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APPENDIX

เลขหมู่..... 2W-2556
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ในเดือนปี..... 16 ส.ค. 2560

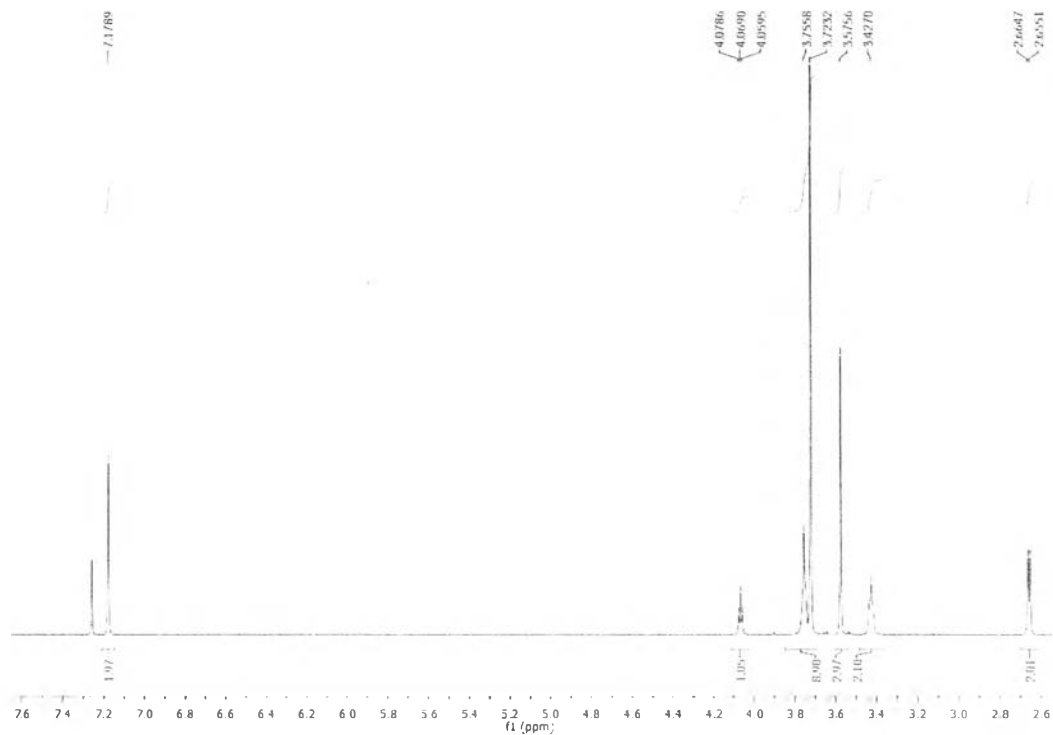


Figure A.1 The ^1H NMR of dimethyl 1-(2-hydroxyethyl)-4-(2-methoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Me-DHP-OH) in CDCl_3 .

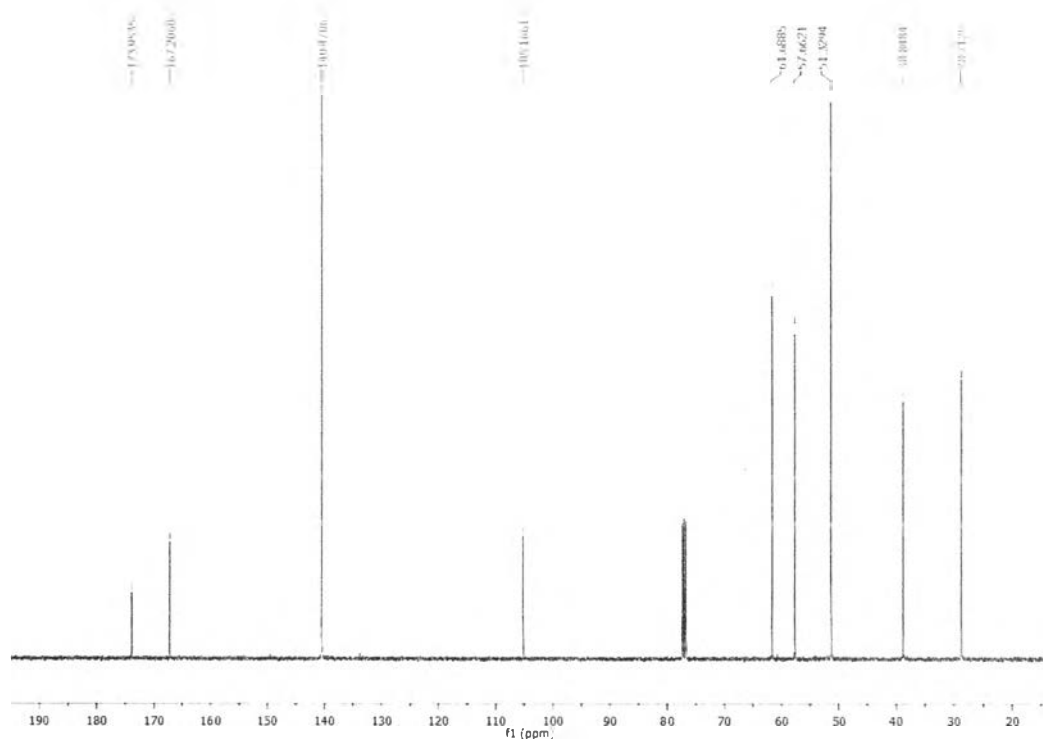


Figure A.2 The ^{13}C NMR of dimethyl 1-(2-hydroxyethyl)-4-(2-methoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Me-DHP-OH) in CDCl_3 .



Figure A.3 The ^1H NMR of dimethyl 4-(2-methoxy-2-oxoethyl)-1-(2-(tosyloxy)ethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Me-DHP-OTs) in CDCl_3 .

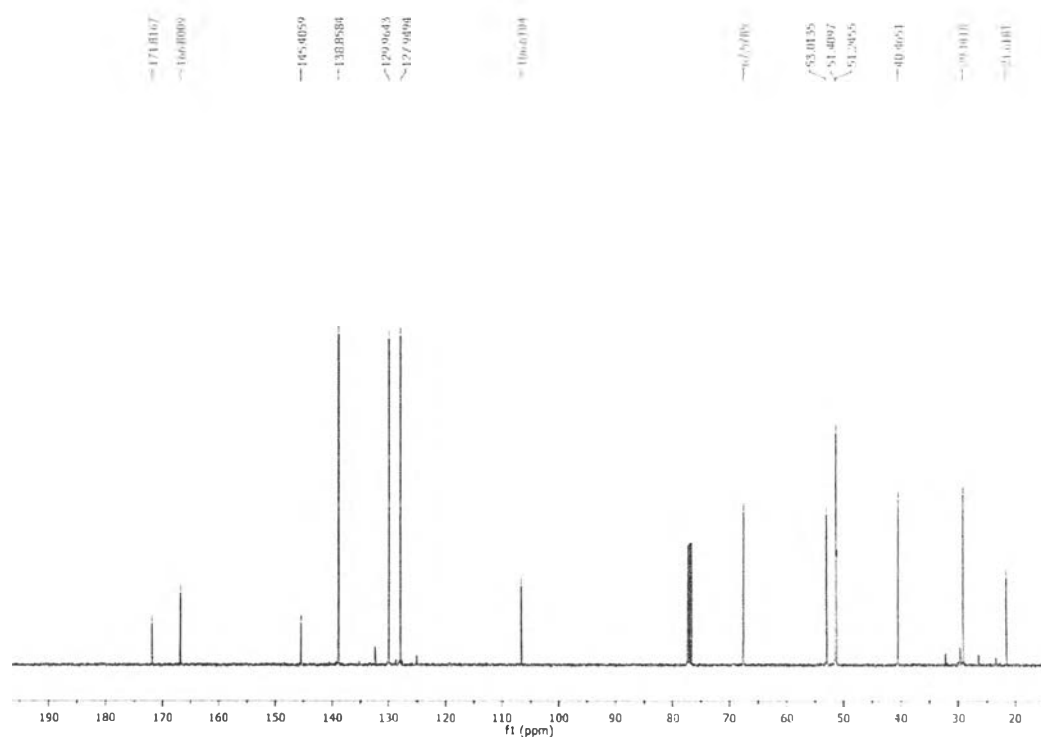


Figure A.4 The ^{13}C NMR of dimethyl 4-(2-methoxy-2-oxoethyl)-1-(2-(tosyloxy)ethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Me-DHP-OTs) in CDCl_3 .

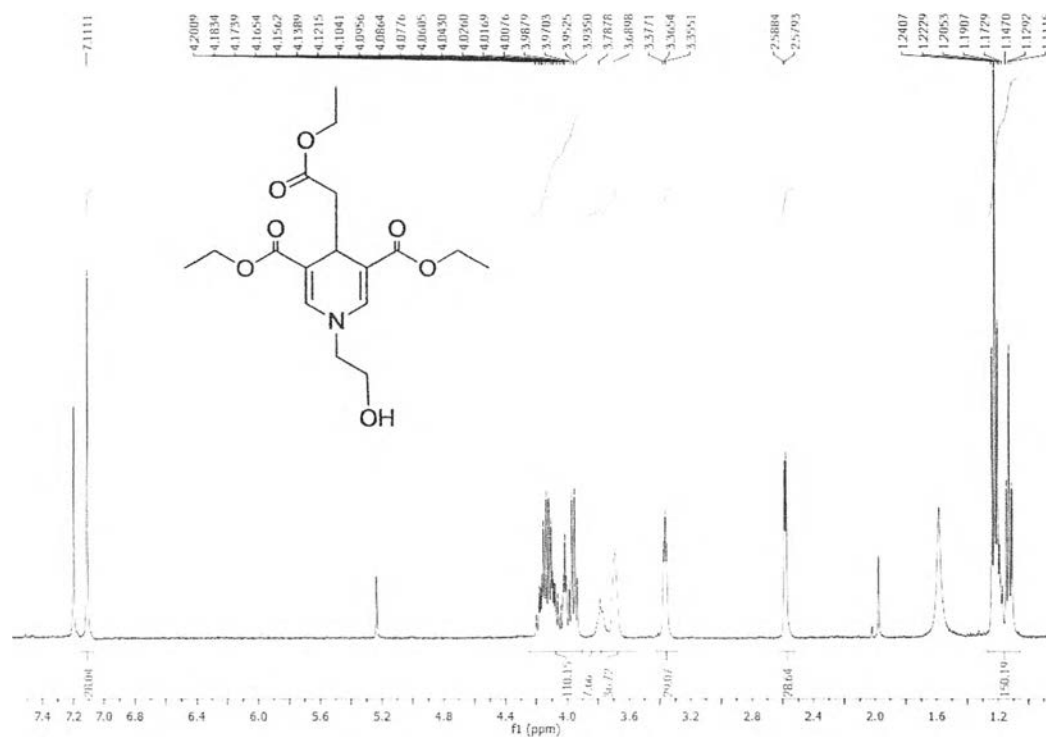


Figure A.5 The ^1H NMR of diethyl 4-(2-ethoxy-2-oxoethyl)-1-(2-hydroxyethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-OH) in CDCl_3 .

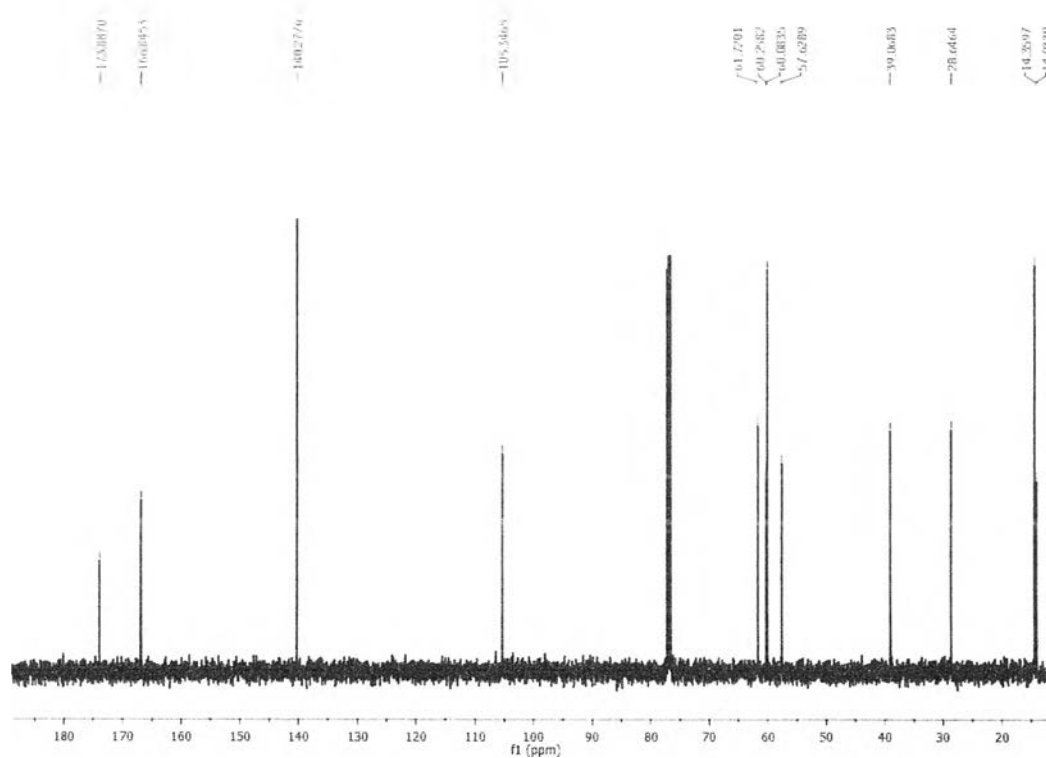


Figure A.6 The ^{13}C NMR of diethyl 4-(2-ethoxy-2-oxoethyl)-1-(2-hydroxyethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-OH) in CDCl_3 .

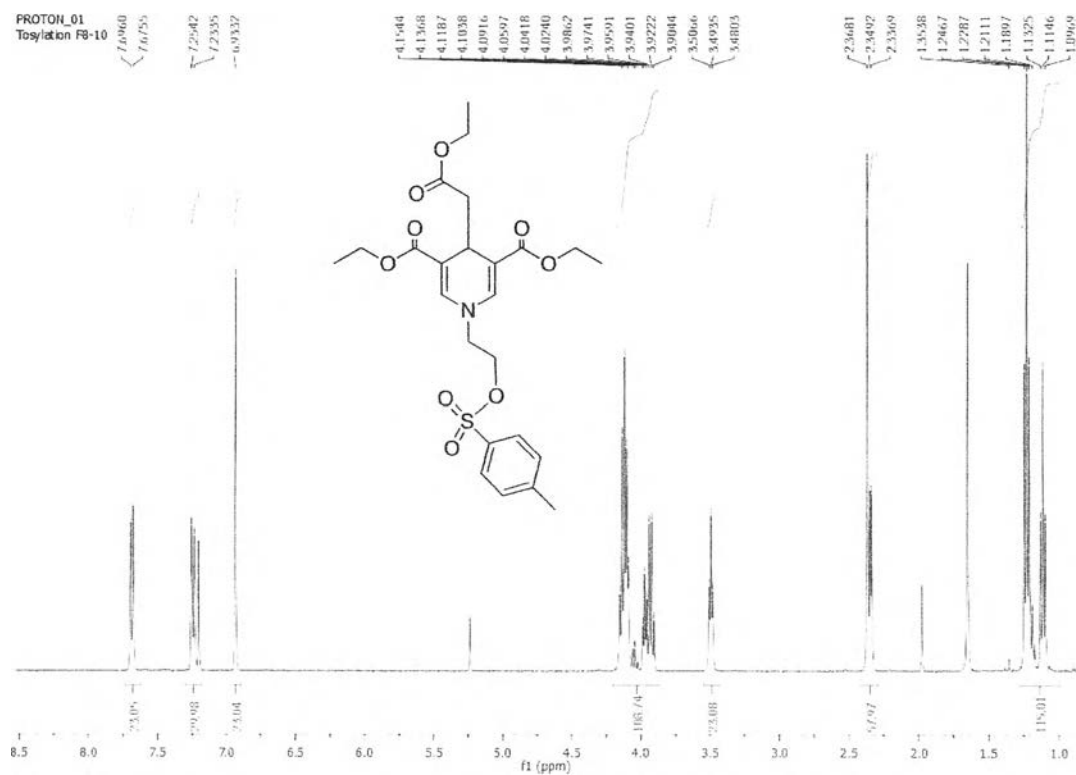


Figure A.7 The ^1H NMR of diethyl 4-(2-ethoxy-2-oxoethyl)-1-(2-(tosyloxy)ethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-OTs) in CDCl_3 .

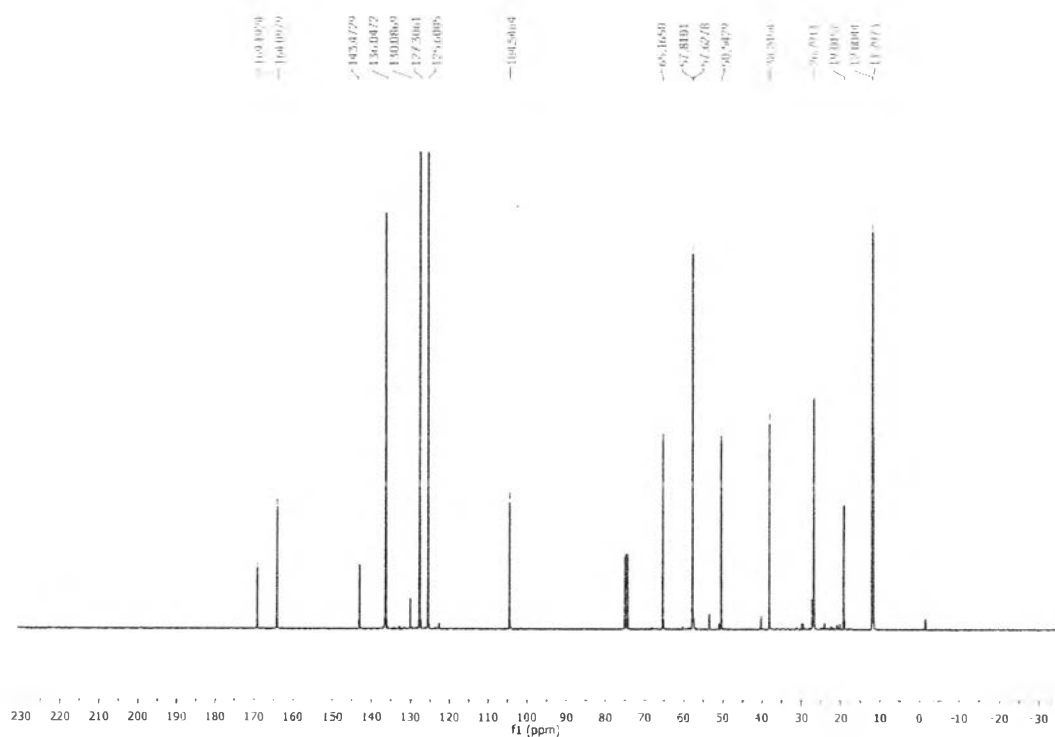


Figure A.8 The ^{13}C NMR of diethyl 4-(2-ethoxy-2-oxoethyl)-1-(2-(tosyloxy)ethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-OTs) in CDCl_3 .

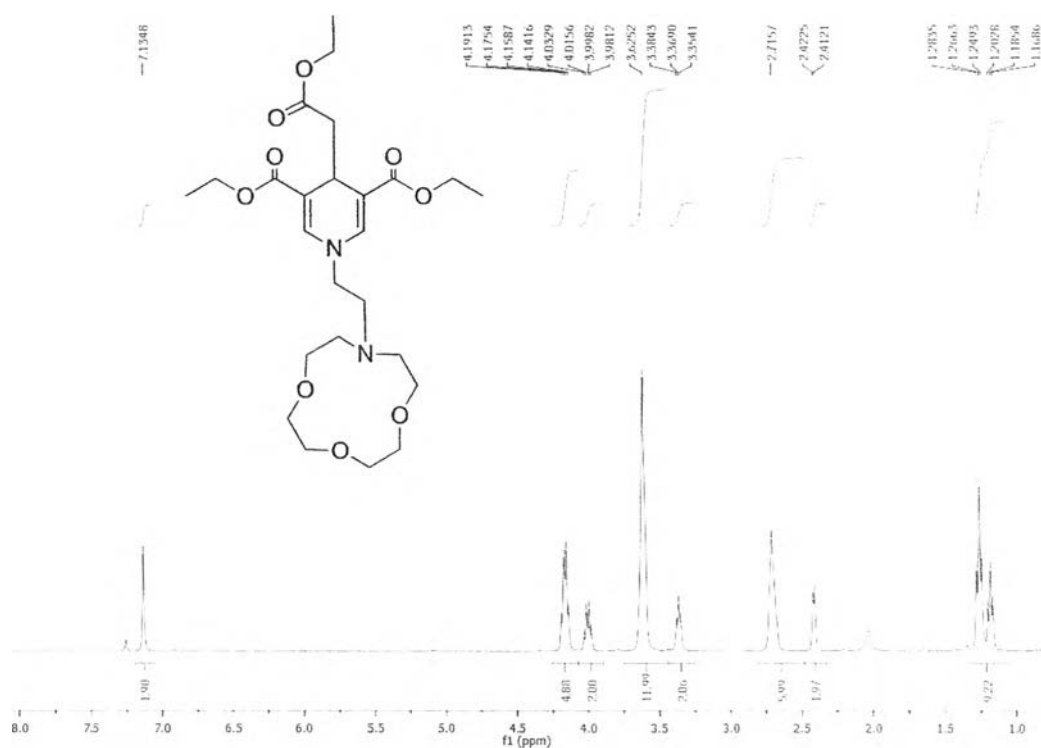


Figure A.9 The ¹H NMR of diethyl 1-(2-(1,4,7-trioxa-10-azacyclododecan-10-yl)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-AC(1)) in CDCl₃.

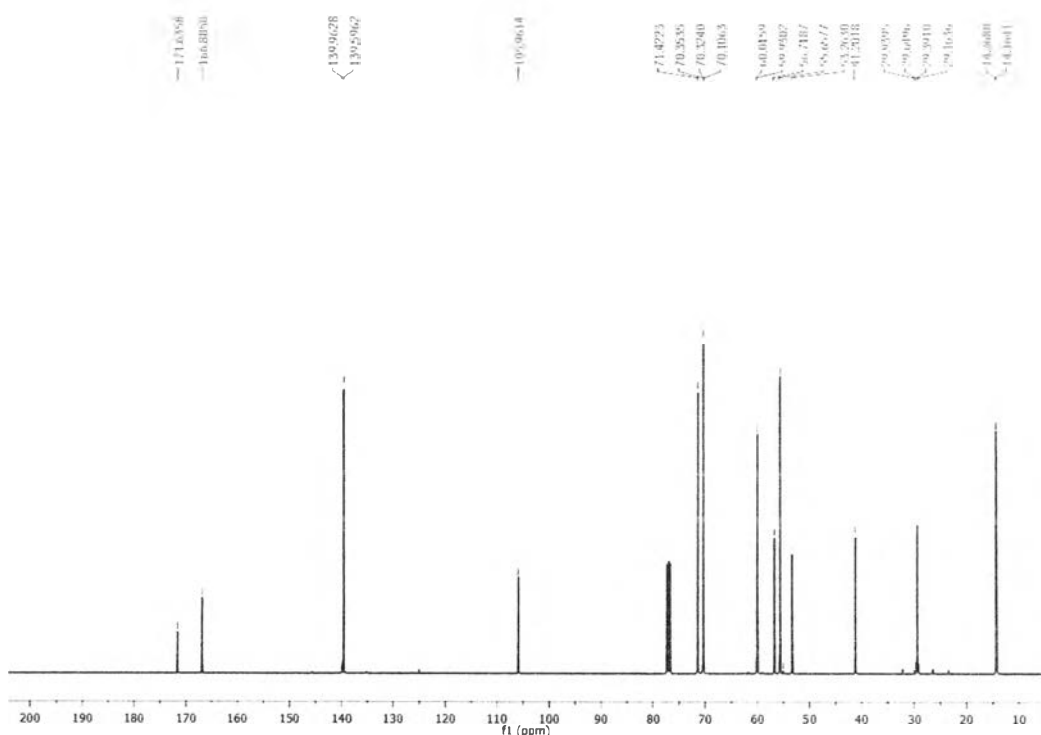


Figure A.10 The ¹³C NMR of diethyl 1-(2-(1,4,7-trioxa-10-azacyclododecan-10-yl)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-AC(1)) in CDCl₃.



Figure A.11 The ^1H NMR of diethyl 1-(2-(1,4,7,10-tetraoxa-13-azacyclopentadecan-13-yl)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-AC(2)) in CDCl_3 .

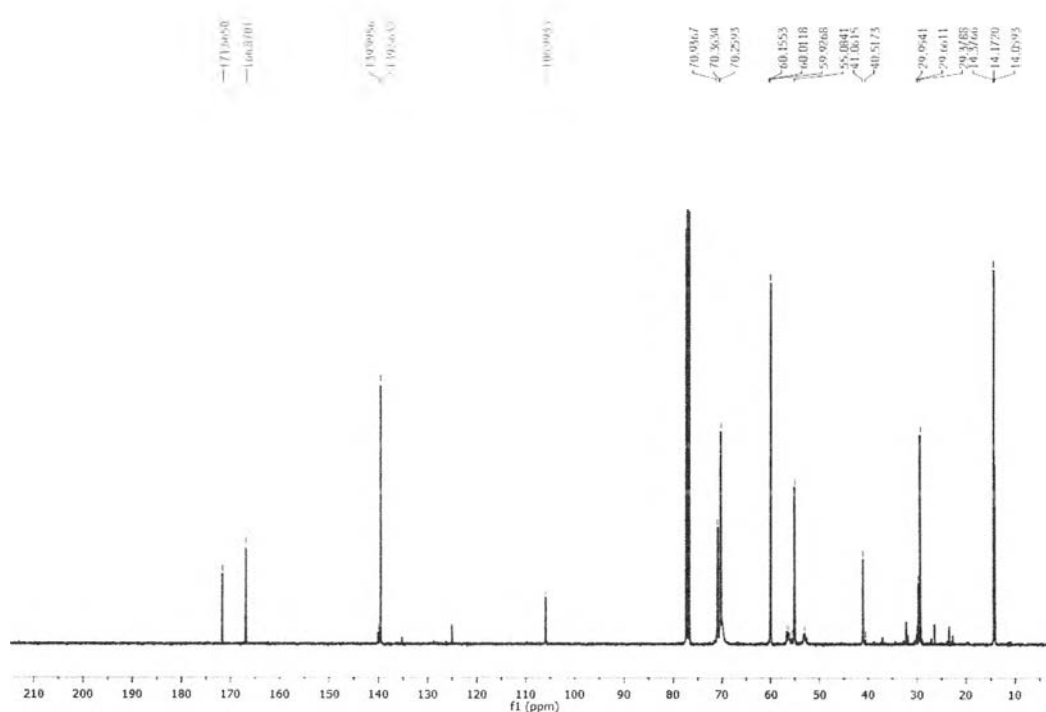


Figure A.12 The ^{13}C NMR of diethyl 1-(2-(1,4,7,10-tetraoxa-13-azacyclopentadecan-13-yl)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-AC(2)) in CDCl_3 .

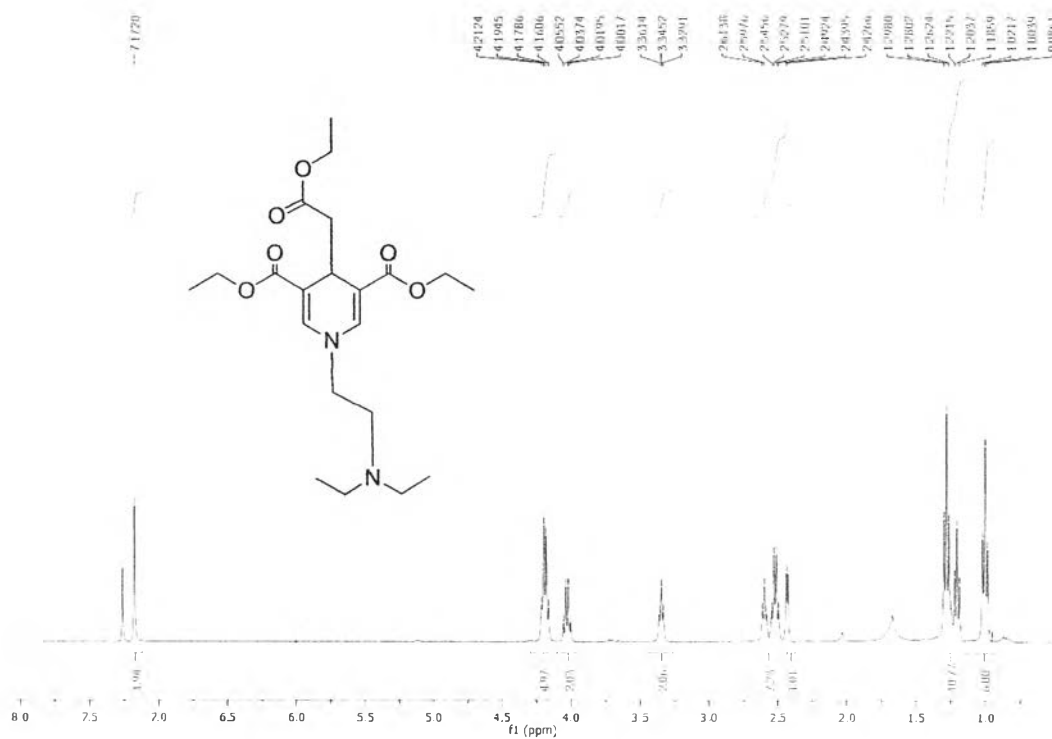


Figure A.15 The ¹H NMR of diethyl 1-(2-(diethylamino)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-NEt₂) in CDCl₃.

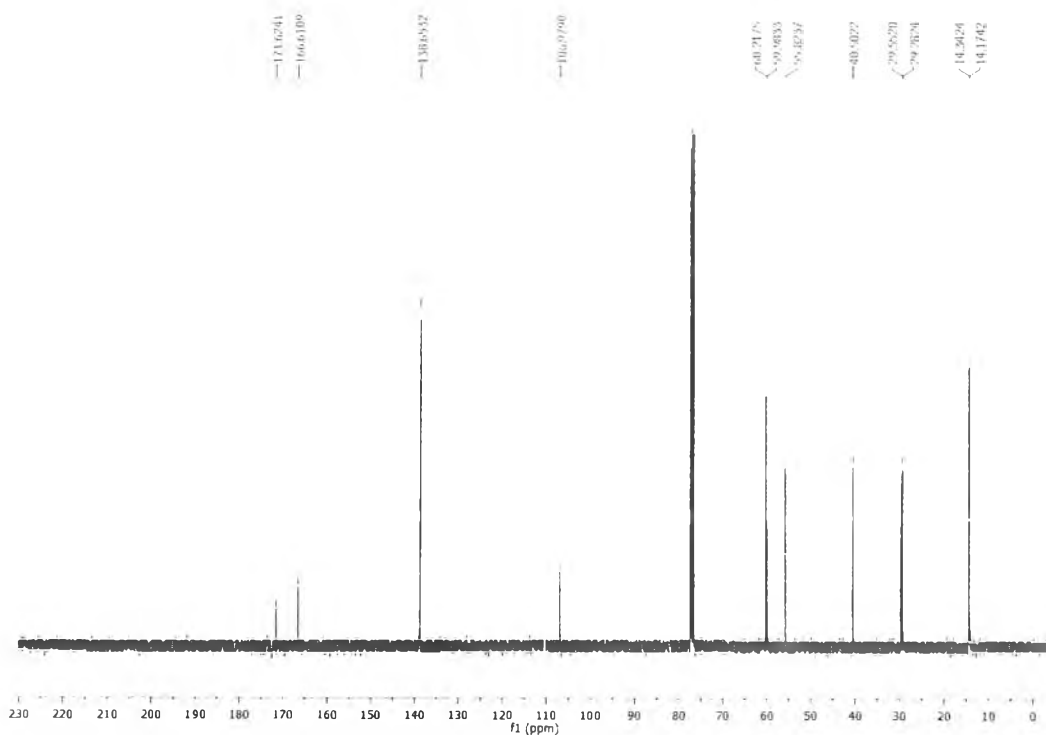


Figure A.16 The ¹³C NMR of diethyl 1-(2-(diethylamino)ethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-NEt₂) in CDCl₃.

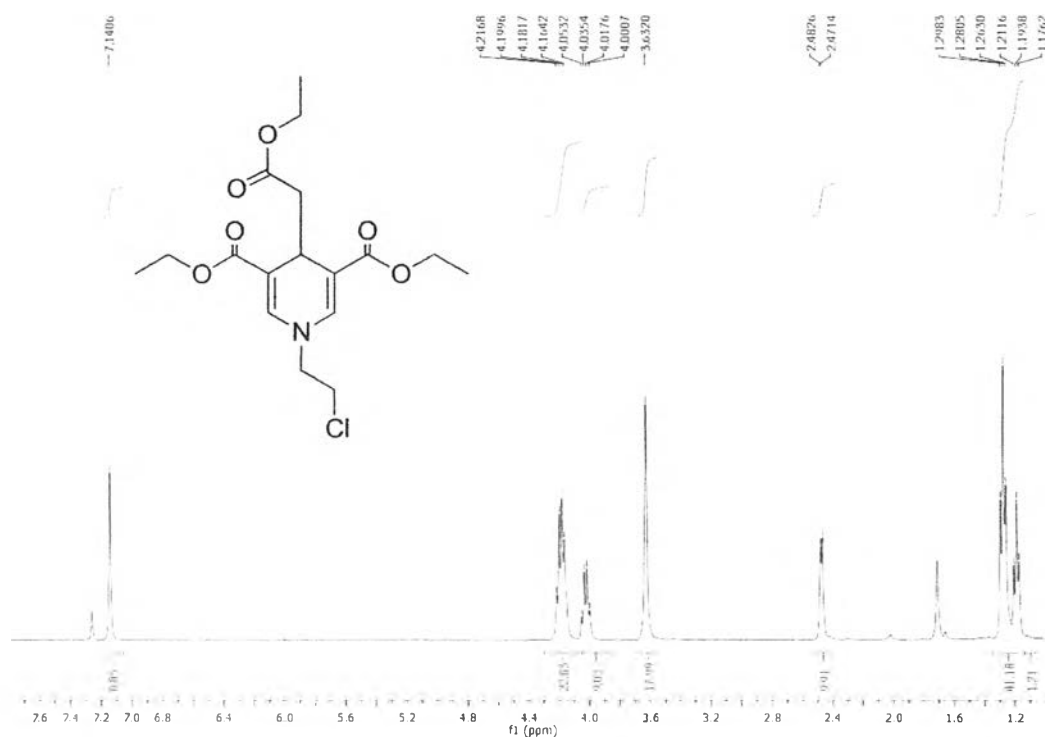


Figure A.17 The ^1H NMR of diethyl 1-(2-chloroethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-Cl) in CDCl_3 .

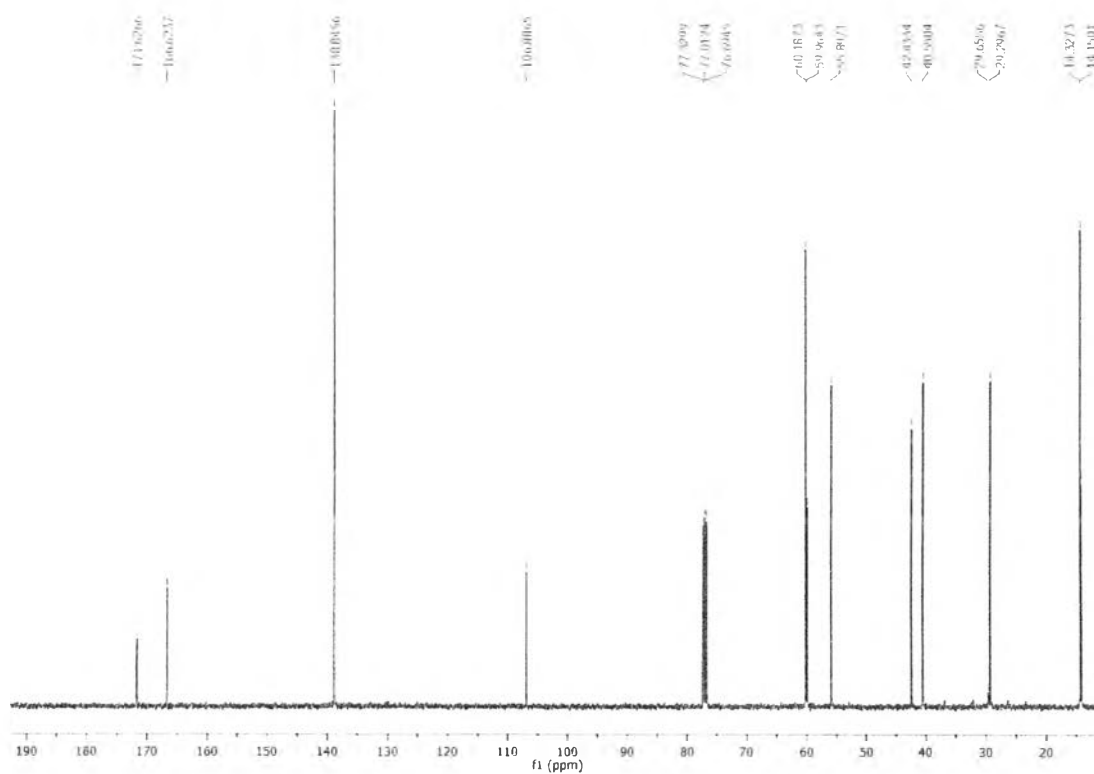


Figure A.18 The ^{13}C NMR of diethyl 1-(2-chloroethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-Cl) in CDCl_3 .

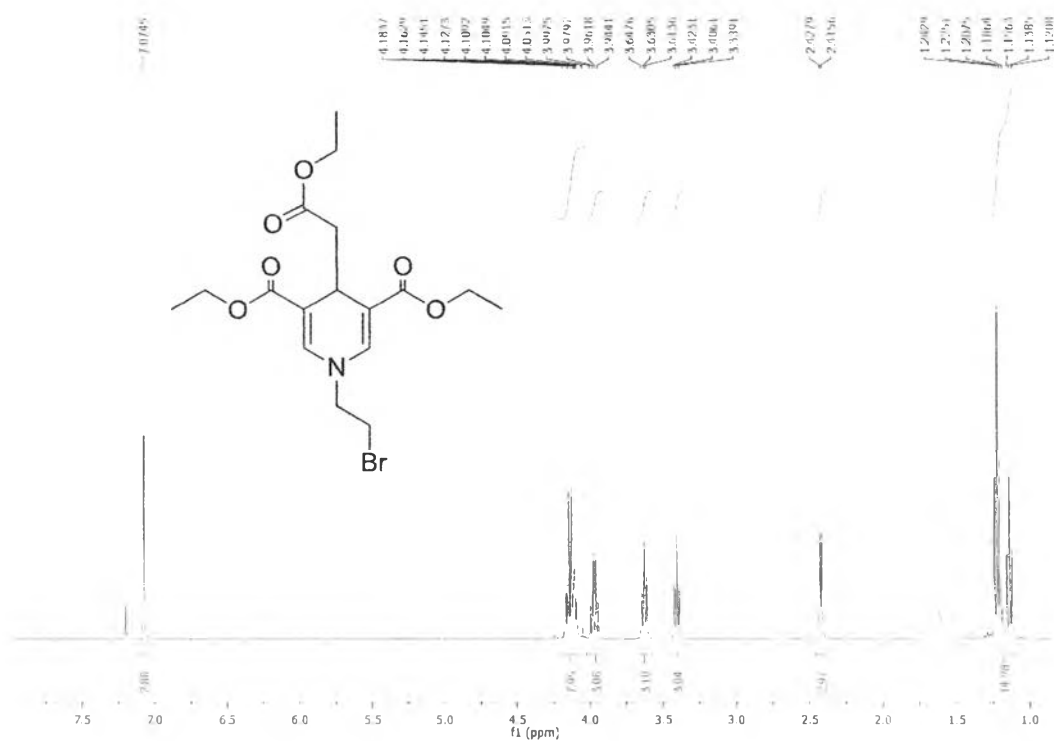


Figure A.19 The ^1H NMR of diethyl 1-(2-bromoethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-Br) in CDCl_3 .

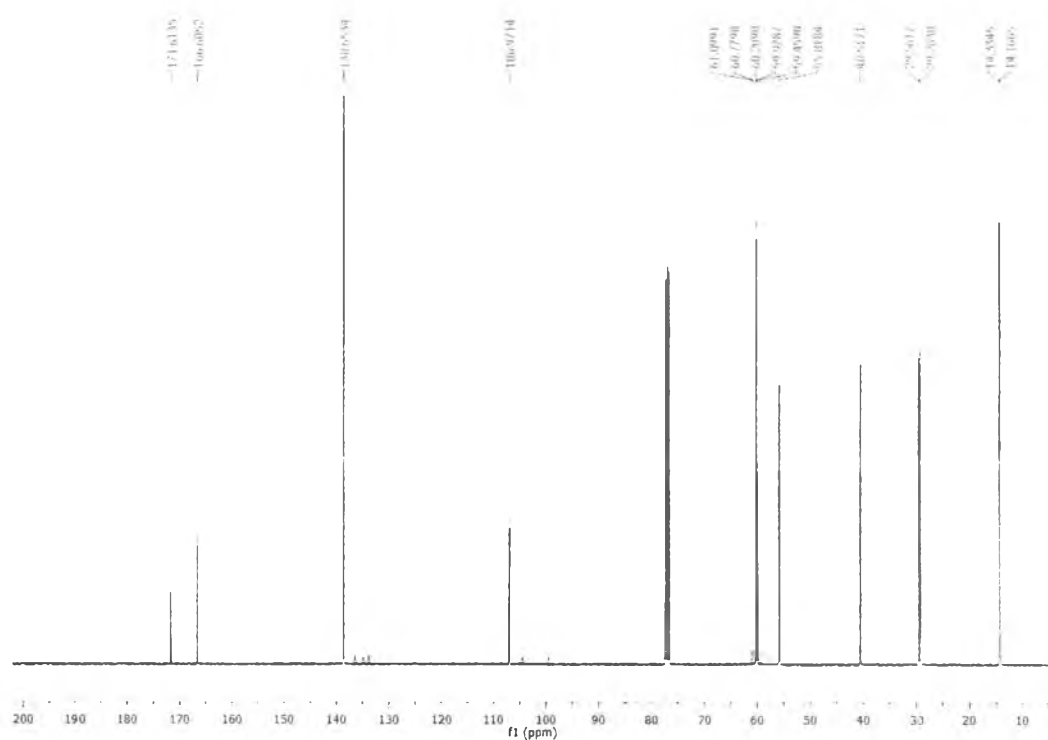


Figure A.20 The ^{13}C NMR of diethyl 1-(2-bromoethyl)-4-(2-ethoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Et-DHP-Br) in CDCl_3 .

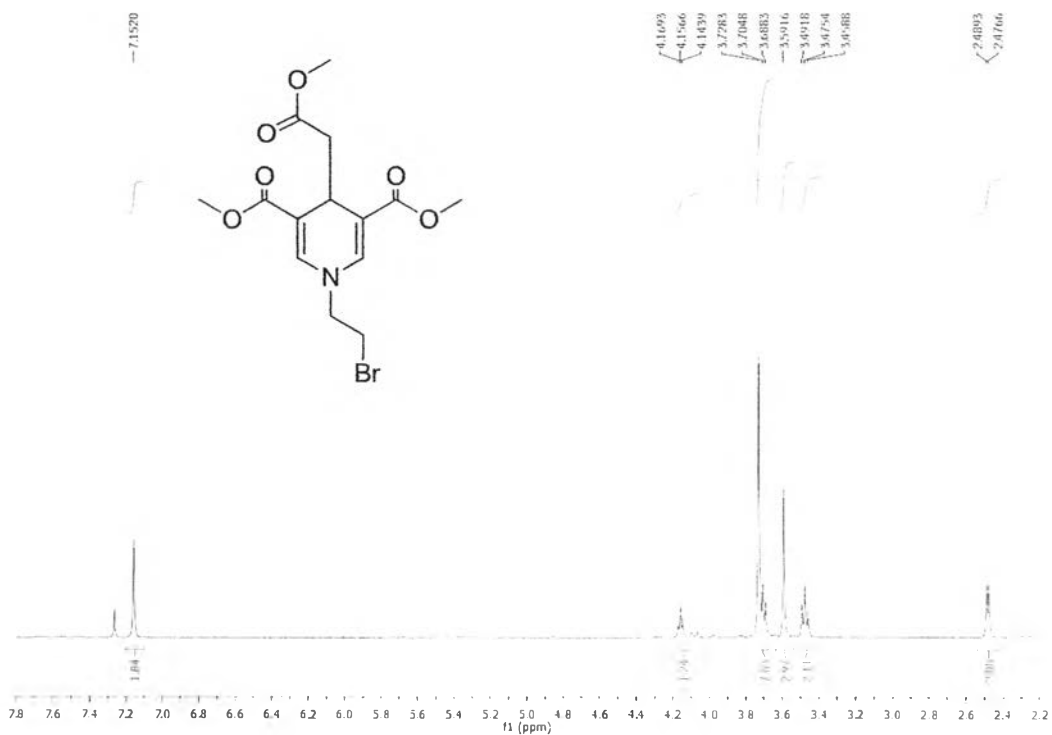


Figure A.21 The ^1H NMR of dimethyl 1-(2-bromoethyl)-4-(2-methoxy-2-oxoethyl)-1,4-dihydropyridine-3,5-dicarboxylate (Me-DHP-Br) in CDCl_3 .

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	4500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	3000 m/z	Set Collision Cell RF	150.0 Vpp	Set Divert Valve	Waste

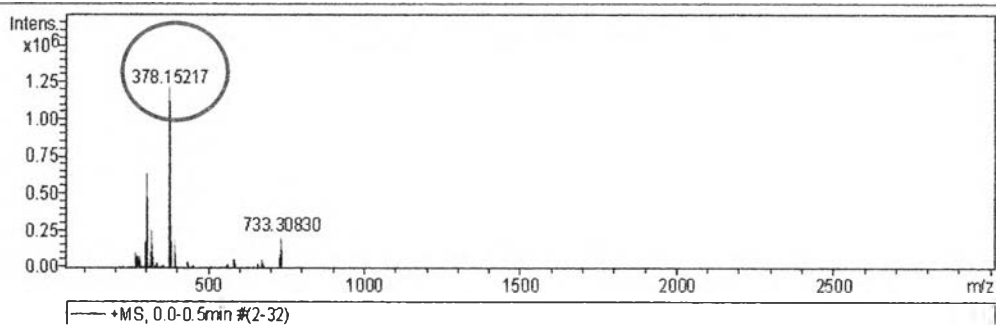


Figure A.22 The HRMS spectra of Et-DHP-OH.

Acquisition Parameter

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Scan End	3000 m/z	Set Collision Cell RF	150.0 Vpp	Set Divert Valve	Waste

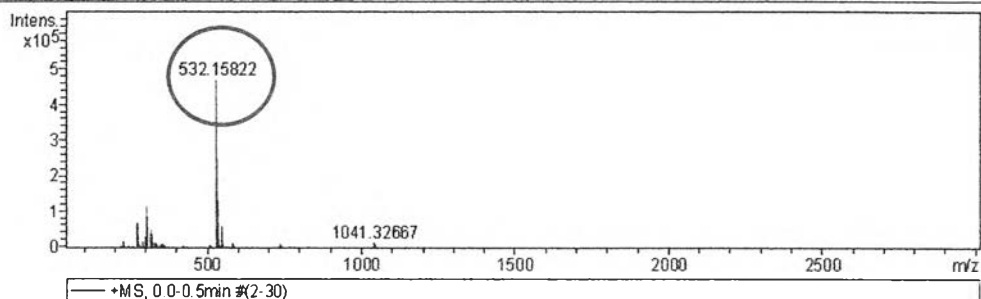


Figure A.23 The HRMS spectra of Et-DHP-OH.

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	4500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	3000 m/z	Set Collision Cell RF	150.0 Vpp	Set Divert Valve	Waste

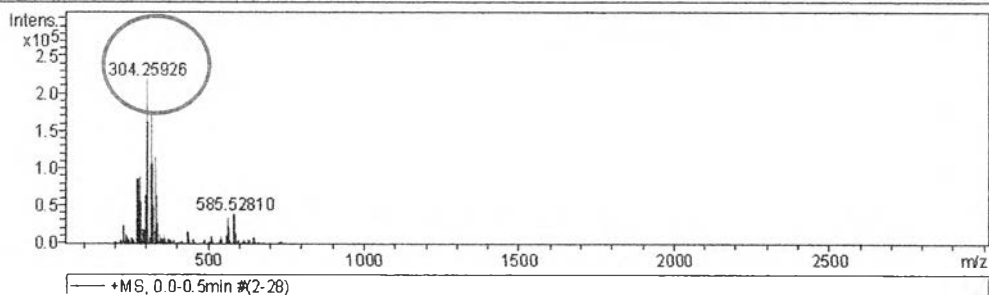


Figure A.24 The HRMS spectra of Me-DHP-OH.

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
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Scan End	3000 m/z	Set Collision Cell RF	150.0 Vpp	Set Divert Valve	Waste

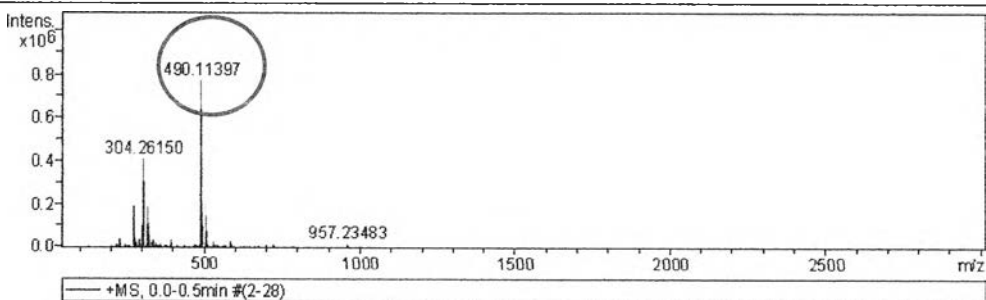


Figure A.25 The HRMS spectra of Me-DHP-OTs.

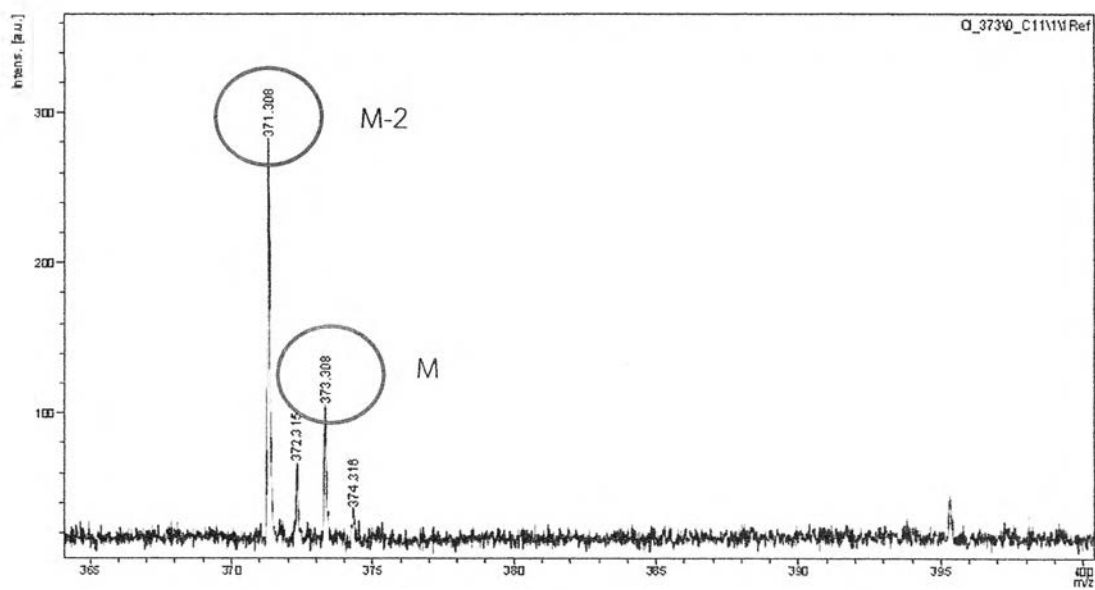


Figure A.26 The Maldi-TOF spectra of Me-DHP-Cl.

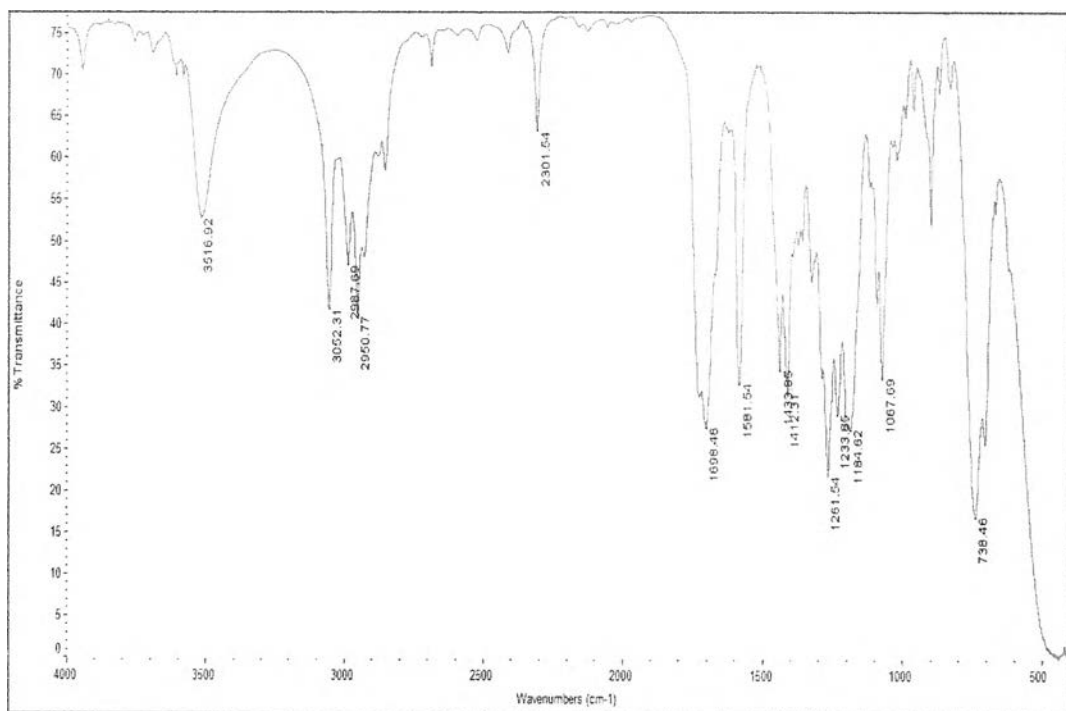


Figure A.27 The IR spectra of Me-DHP-OH.

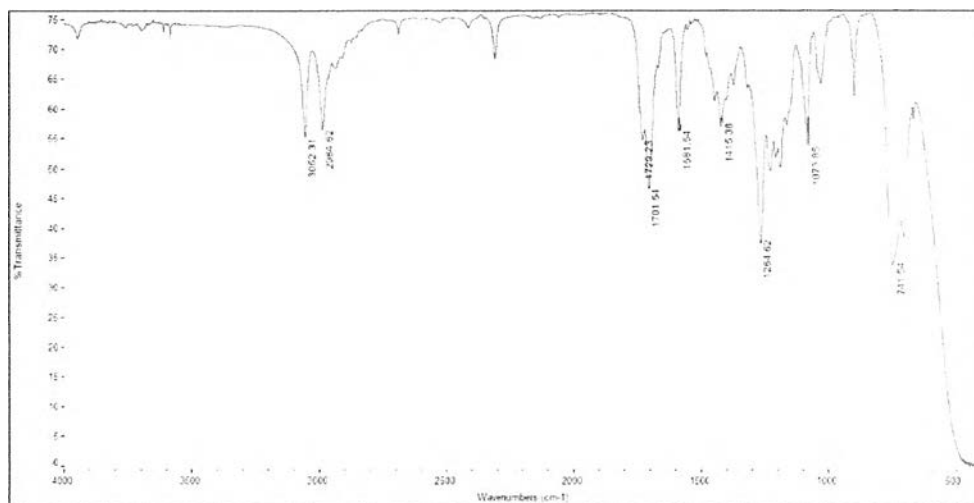


Figure A. 28 The IR spectra of Et-DHP-Br.

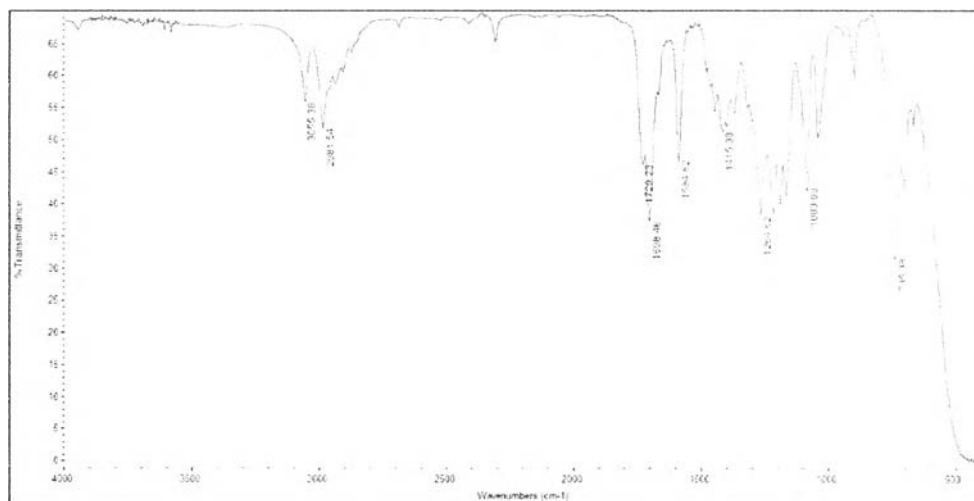


Figure A. 29 The IR spectra of Et-DHP-Cl.

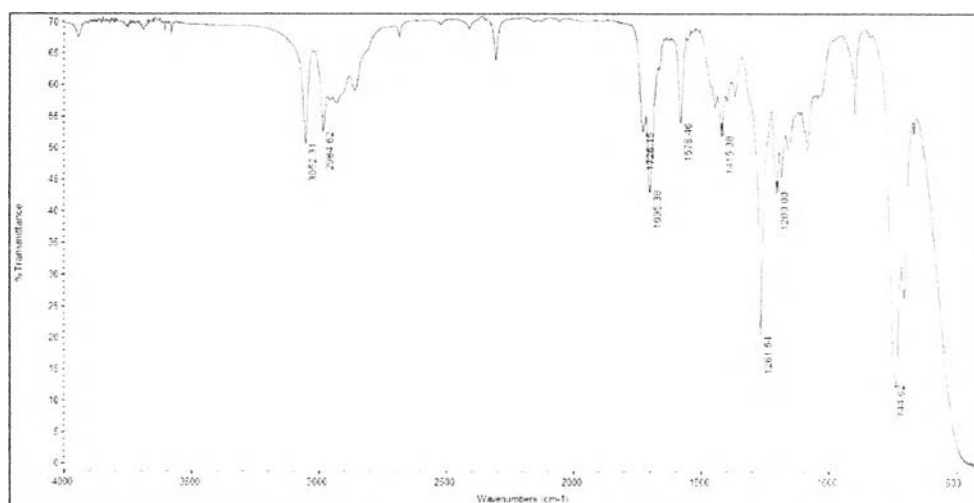


Figure A. 30 The IR spectra of Et-DHP-AC(1).

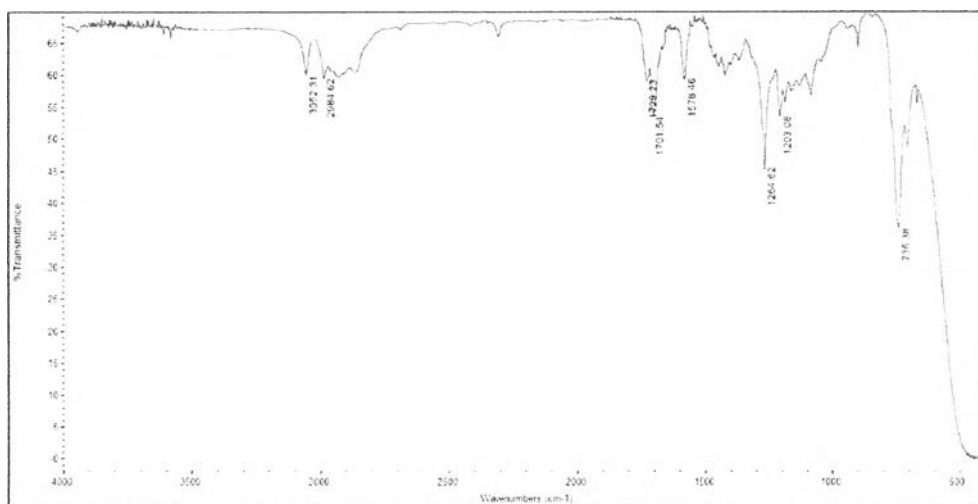


Figure A. 31 The IR spectra of Et-DHP-AC(2).

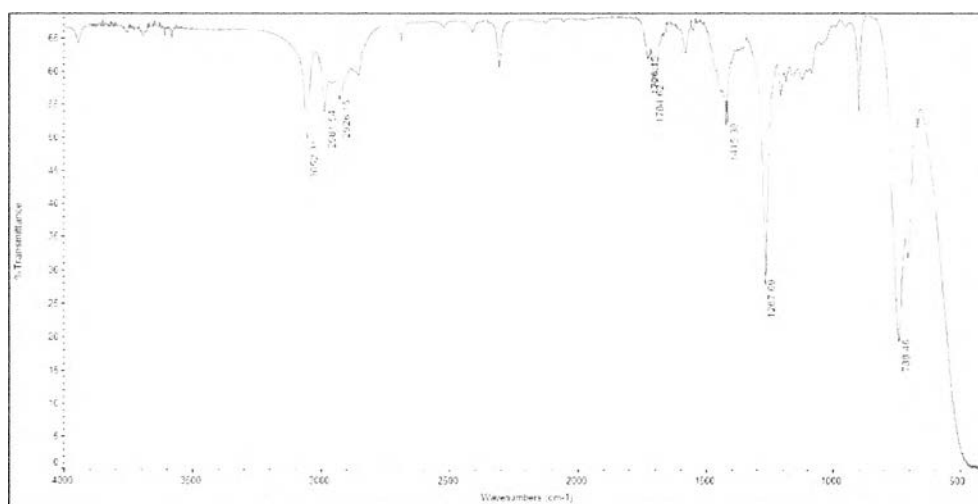


Figure A. 32 The IR spectra of Et-DHP-AC(3).

VITA

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