

## REFERENCES

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## Appendix

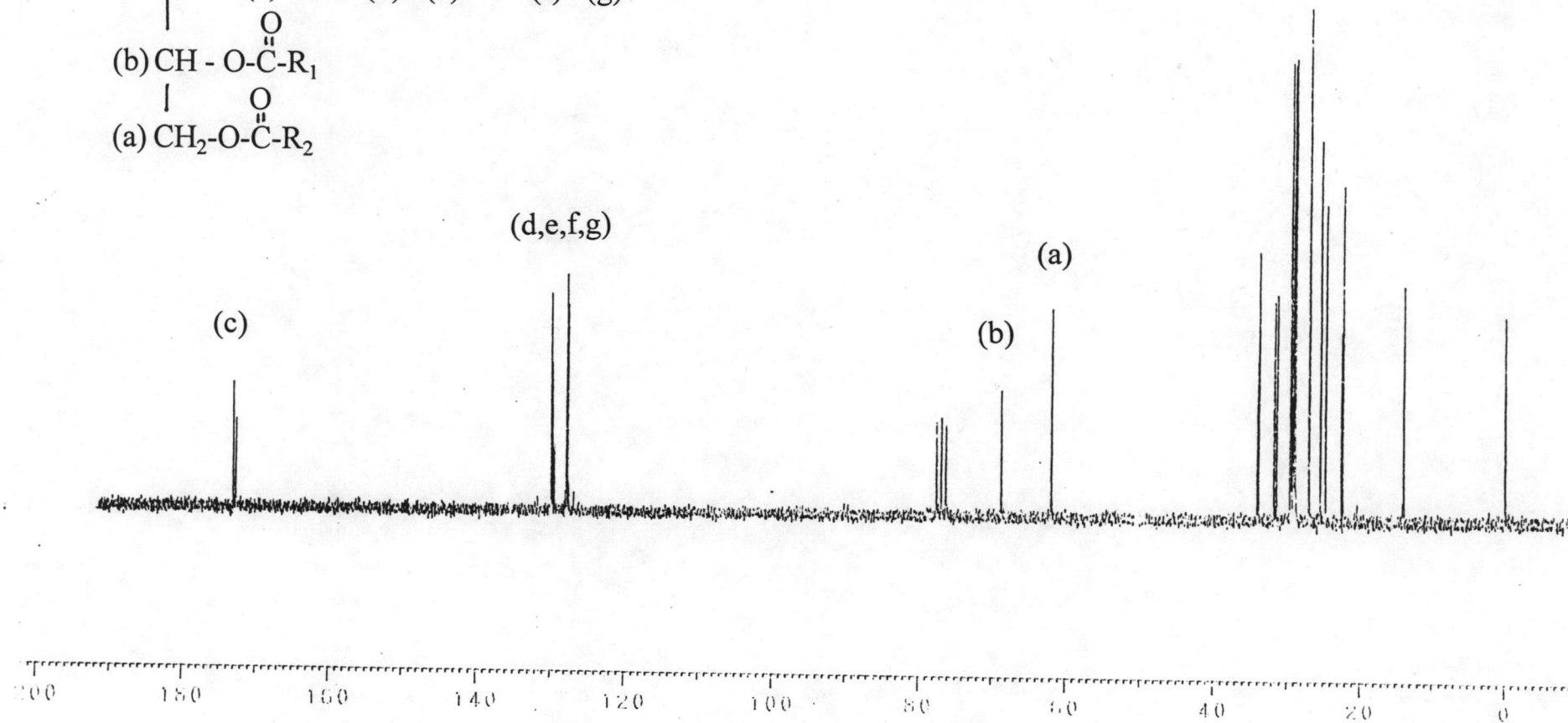
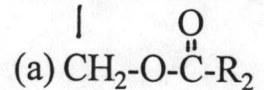
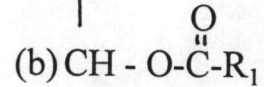
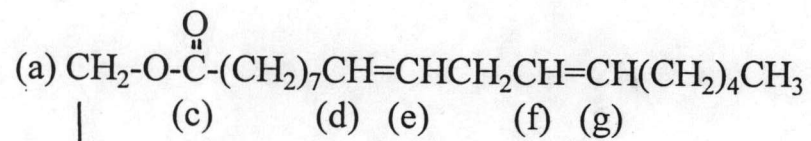


Figure A-1:  $^{13}\text{C-NMR}$  ( $\text{CDCl}_3$ ) Spectrum of Soybean Oil

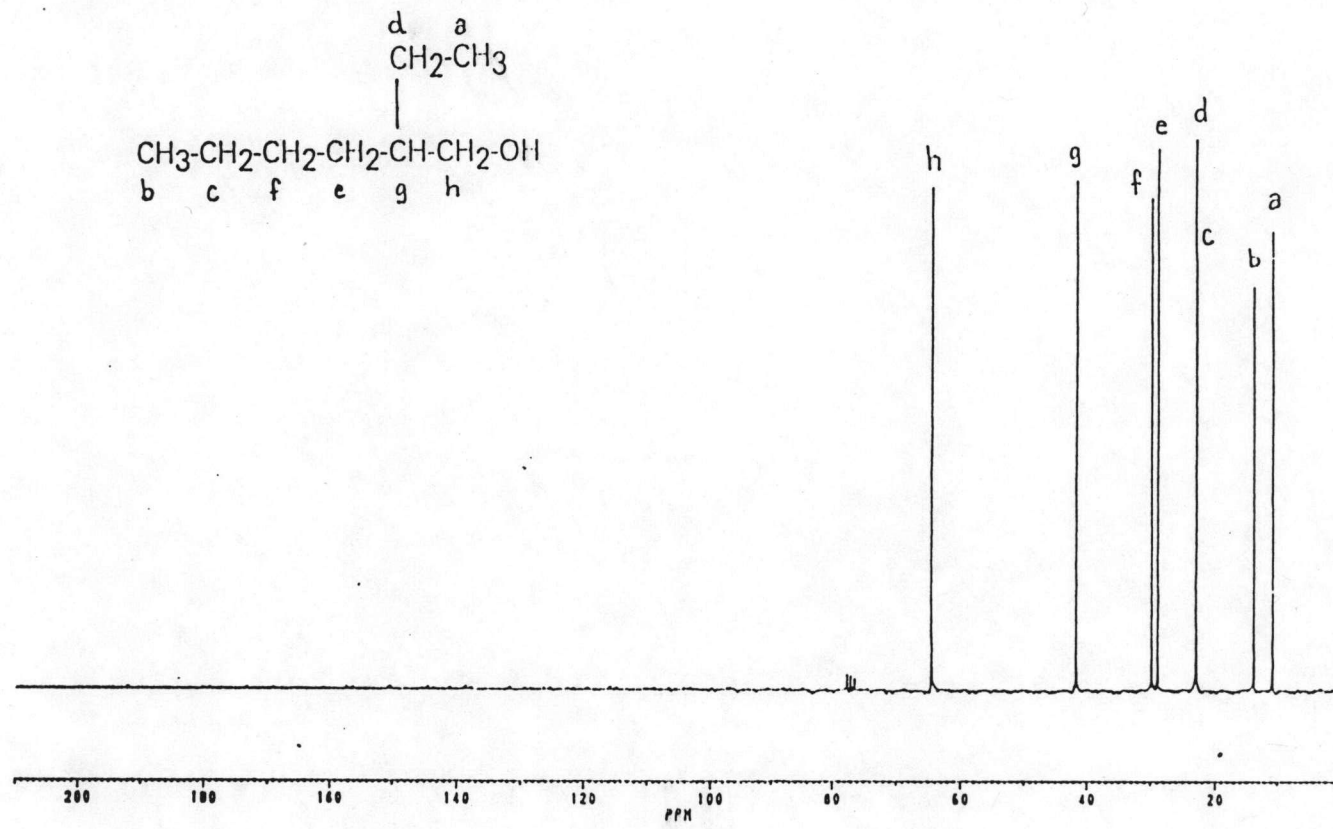


Figure A-2 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of 2-ethyl-1-hexanol

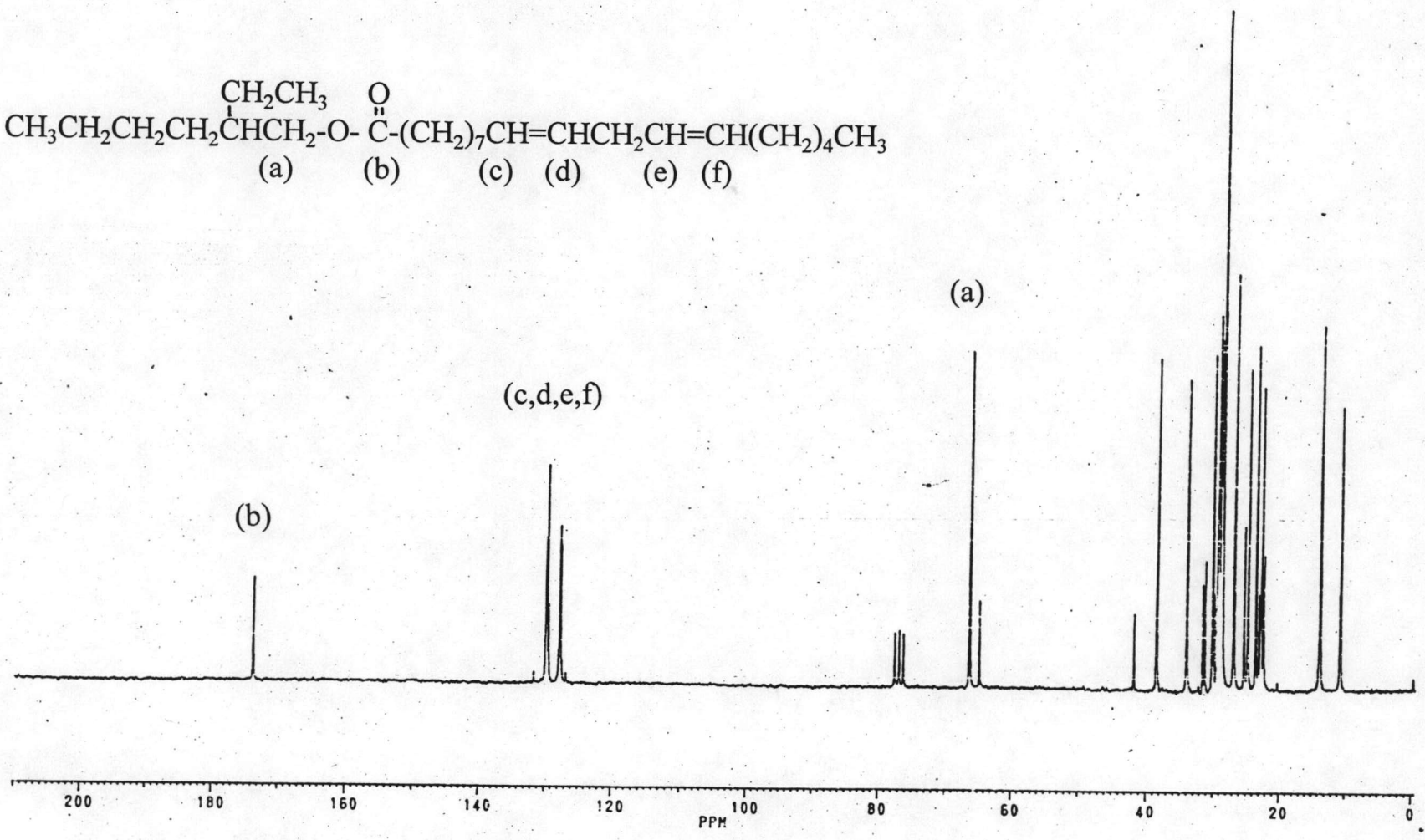
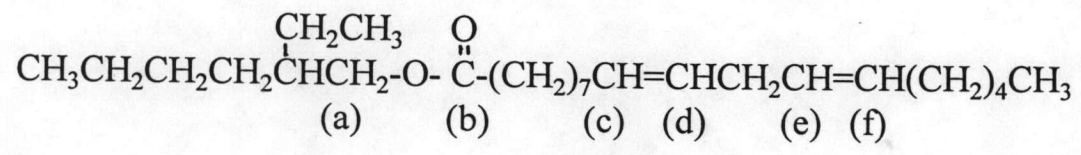


Figure A-3 : <sup>13</sup>C-NMR (CDCl<sub>3</sub>) Spectrum of monoester obtained from transesterification between soybean oil and 2-ethyl-1-hexanol

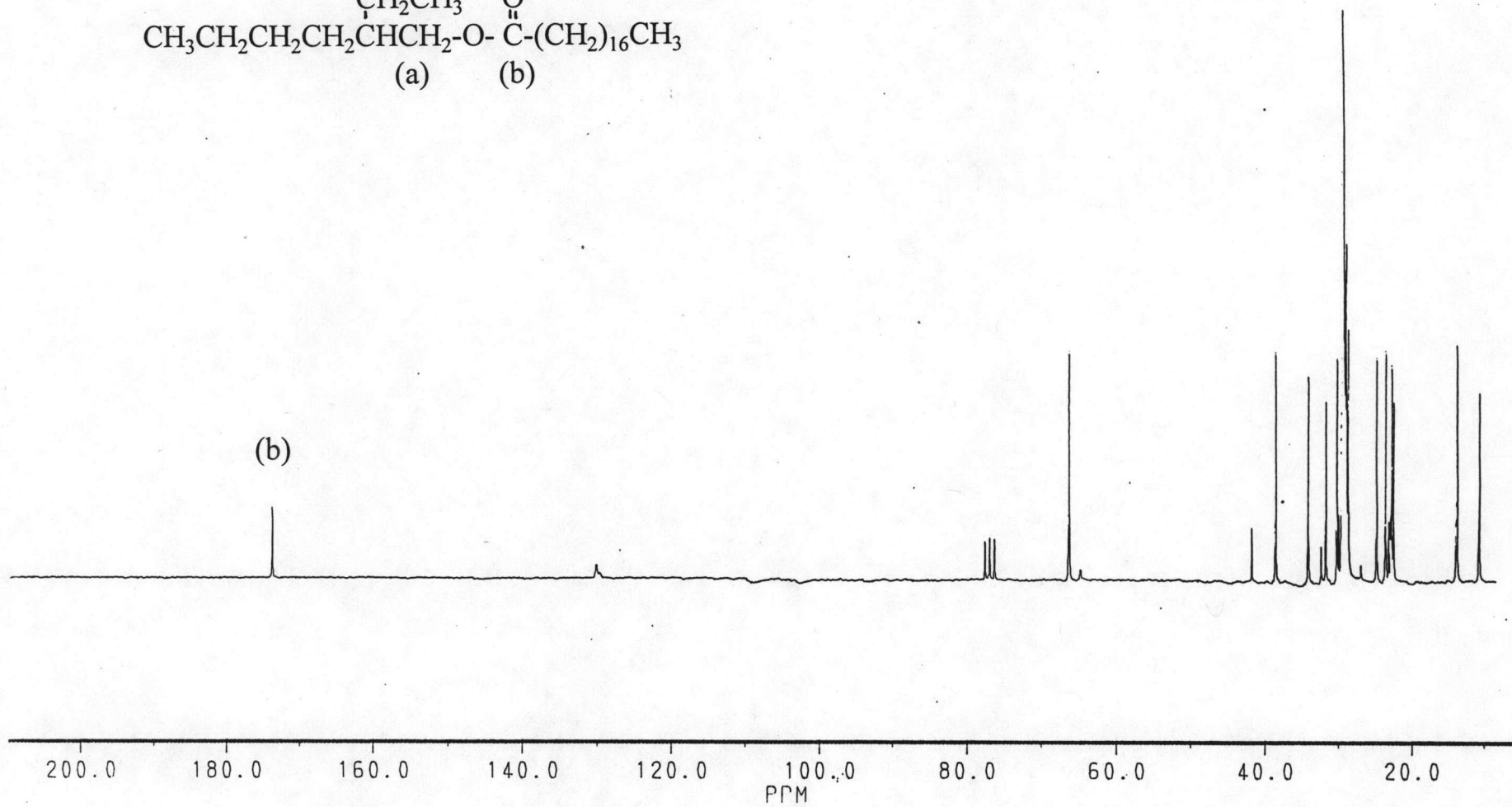
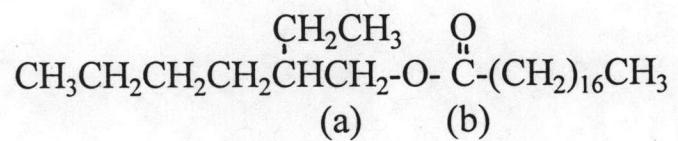


Figure A-4 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 2-ethyl-1-hexanol (After hydrogenation)

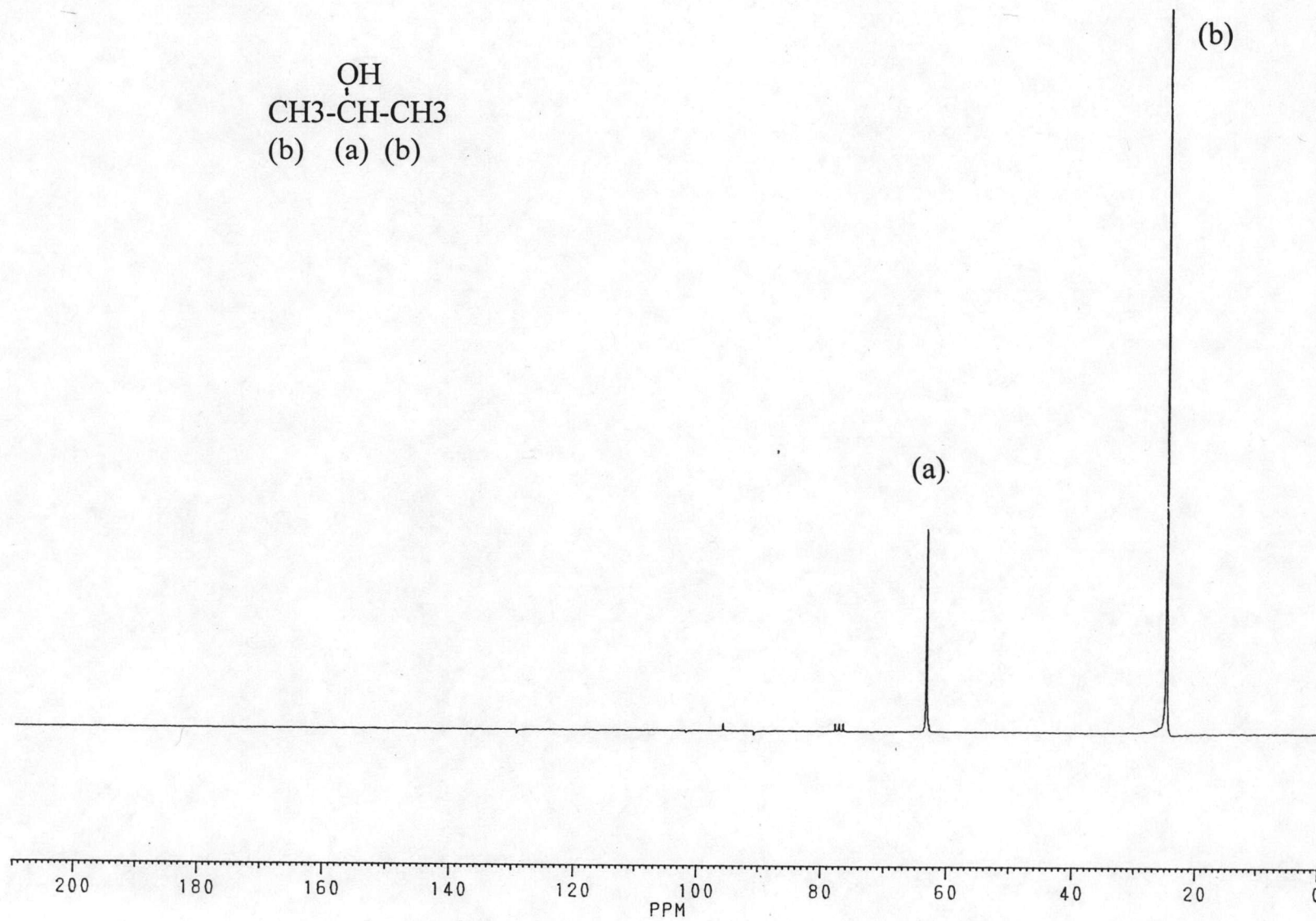
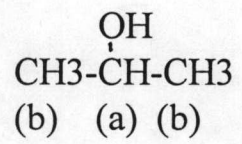


Figure A-5 :  $^{13}\text{C}$ -NMR (CDCl<sub>3</sub>) Spectrum of Isopropanol



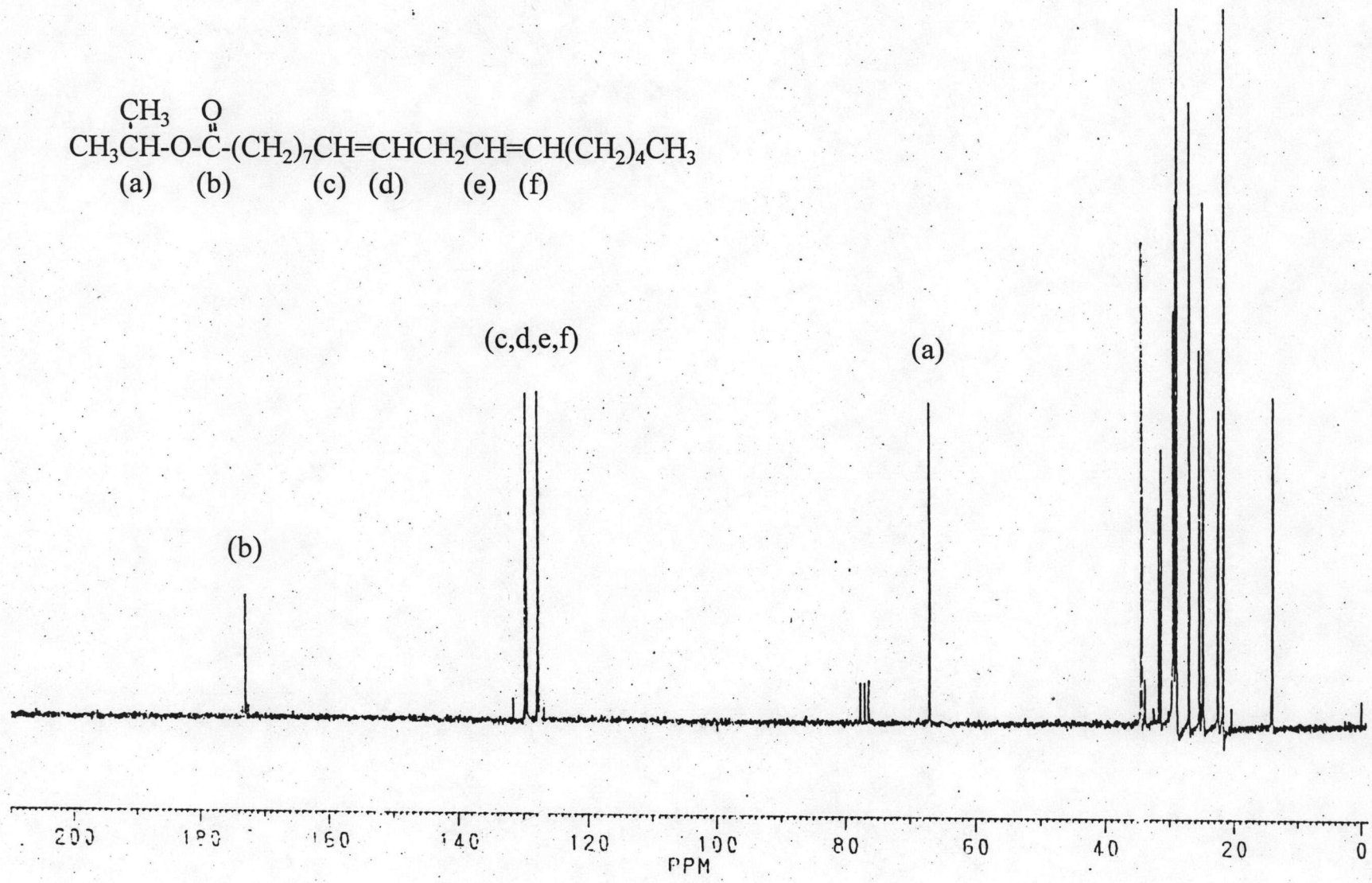
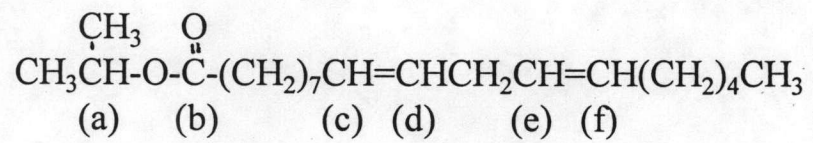


Figure A-6 : <sup>13</sup>C-NMR (CDCl<sub>3</sub>) Spectrum of monoester obtained from transesterification between soybean oil and Isopropanol

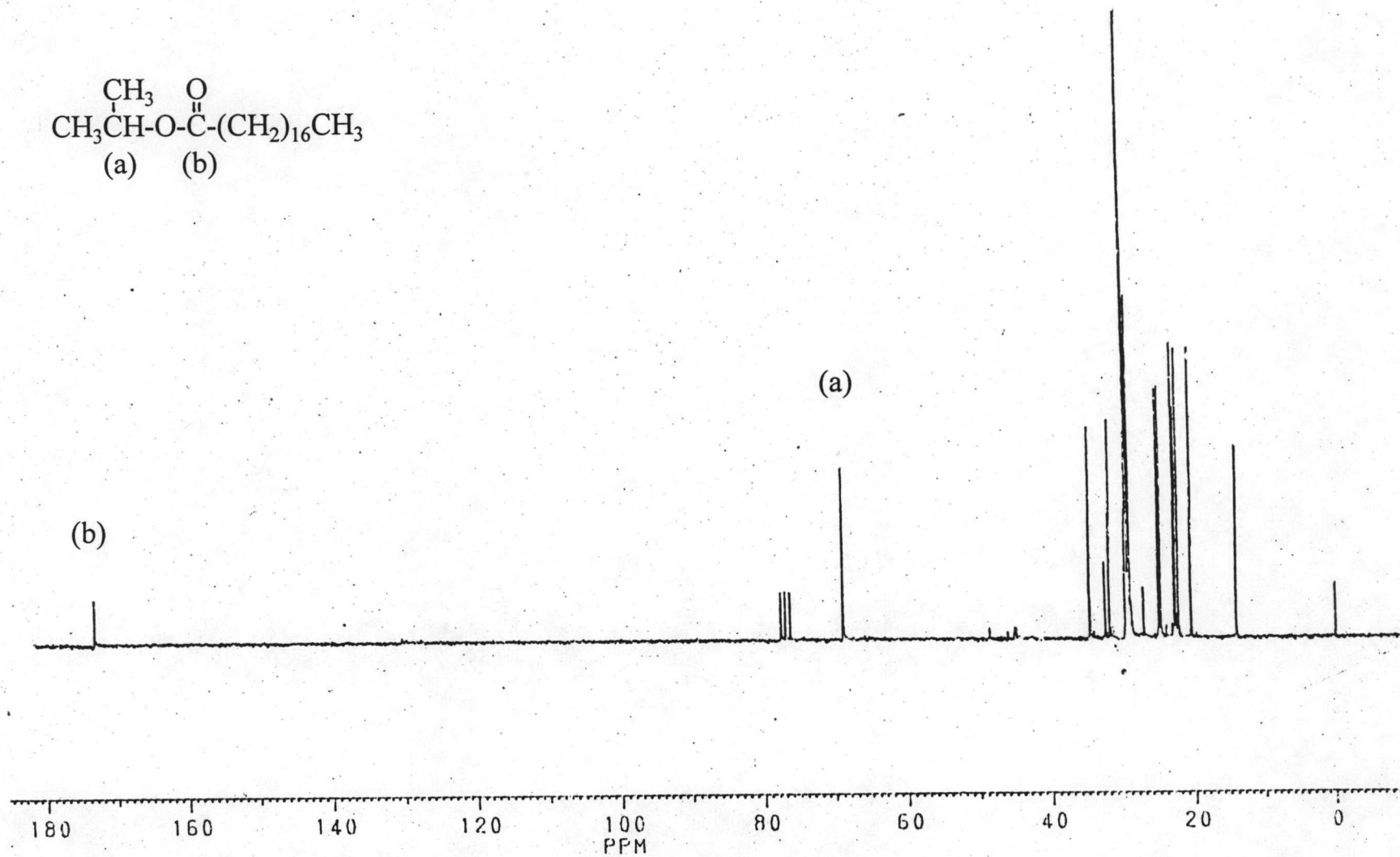
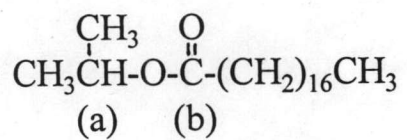


Figure A-7 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and Isopropanol (After hydrogenation)

1-BUTANOL

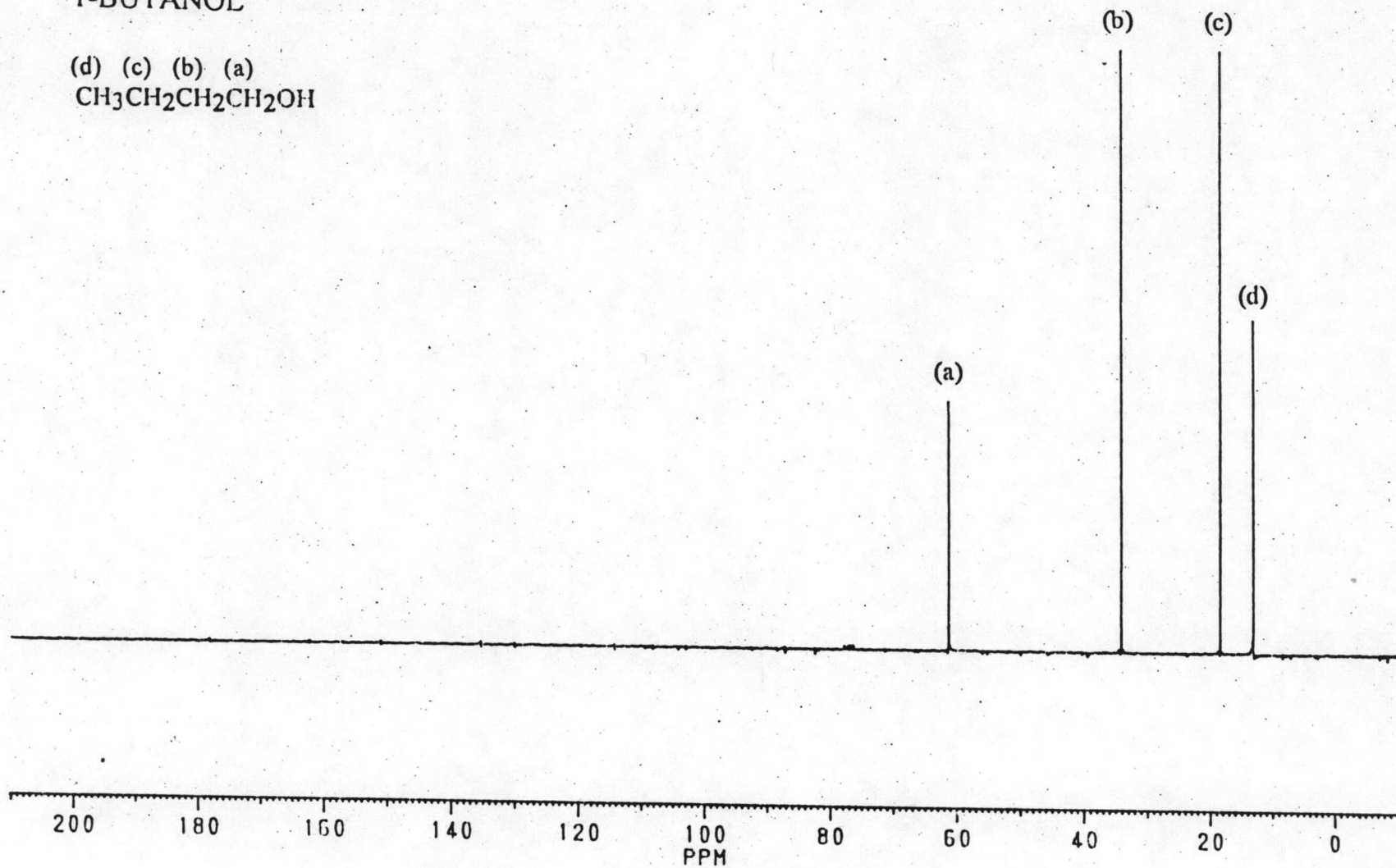
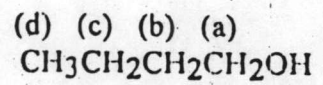


Figure A-8 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of 1-butanol

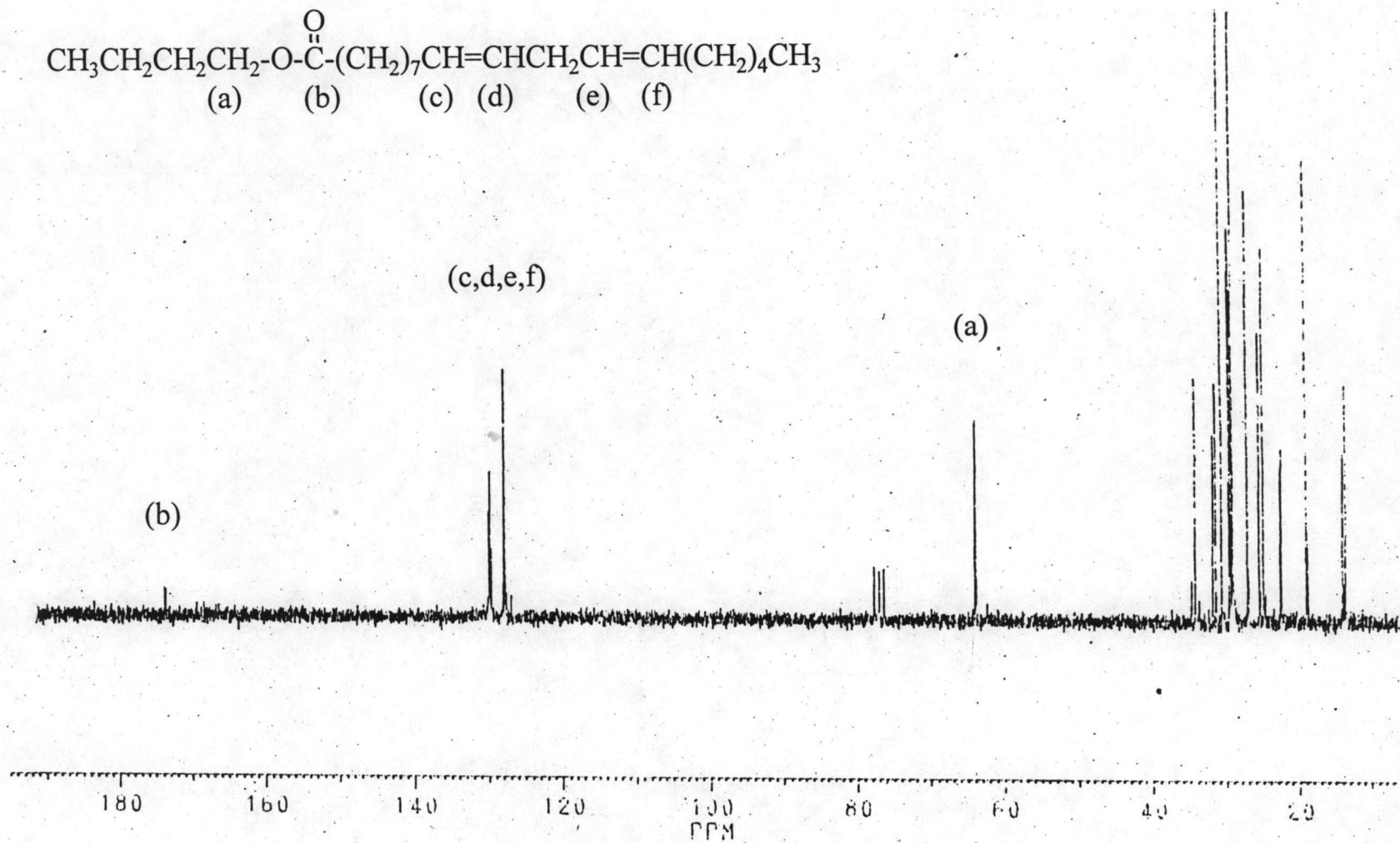
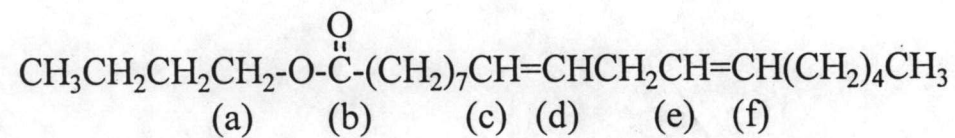


Figure A-9 :  $^{13}\text{C-NMR}$  ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 1-butanol

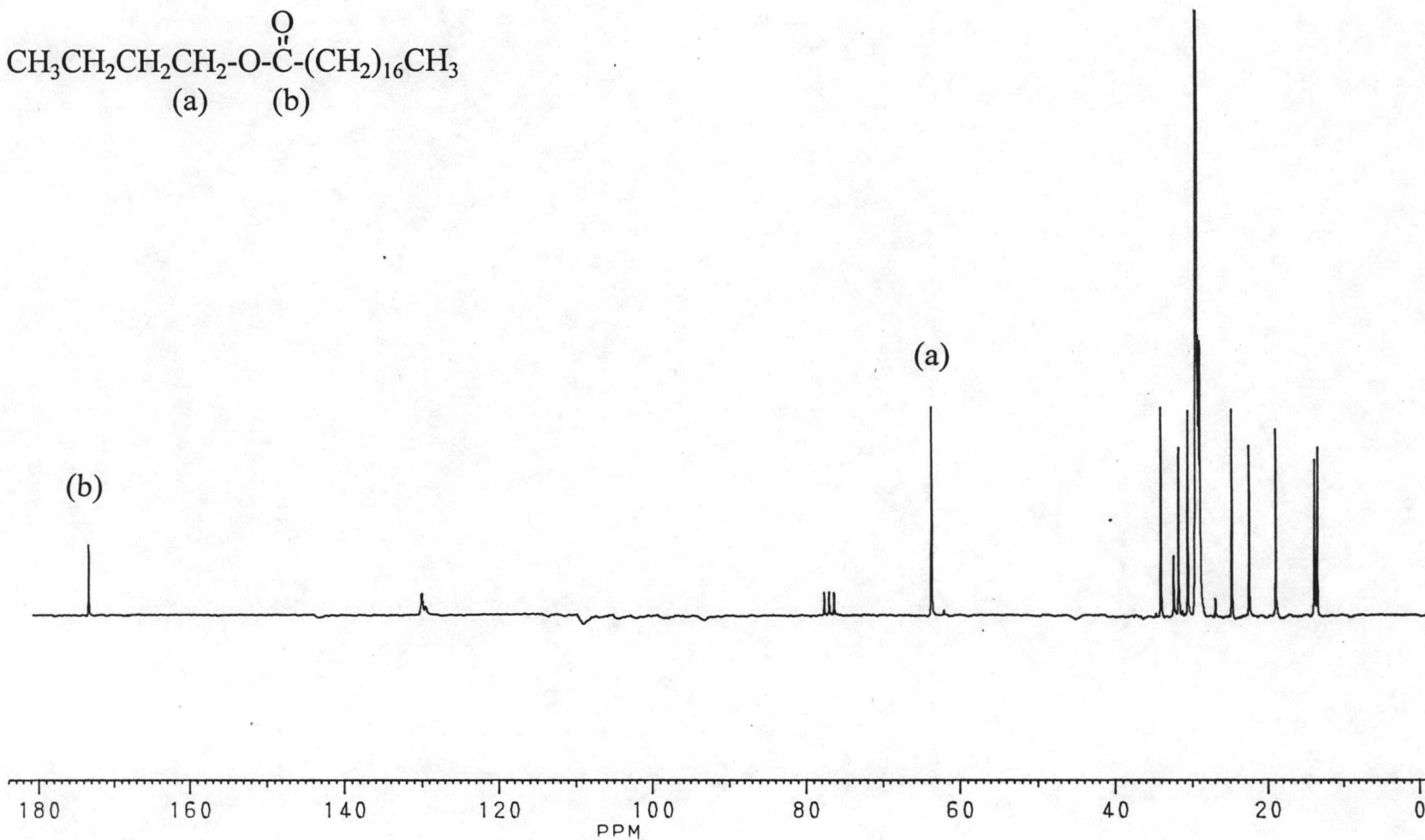
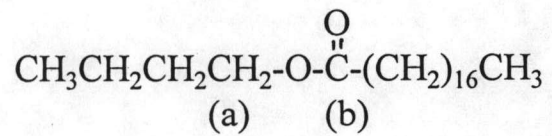


Figure A-10 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 1-butanol (After hydrogenation)

HEXANOL.

(f) (e) (d) (c) (b) (a)

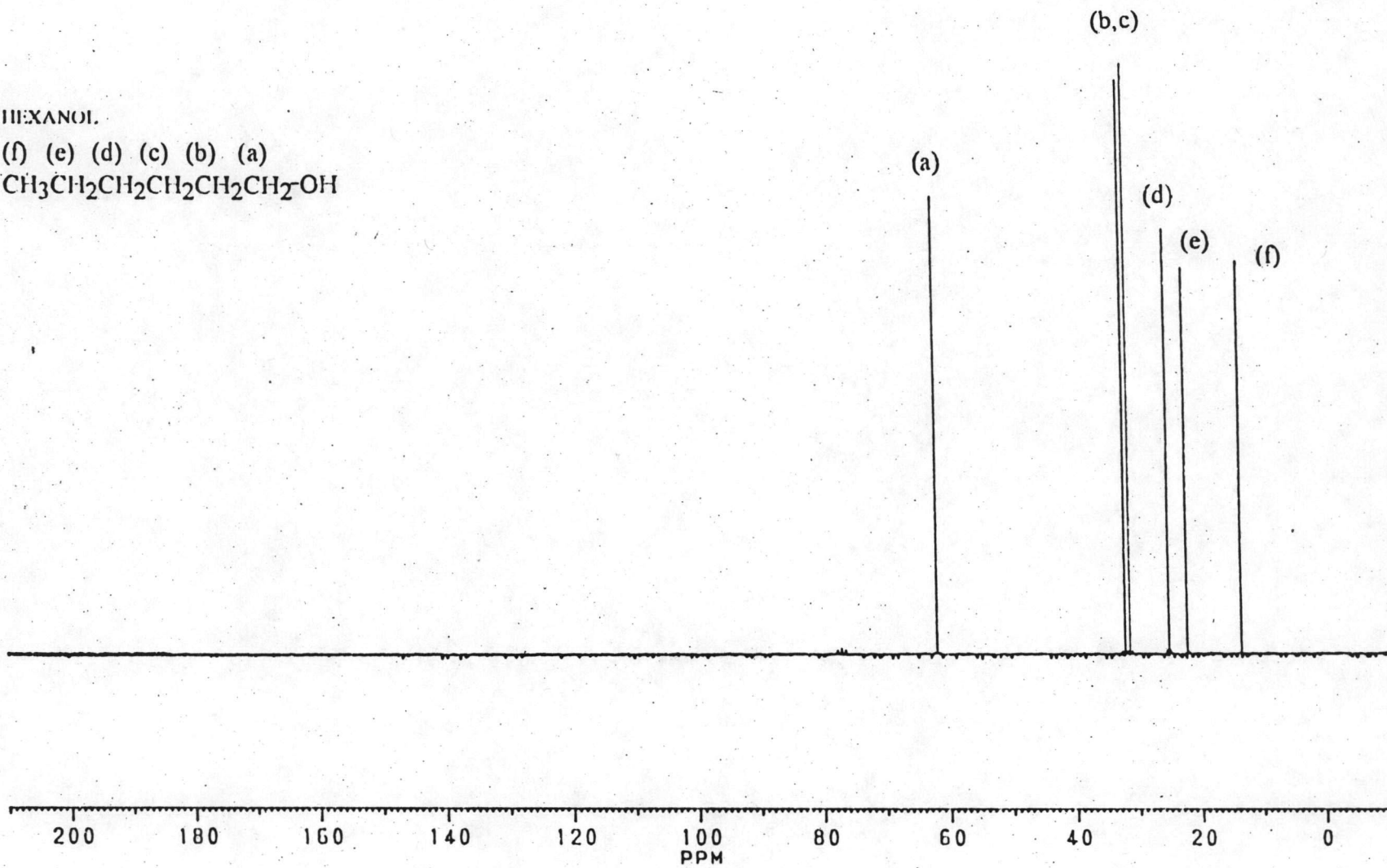
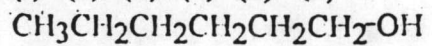


Figure A-11 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of 1-hexanol

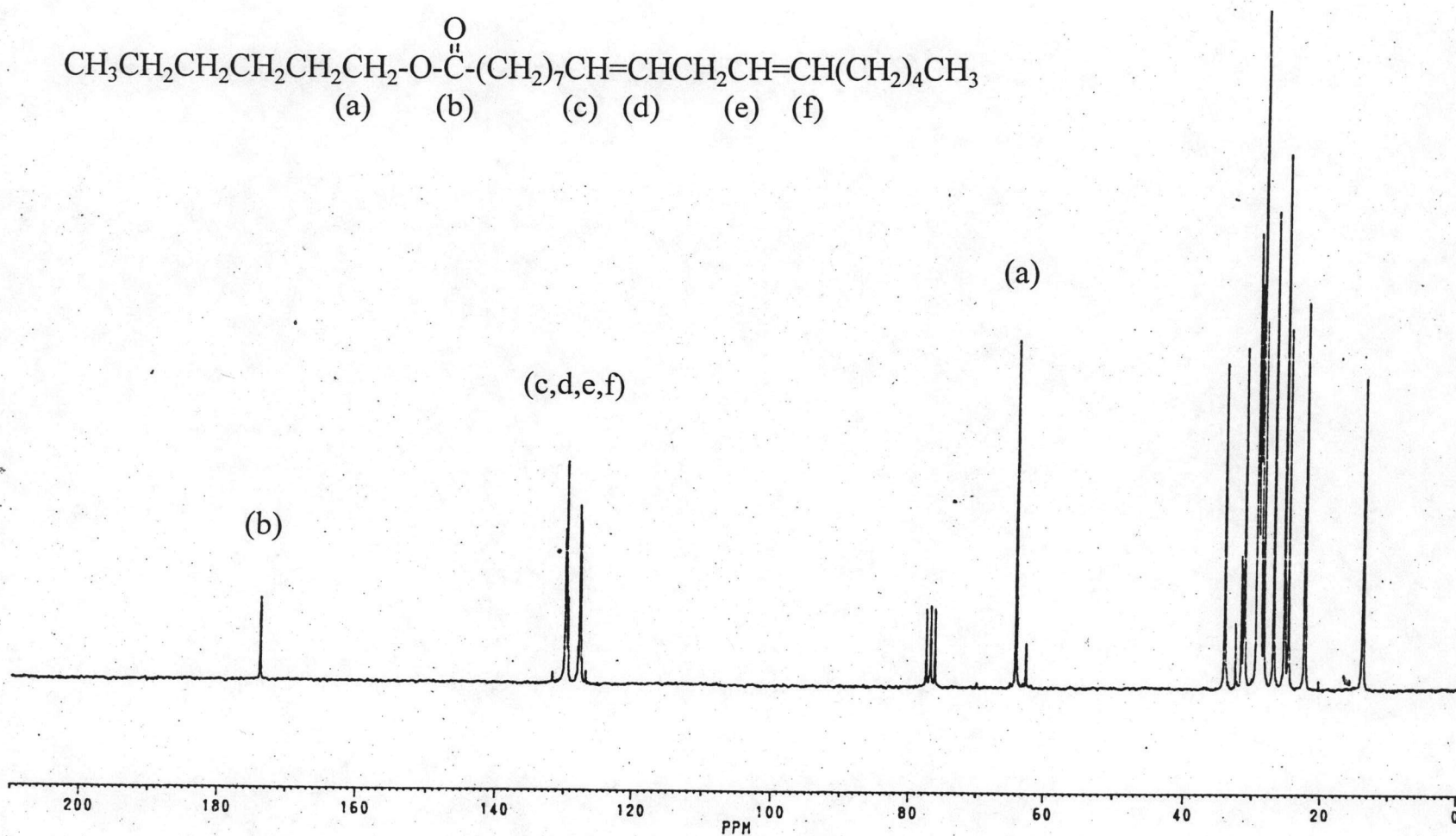
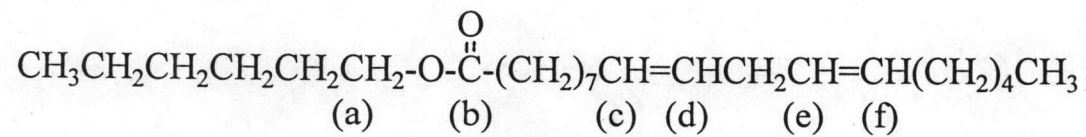


Figure A-12 :  $^{13}\text{C-NMR}$  ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 1-hexanol

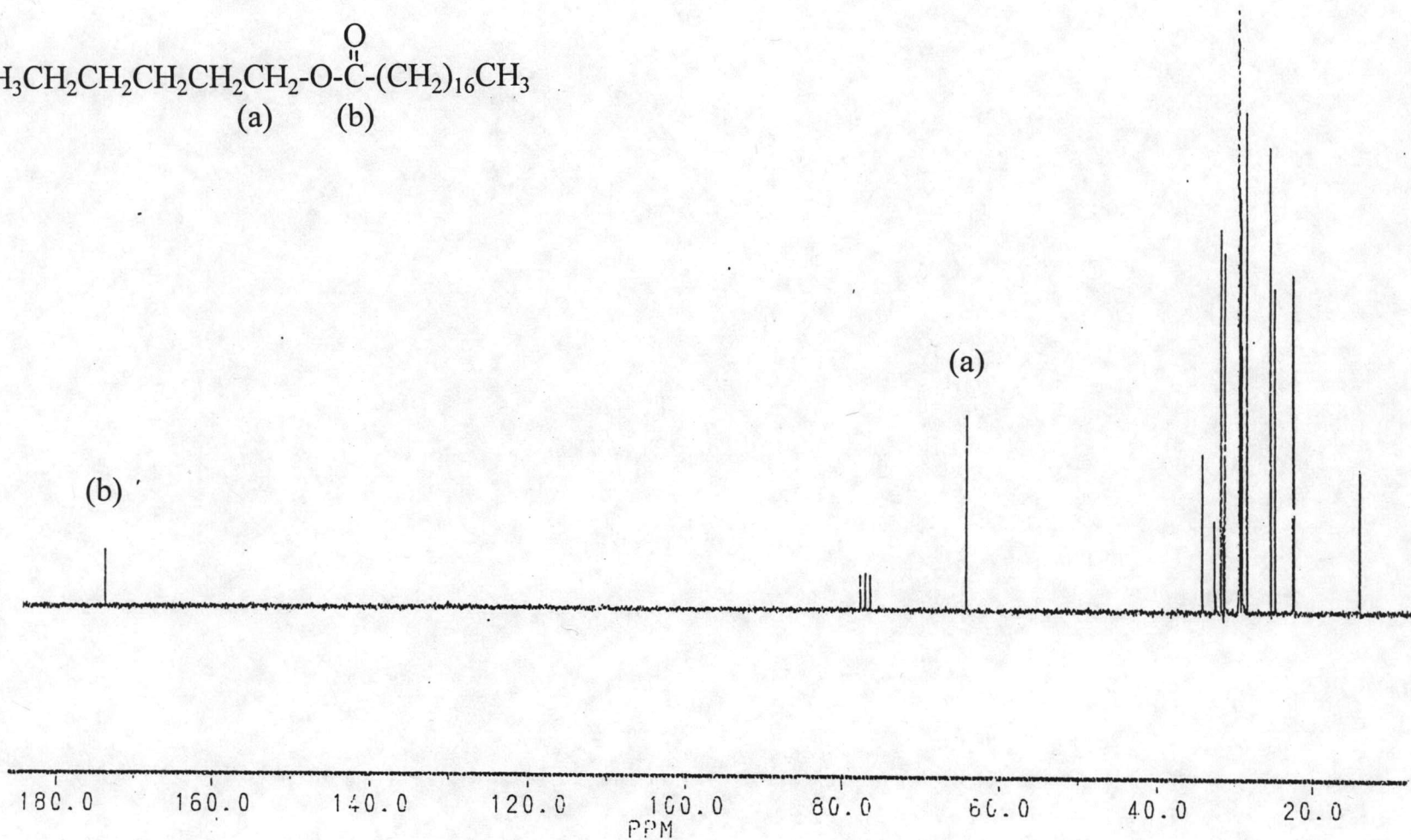
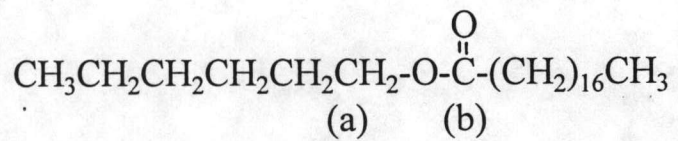


Figure A-13 : <sup>13</sup>C-NMR (CDCl<sub>3</sub>) Spectrum of monoester obtained from transesterification between soybean oil and 1-hexanol (After hydrogenation)



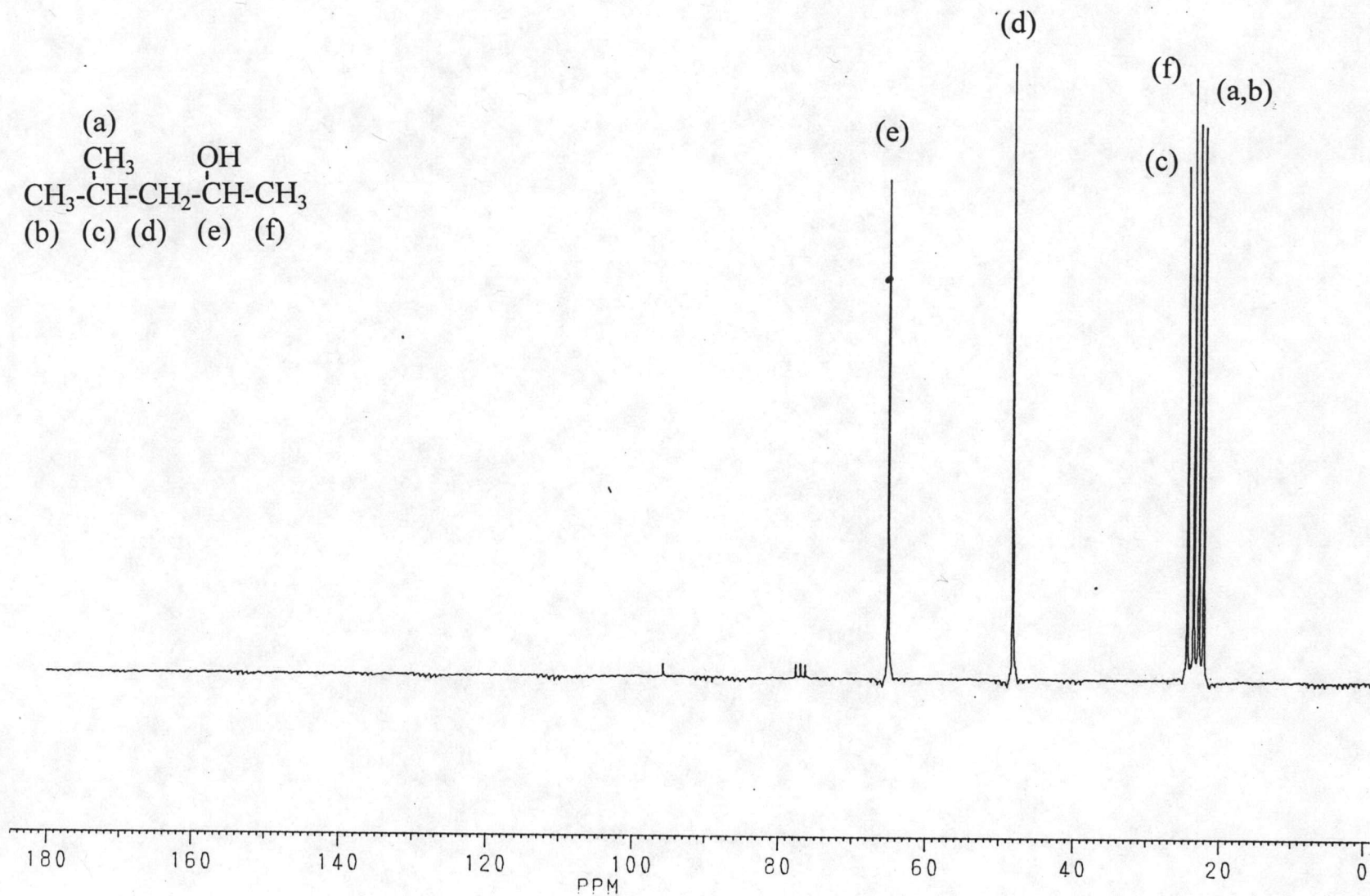


Figure A-14 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of 4-methyl-2-pentanol

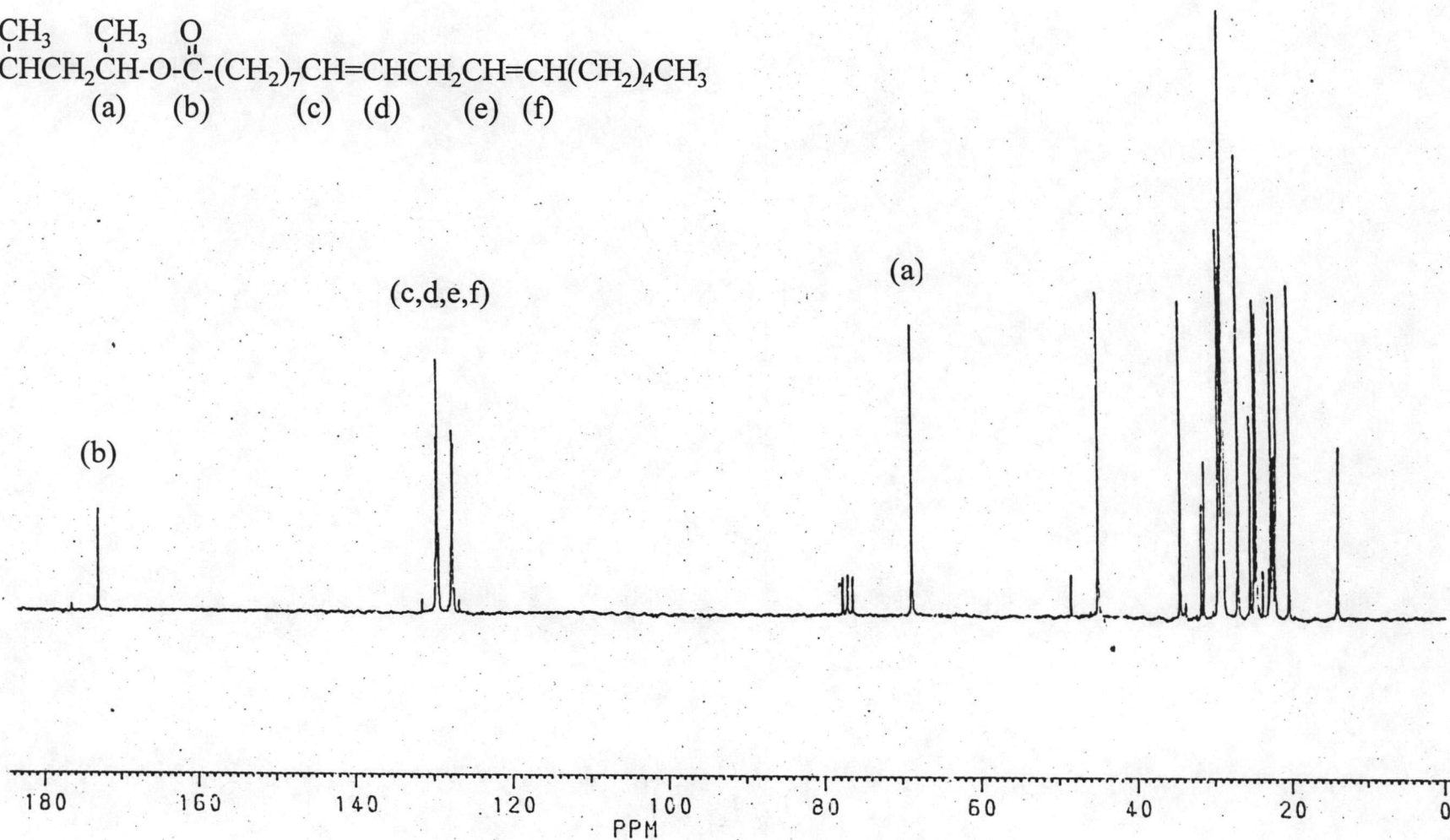
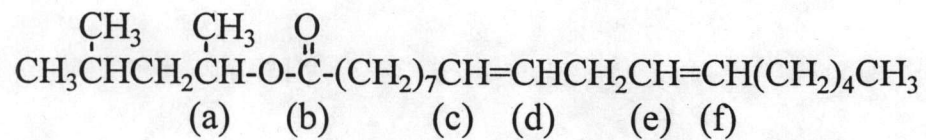


Figure A-15 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 4-methyl-2-pentanol

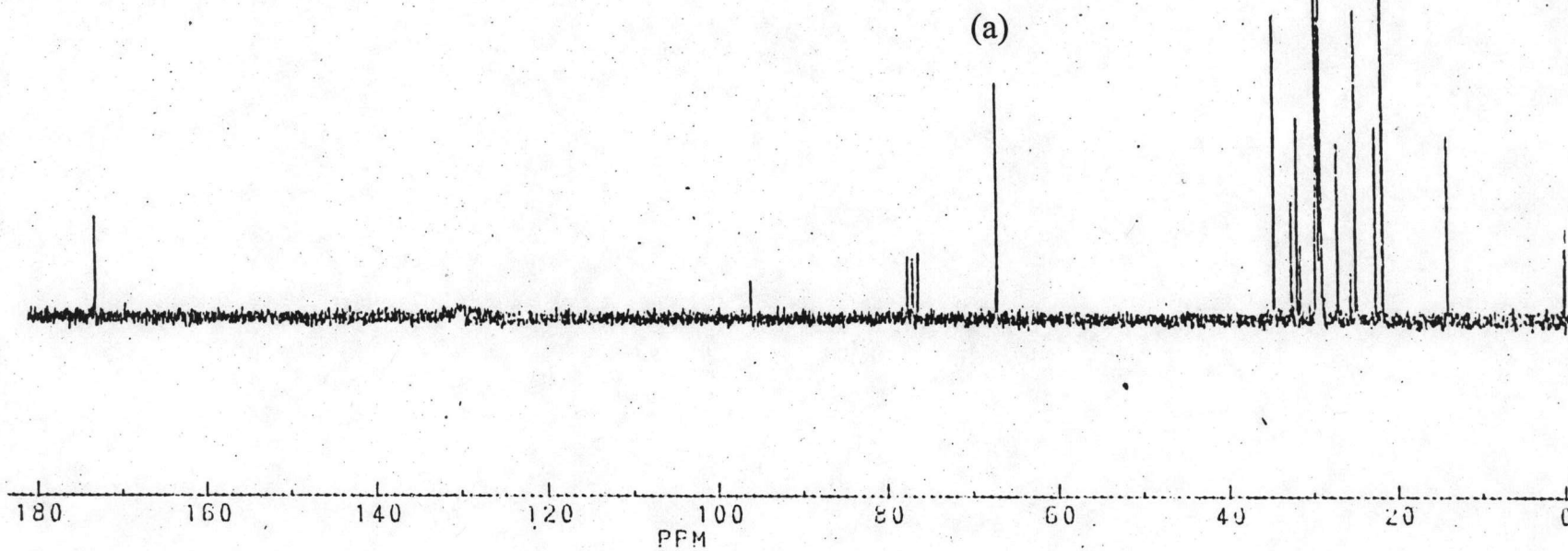
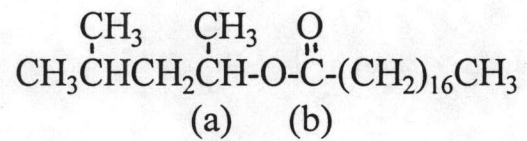


Figure A-16 :  $^{13}\text{C}$ -NMR ( $\text{CDCl}_3$ ) Spectrum of monoester obtained from transesterification between soybean oil and 4-methyl-2-pentanol (After hydrogenation)

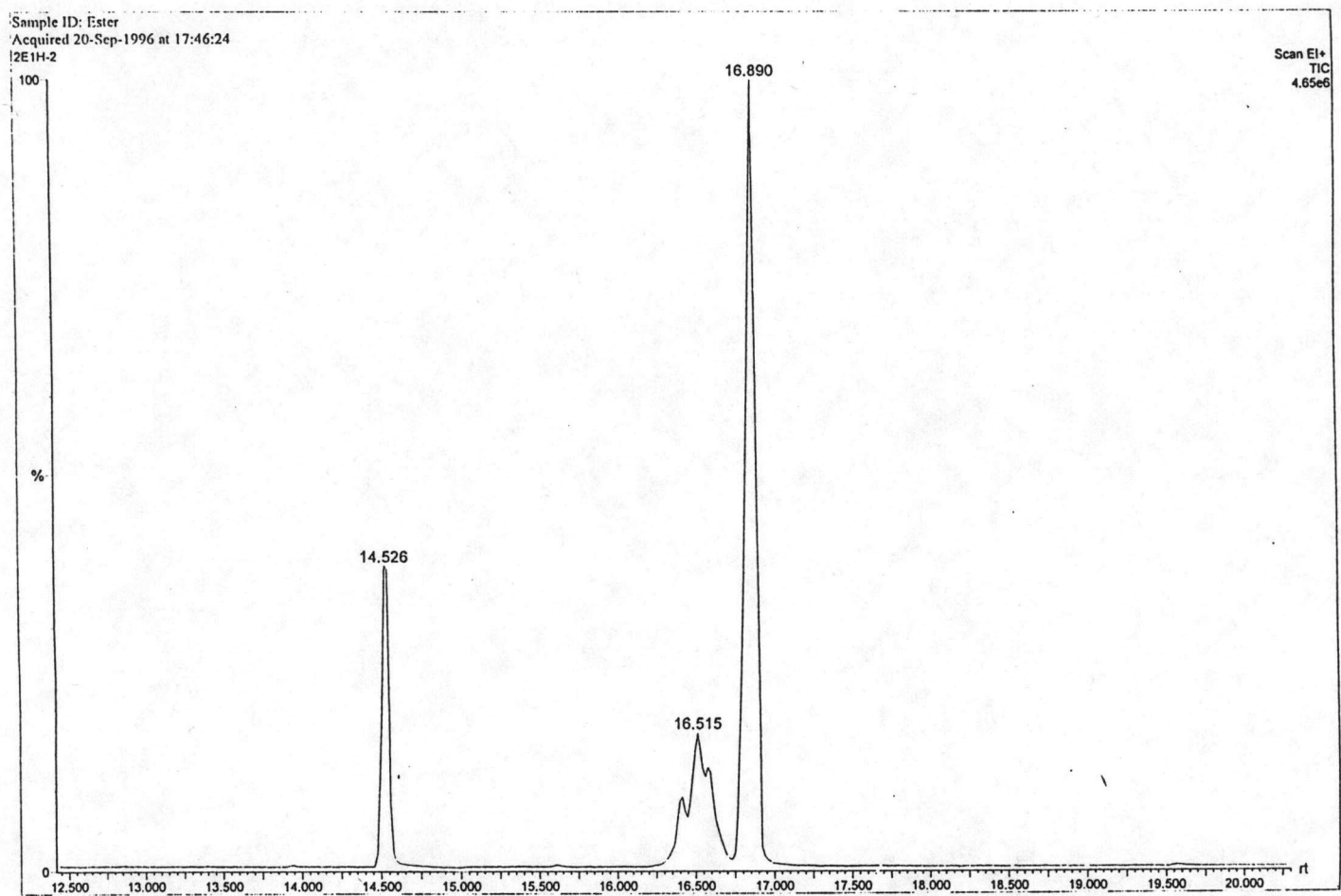


Figure A-17 : GC-MS Chromatogram of hydrogenated 2-ethyl-1-hexyl ester

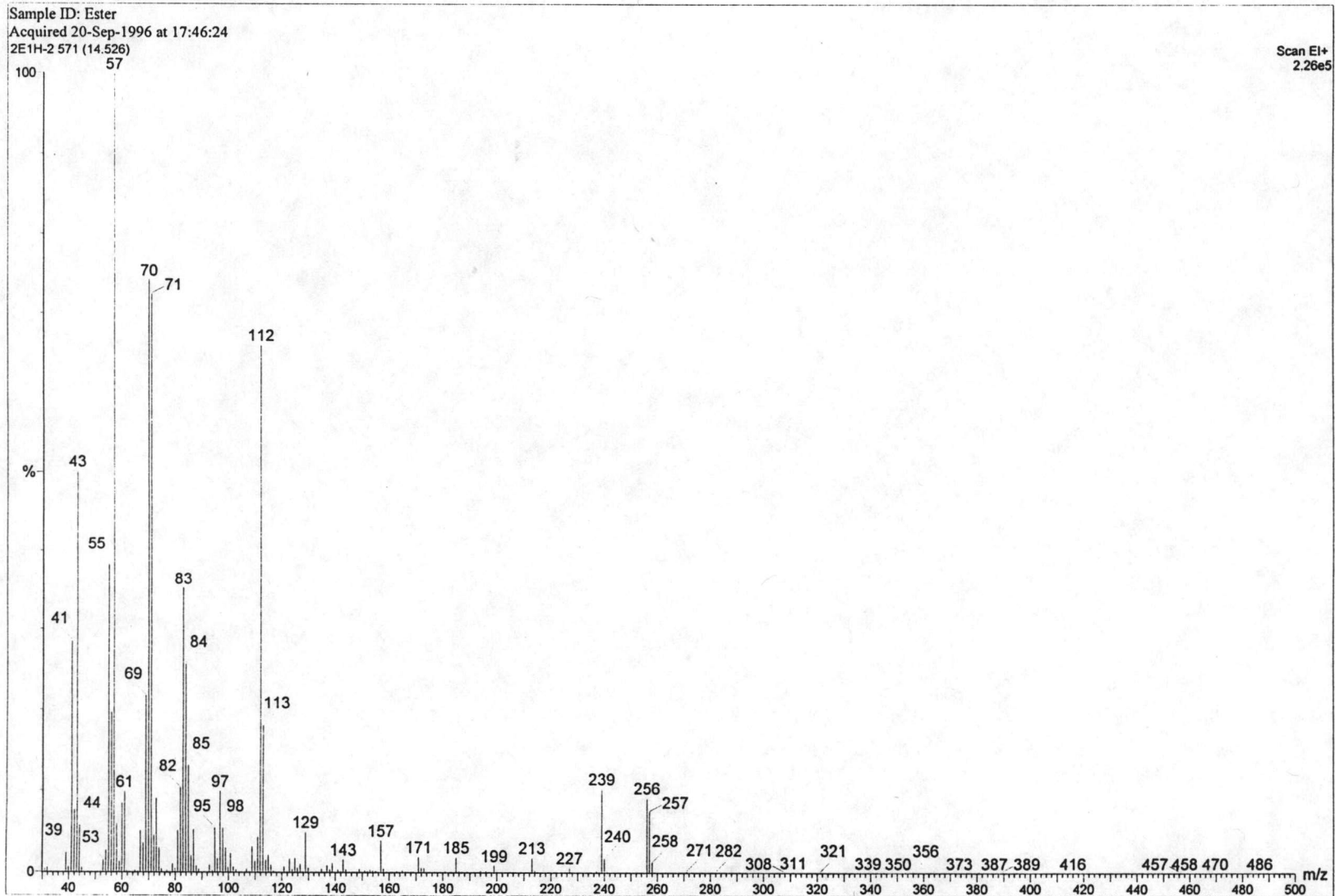


Figure A-18 : Mass-spectrum of 2-ethyl-1-hexyl palmitate at retention time of 14.526 min. in Figure A-17

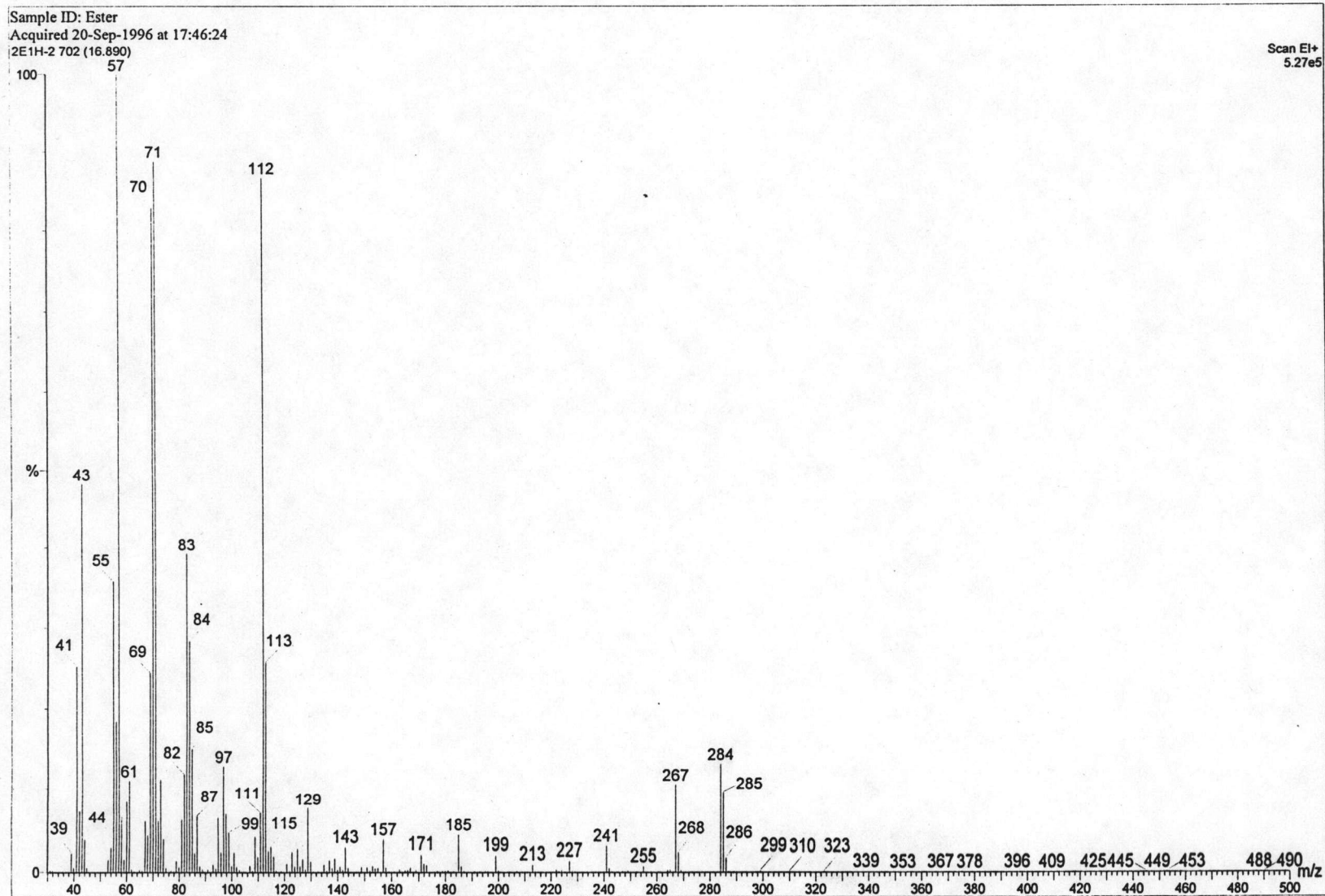


Figure A-19 : Mass-spectrum of 2-ethyl-1-hexyl stearate at retention time of 16.890 min. in Figure A-17

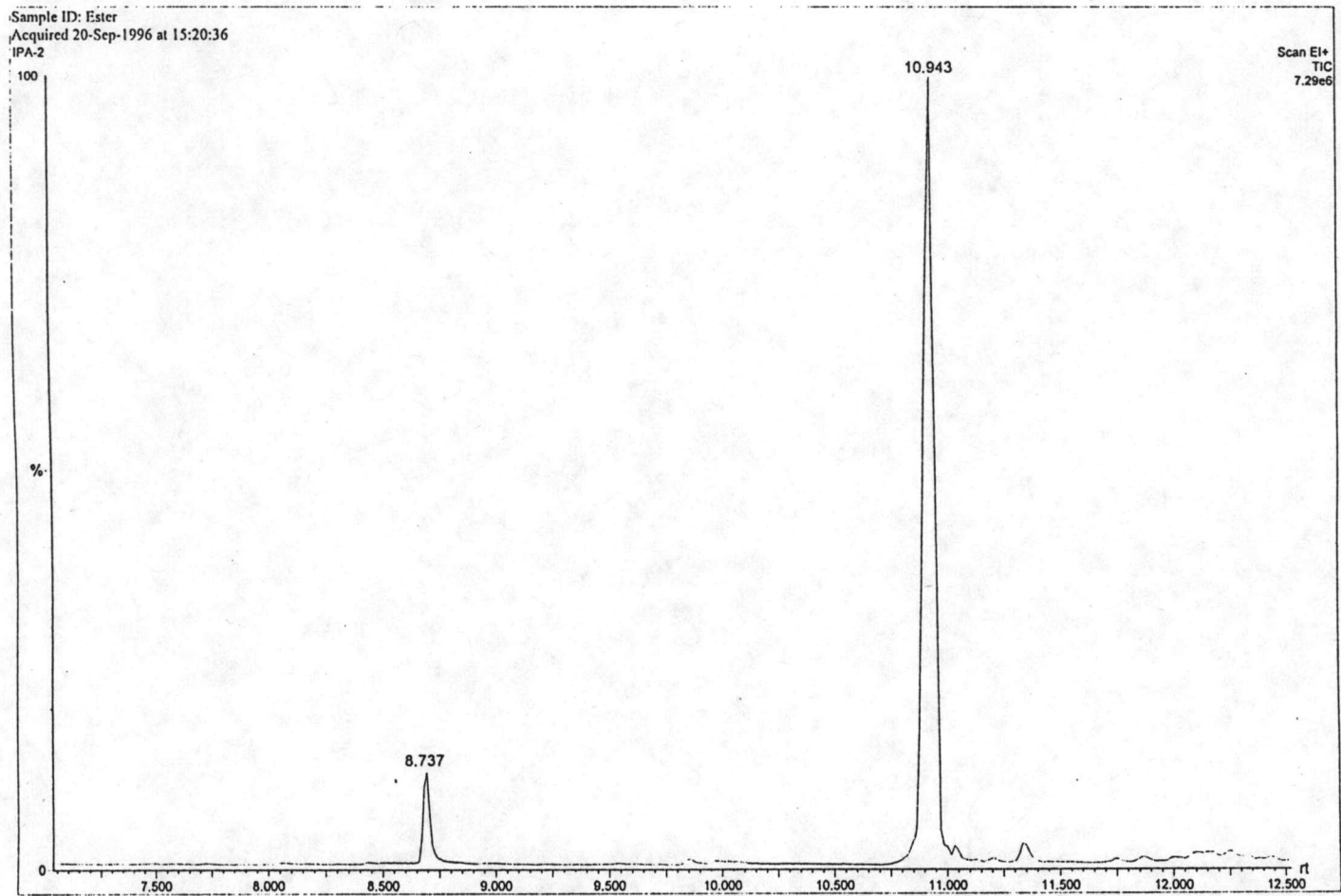


Figure A-20 : GC-MS Chromatogram of hydrogenated isopropyl ester

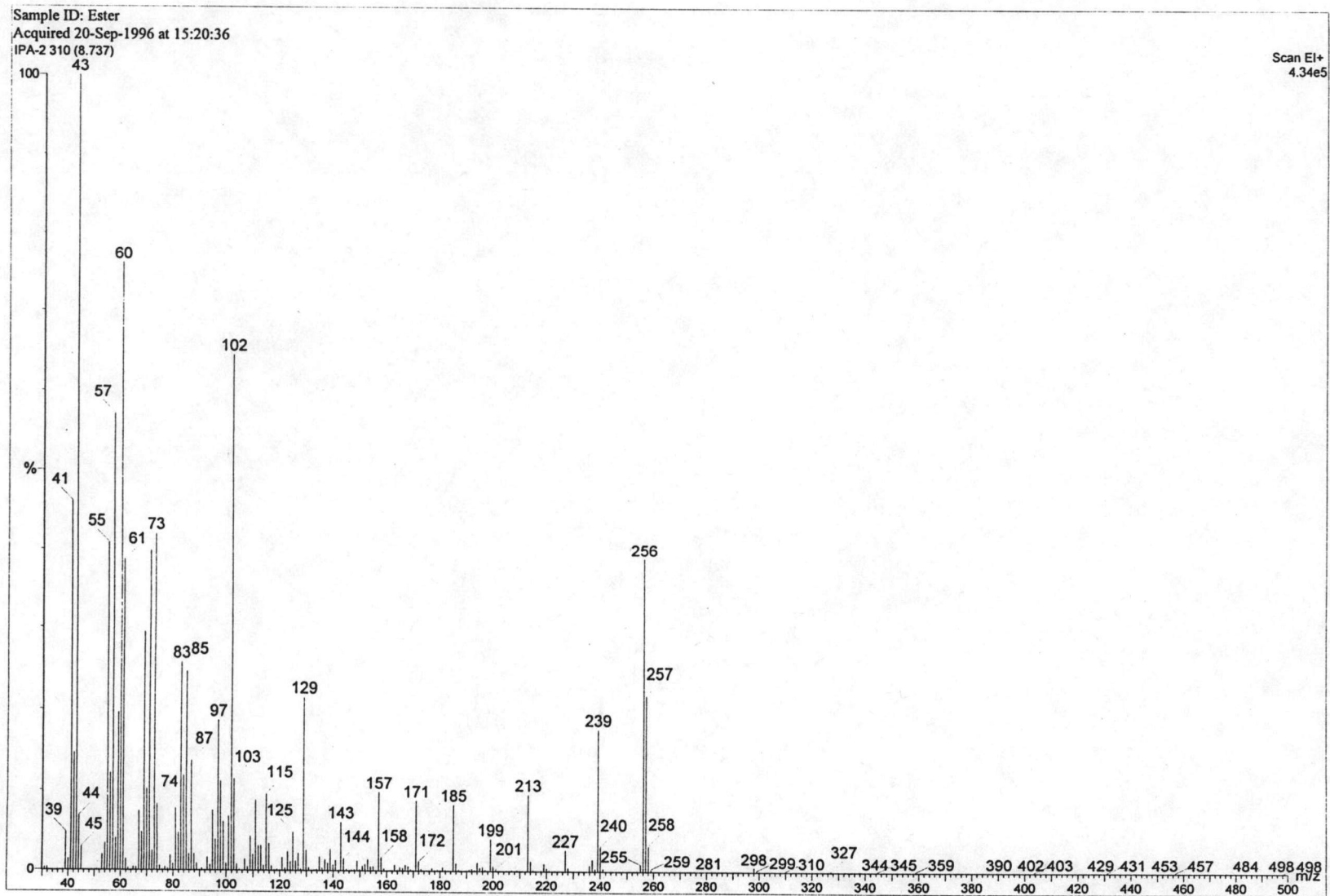


Figure A-21 : Mass-spectrum of isopropyl palmitate at retention time of 8.737 min. in Figure A-20



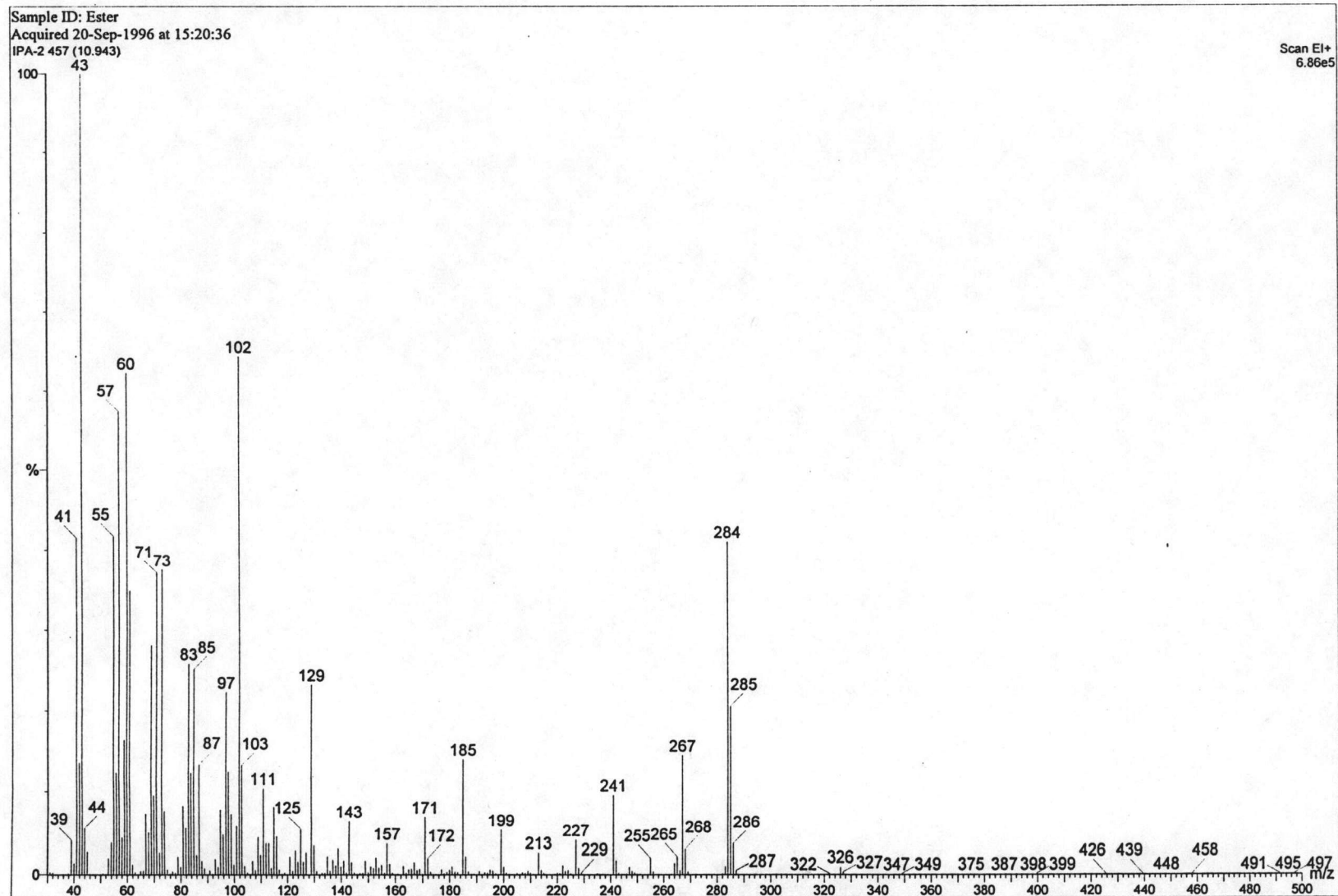


Figure A-22 : Mass-spectrum of isopropyl stearate at retention time of 10.943 min. in Figure A-20

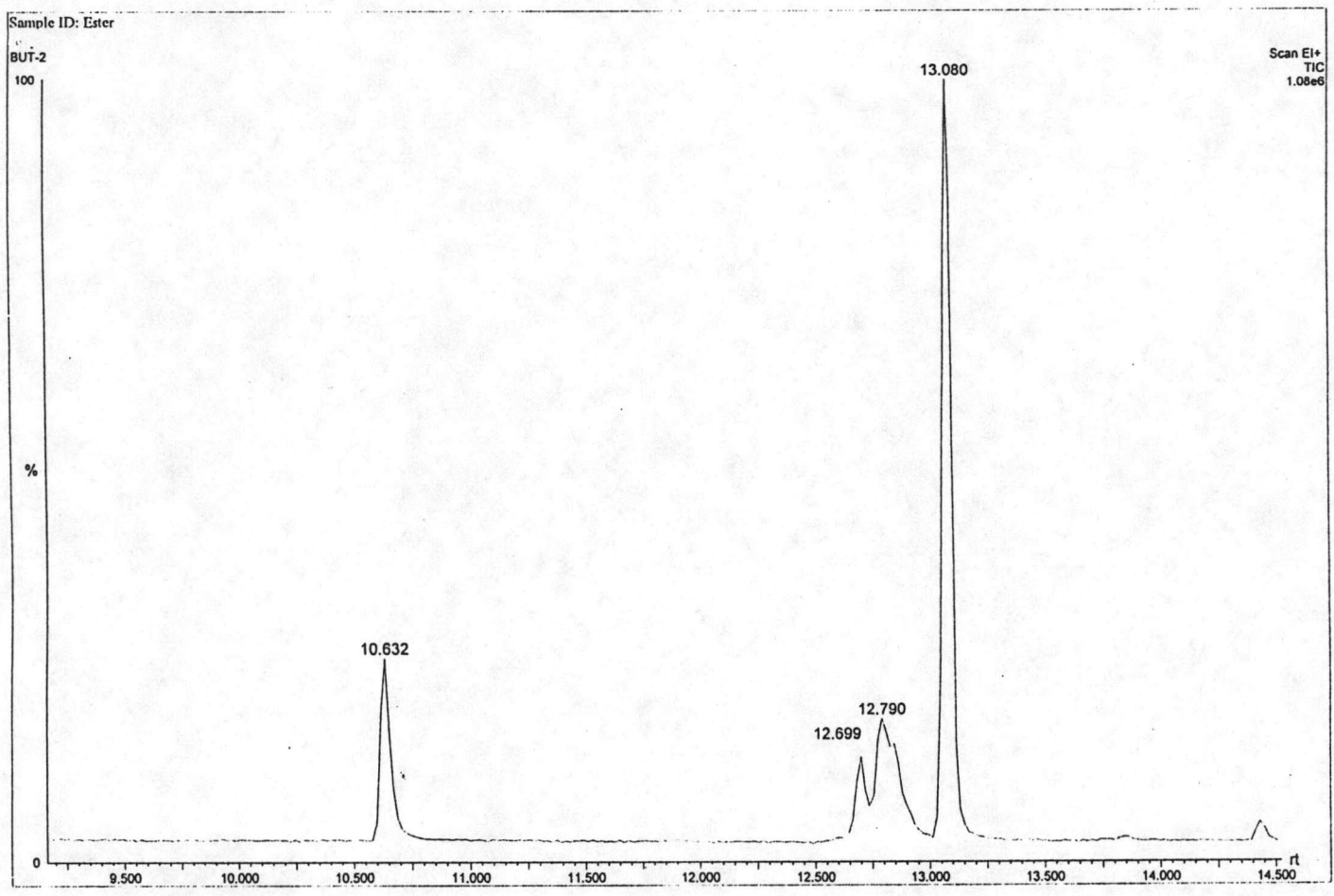


Figure A-23 : GC-Chromatogram of hydrogenated 1-butyl ester

Sample ID: Ester  
Acquired 20-Sep-1996 at 18:26:33  
BUT-2 357 (10.632)

Scan EI+  
4.79e4

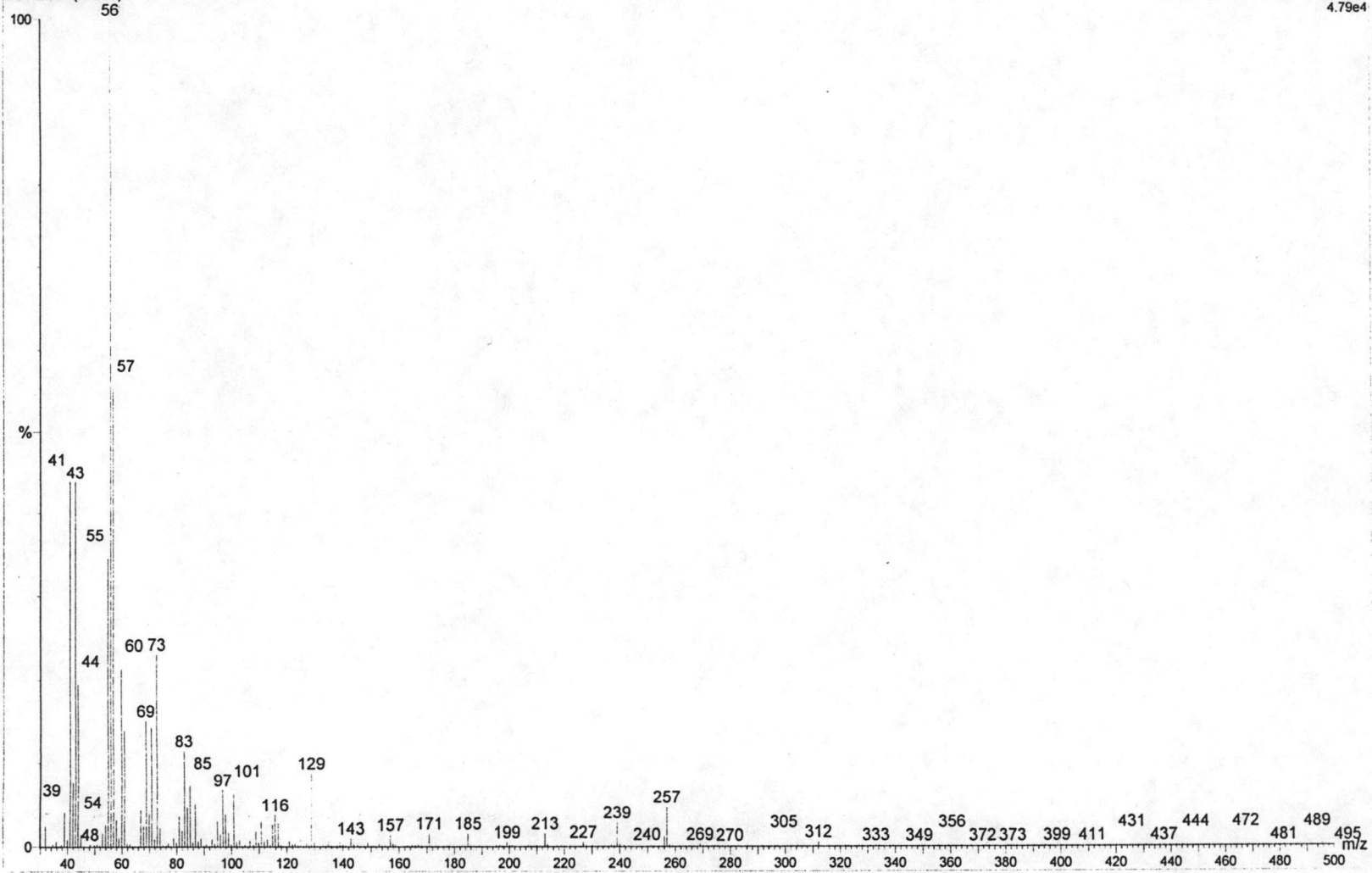


Figure A-24 : Mass-spectrum of 1-butyl palmitate at retention time of 10.632 min. in Figure A-23

Sample ID: Ester  
Acquired 20-Sep-1996 at 18:26:33  
BUT-2 484 (13.080)  
56

Scan E1+  
1.79e5

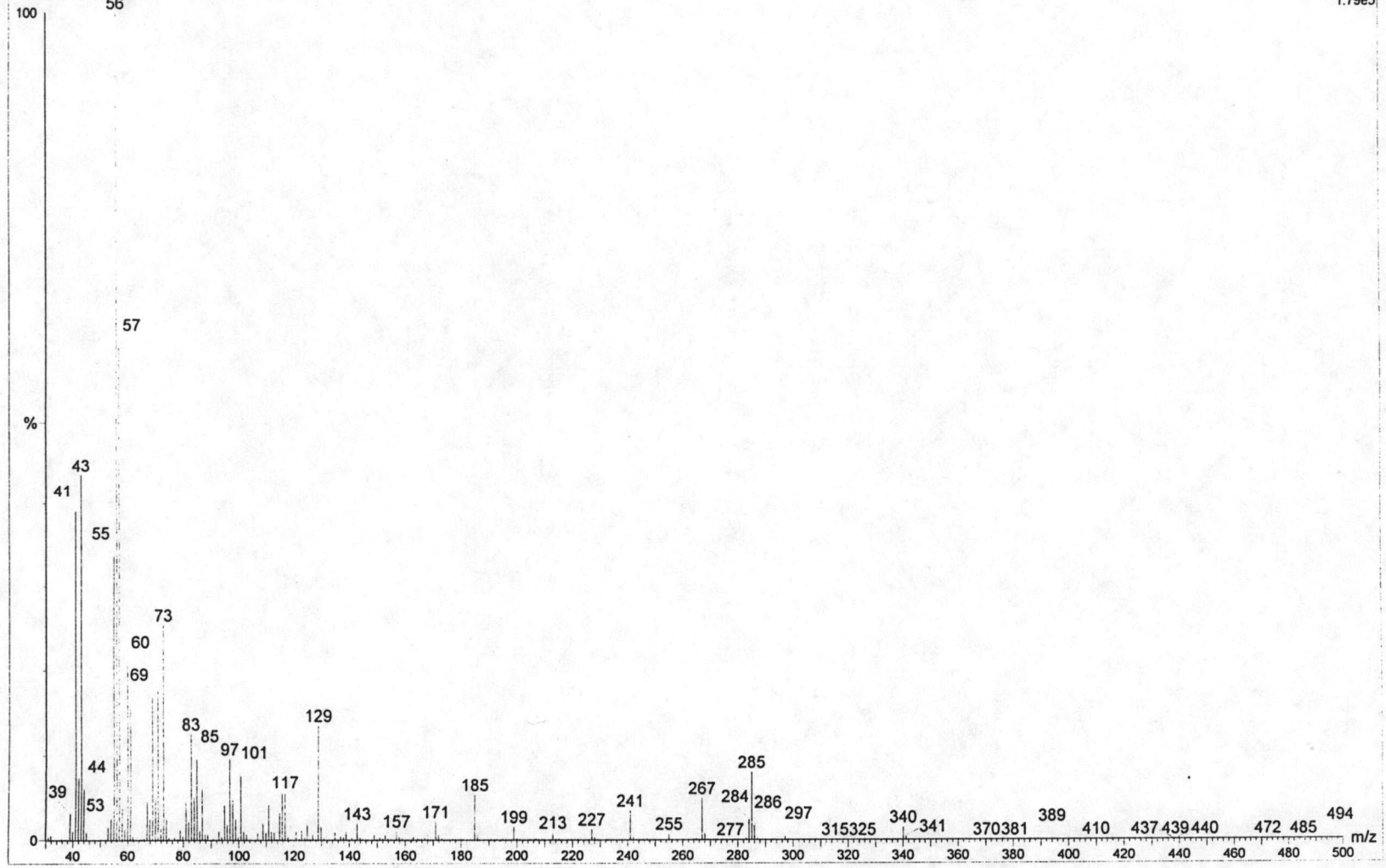


Figure A-25 : Mass-spectrum of 1-butyl stearate at retention time of 13.080 min. in Figure A-23

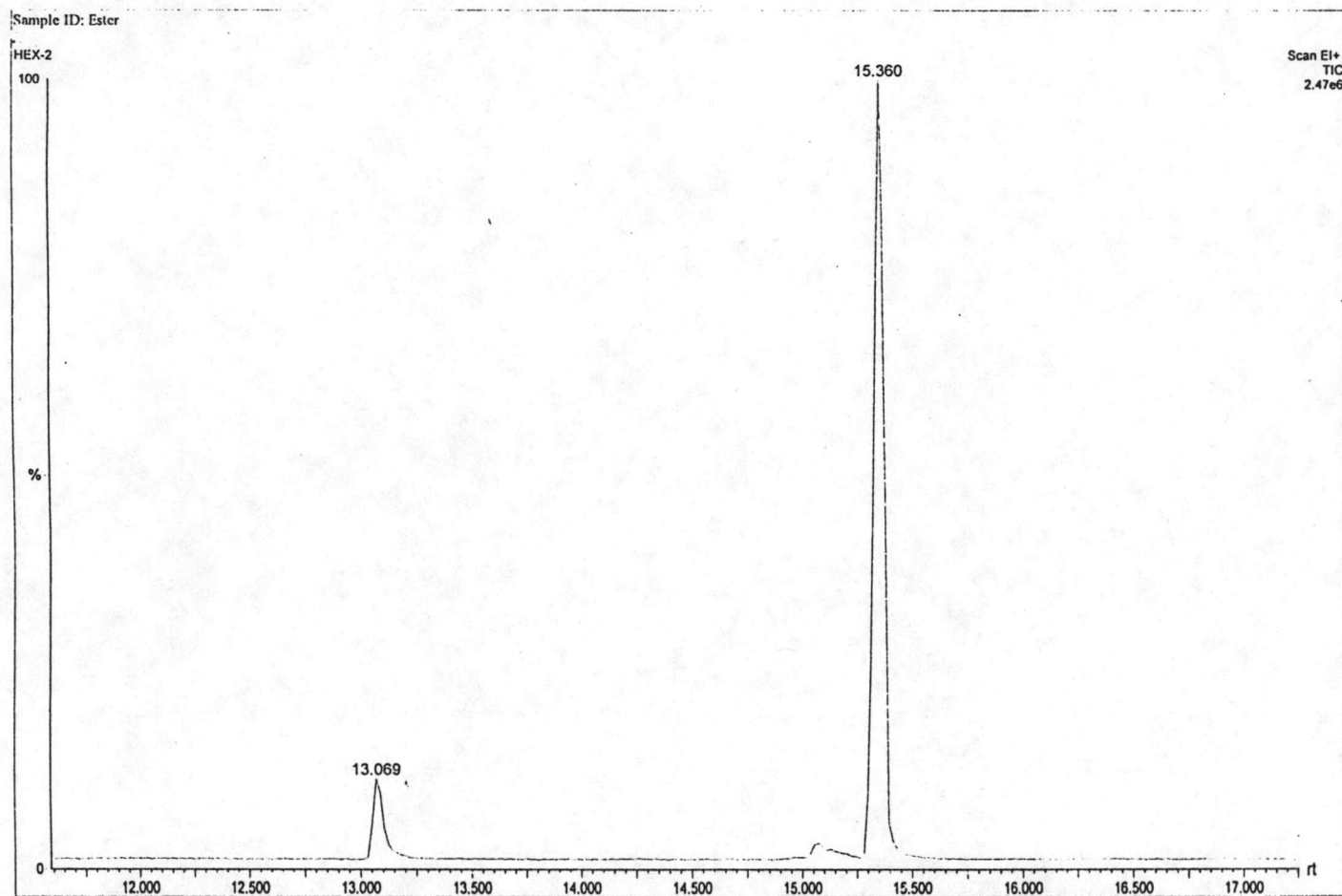


Figure A-26 : GC-Chromatogram of hydrogenated 1-hexyl ester

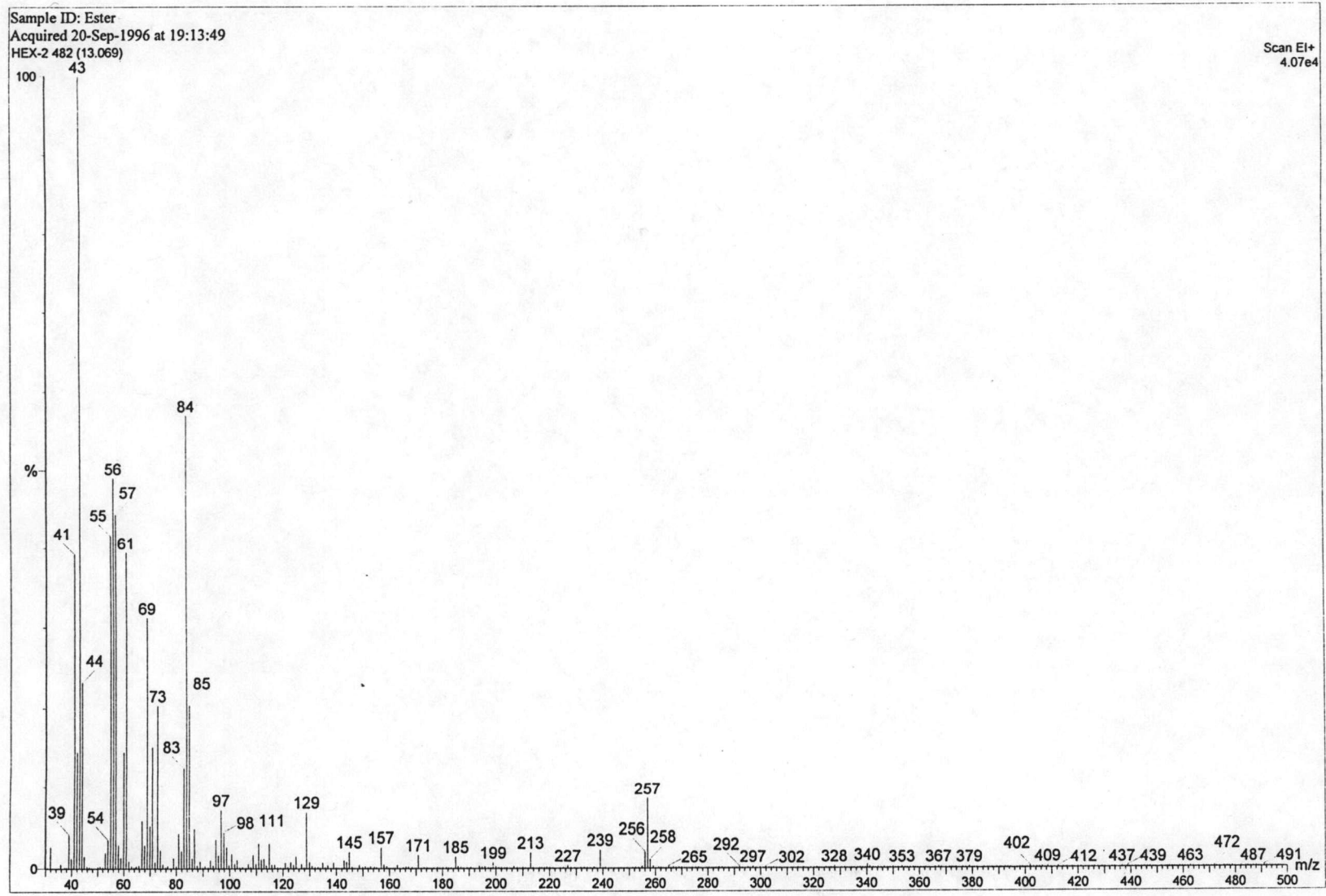


Figure A-27 : Mass-spectrum of 1-hexyl palmitate at retention time of 13.069 min. in Figure A-26

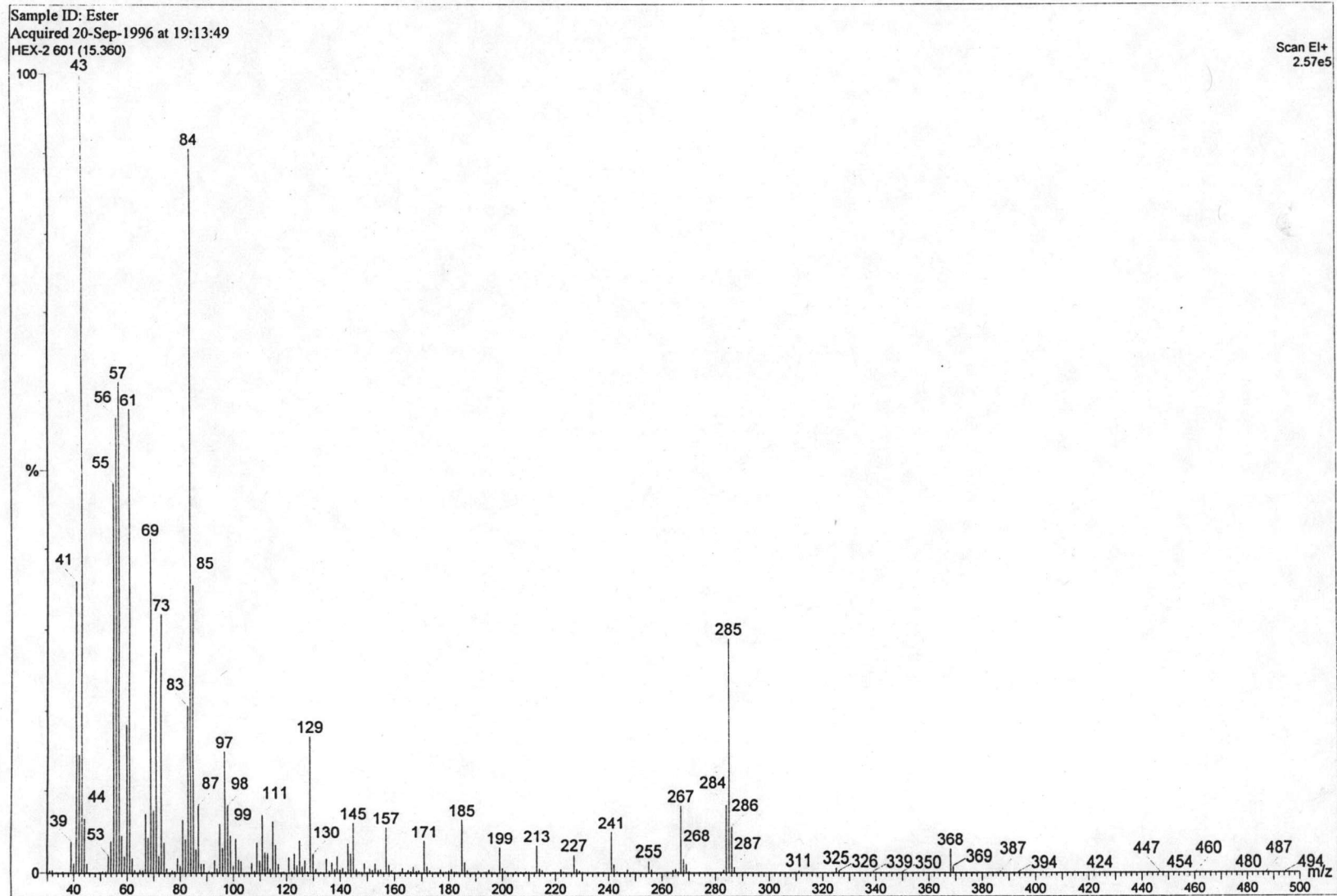


Figure A-28 : Mass-spectrum of 1-hexyl stearate at retention time of 15.360 min. in Figure A-26

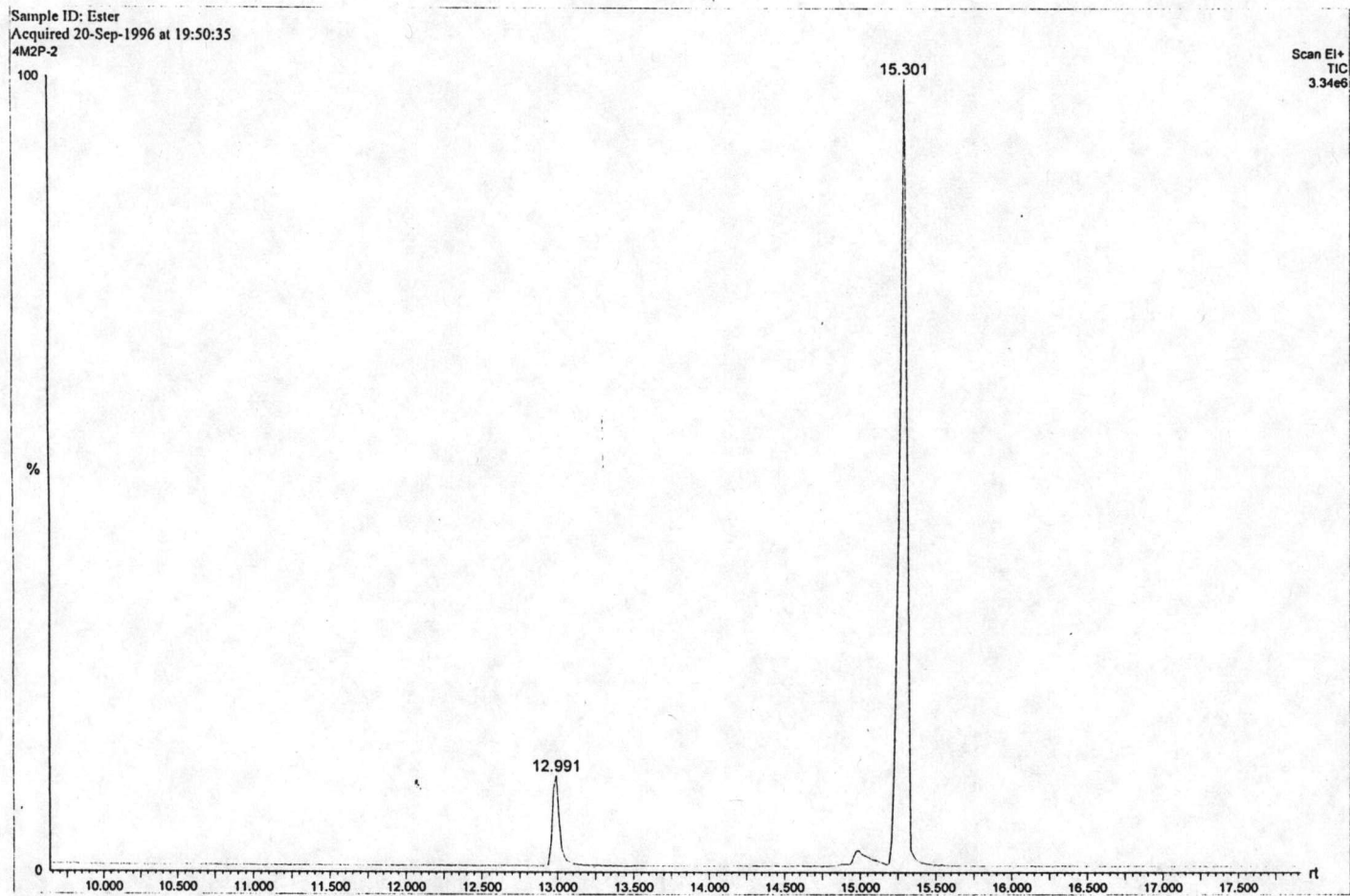


Figure A-29 : GC-MS Chromatogram of hydrogenated 4-methyl-2-pentyl ester



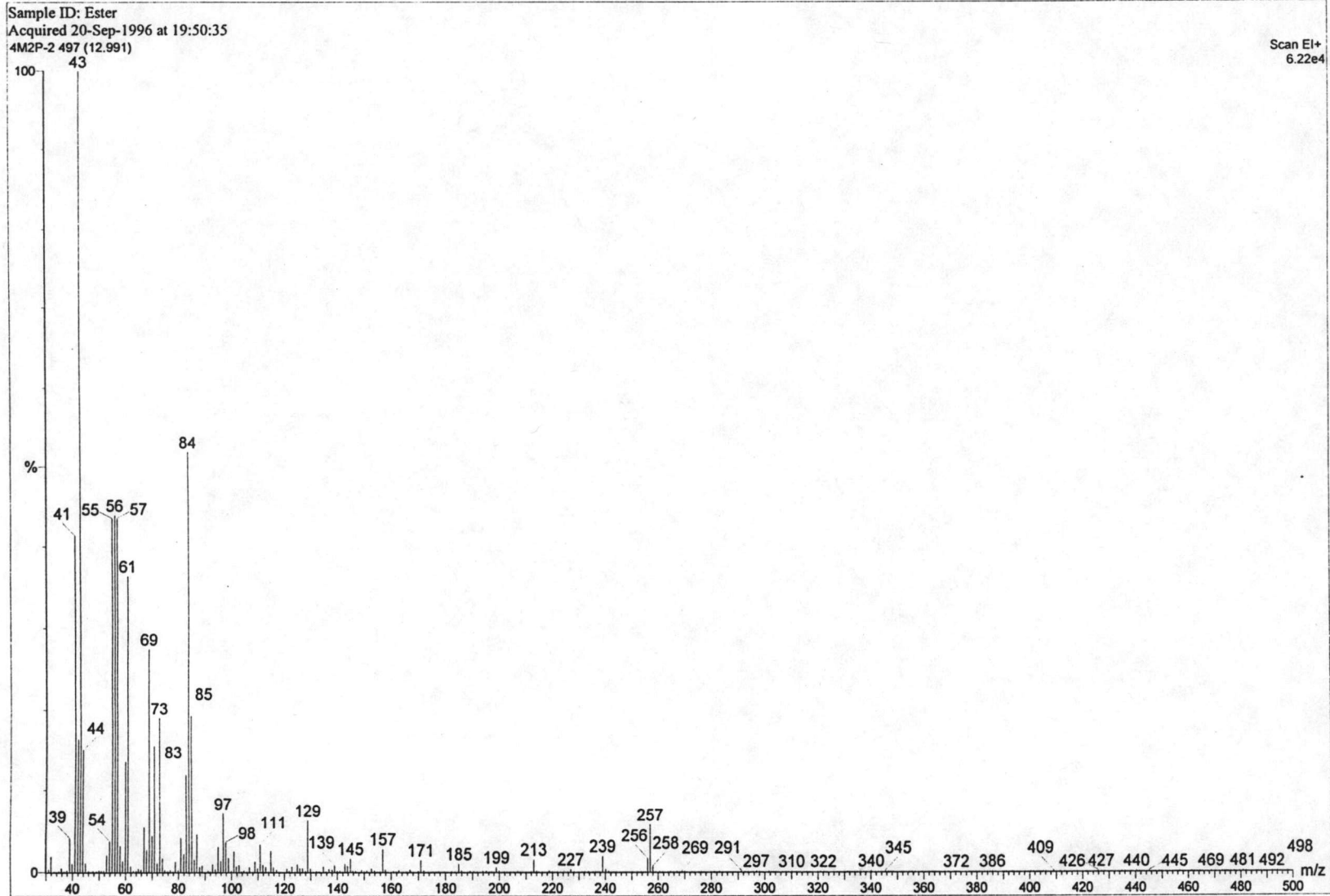


Figure A-30 : Mass-spectrum of 4-methyl-2-pentyl palmitate at retention time of 12.991 min. in Figure A-29

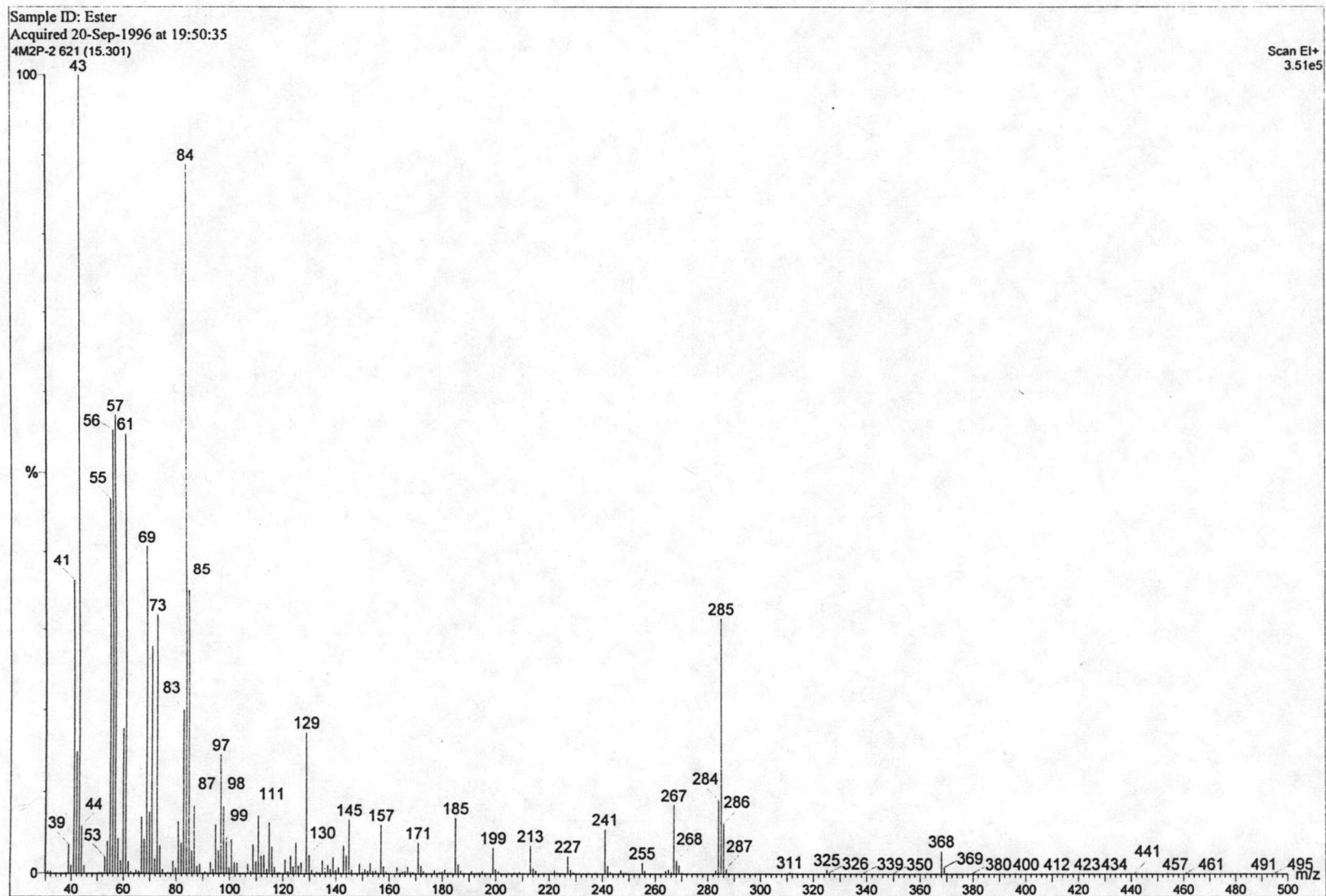


Figure A-31 : Mass-spectrum of 4-methyl-2-pentyl at retention time of 15.301 min. in Figure A-29

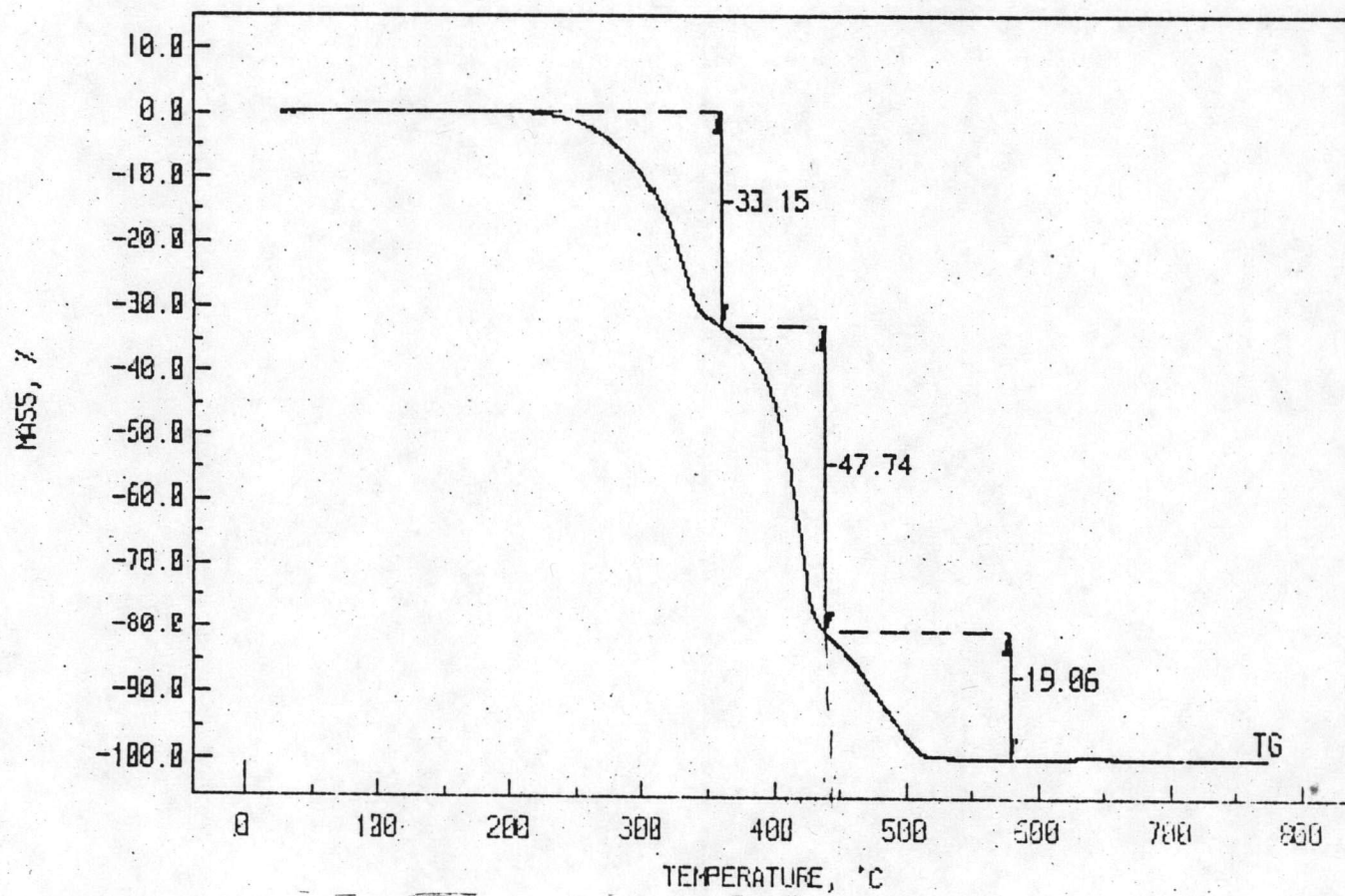


Figure A-32 : Thermogram of Soybean Oil

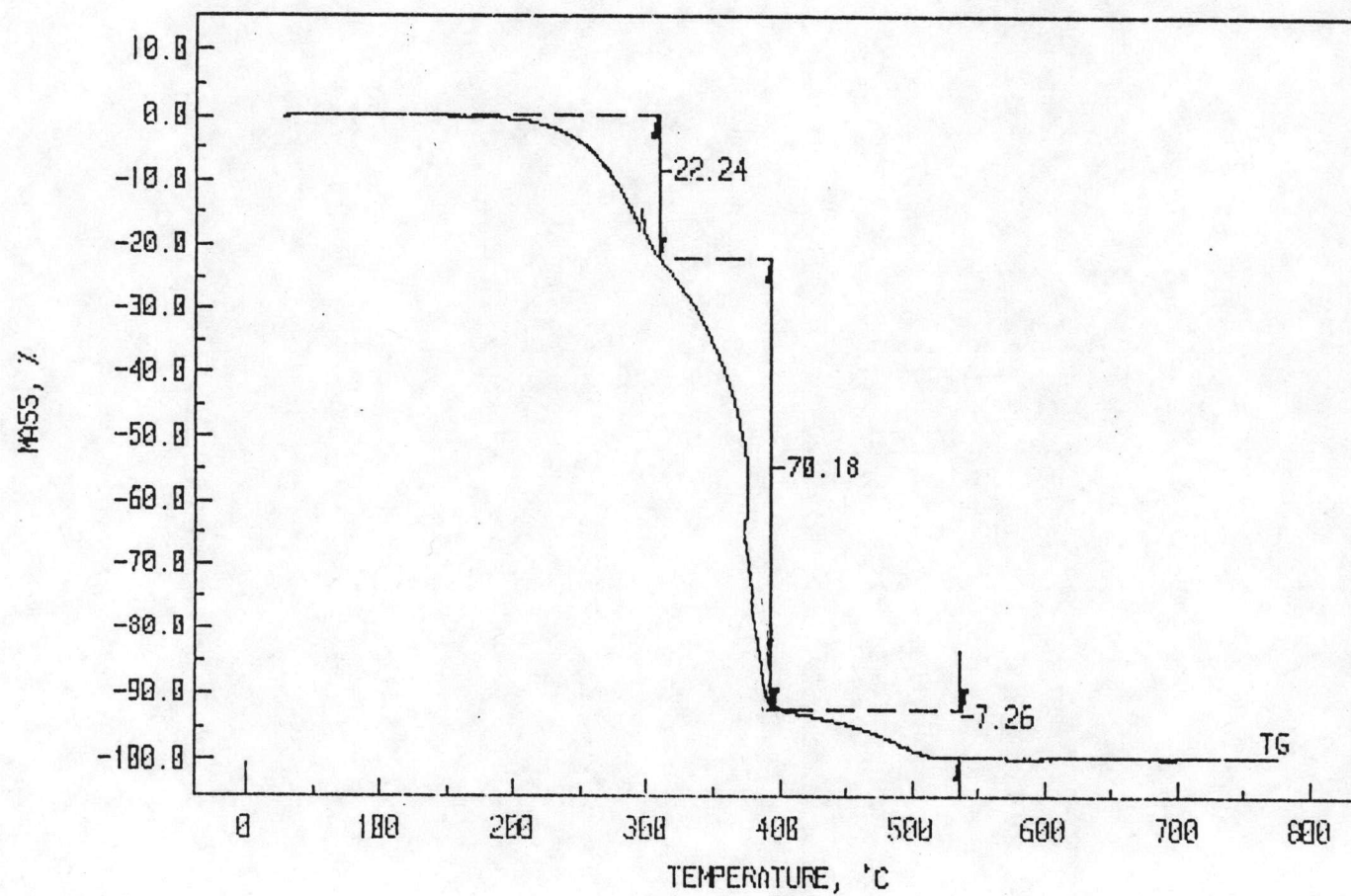


Figure A-33 : Thermogram of 2-ethyl-1-hexyl ester

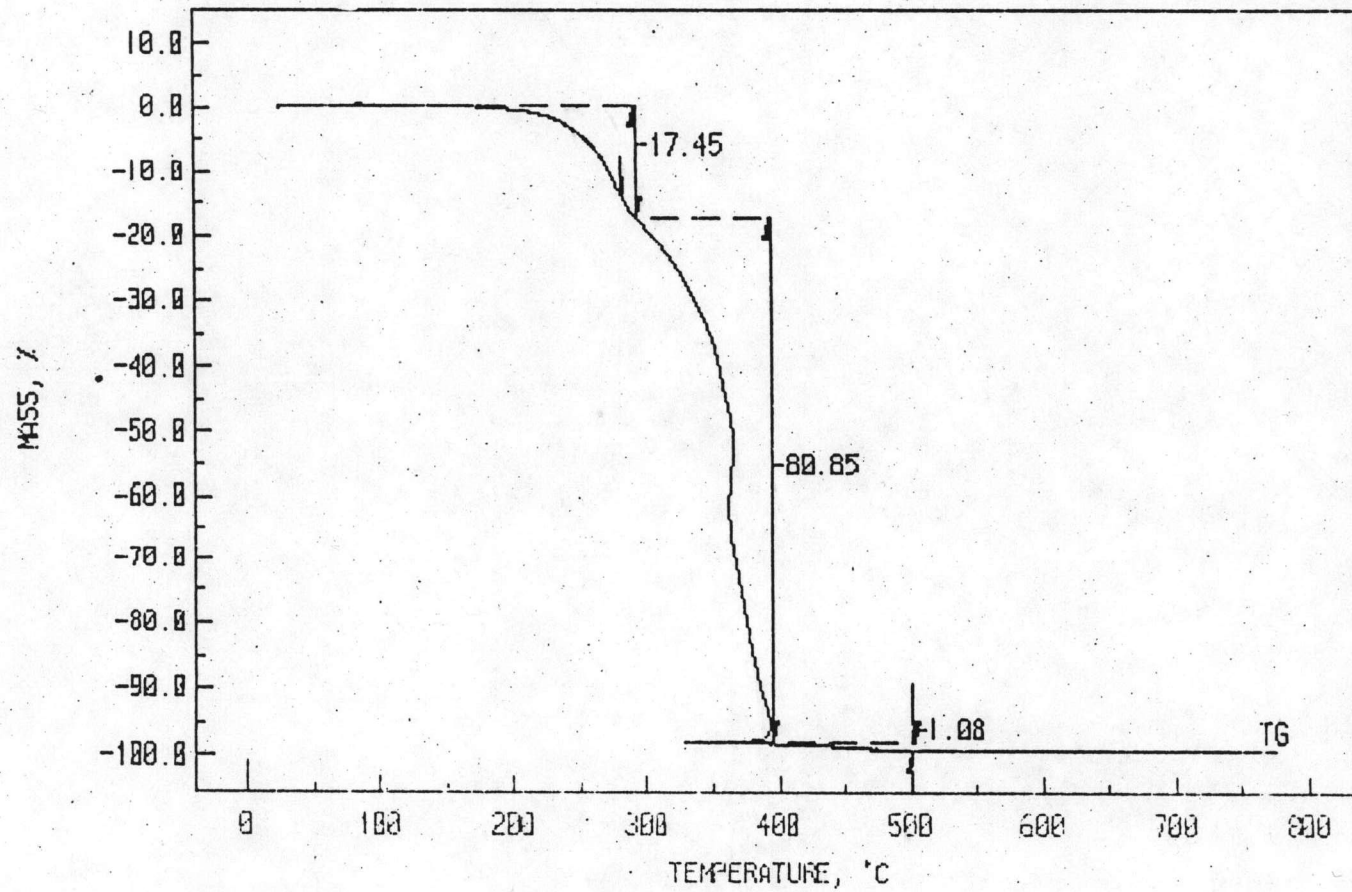


Figure A-34 : Thermogram of hydrogenated 2-ethyl-1-hexyl ester

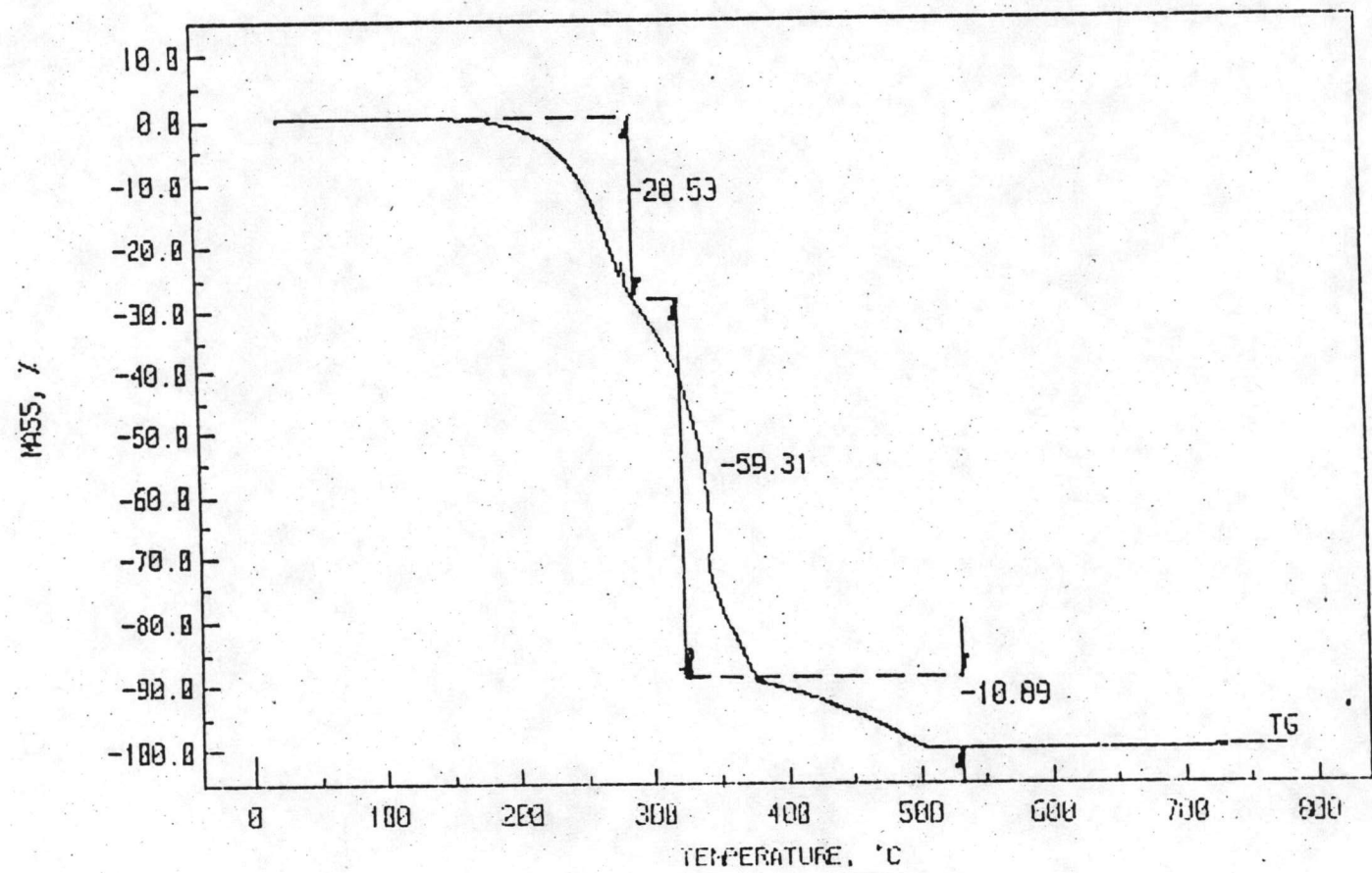


Figure A-35 : Thermogram of hydrogenated isopropyl ester

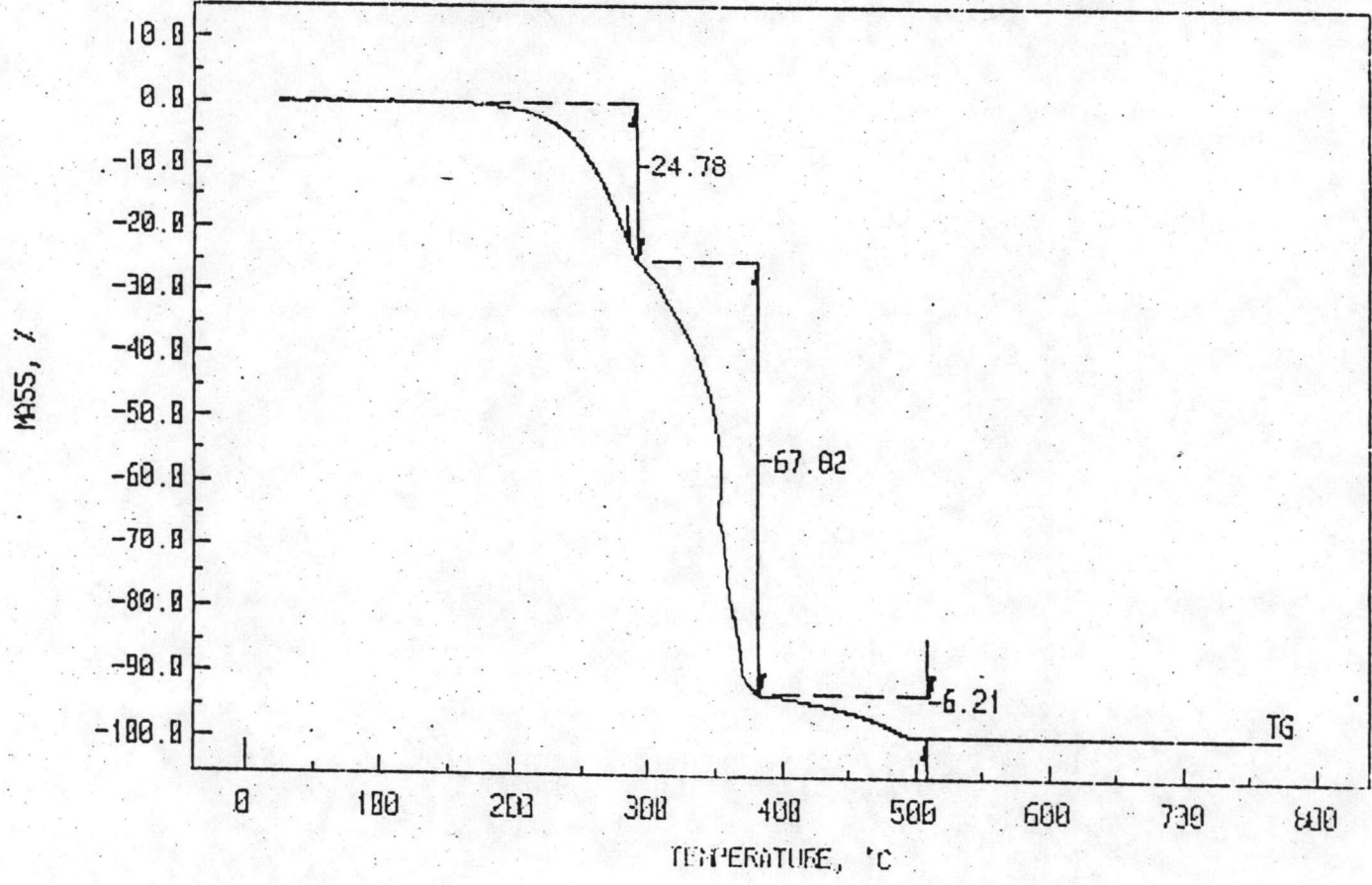


Figure A-36 : Thermogram of hydrogenated 1-butyl ester

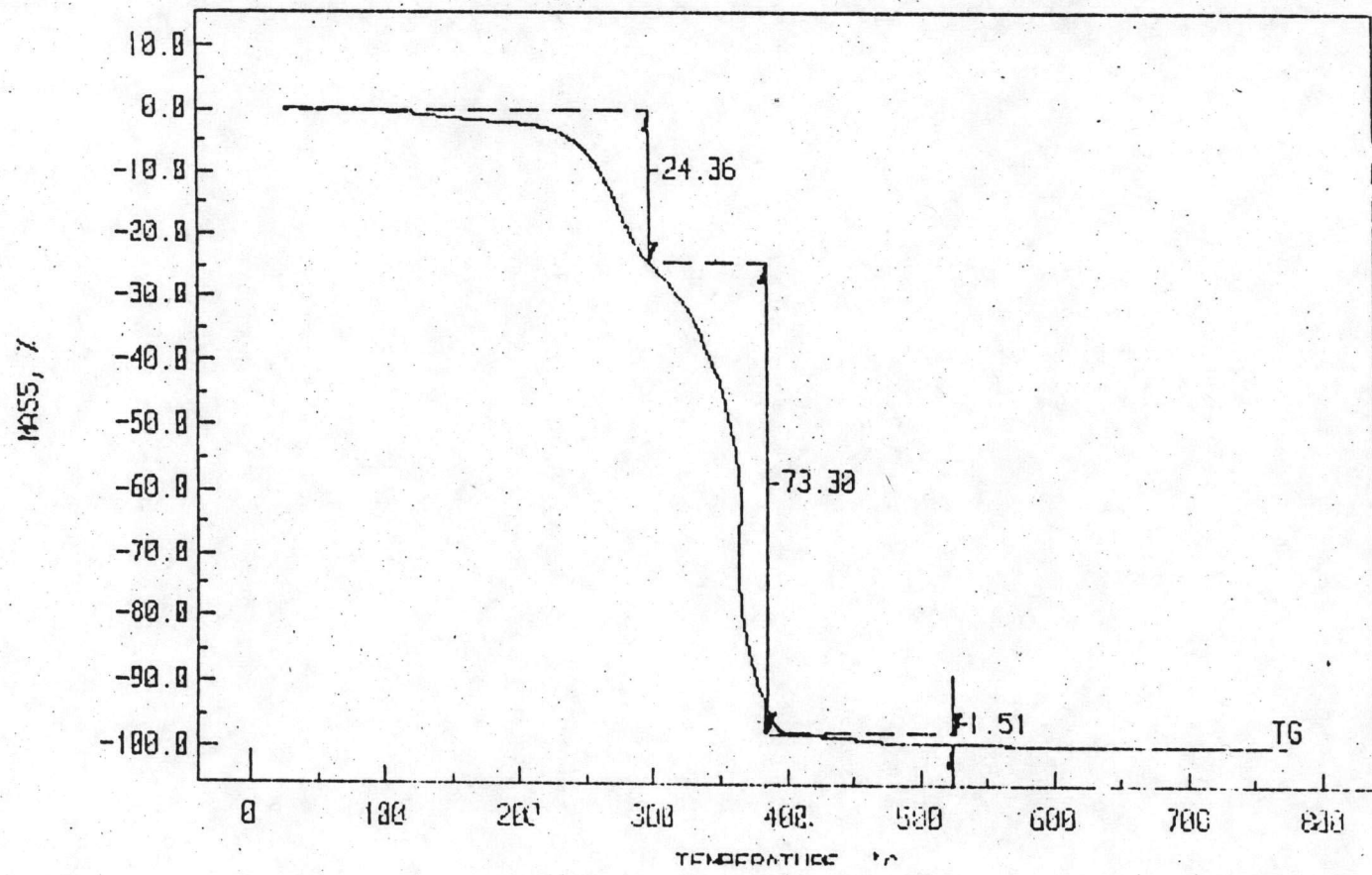


Figure A-37 : Thermogram of hydrogenated 1-hexyl ester



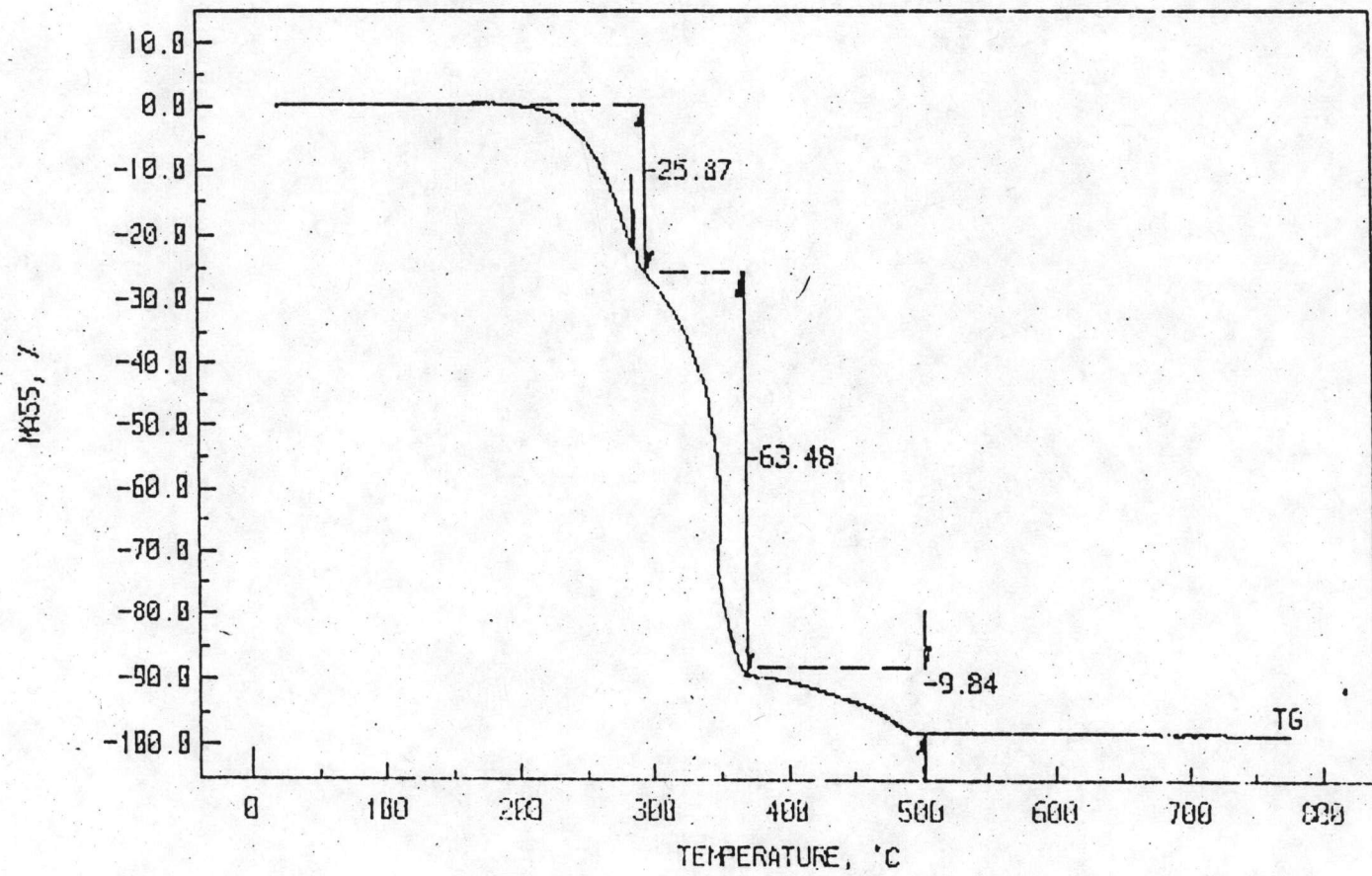


Figure A-38 : Thermogram of hydrogenated 4-methyl-2-pentyl ester

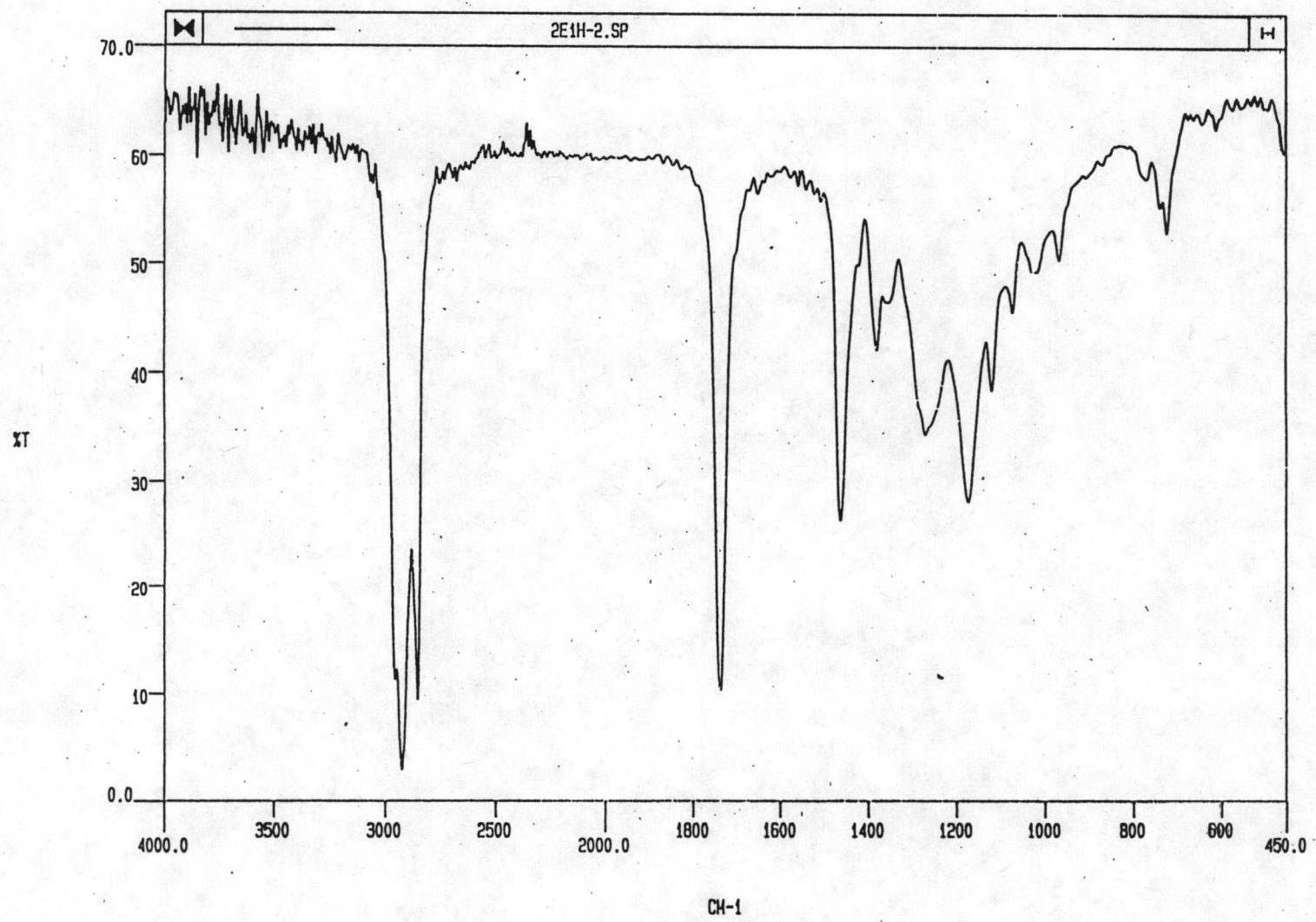


Figure 39 : FT-IR spectrum of hydrogenated 2-ethyl-1-hexyl ester

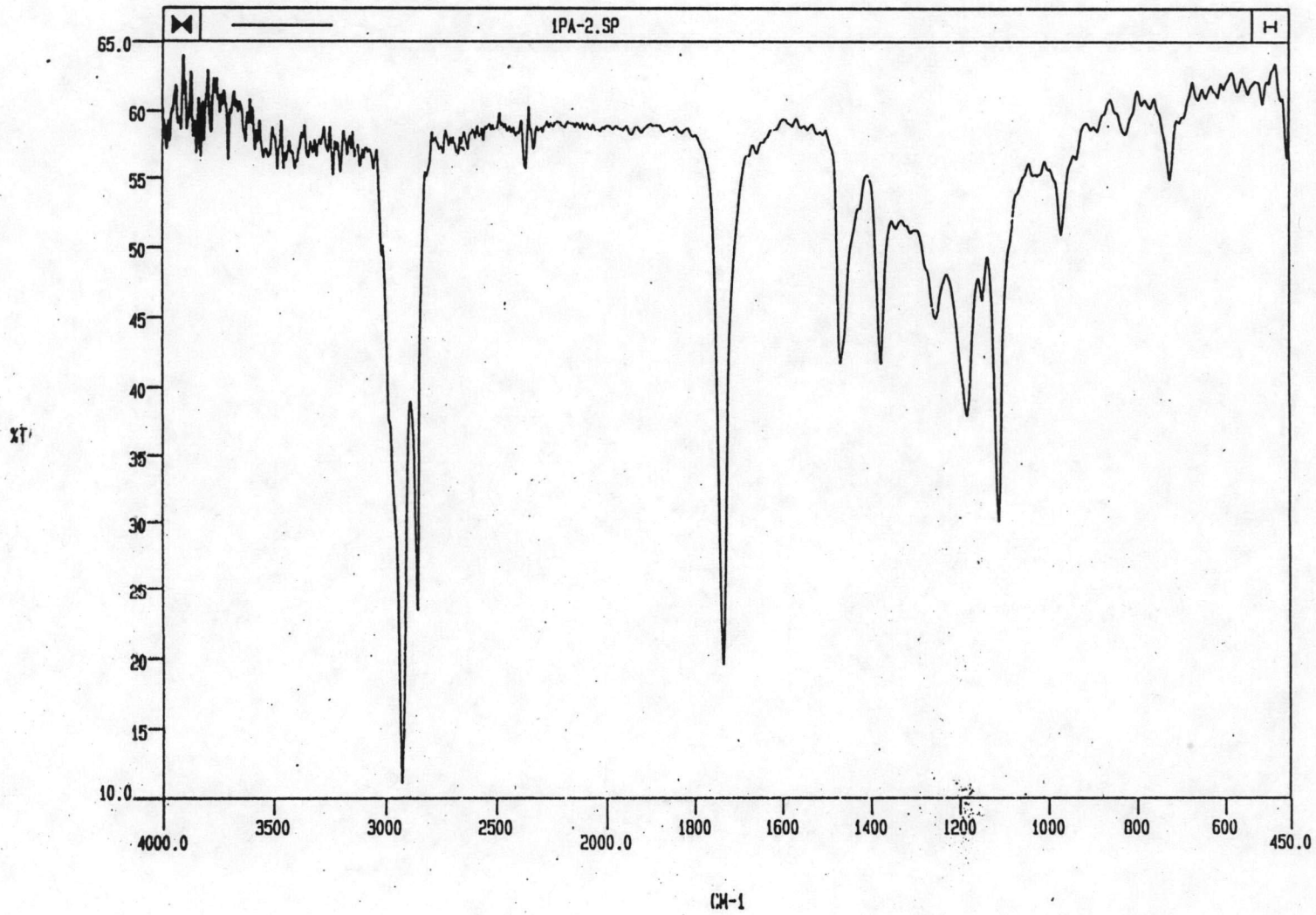


Figure 40 : FT-IR spectrum of hydrogenated isopropyl ester

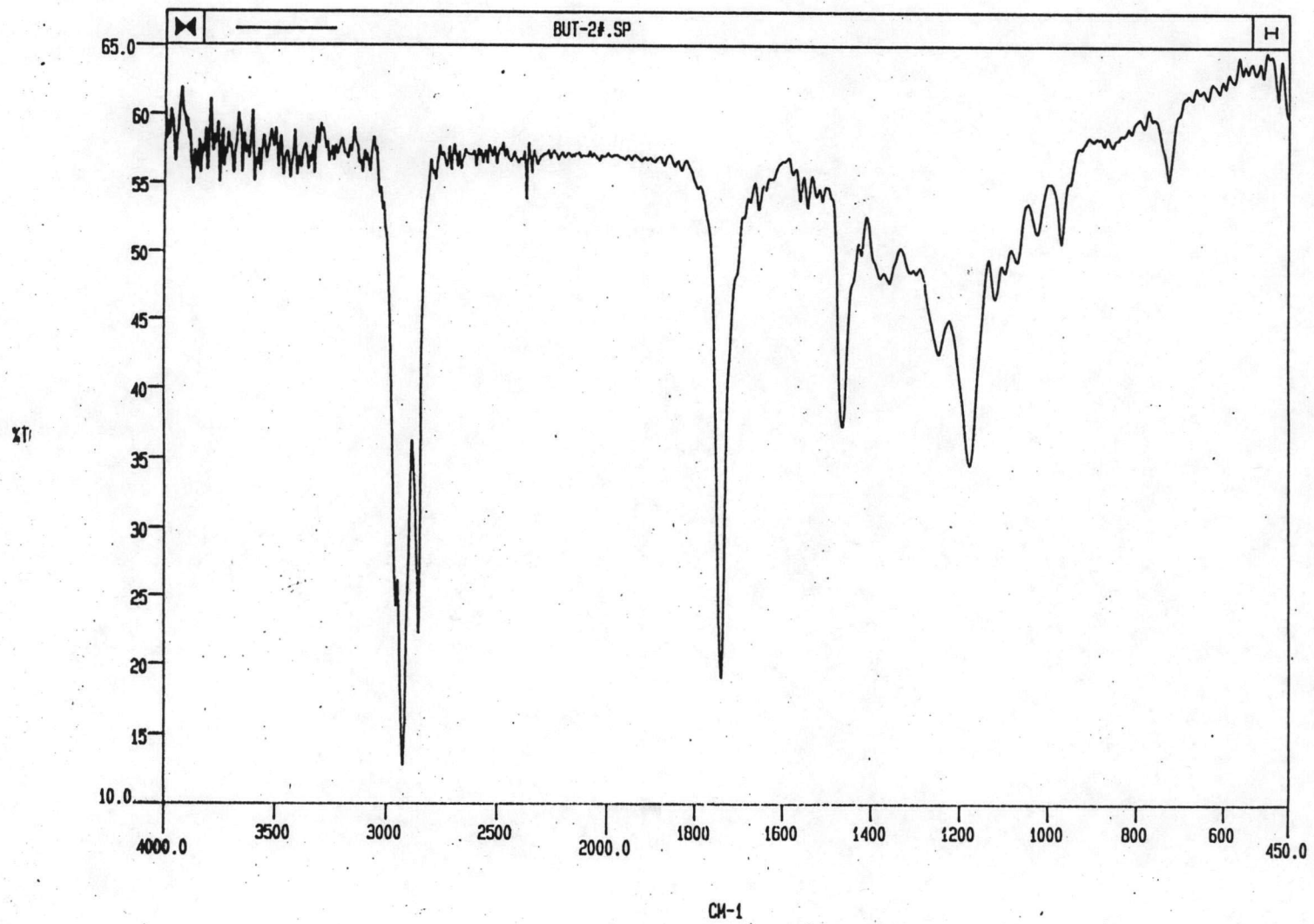


Figure 41 : FT-IR spectrum of hydrogenated 1-butyl ester

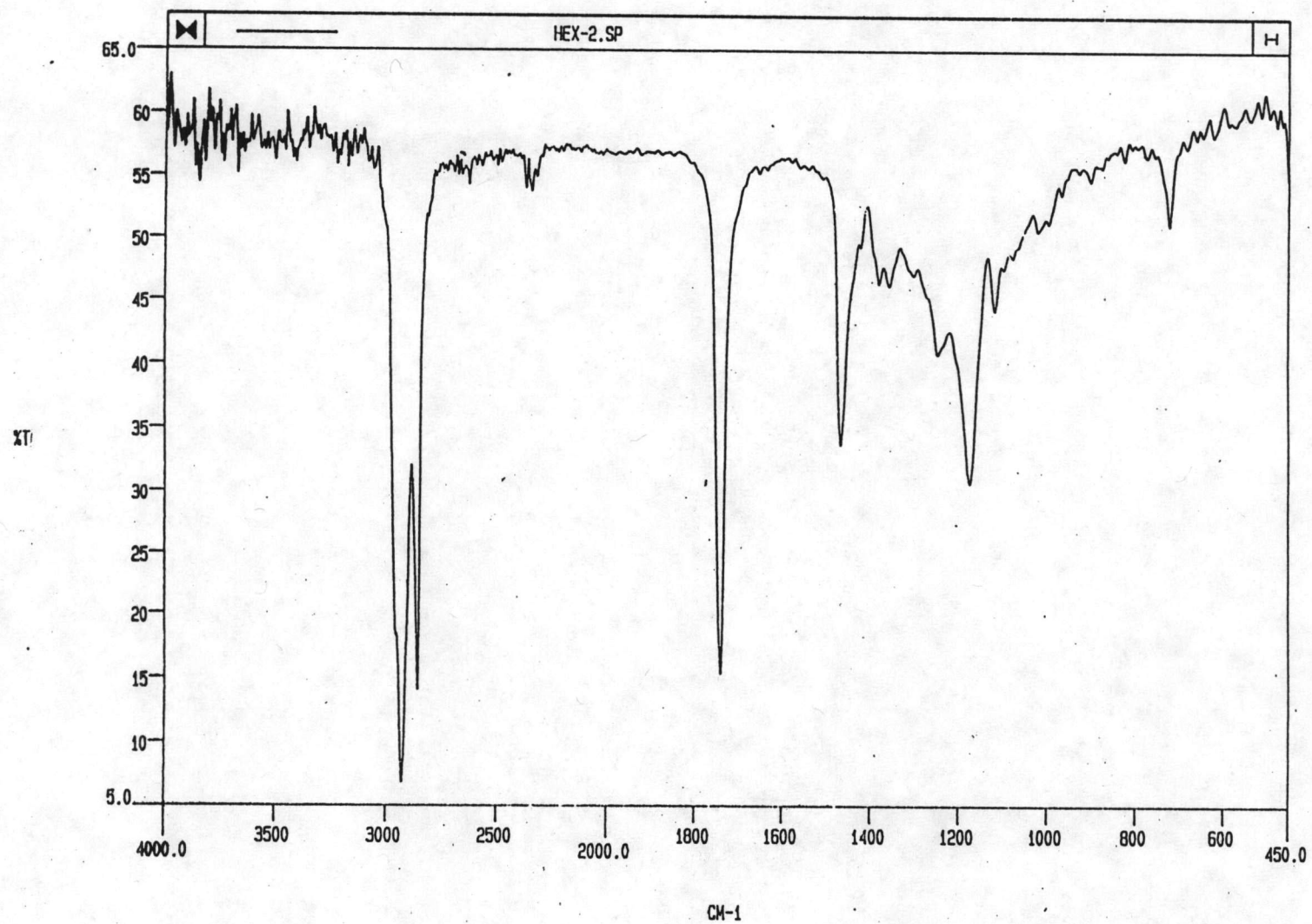


Figure 42 : FT-IR spectrum of hydrogenated 1-hexyl ester

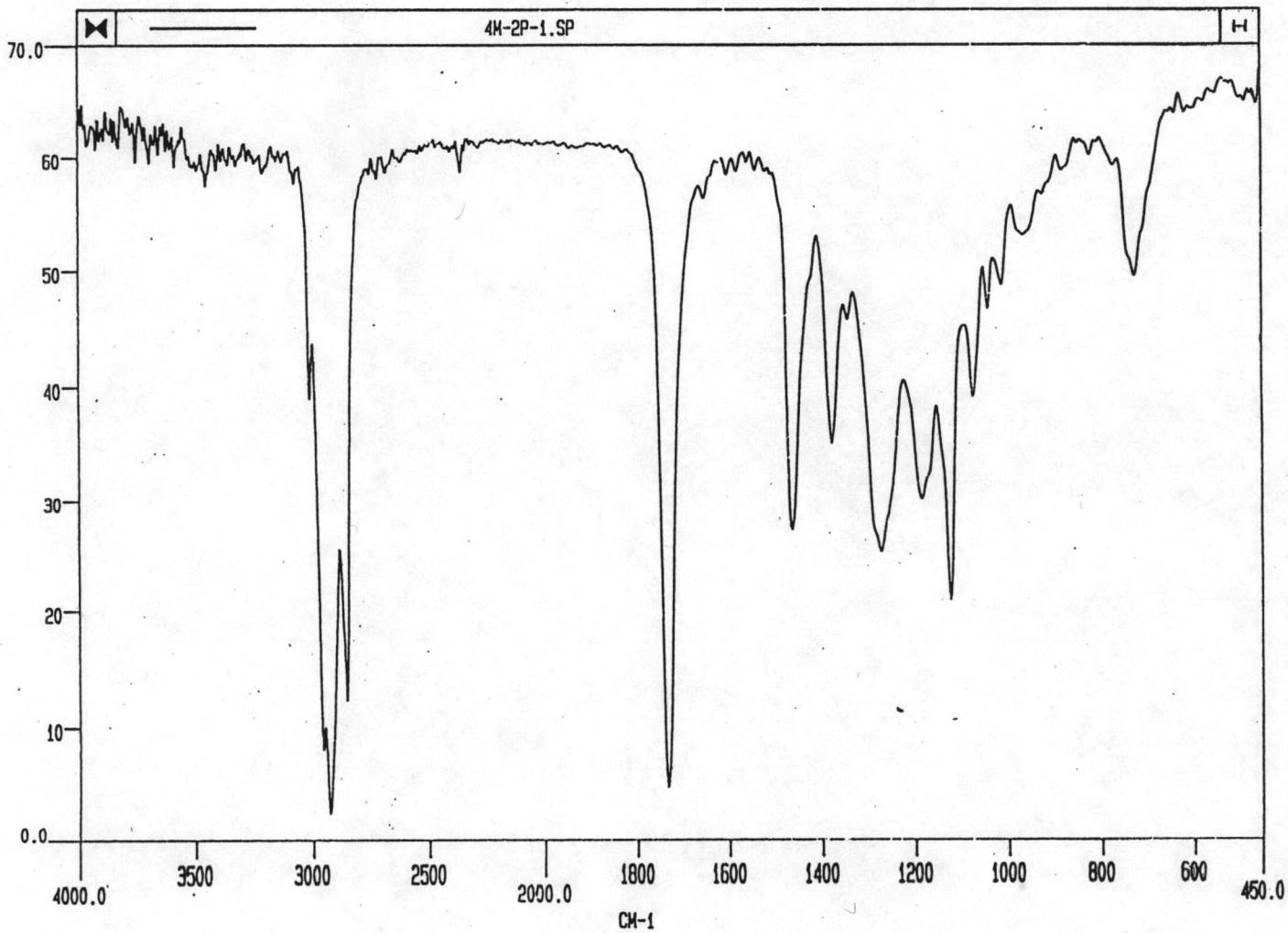


Figure 43 : FT-IR spectrum of hydrogenated 4-methyl-2-pentyl ester

## VITA

Miss Thongjuta Suwanprasert was born on January 23, 1972, in Bangkok. She received Bachelor's Degree of Science in Industrial Chemistry from King Mongkut Institute of Technology North Bangkok in 1993. She has been a graduate student studying Petrochemistry in Chulalongkorn University since 1993.

