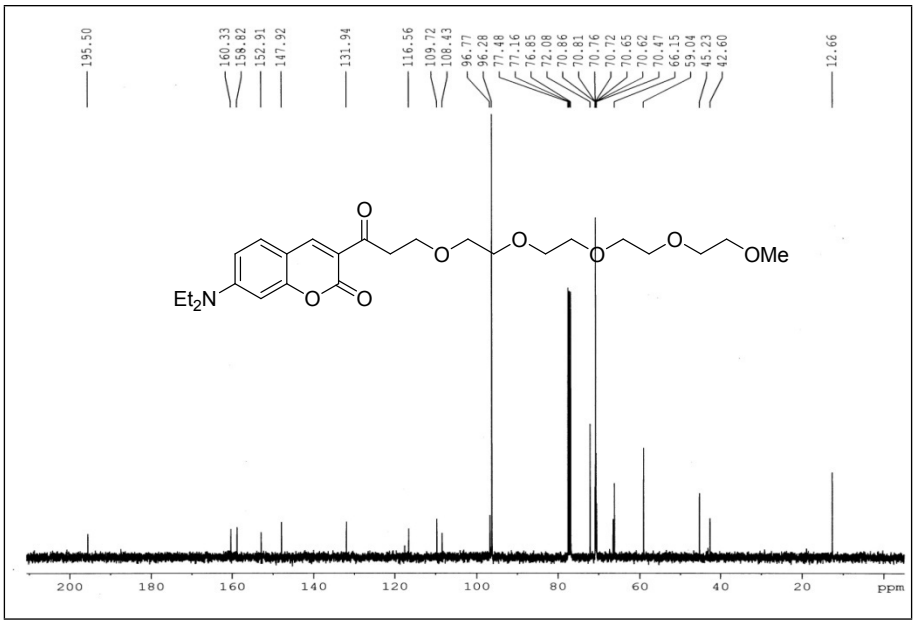

Figure 56. ^{13}C NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4d**.

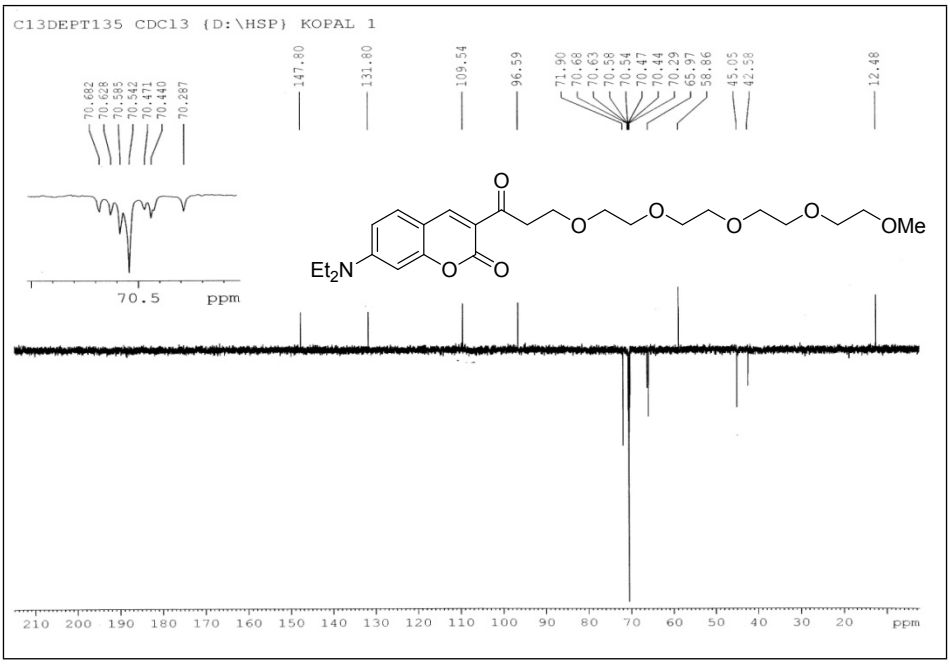

Figure 57. DEPT-135 NMR (100 MHz, CCl_4 + $CDCl_3$, 1:1) spectrum of 7-(diethylamino)-3-[3-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4d**

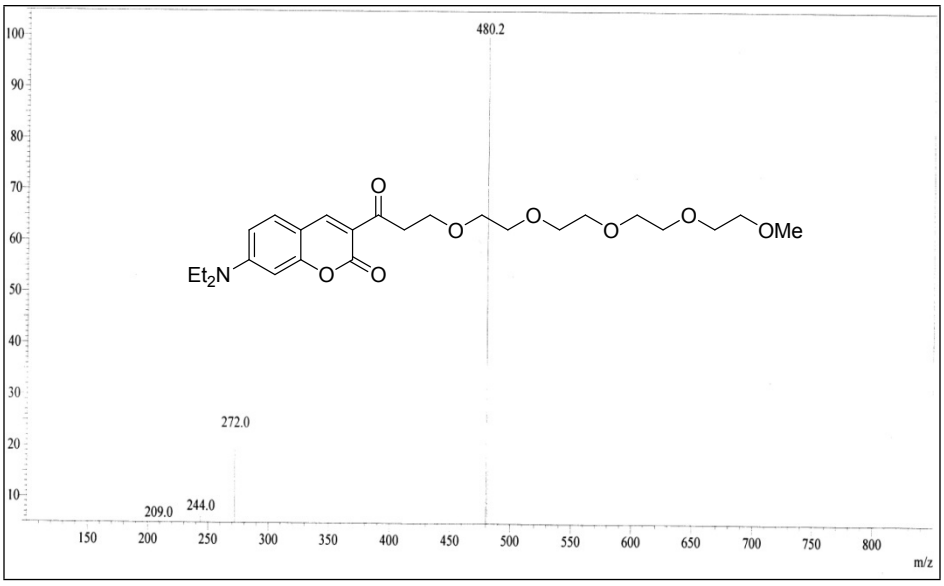

Figure 58. ESI-MS (HRMS) spectrum of 7-(diethylamino)-3-[3-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]propanoyl]-2*H*-chromen-2-one **4d**.

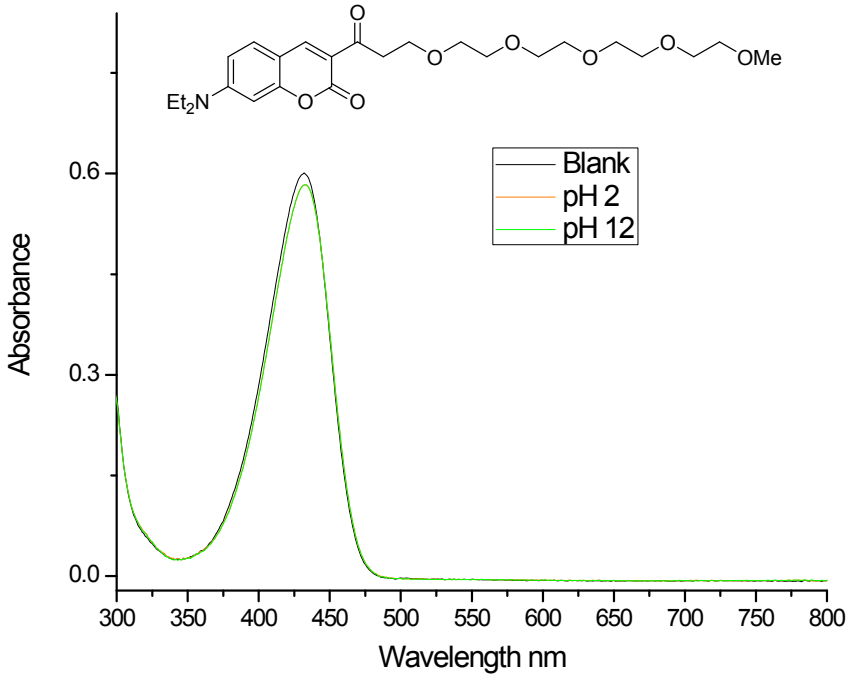

Figure 59. Uv spectrum of **4d** recorded at pH 7, pH 2 and pH 12