

Supporting Information

for

Solvent-free synthesis of novel *para*-menthane-3,8-diol ester derivatives from citronellal using a polymer-supported scandium triflate catalyst

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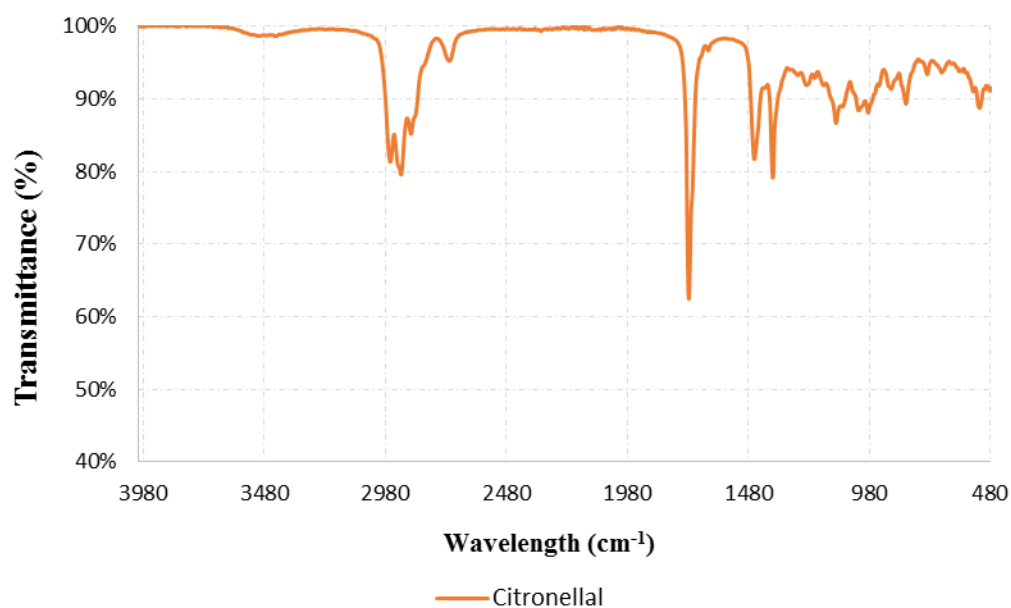
*Corresponding author

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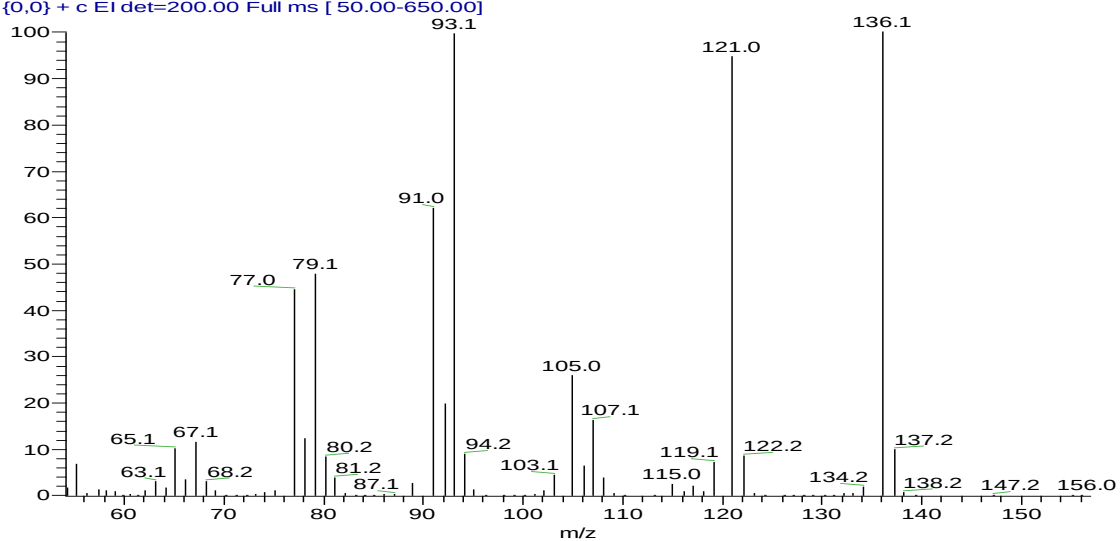
1. Starting material and oil components

1.1. Citronellal

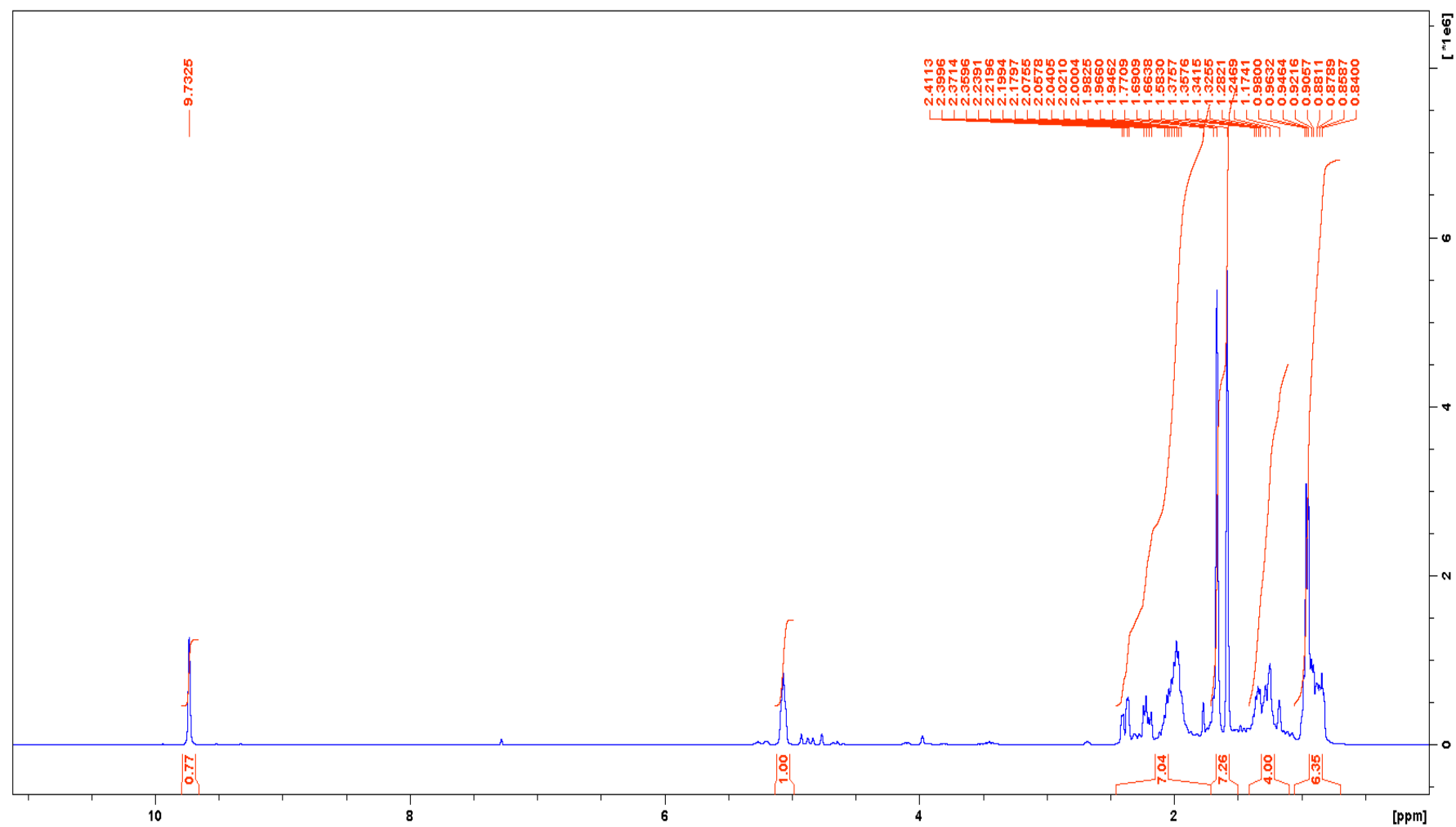


FTIR- spectrum

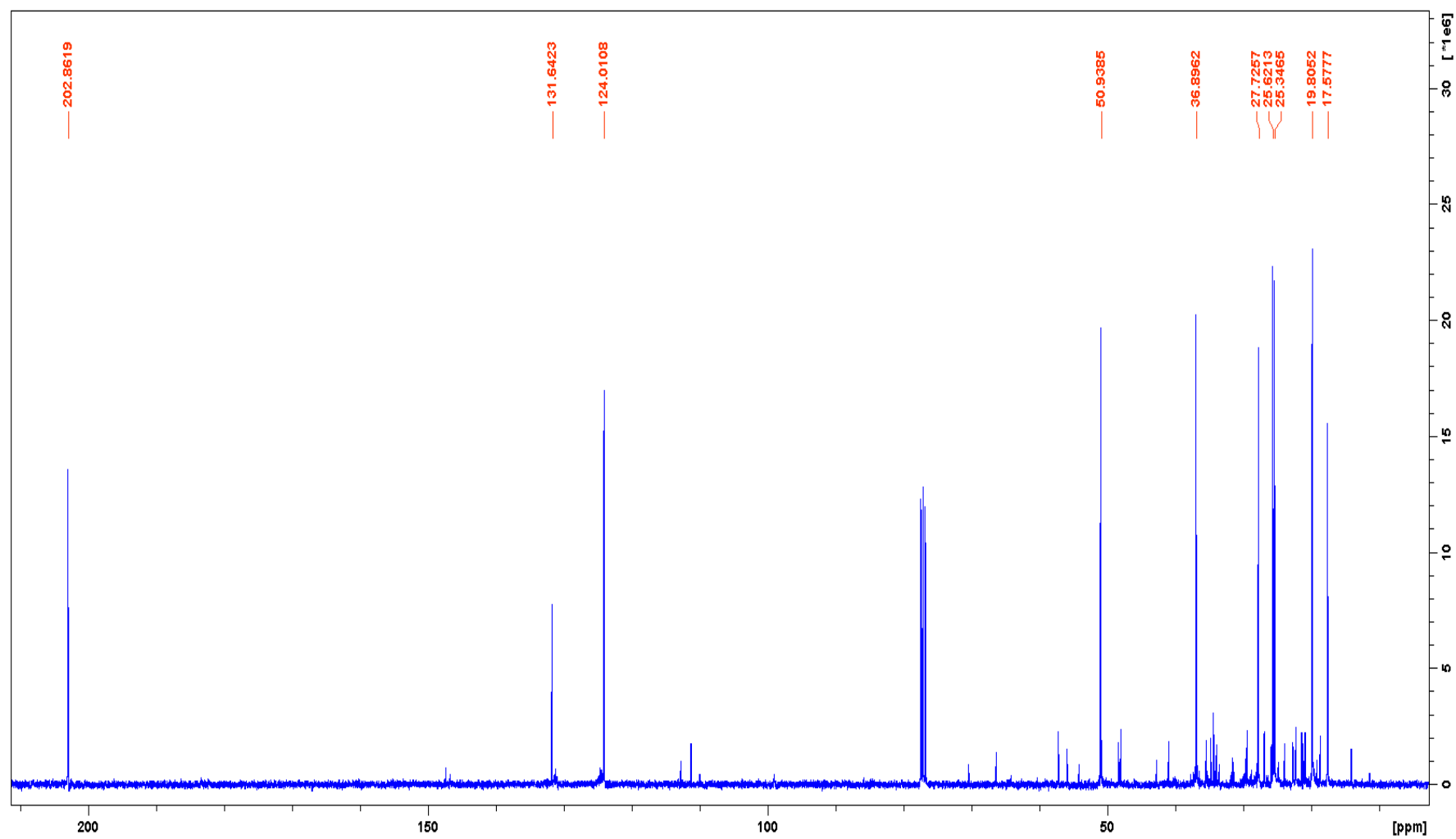
Ether 131010155848 #525 RT: 9.05 AV: 1 NL: 1.04E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum

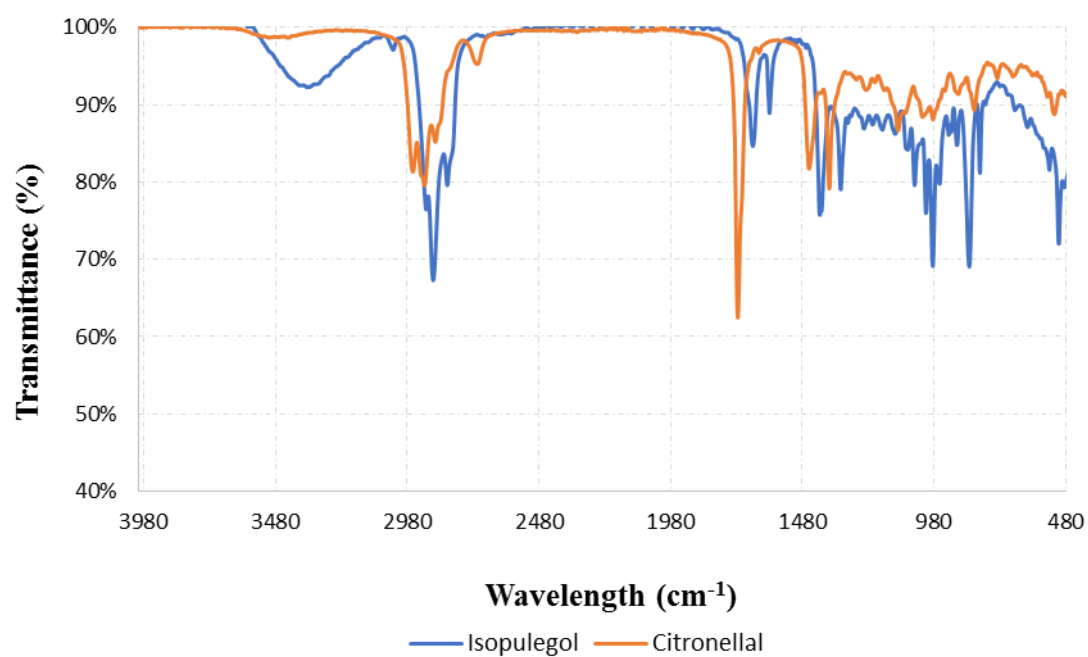


¹H NMR spectrum



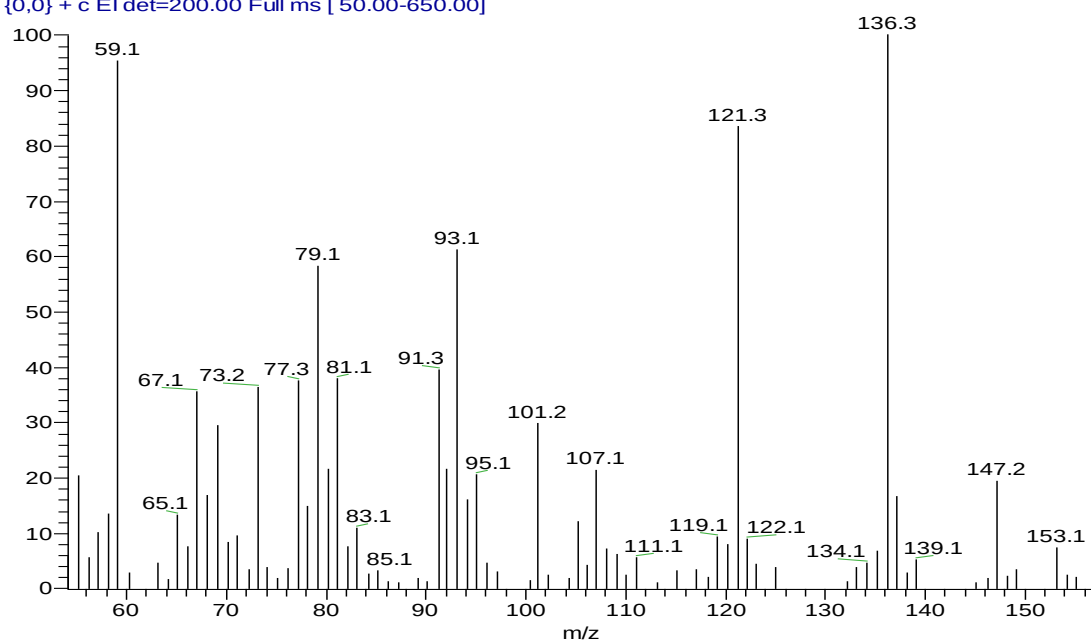
^{13}C NMR spectrum

1.2. Isopulegol

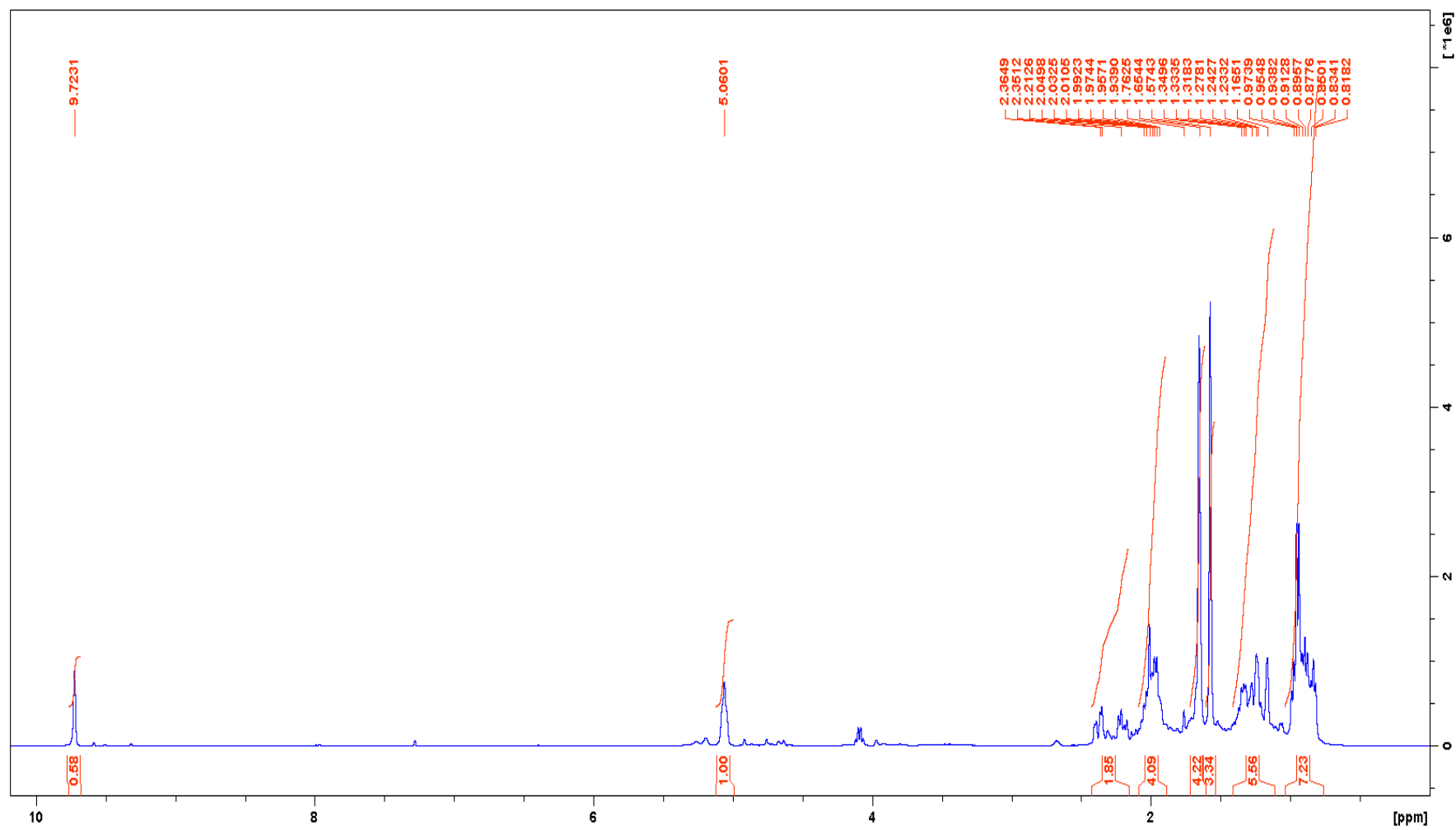


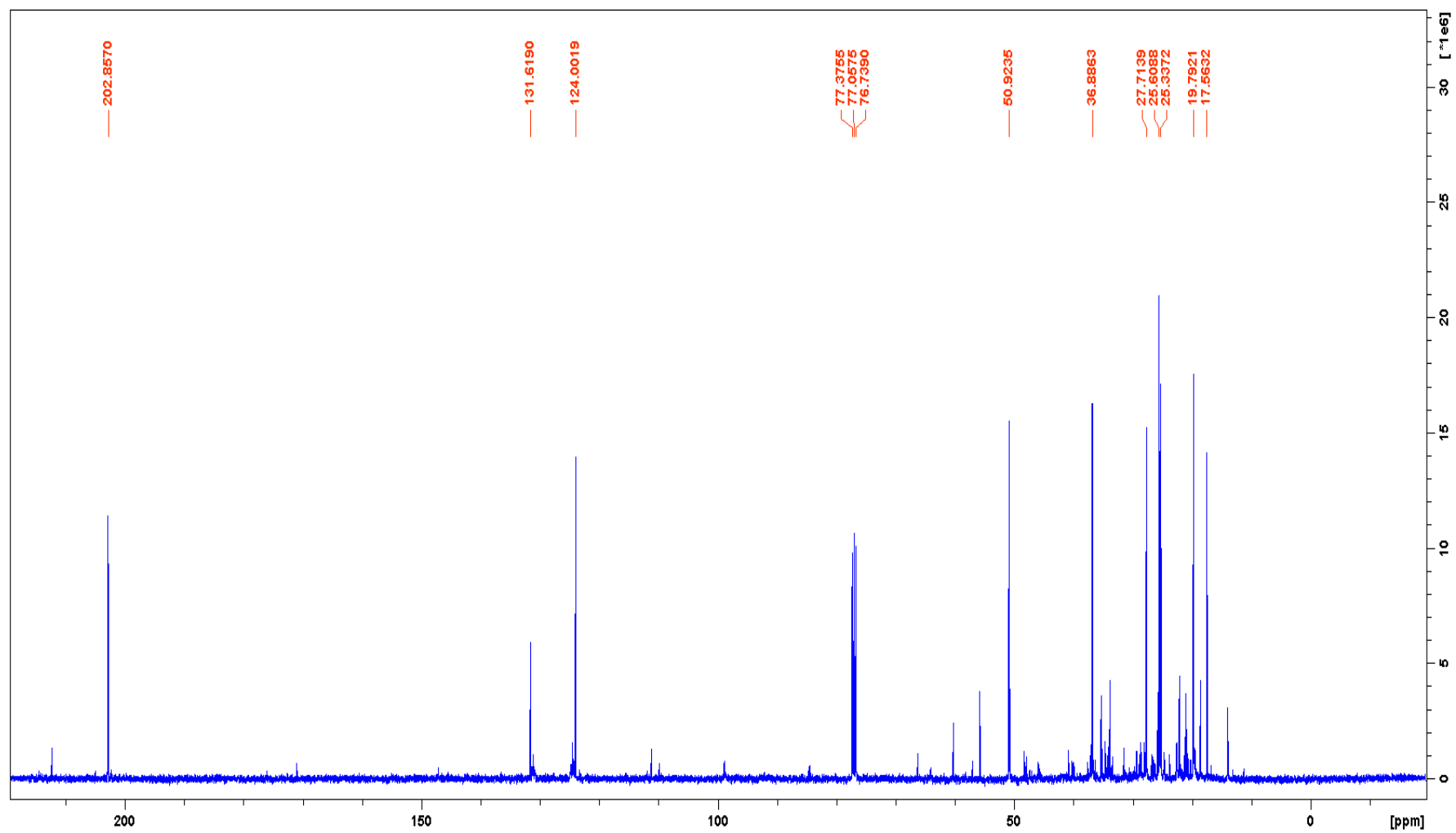
FTIR spectrum

Ether_131010155848 #791 RT: 13.59 AV: 1 NL: 8.44E4
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



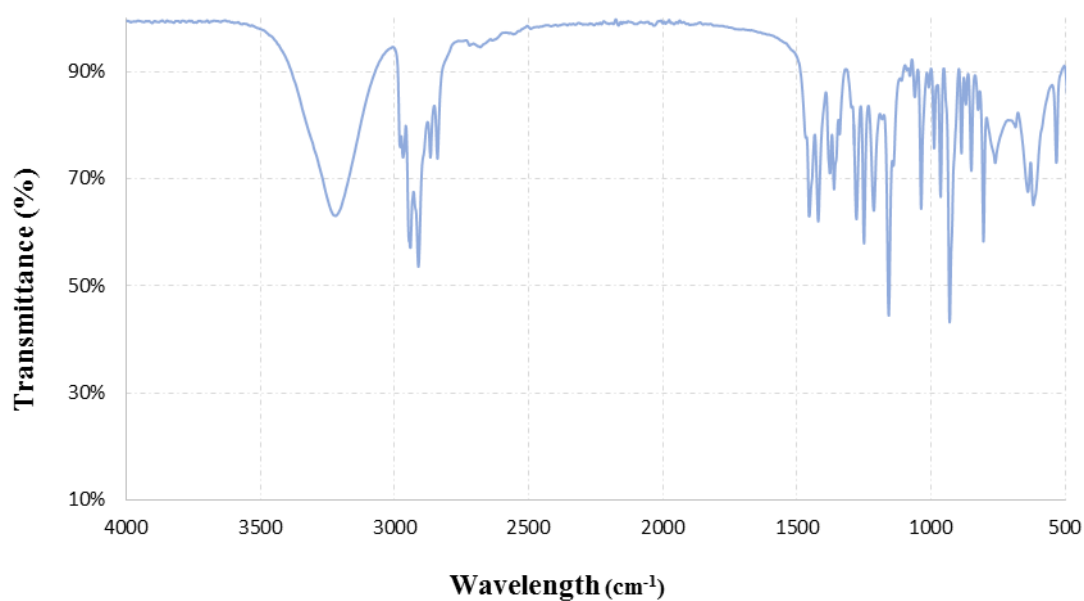
GC-MS spectrum





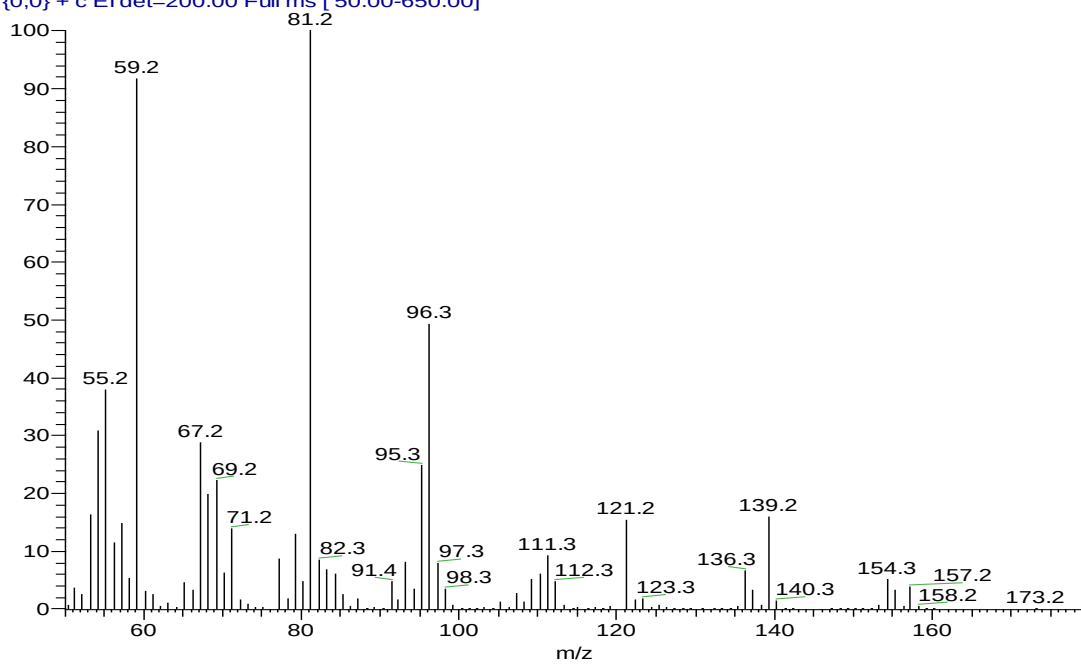
^{13}C NMR spectrum

1.3. *para*-menthane-3,8-diol

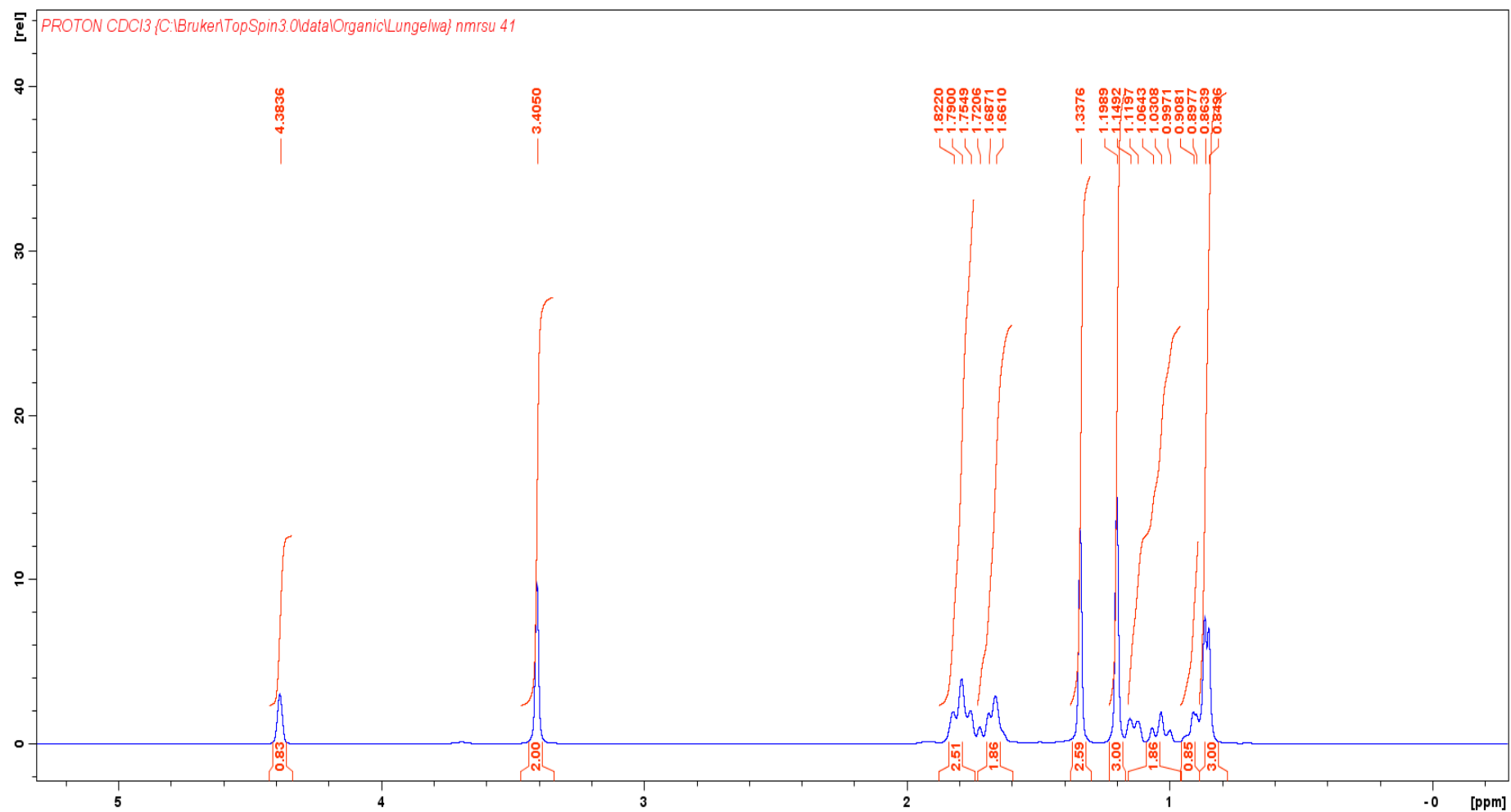


FTIR spectrum

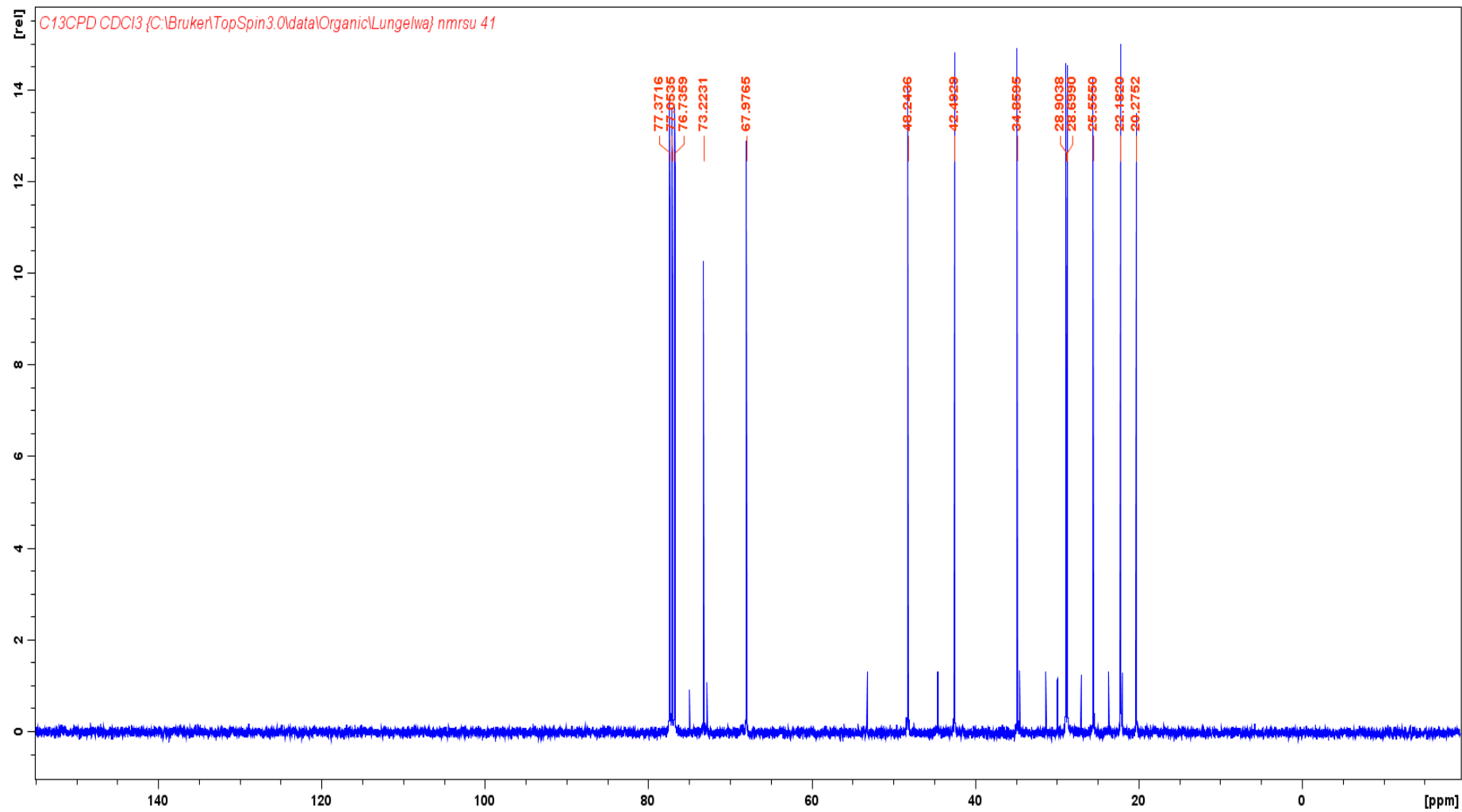
PMD #351 RT: 11.56 AV: 1 NL: 4.31E6
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum



¹H NMR spectrum

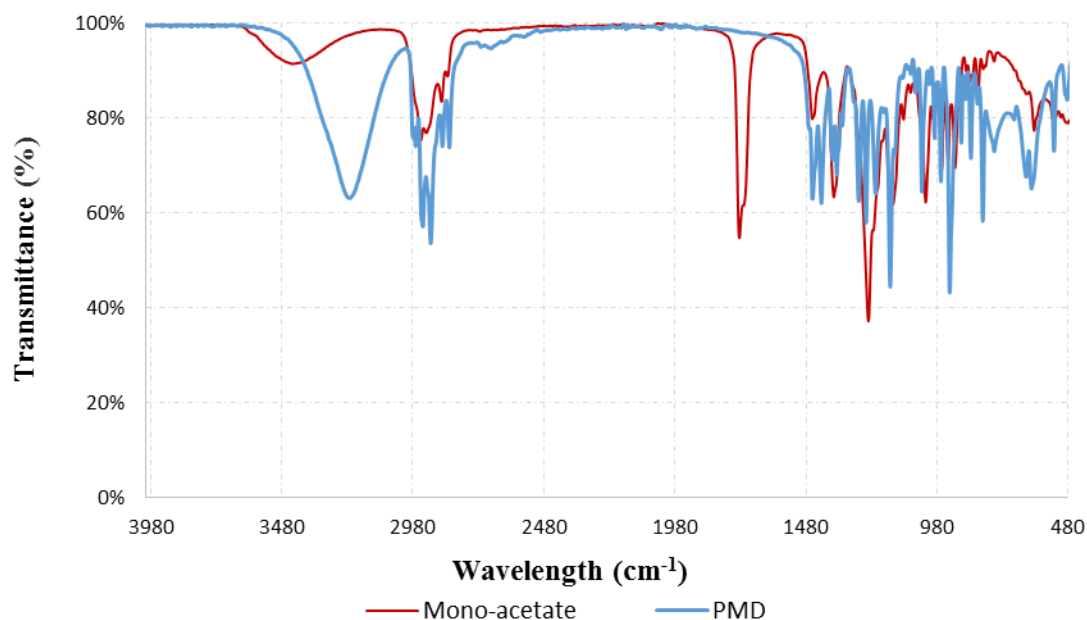


^{13}C NMR spectrum

Appendix B:

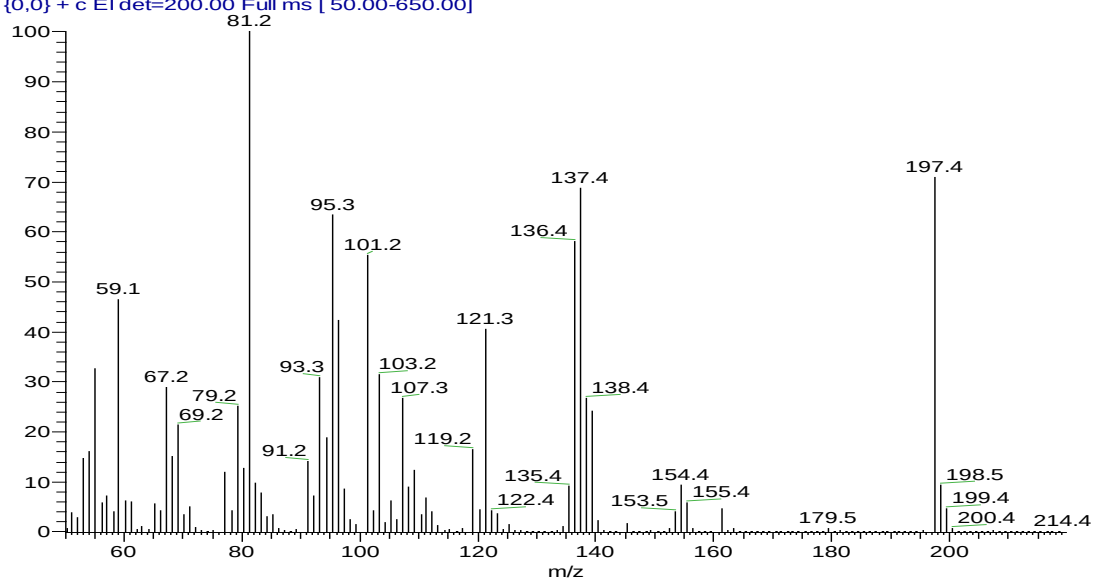
2. *para*-Menthane-3,8-diester derivatives

2.1. Mono-acetate

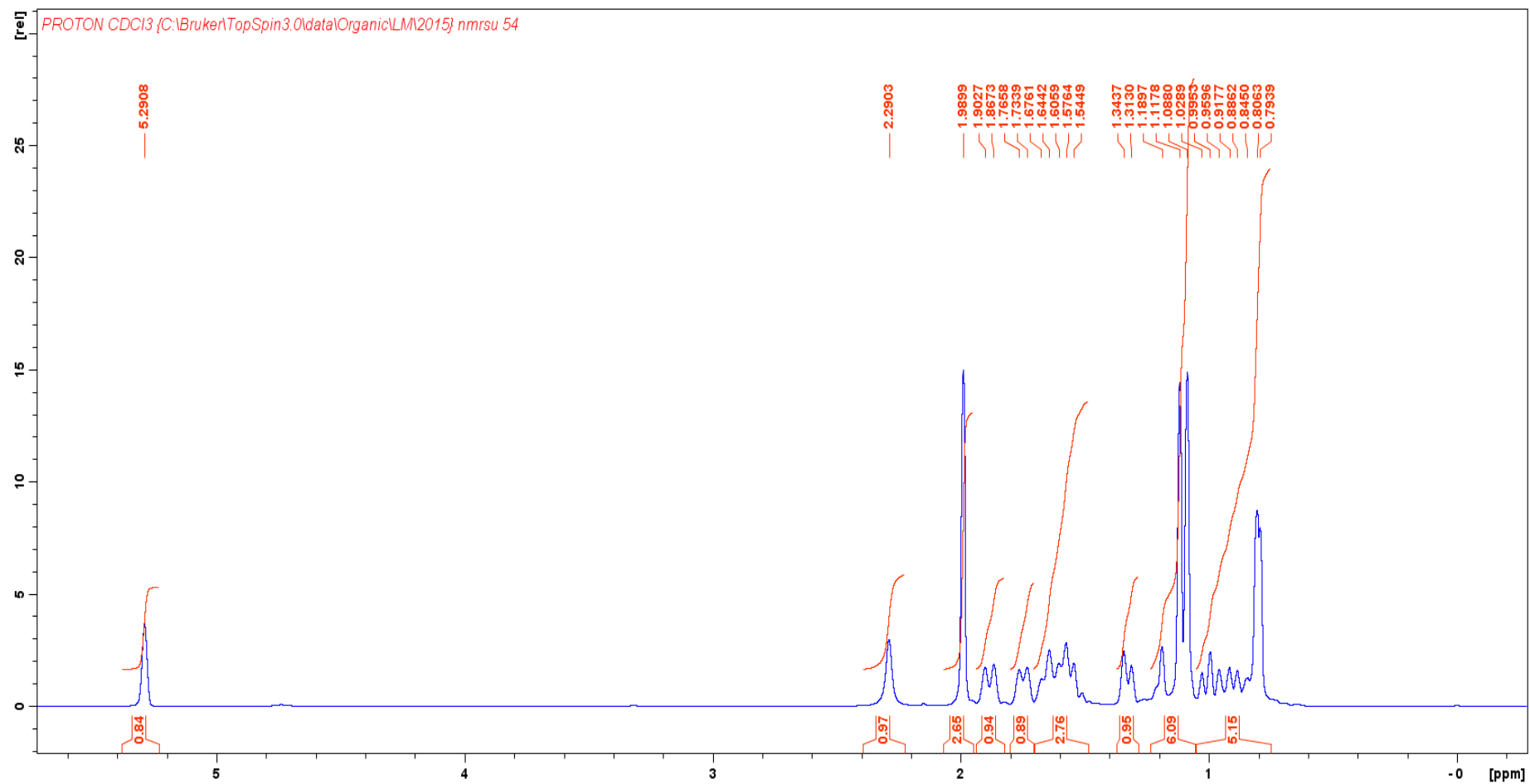


FTIR spectrum

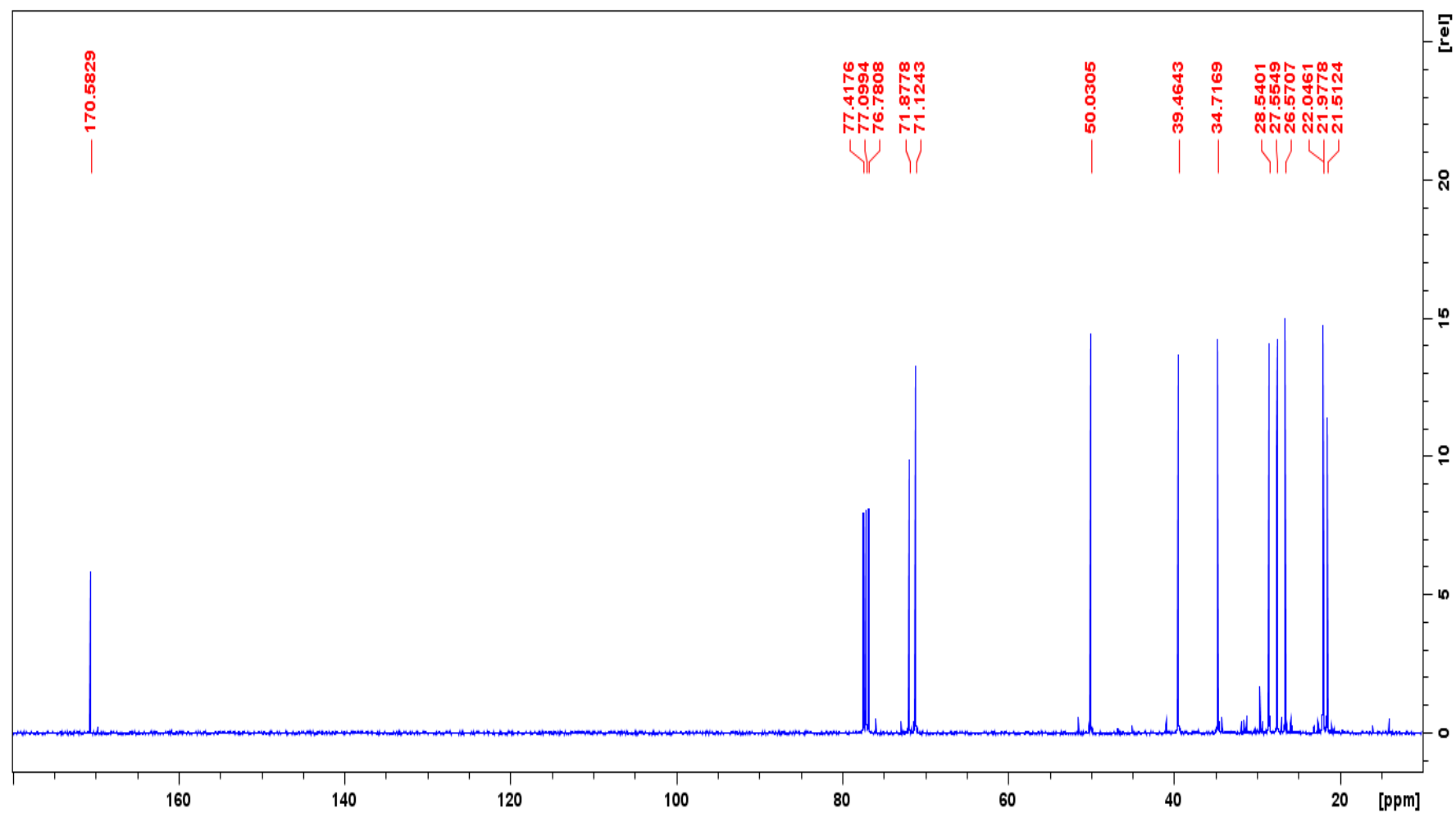
PMD di-acetate #639 RT: 14.26 AV: 1 NL: 1.66E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum

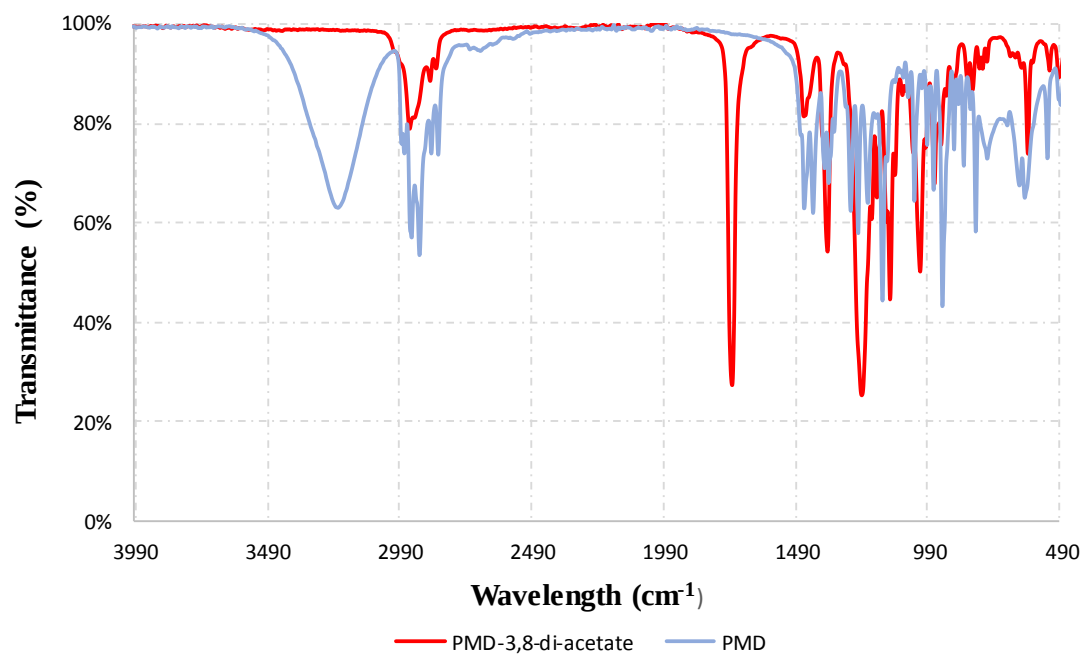


¹H NMR spectrum



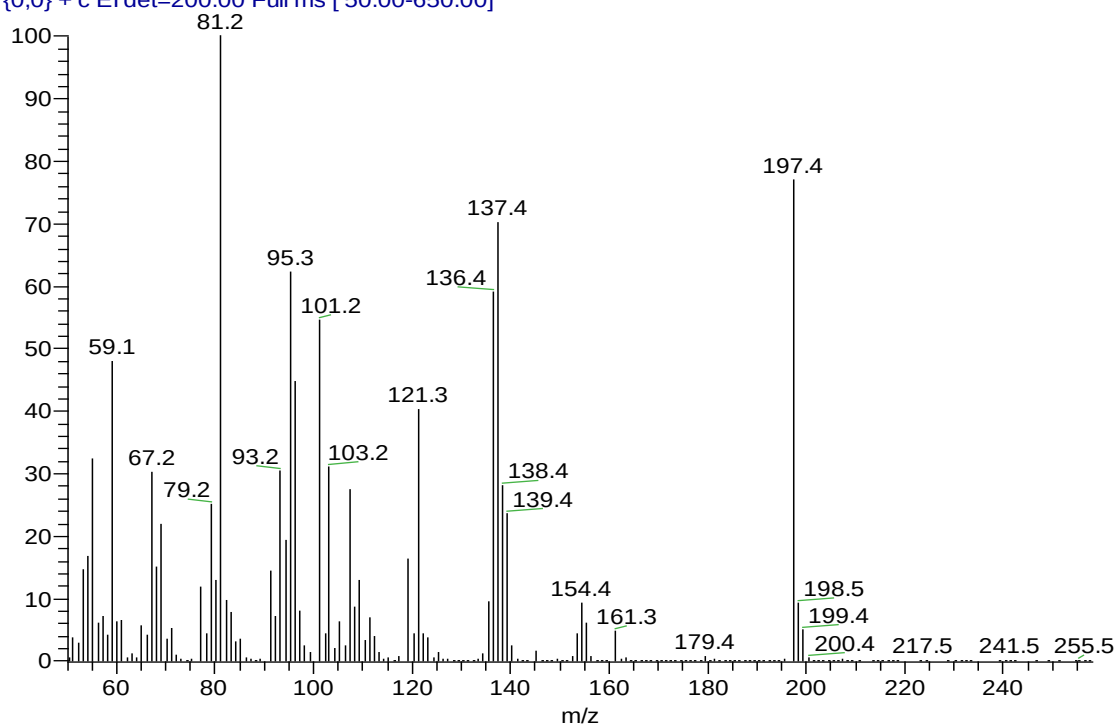
^{13}C NMR spectrum

2.2. Di-acetate

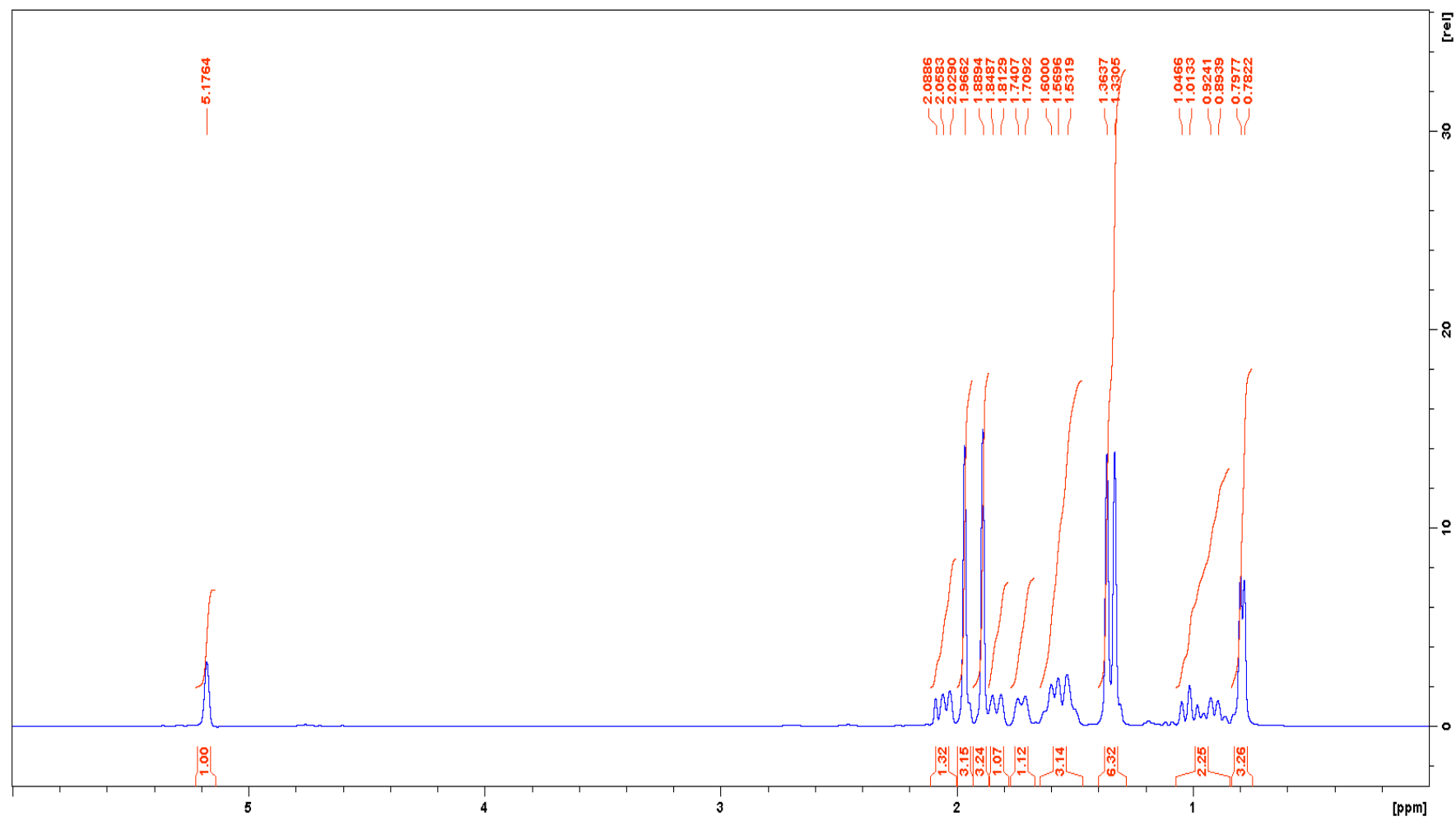


FTIR spectrum

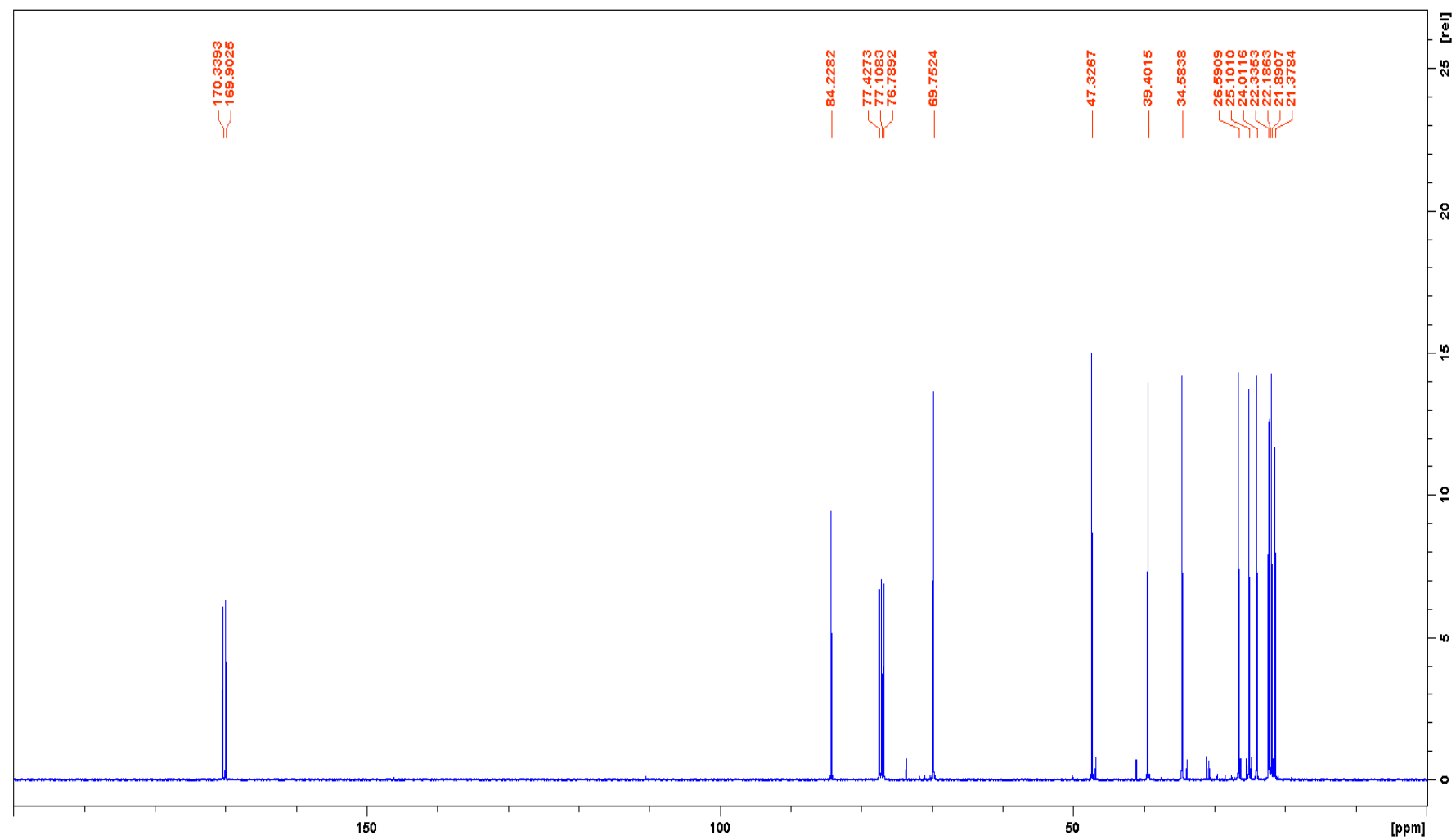
PMD di-acetate #640 RT: 14.28 AV: 1 NL: 1.66E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum

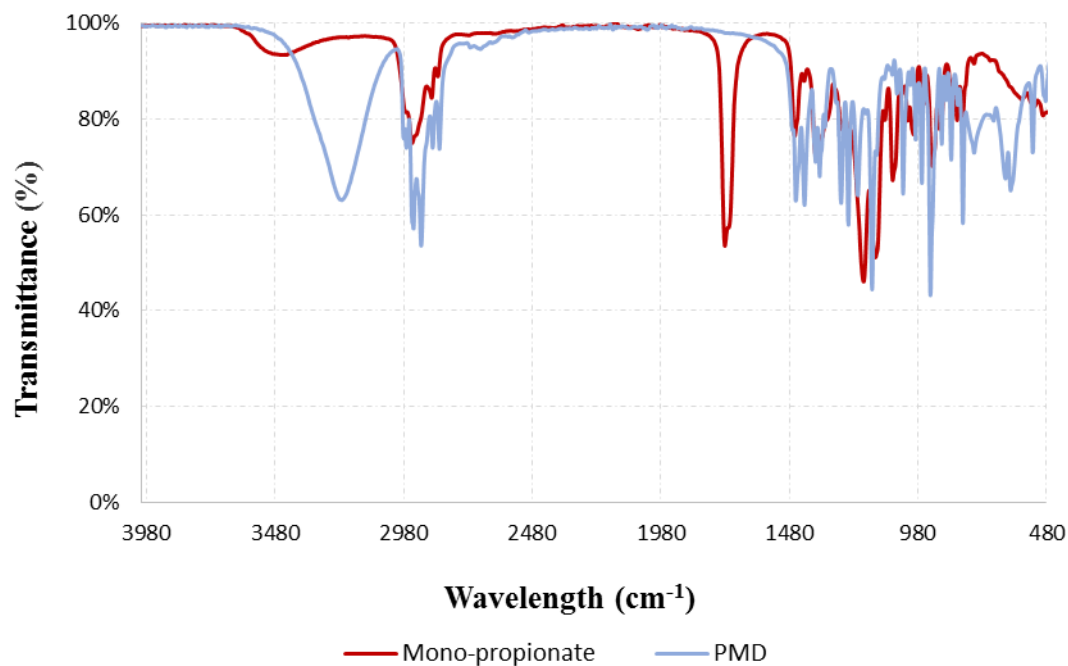


^1H NMR spectrum



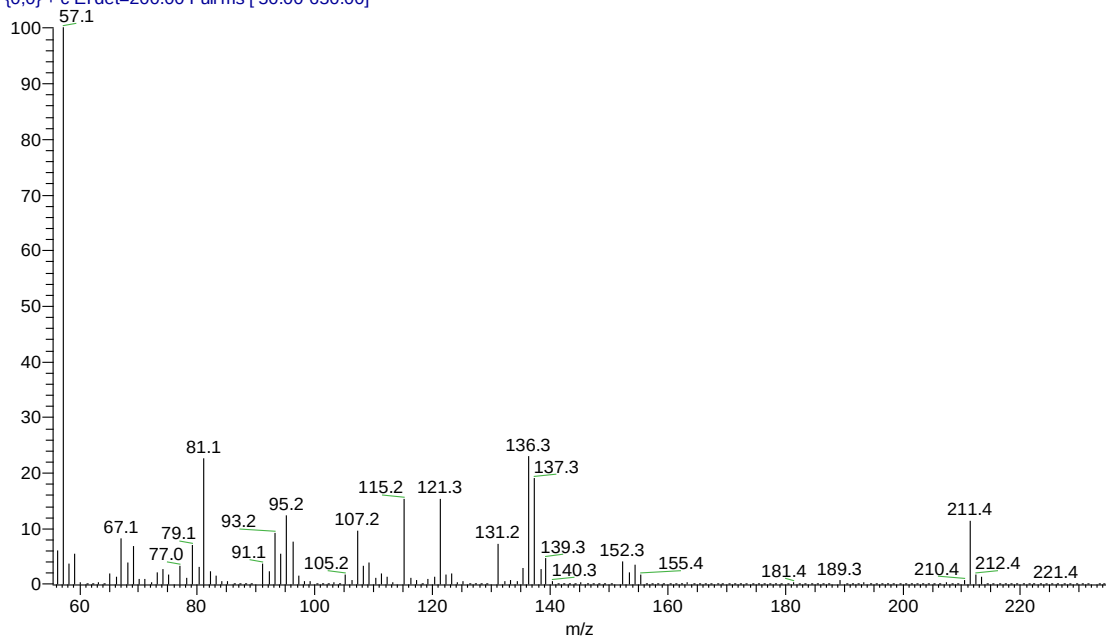
¹³C NMR spectrum

2.3. Mono-propionate

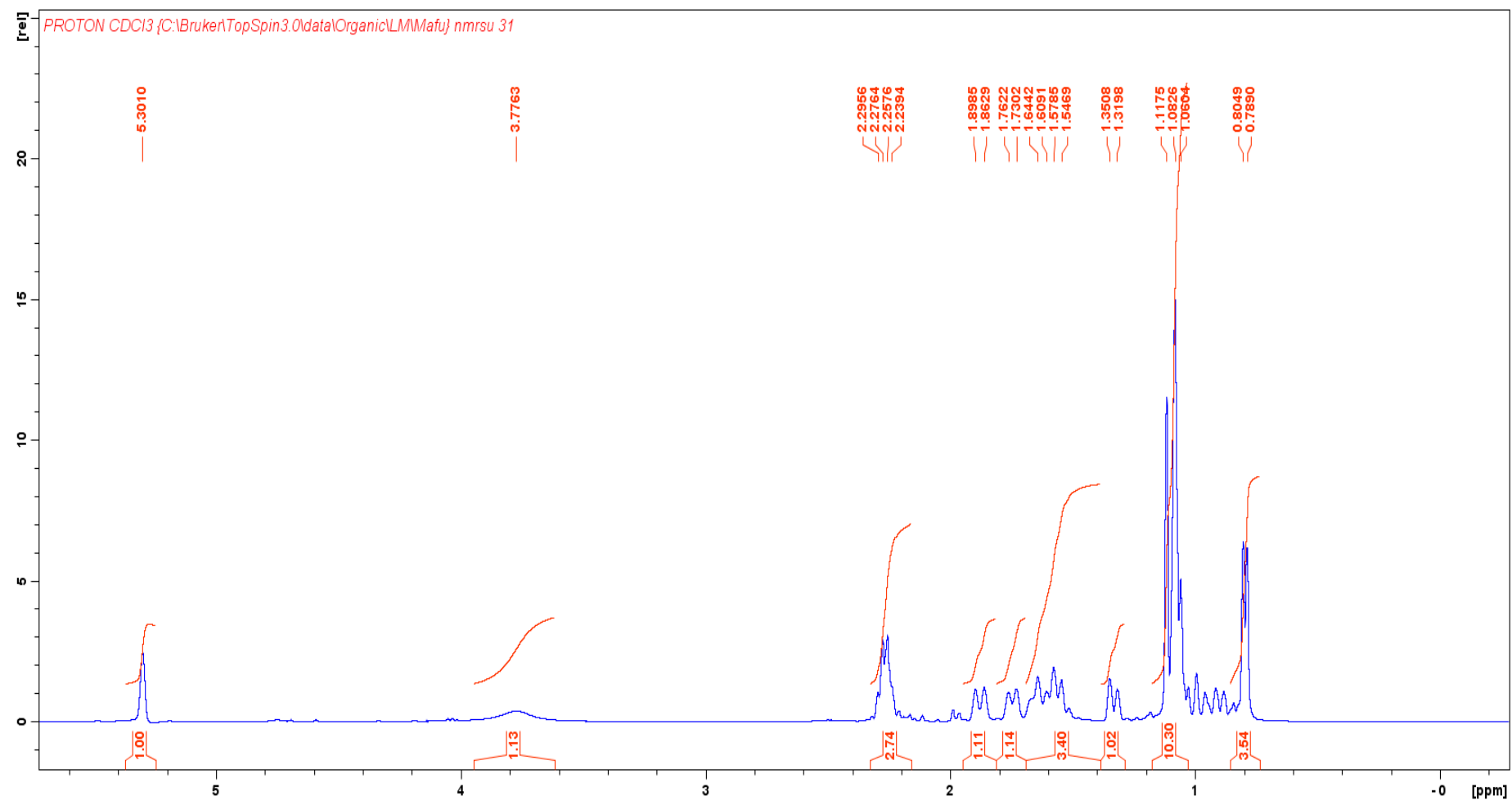


FTIR spectrum

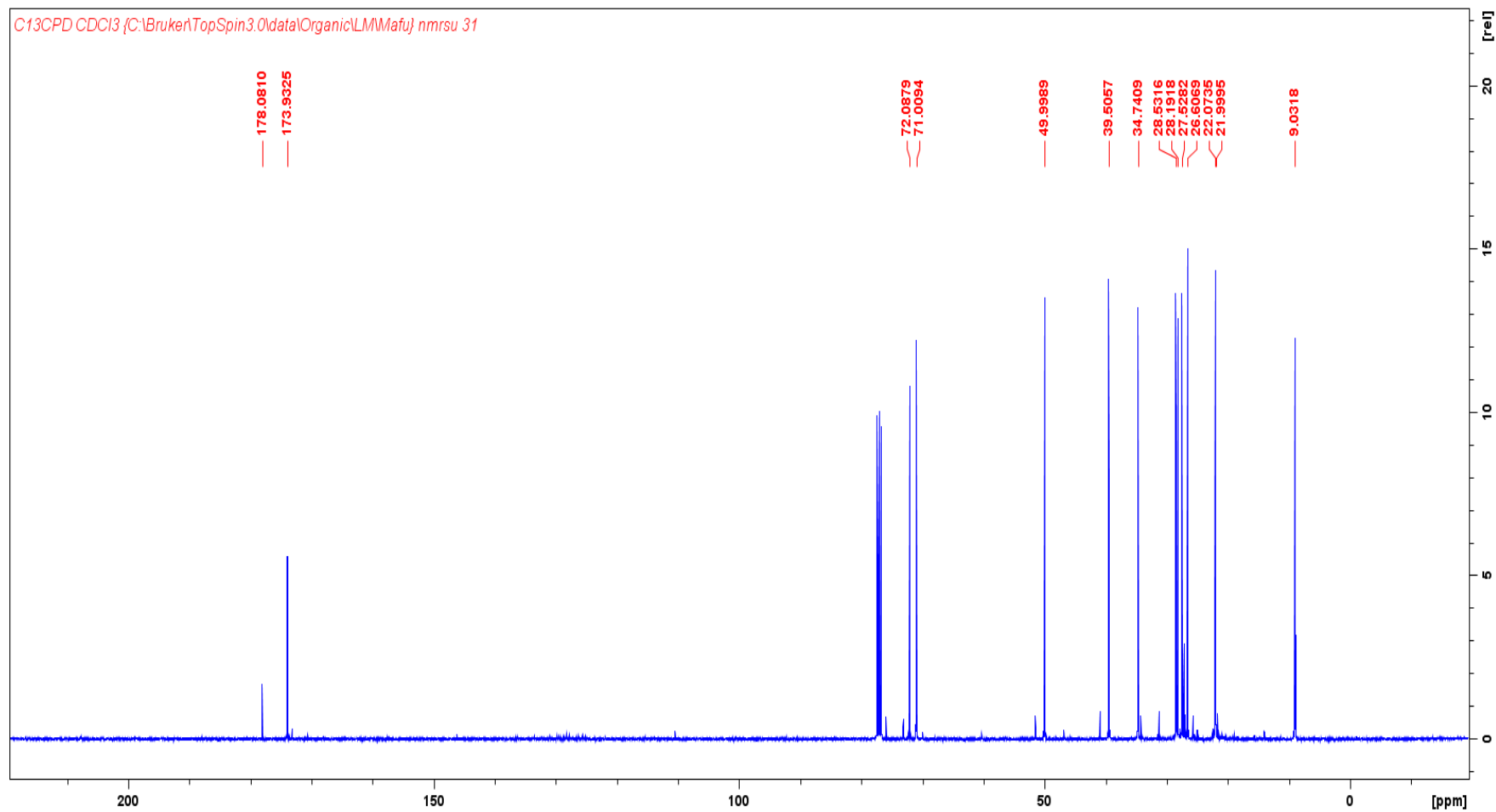
PMD di-propanoate #746 RT: 15.96 AV: 1 NL: 4.12E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum

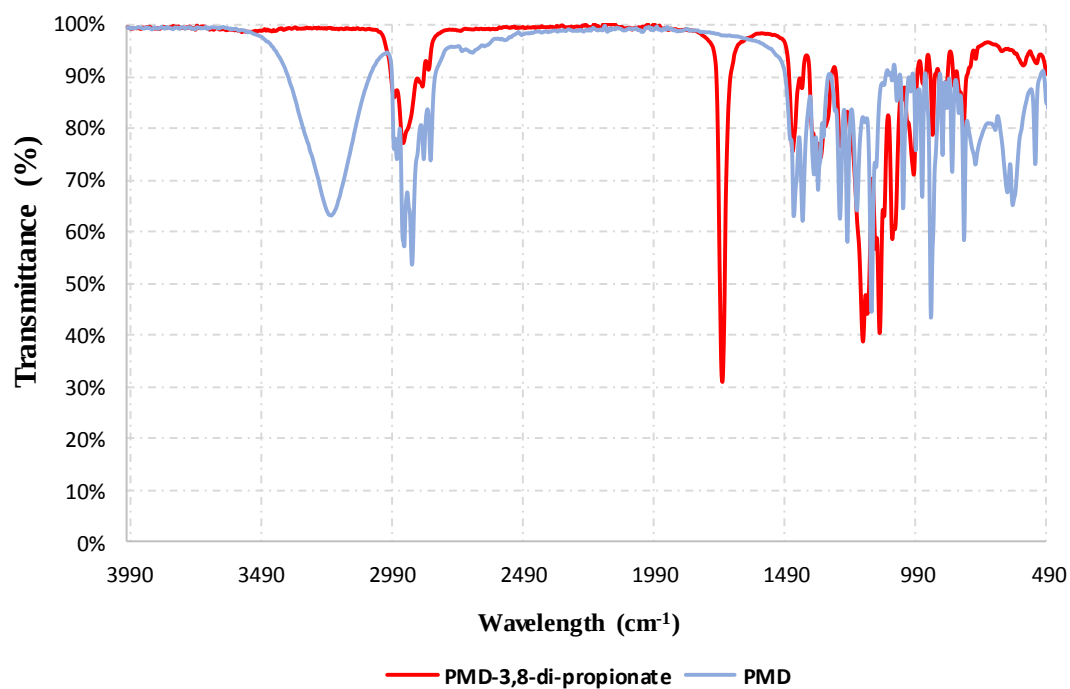


¹H NMR spectrum



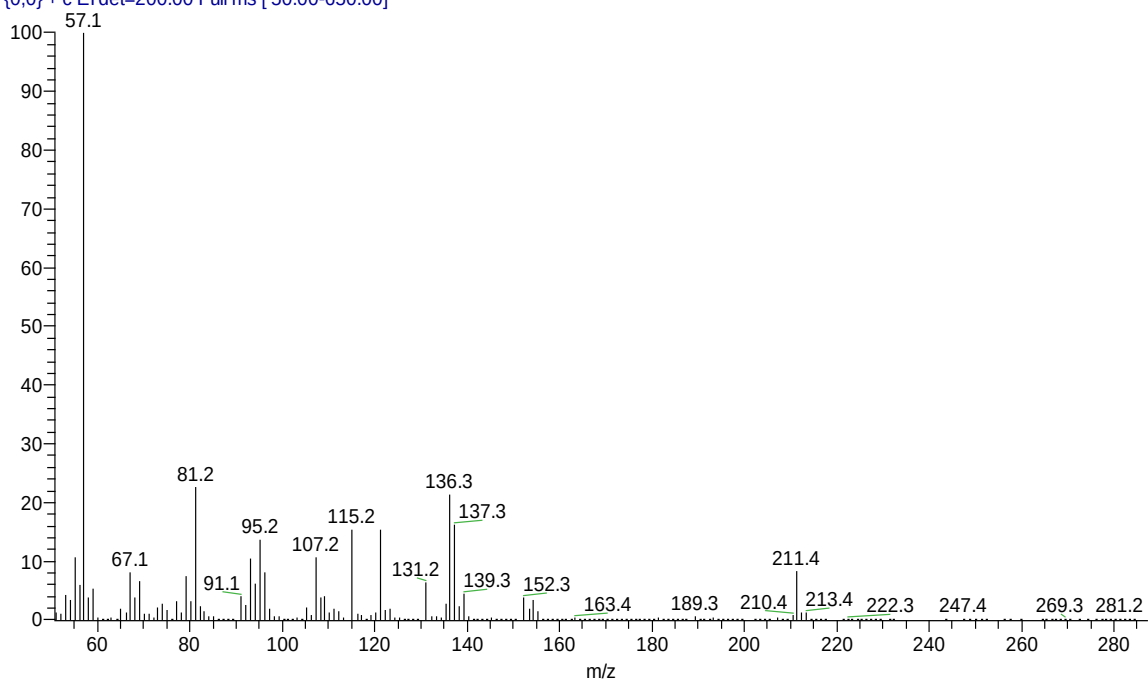
^{13}C NMR spectrum

2.4. Di-propionate

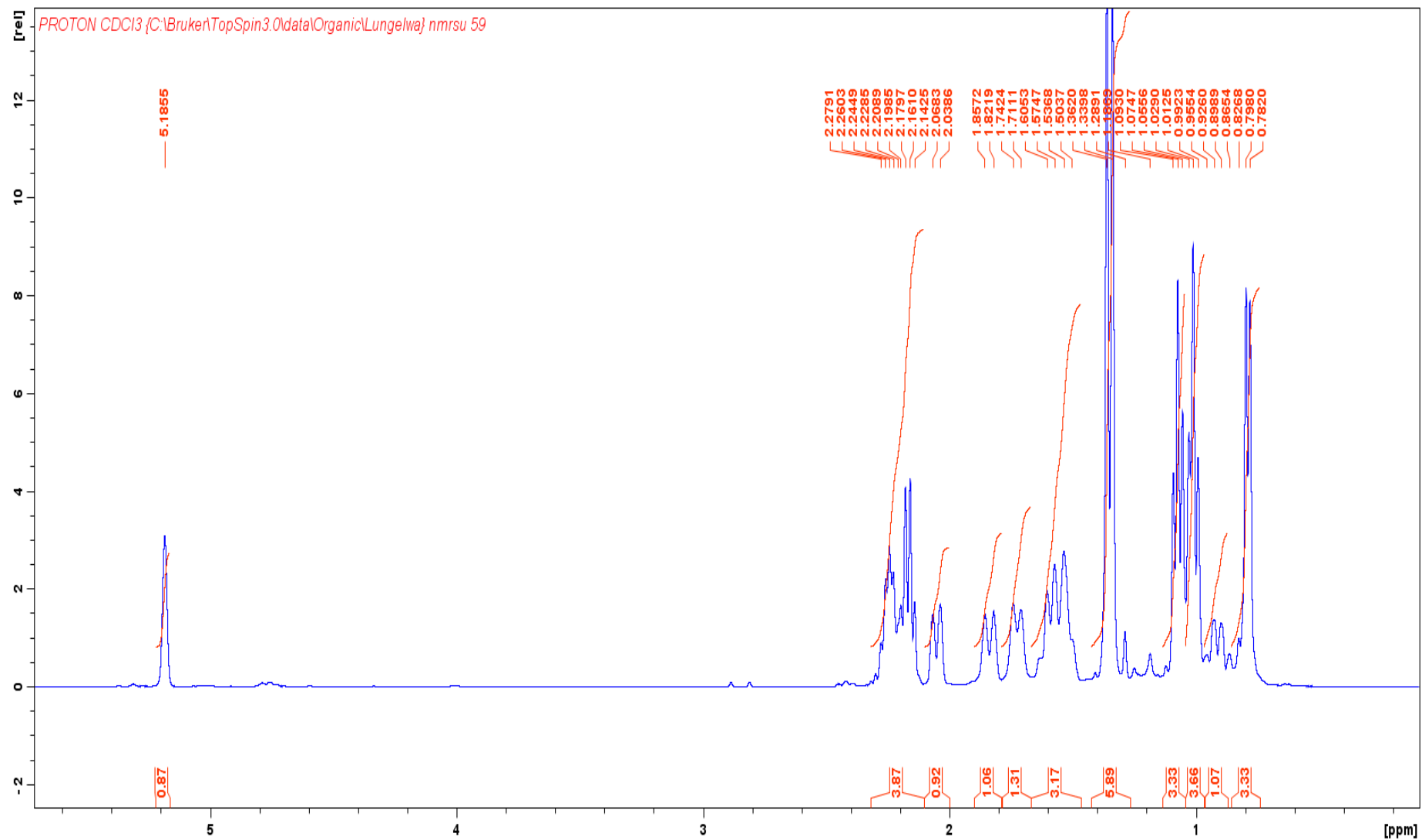


FTIR spectrum

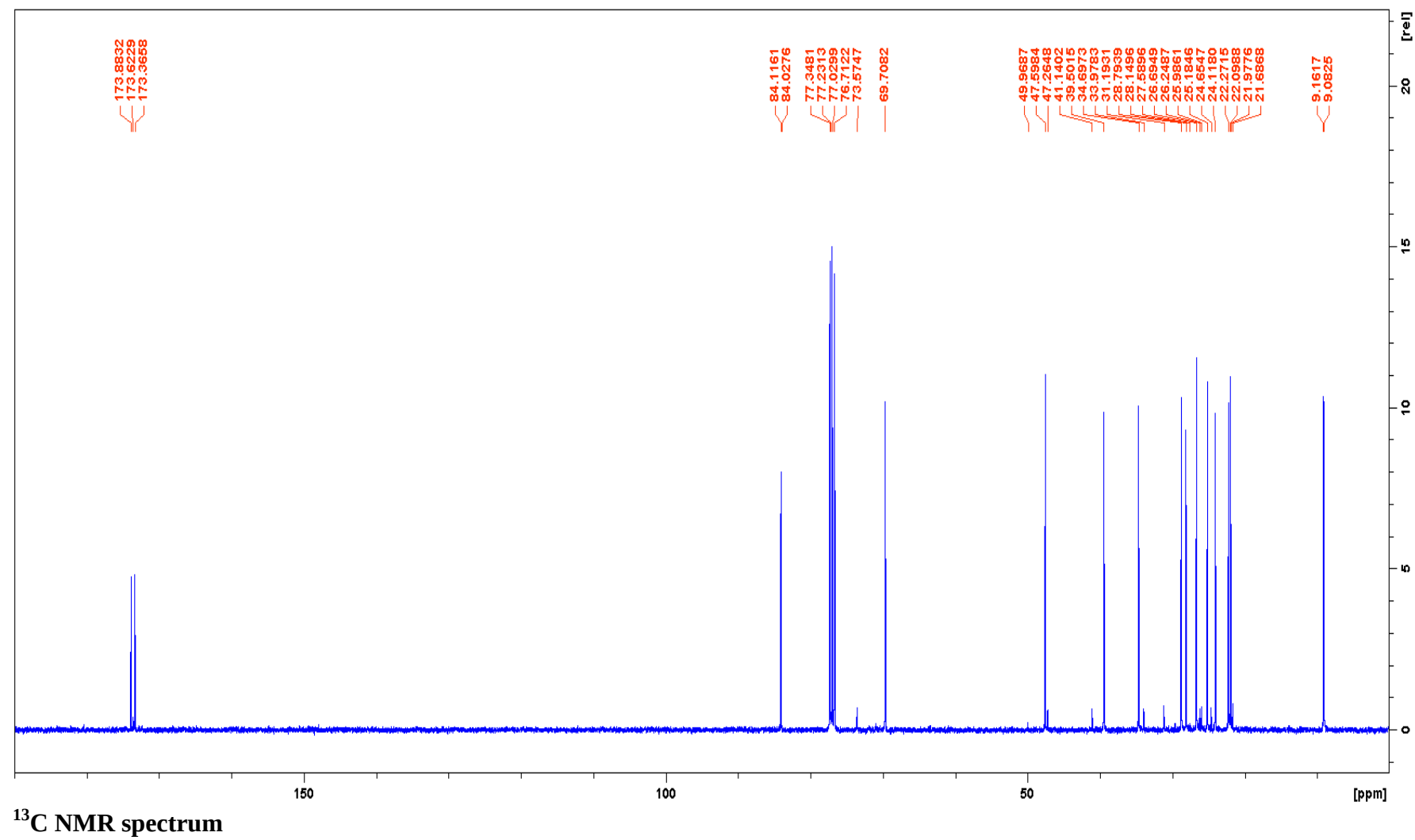
PMD di-propanoate #744 RT: 15.93 AV: 1 NL: 3.07E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



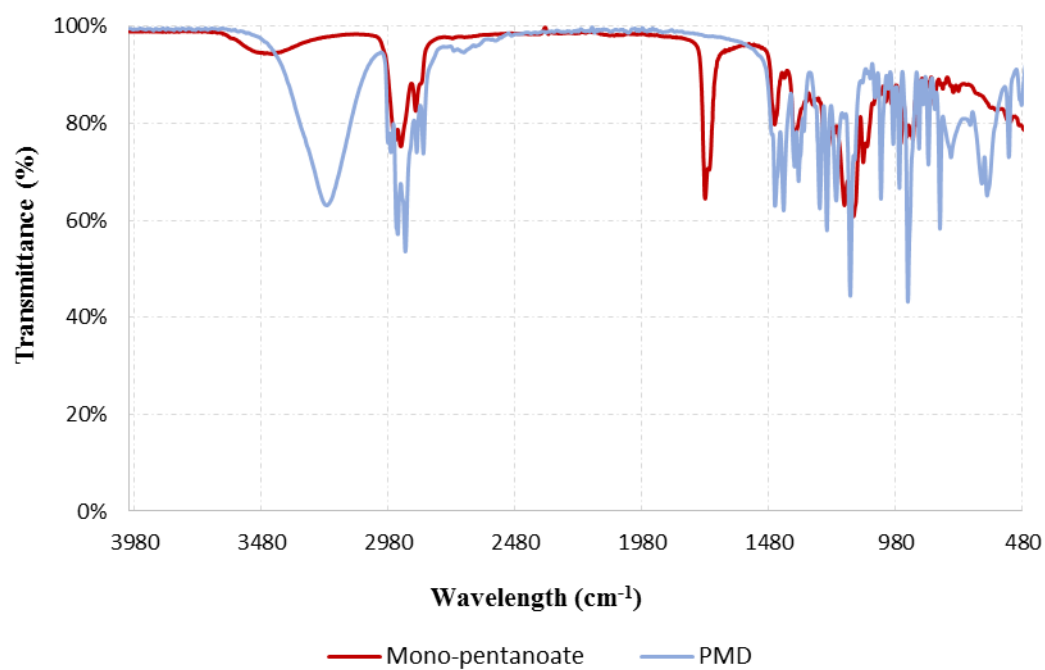
GC-MS spectrum



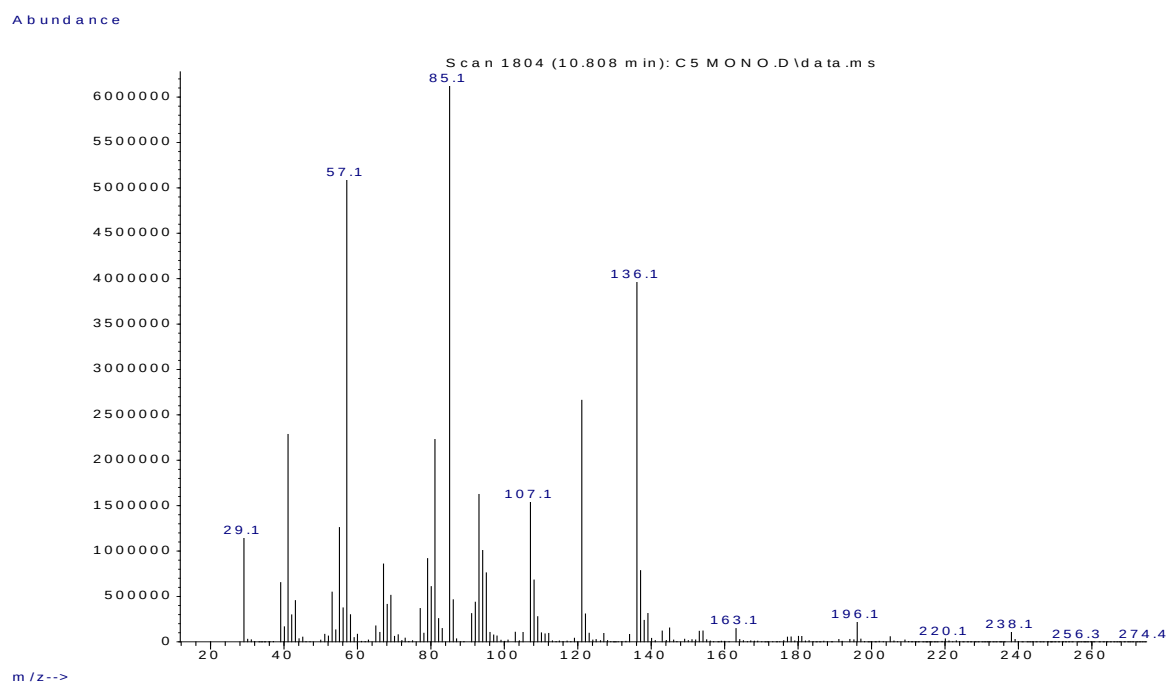
¹H NMR spectrum



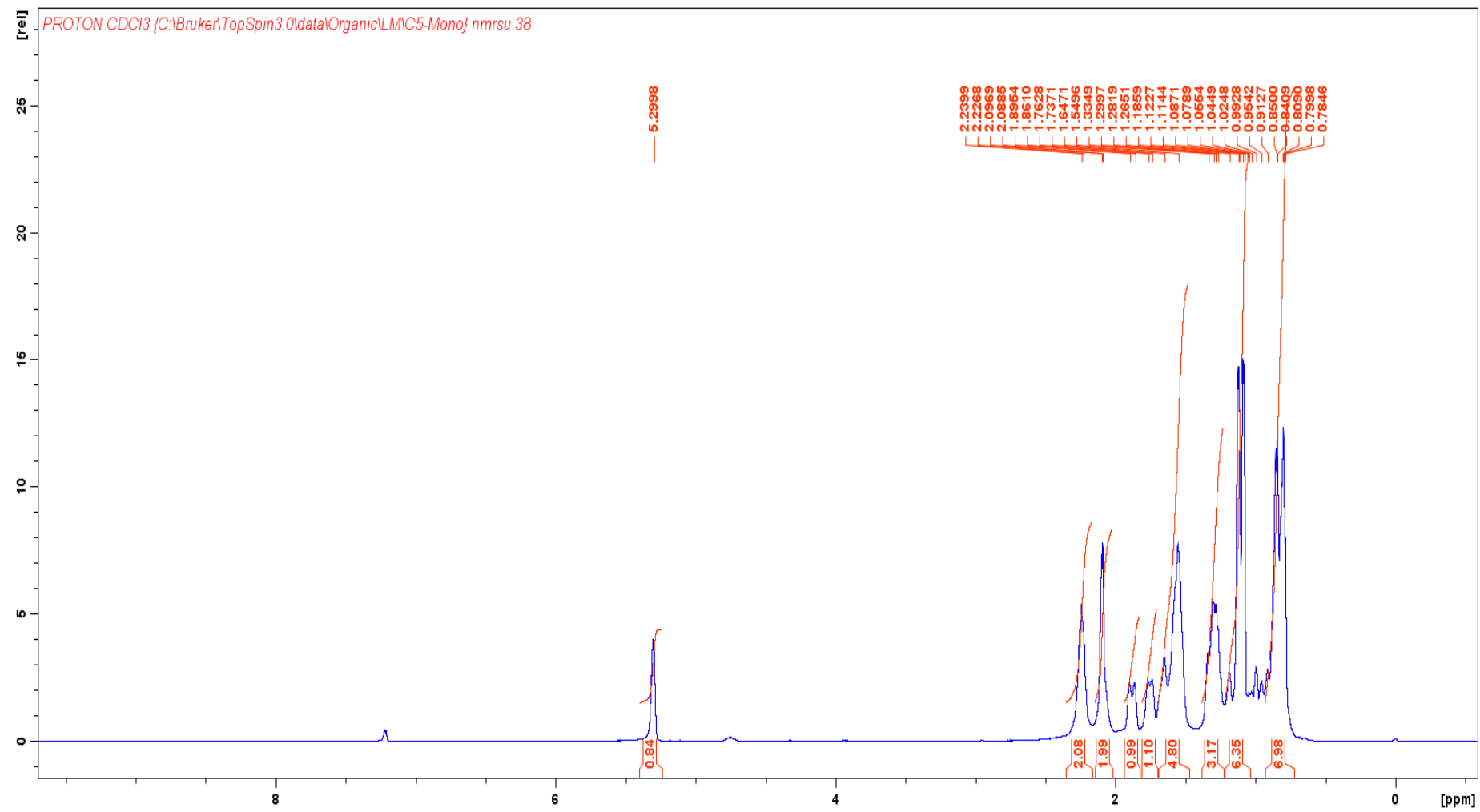
2.5. Mono-pentanoate



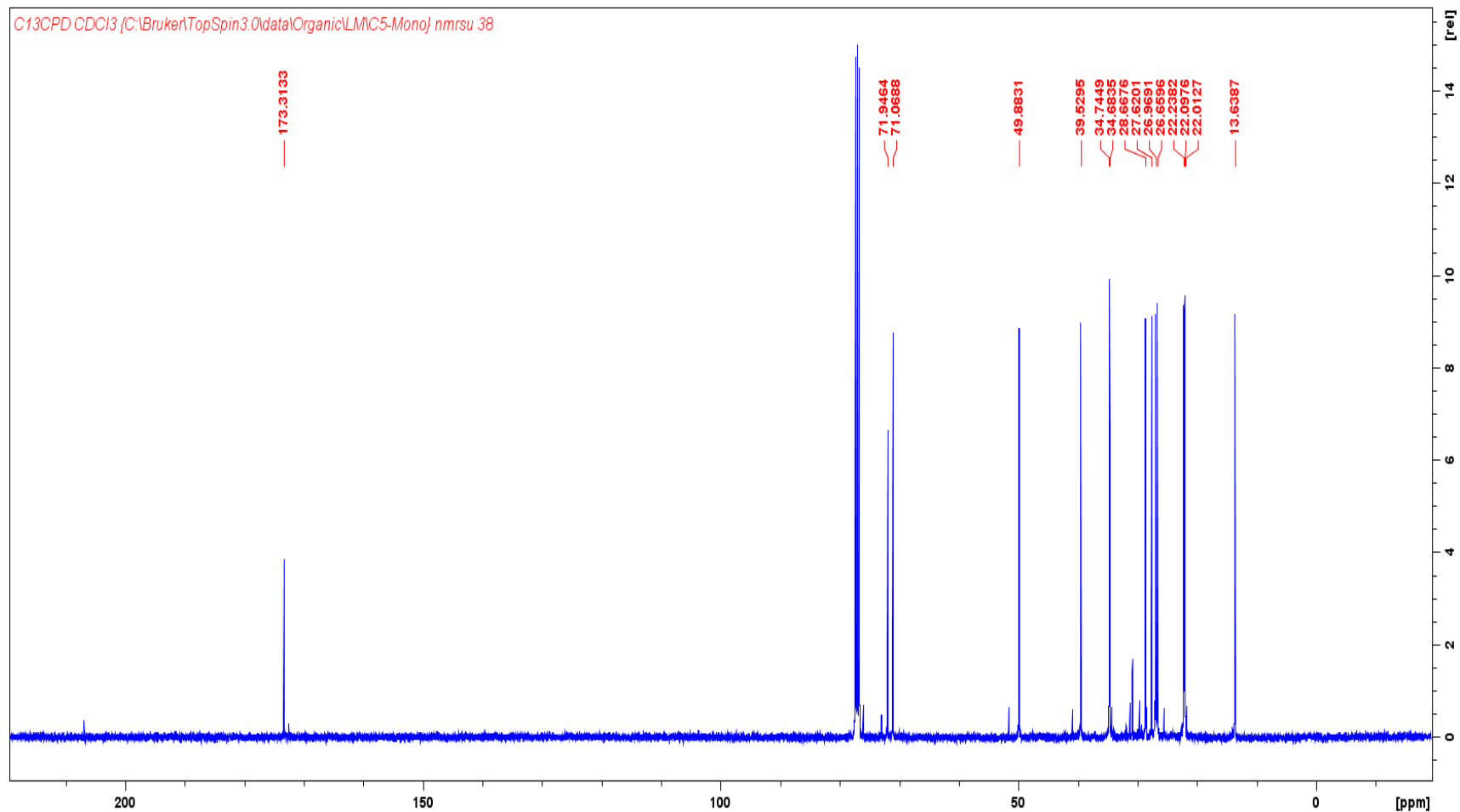
FTIR spectrum



GC-MS spectrum

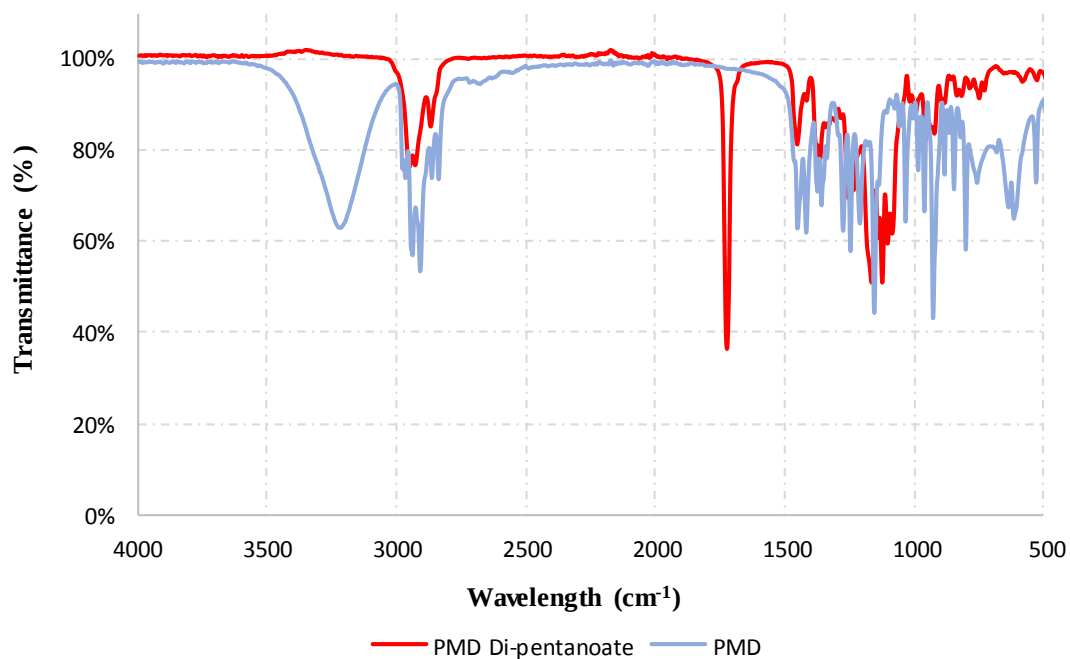


¹H NMR spectrum



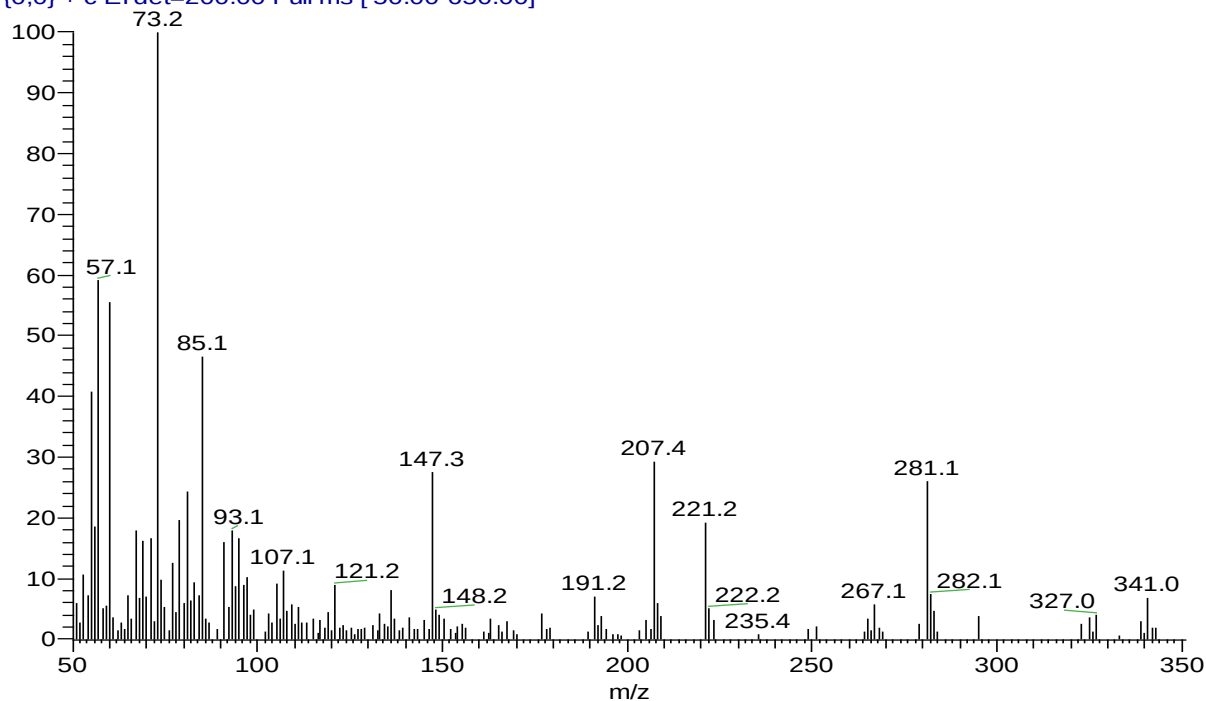
^{13}C NMR spectrum

2.6. Di-pentanoate

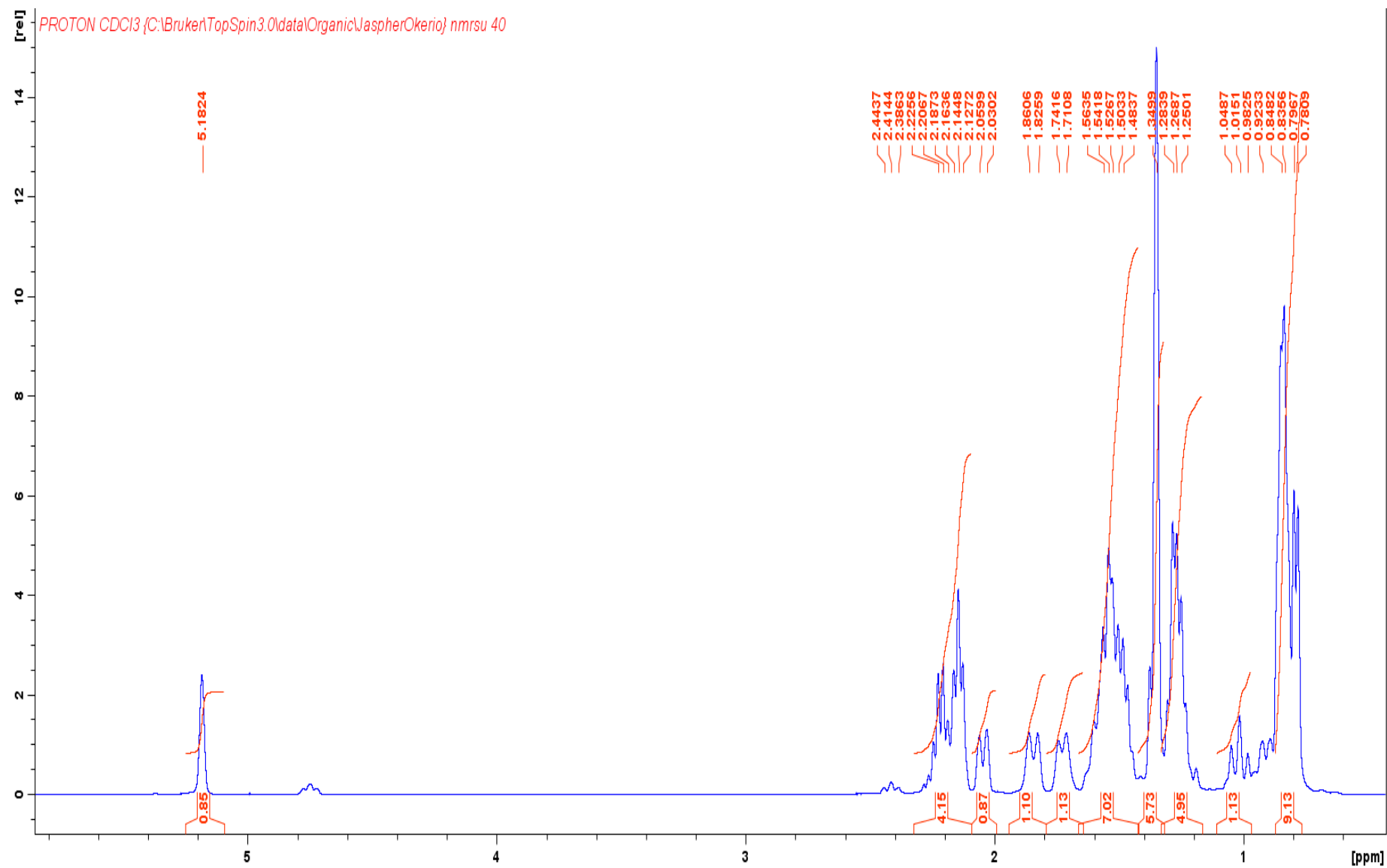


FTIR spectrum

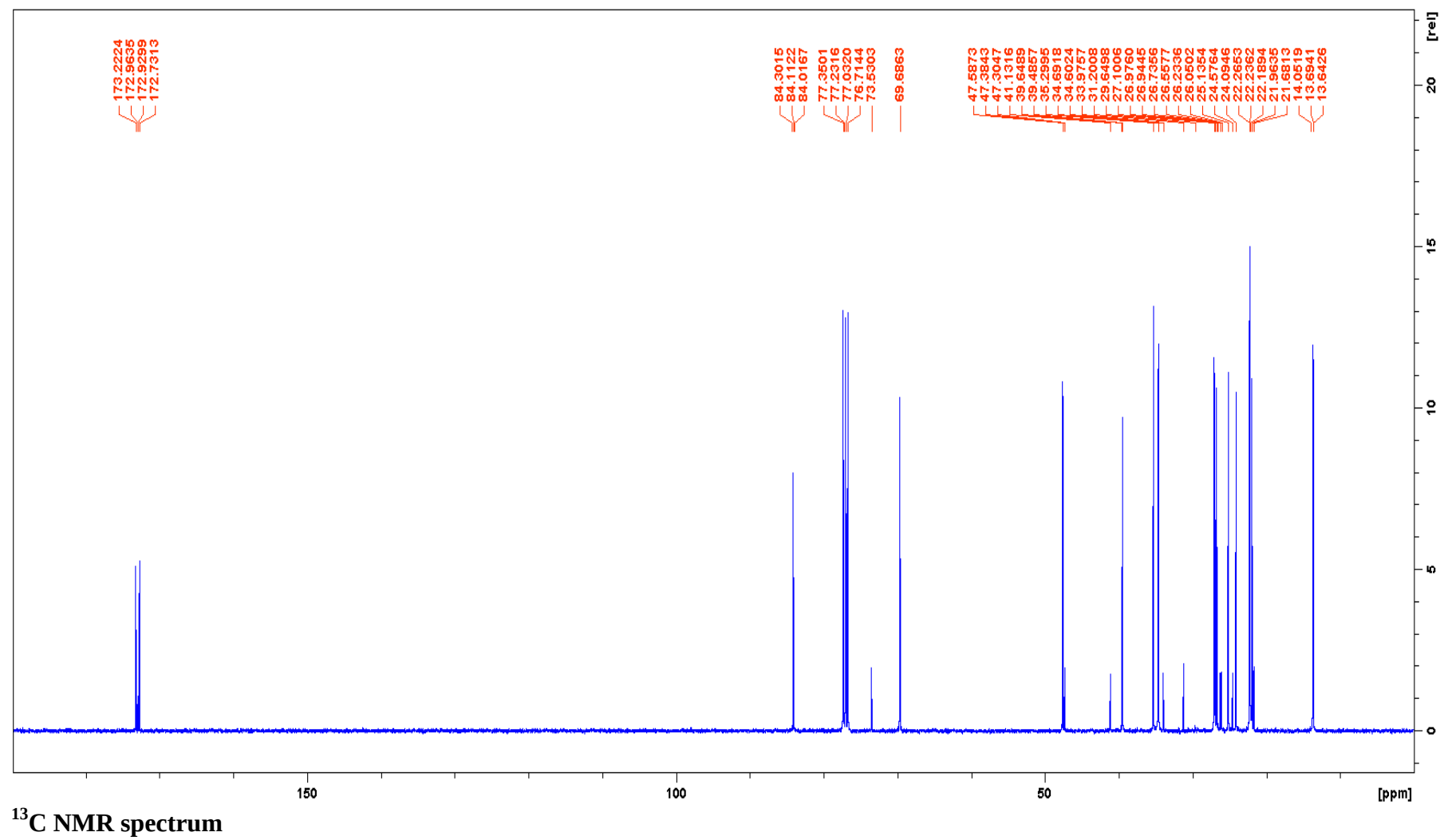
PMD Di-propanoate_141104144341 #773 RT: 19.96 AV: 1 NL: 1.29E5
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



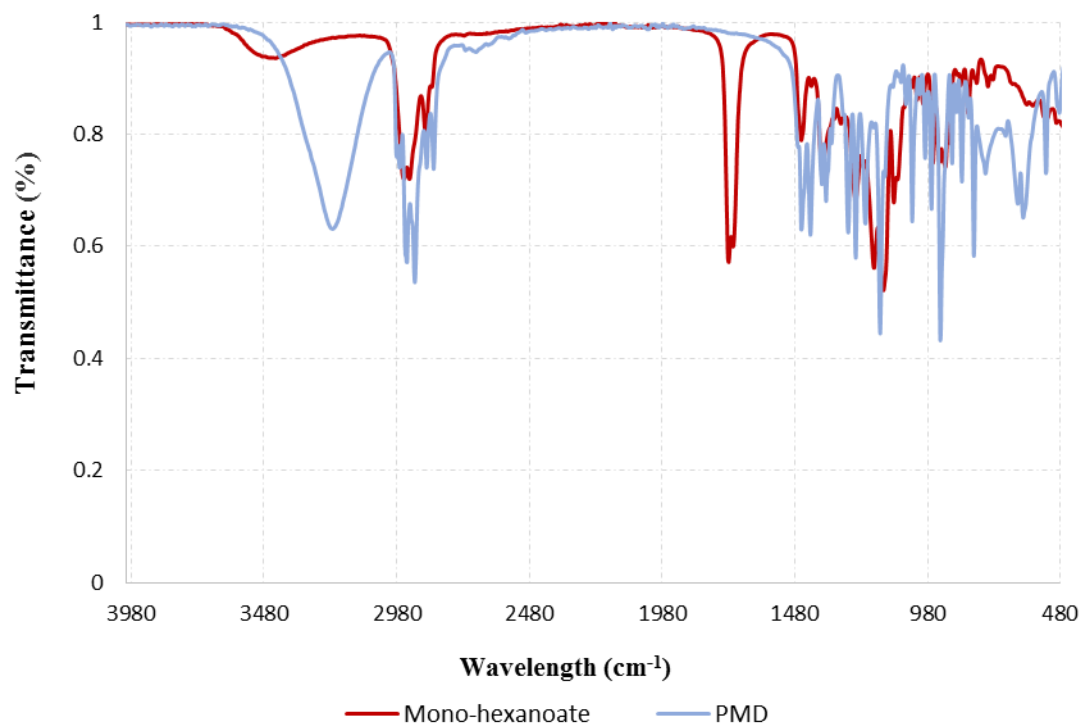
GC-MS spectrum



¹H NMR spectrum

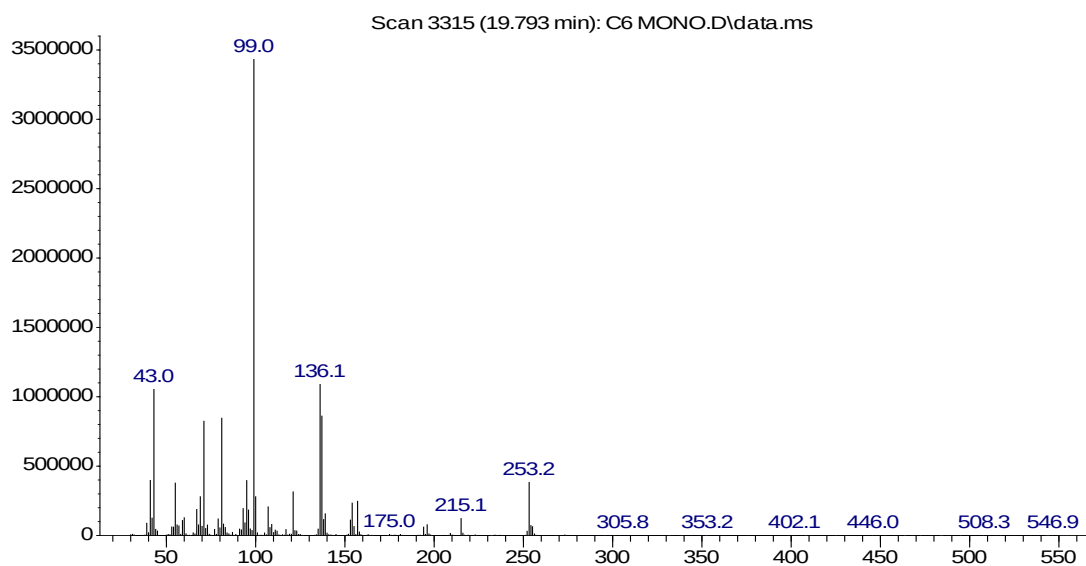


2.7. Mono-hexanoate



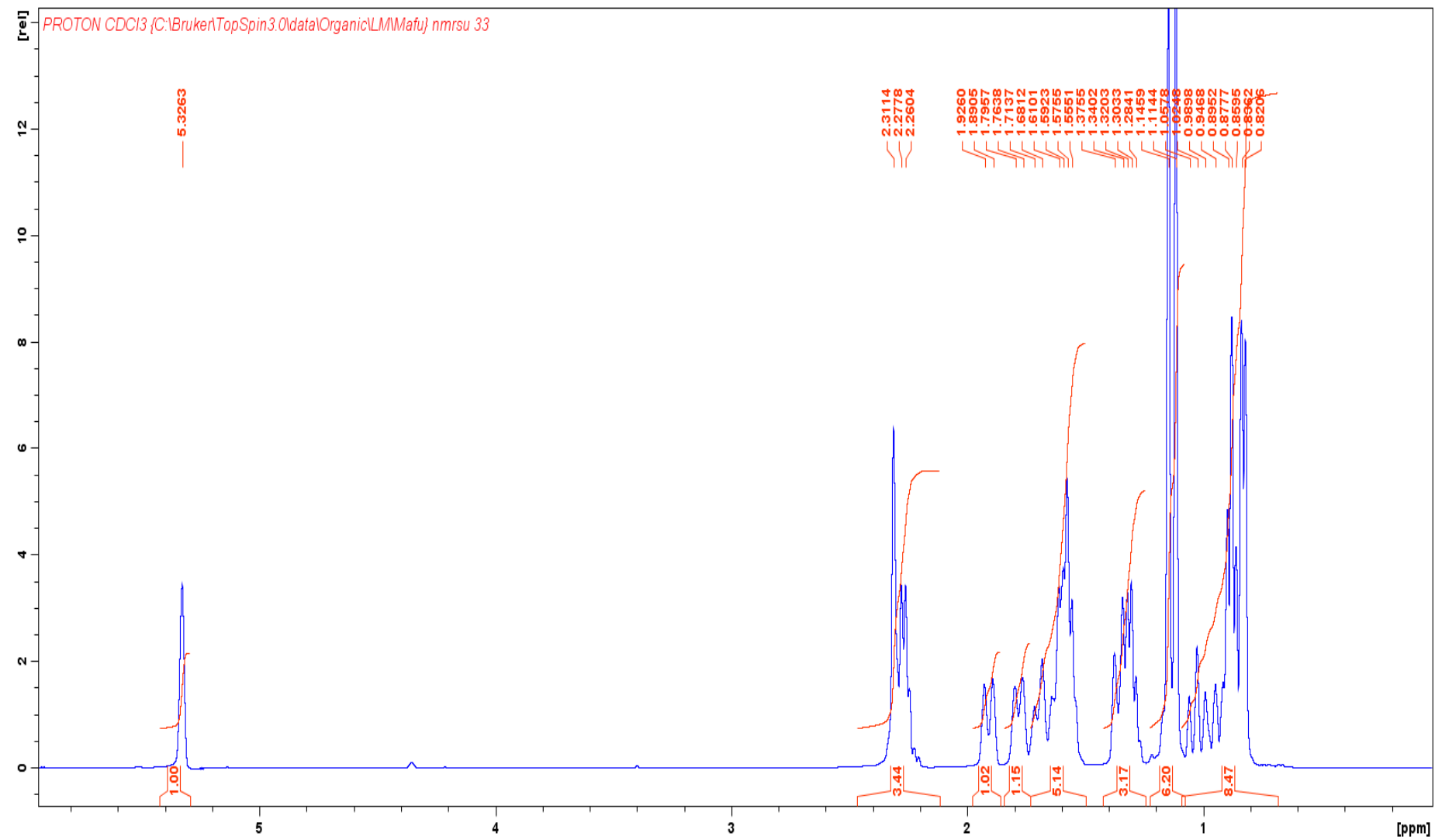
FTIR spectrum

Abundance

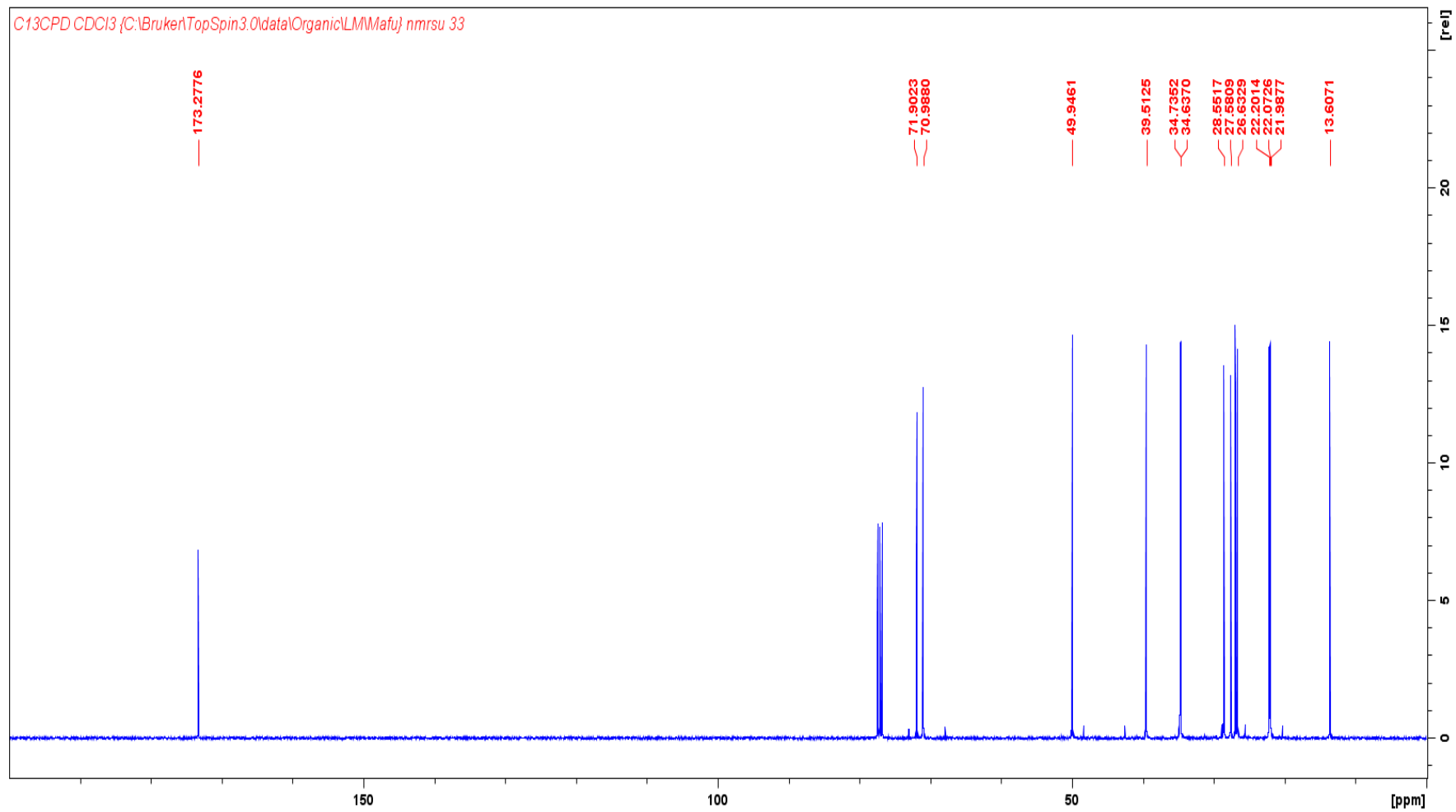


m/z-->

GC-MS spectrum

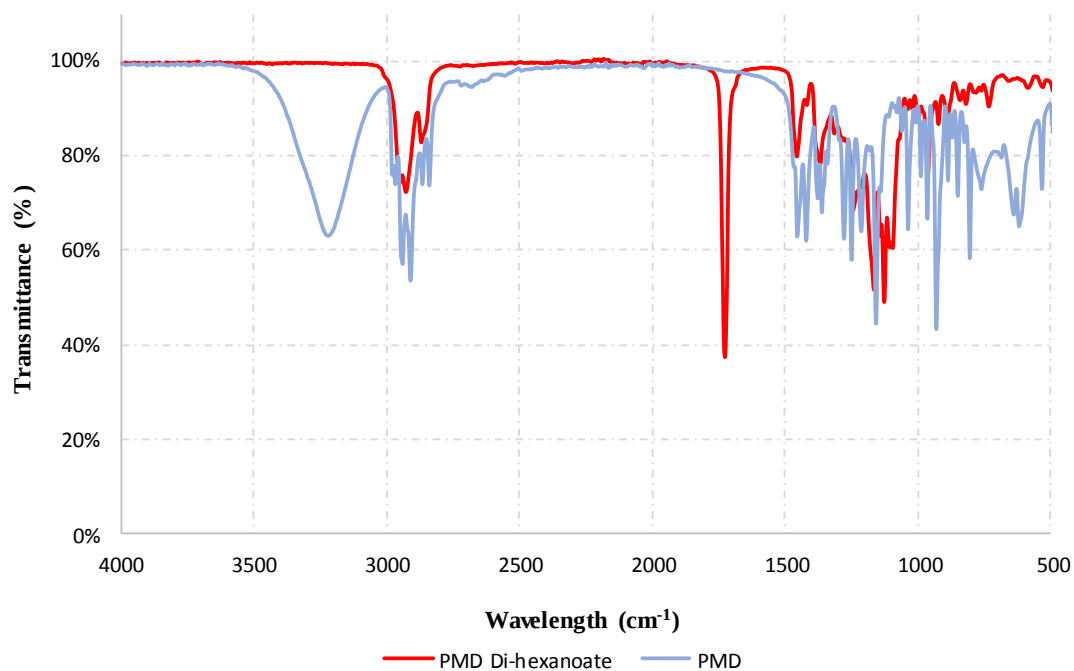


¹H NMR spectrum



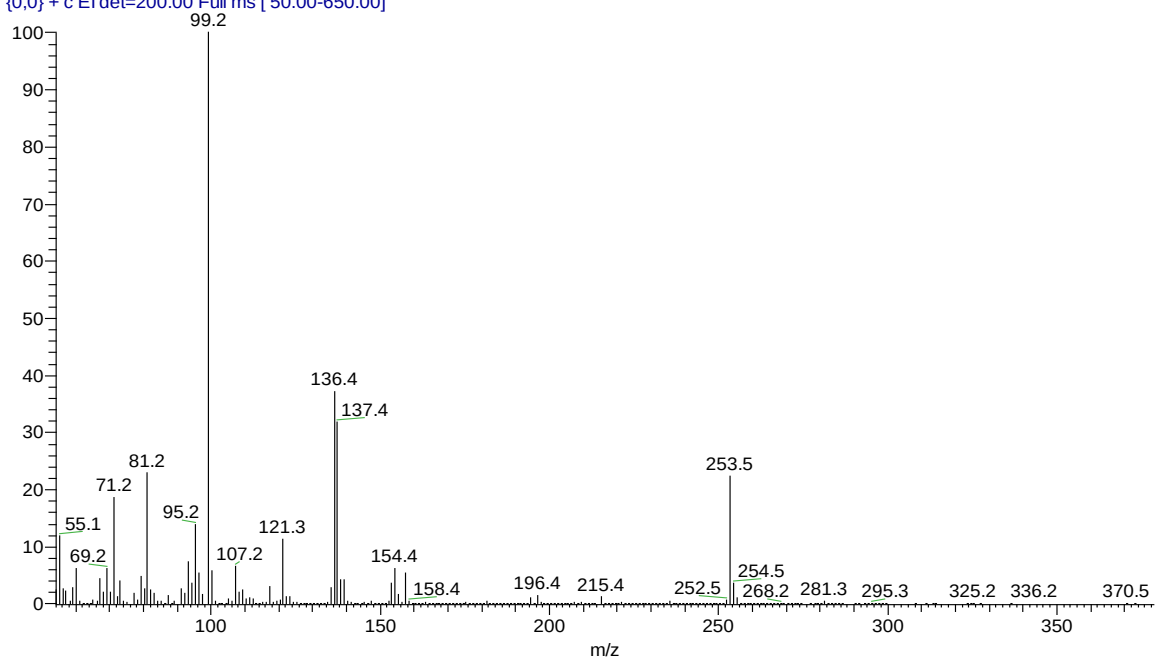
^{13}C NMR spectrum

Di-hexanoate

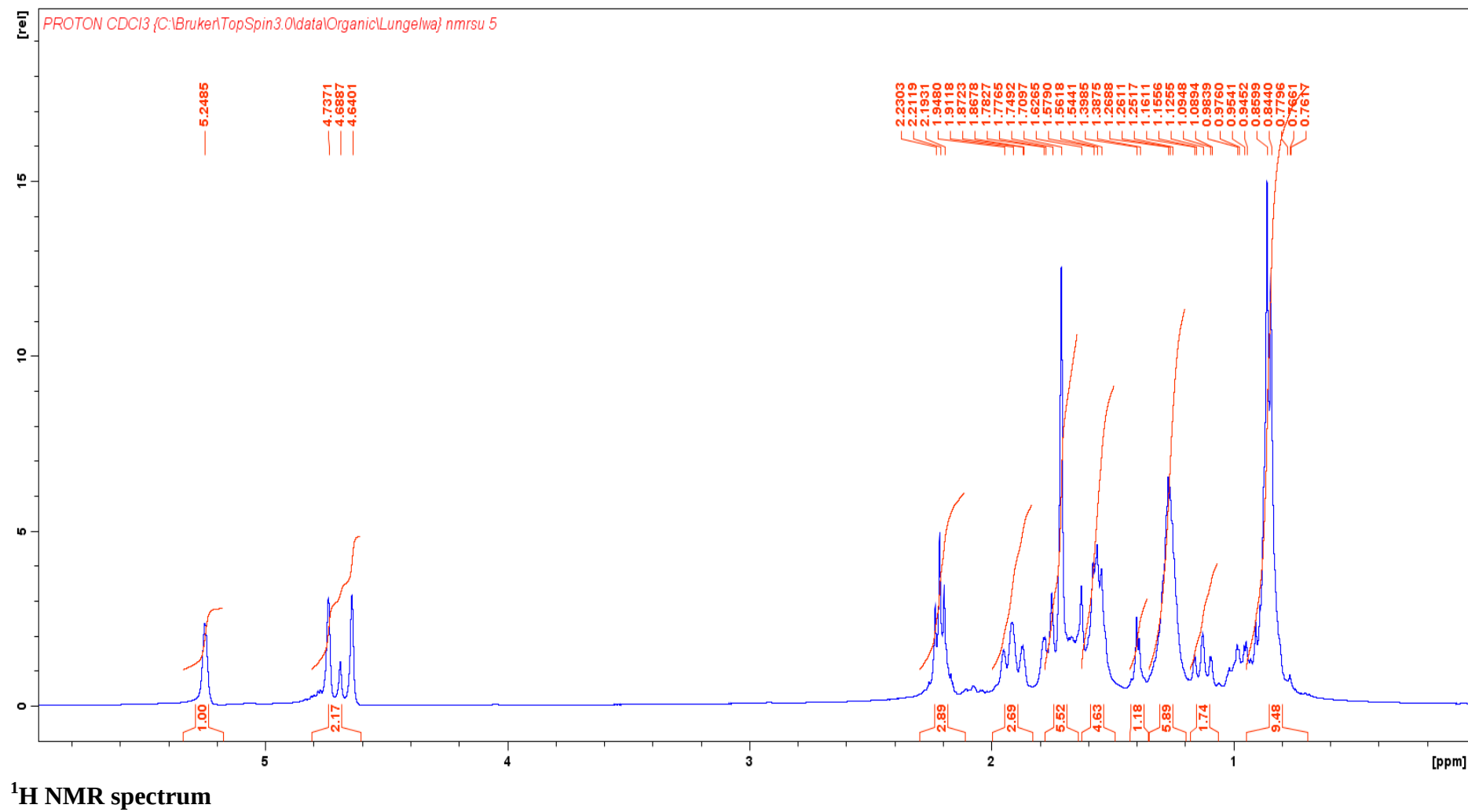


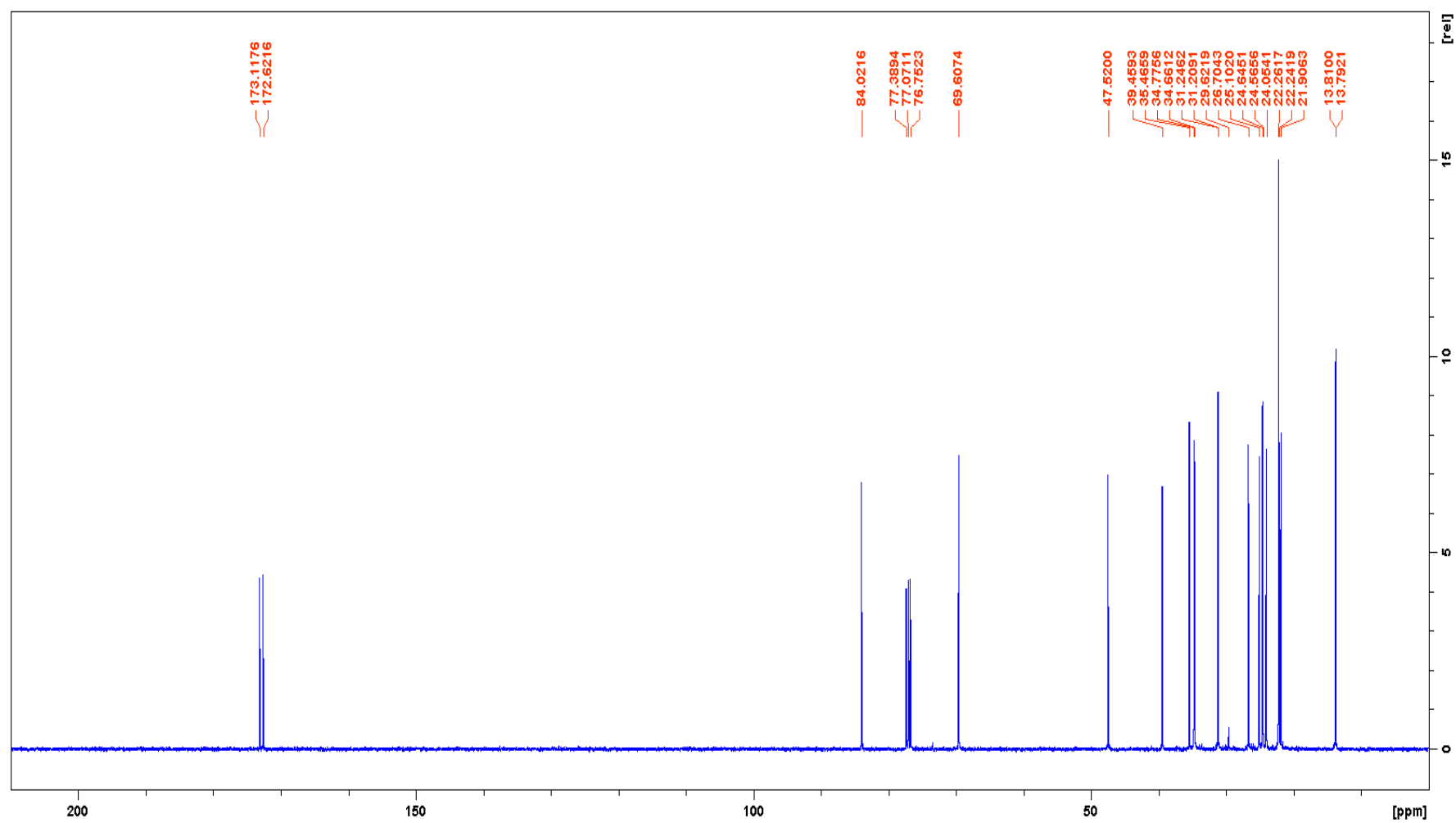
FTIR spectrum

PMD Di-hexanoate #667 RT: 21.37 AV: 1 NL: 3.87E7
T: {0,0} + c EI det=200.00 Full ms [50.00-650.00]



GC-MS spectrum





¹³C NMR spectrum