REFERENCES

1. เต็ม สมิตินันท์. ชื่อพรรณไม้แห่งประเทศไทย (ชื่อพฤกษศาสตร์-ชื่อพื้นเมือง). กรุงเทพมหานคร : สำนักพิมพ์แฟนนี่, 2523.

2. Simao, S.M., Barreiros, E. L. and Gottlieb, O. R. Chemogeographical Evolution of Quassinoids in Simaroubaceae. Phytochemistry. 30(1991) : 853-865.

3. Smittinand, S. Flora of Thailand. vol II part IV Bangkok : Thailand Institue of Scientific and Technology research Press, 1981.

4. Backer, C.A., and Bakhuizen, R.C. Flora of Java. vol II. Netherlands : N.V.P. noordhoff-Groningen, 1965.

5. Kariyone, T. Annual Index of the Reports on Plant Chemistry. Hirokawa Publishing Company, Inc., Tokyo, Japan, 1957-1972.

6. Kubo, I., Tanis, S. P., Yue-Wai Lee, Miura, I. and Nakanishi, K. The Structure of Harrisonin. Heterocycles., 5(1976) : 485-496.

7. Lin, H., Kubo, I. and Nakanishi, K. A Southern Army-Worm Antifeedant, 12β-Acetoxyharrisonin From an African Shrub *Harrisonia abyssinica.* Heterocycles, 17(1982) : 67-71.

8. Balde, A.M., Vanhaelen, M. and Ottinger, R. A Chromone From the Root-bark of *Harrisonia abyssinica.* Phytochemistry. 26(1987) : 2415-2416.

9. _____., Vanhaelen, M. and Daloze, D. 5-Dehydrooriciopsin, A Ring-D cleaved Tetranortriterpenoid from *Harrisonia abyssinica.* Phytochemistry. 27(1988) : 942-943.

10. Okoriu, D. A. Chromones and Limonoids from *Harrisonia abyssinica.* Phytochemistry 21(1982) : 2424-2426.

11. Hassanali, A., Bentley, M.D., Slawin, A. M., Williams, D.J., Shephard, N.R. and Chapya, A.W. Pedonin, A Spiro Tetranortriterpenoid Insect Antifeedant From *Harrisonia abyssinica.* Phytochemistry. 26(1987) ; 573-575.

12. Koike, K., Mitsunaga, K., Ishii, K. and Ohmoto, T. Brownins A and B : Novel Rearranged Limonoids from *Harrisonia brownii*., Tetrahedron. 49(1993) : 2209-2216.

13. Lindsay, T. Byrne., Mai Van Tri, Nguyen Minh Phuong, et.al. Perforatin : A Novel Tetranortriterpenoid for *Harrisonia perforata*. Aust. J. Chem. 44(1991) : 165-169.

14. สมบัติ เรืองกฤษ. องค์ประกอบทางเคมีของเปลือกรากคนทา. วิทยานิพนธ์มหาบัณฑิต, บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย, 2525.

15. Mei-Xin, W., Mei-Shang, Z., and Yuan-Long, Z. Studies on the Chemical Constituents of A Chinese Folk Medicine Niu-Jin-Quo (*Harrisonia perforata*). Yaexue 18(1983) : 113-118.

16. _____., Mei-Shang, Z., and Yuan-Long, Z. Isolation and Structural of Perforatic Acid from Chinese Folk Medicine Niu-Jin-Quo (*Harrisonia perforata*). Yaexue 19(1984) : 760-763.

17. ผกามาส เหล่าทองสาร. องค์ประกอบทางเคมีของรากคนทา. วิทยานิพนธ์มหาบัณฑิต, บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย, 2532.

18. มนิดา สถิตมั่นในธรรม. การแยกและหาสูตรโครงสร้างสารประกอบจากรากคนทา. วิทยานิพนธ์มหาบัณฑิต, บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย, 2535.

19. มงคล โมกขสมิตและคณะ. L.Med.Ass.Thailand. pp. 490-503 54(7), 1971.

20. John, C., Quick Column Chromatography, James Cook University of North Queenland. 1st. ed. 1971: 10-24.

21. Fessenden, R.J., and Fessenden, J.S. Technique and Experiments for Organic Chemistry. Willard Grant Press, 1983.

22. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., and Tatchell A.R. Vogel's Textbook of Practical OrganicChemistry. 5th ed. Great Britain : English Language Book Society/Longman, 1989.

23. Pavia, D.L., Lampmon, G.M., and Kriz, G.S. Introduction to Organic Laboratory Techniques : a contemporary approach 2nd ed. New York: Saunders College Publishing, 1982.

APPENDIX

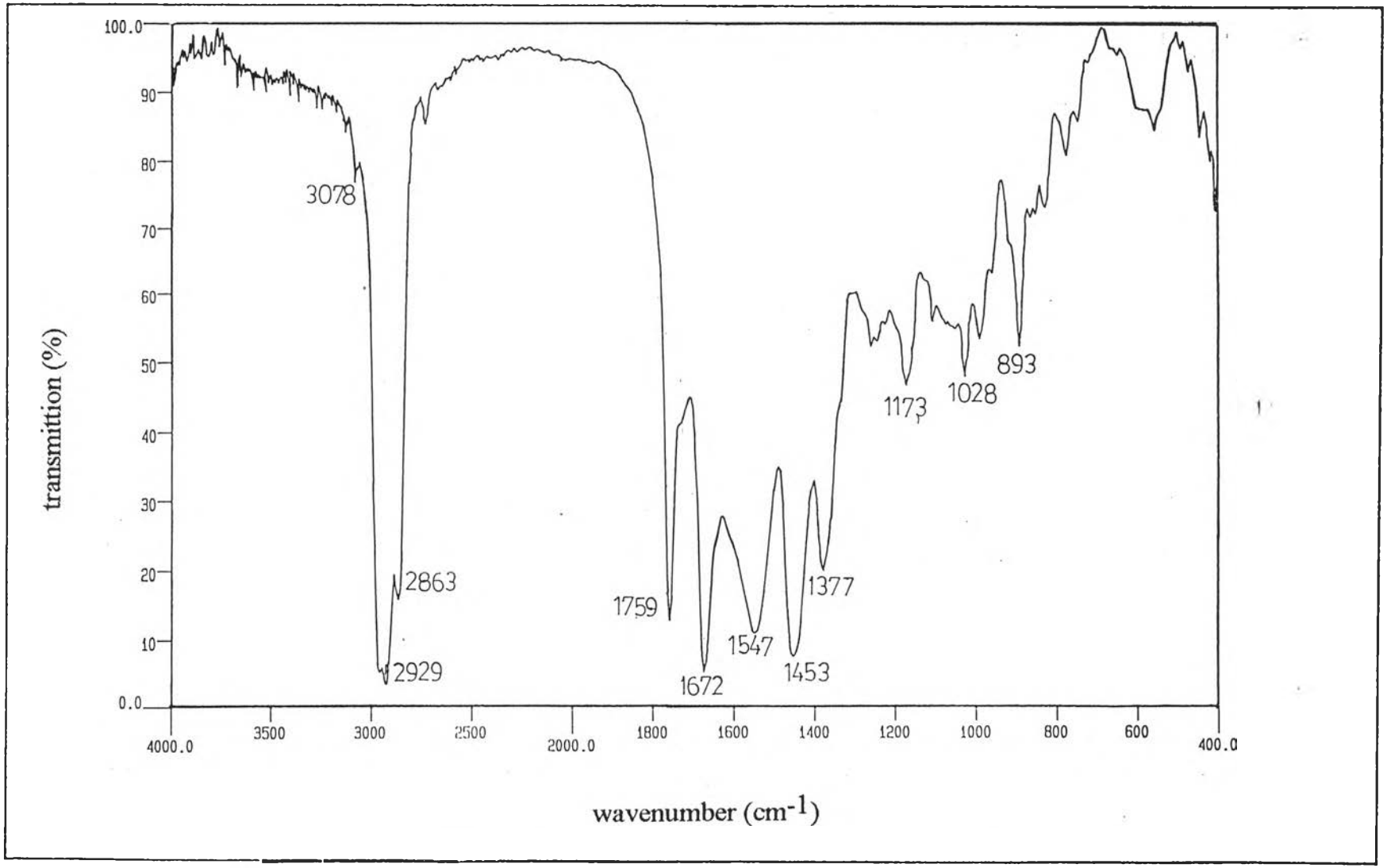

Figure 2 The IR spectrum of PA-1

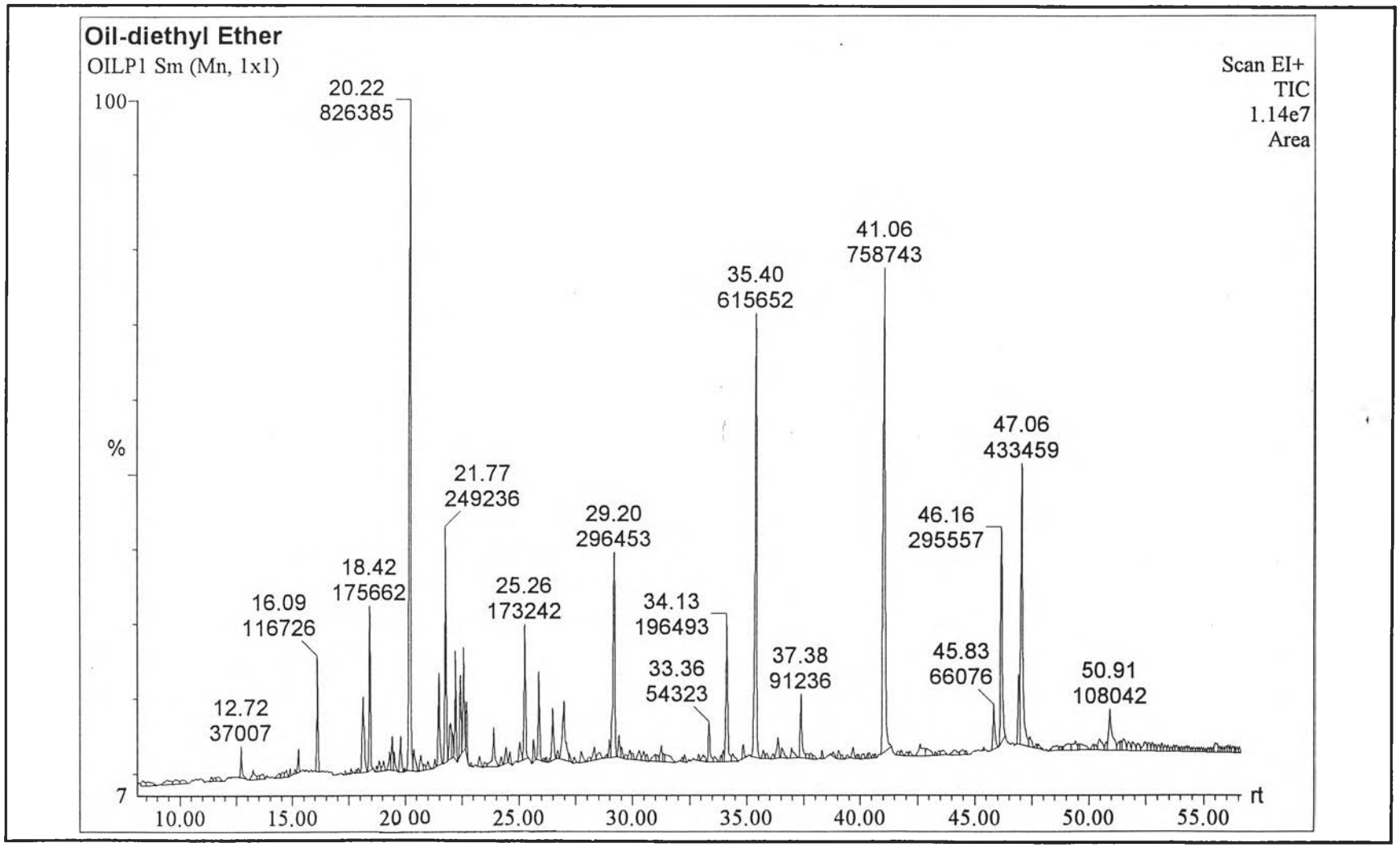

Figure 3 The GC-MS chromatogram of PA-1

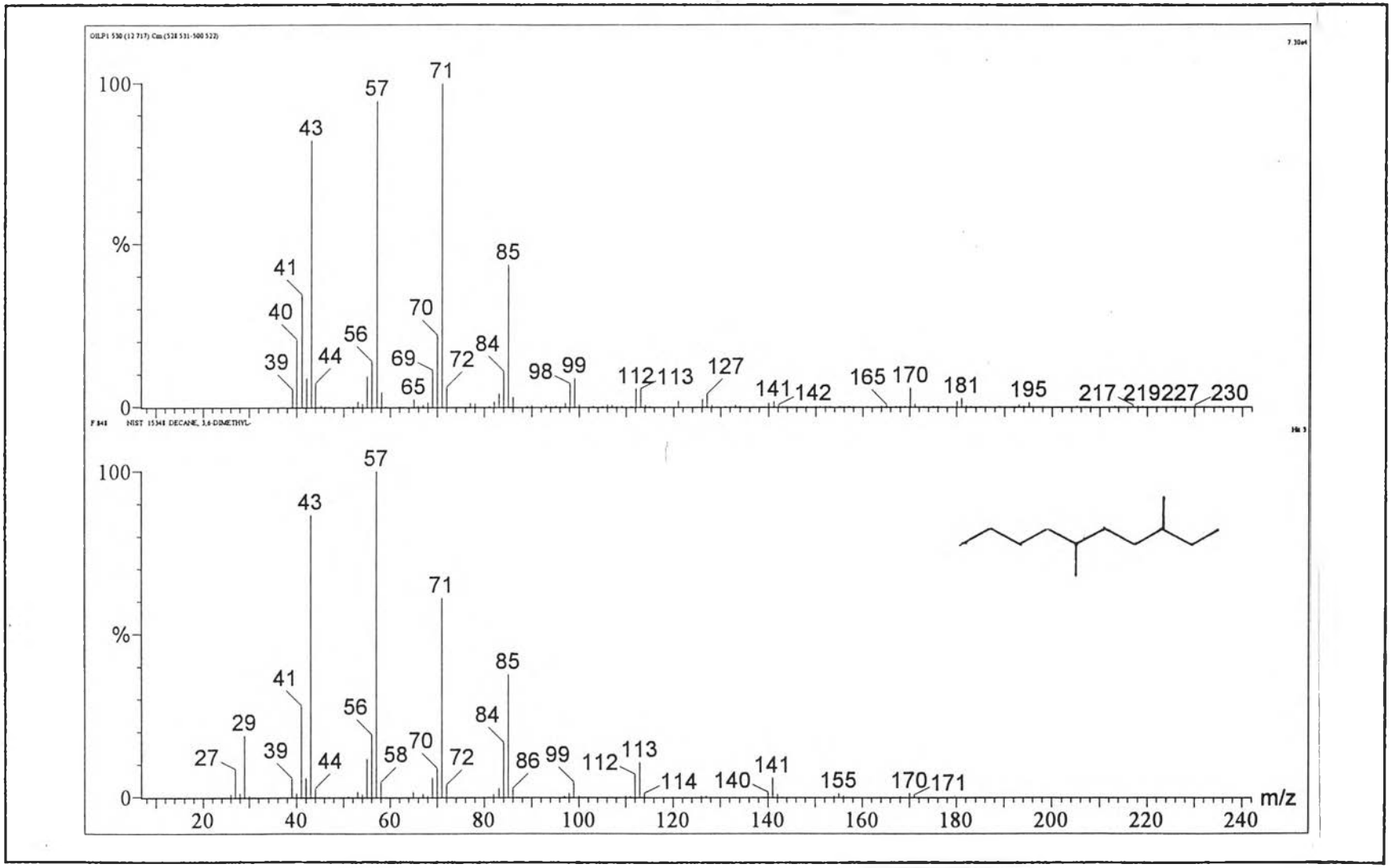

Figure 4 The mass spectrum of PA-1 at retention time 12.72 min.

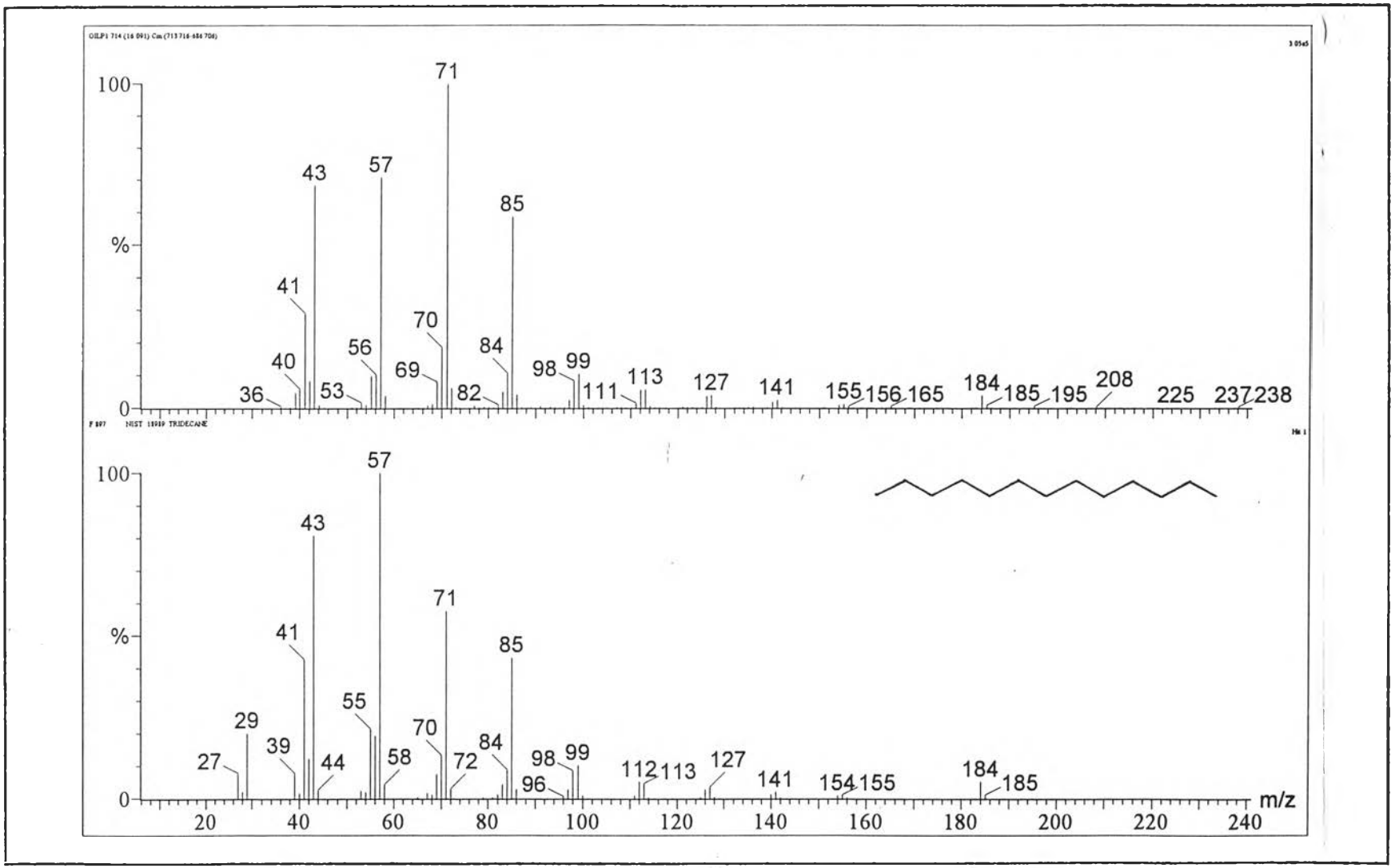

Figure 5 The mass spectrum of PA-1 at retention time 16.09 min.

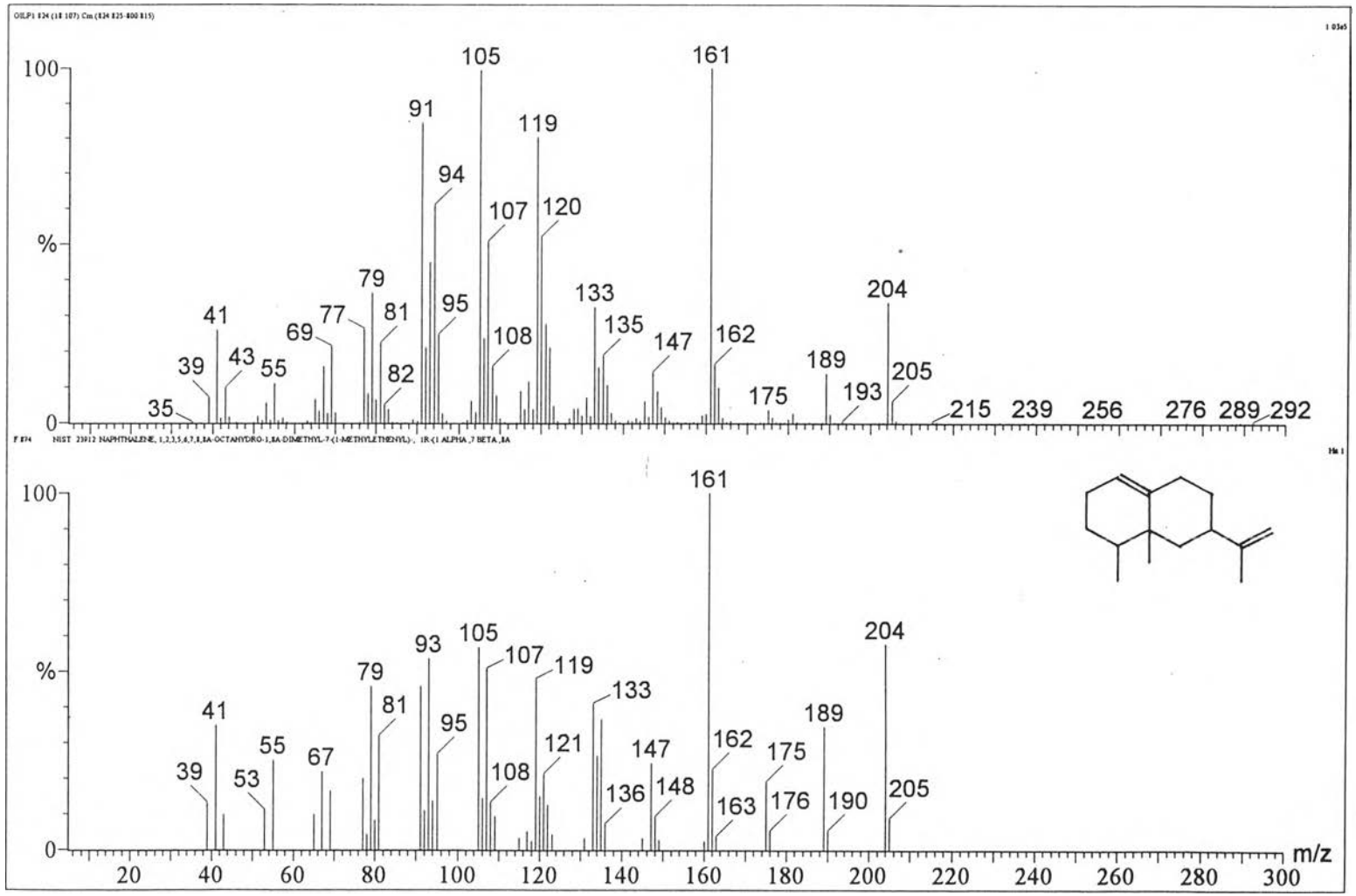

Figure 6 The mass spectrum of PA-1 at retention time 18.11 min.

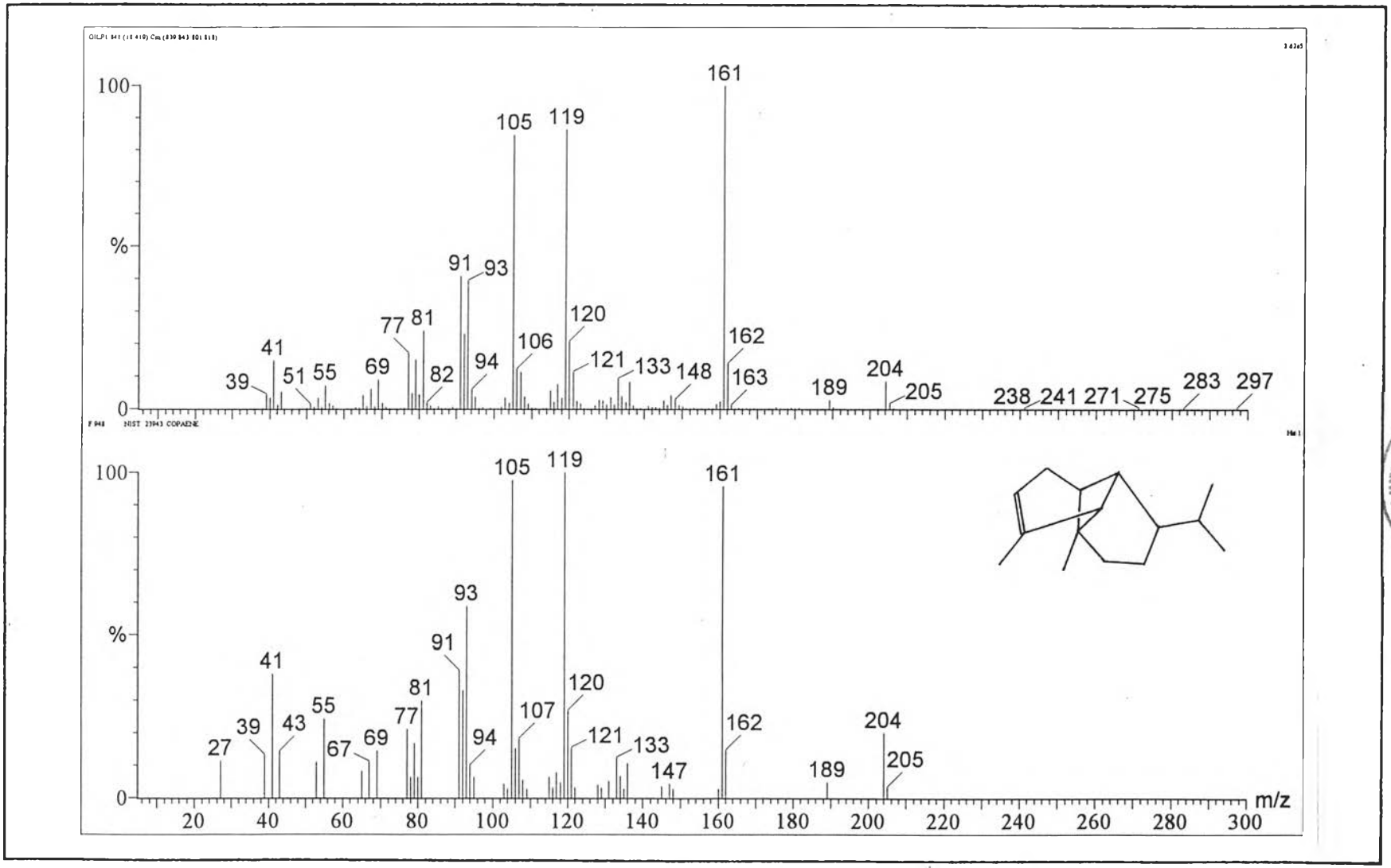

Figure 7 The mass spectrum of PA-1 at retention time 18.42 min.

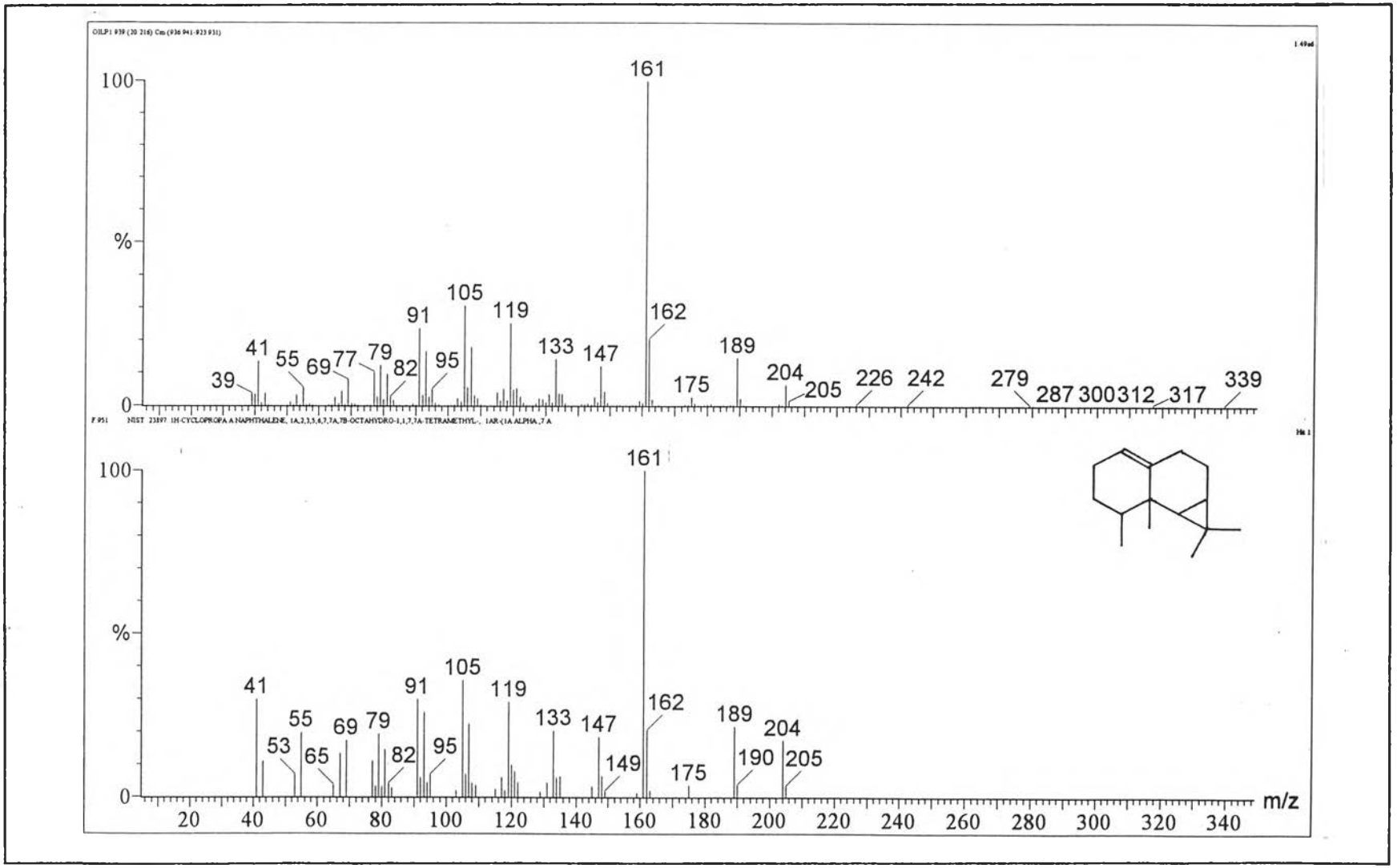

Figure 8 The mass spectrum of PA-1 at retention time 20.22 min.

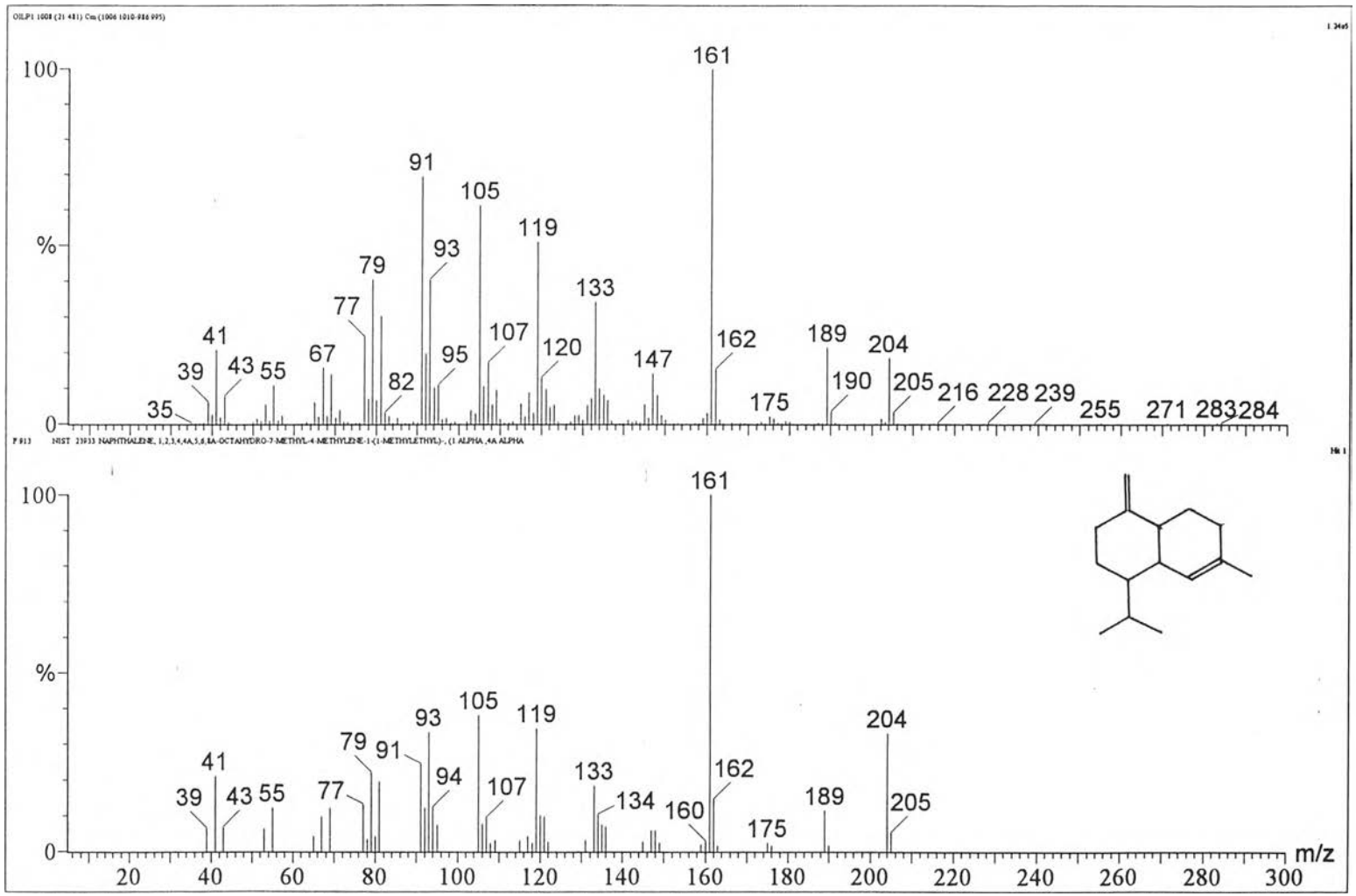

Figure 9 The mass spectrum of PA-1 at retention time 21.48 min.

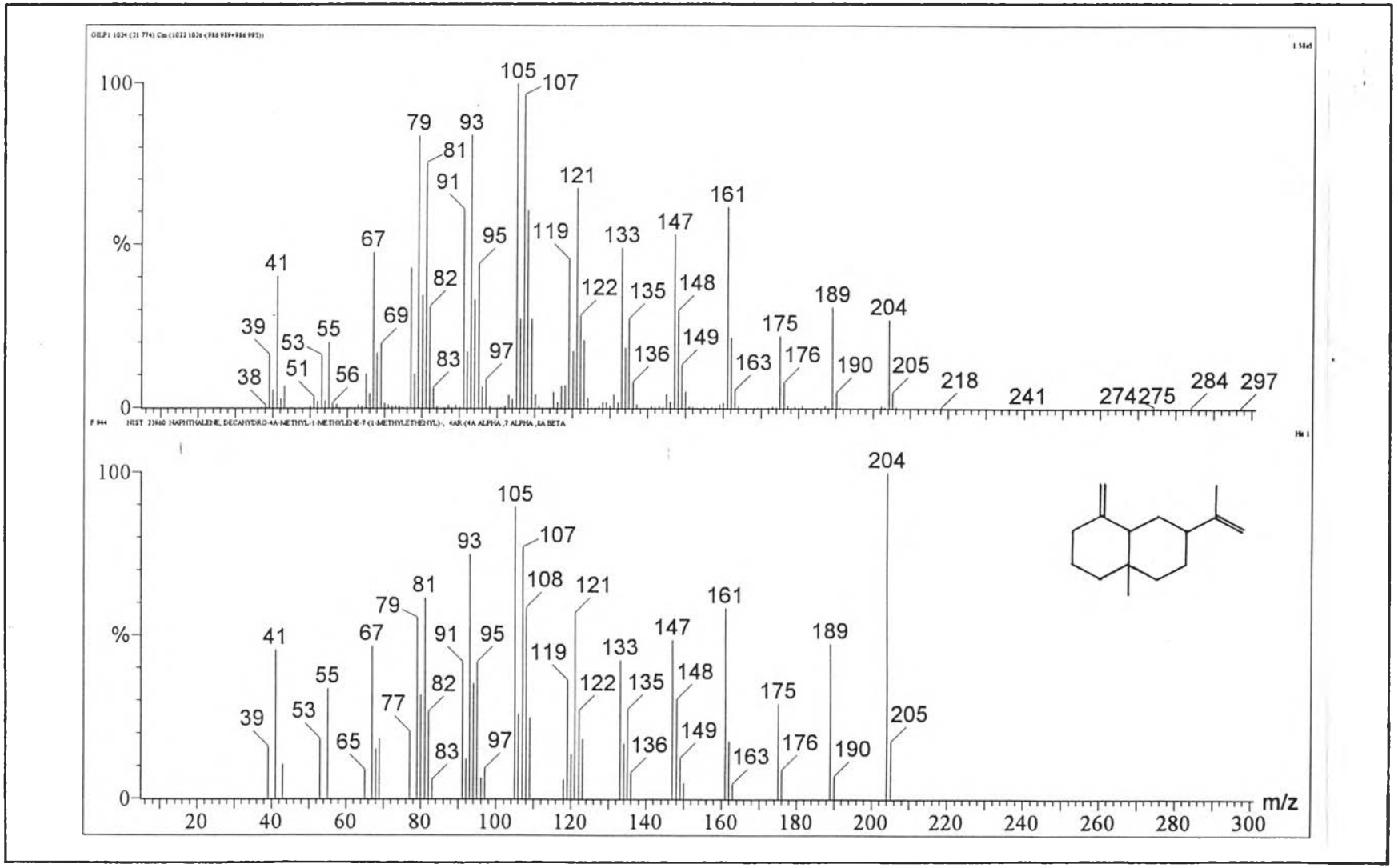

Figure 10 The mass spectrum of PA-1 at retention time 21.77 min.

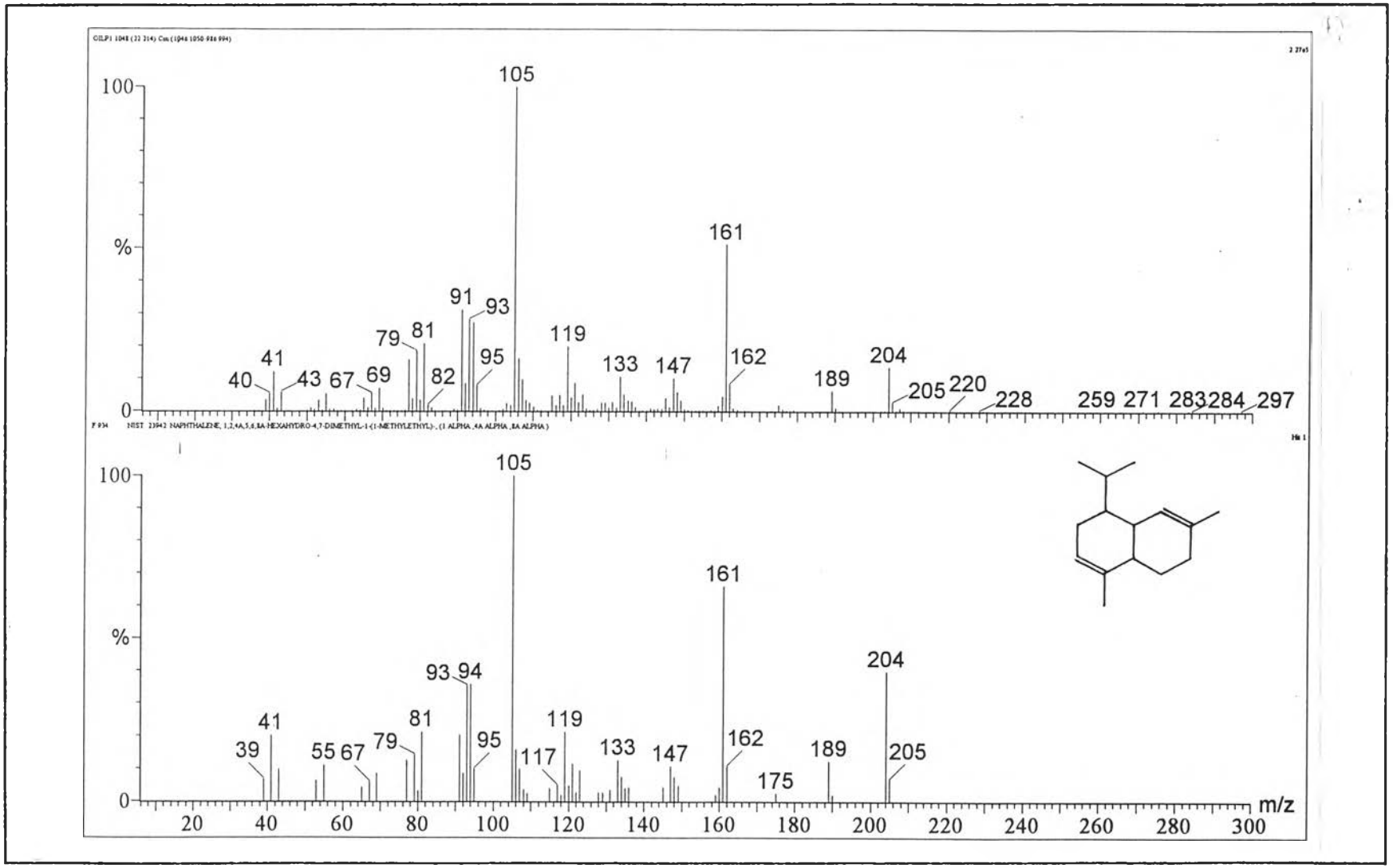

Figure 11 The mass spectrum of PA-1 at retention time 22.21 min.

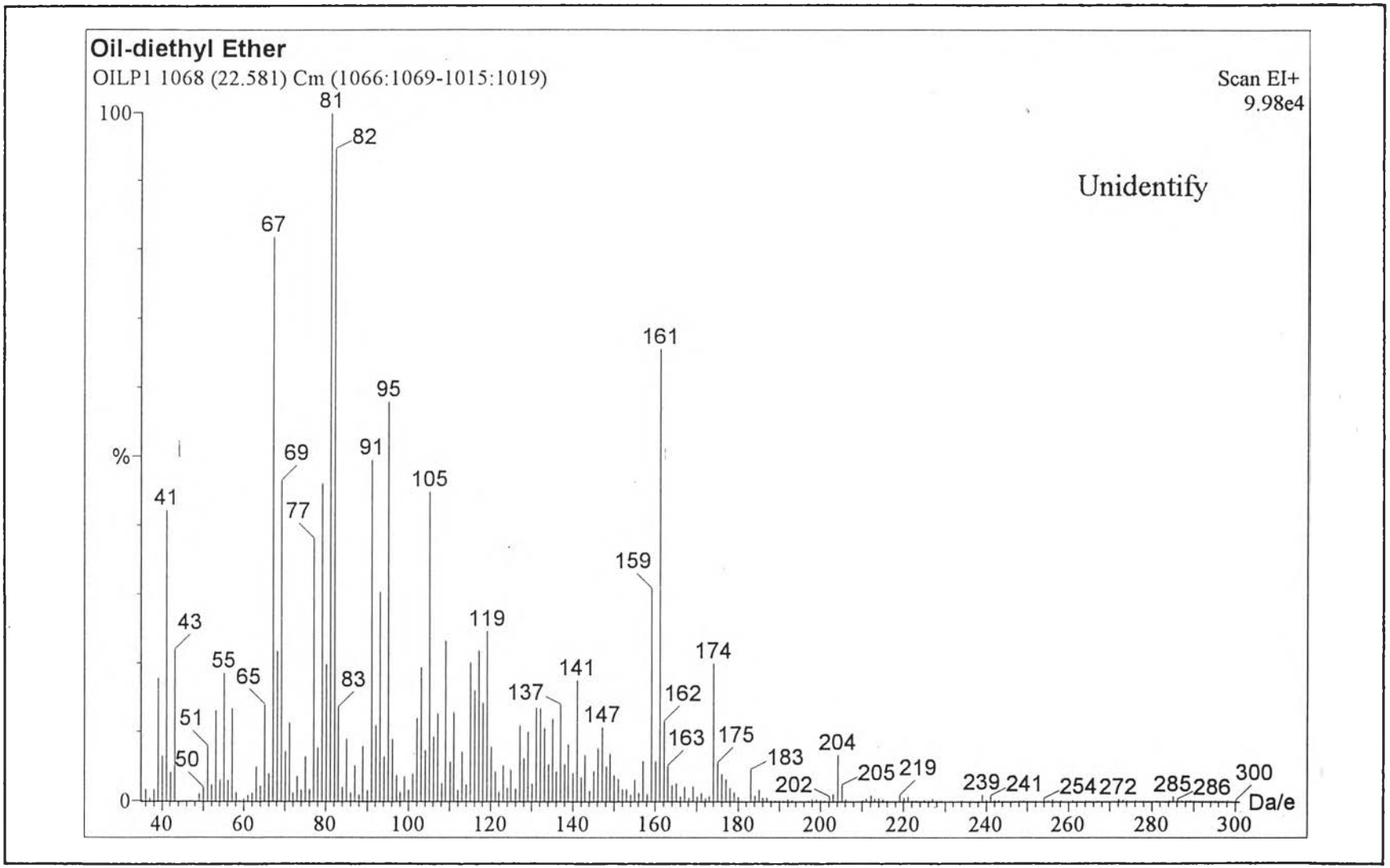

Figure 12 The mass spectrum of PA-1 at retention time 22.58 min.

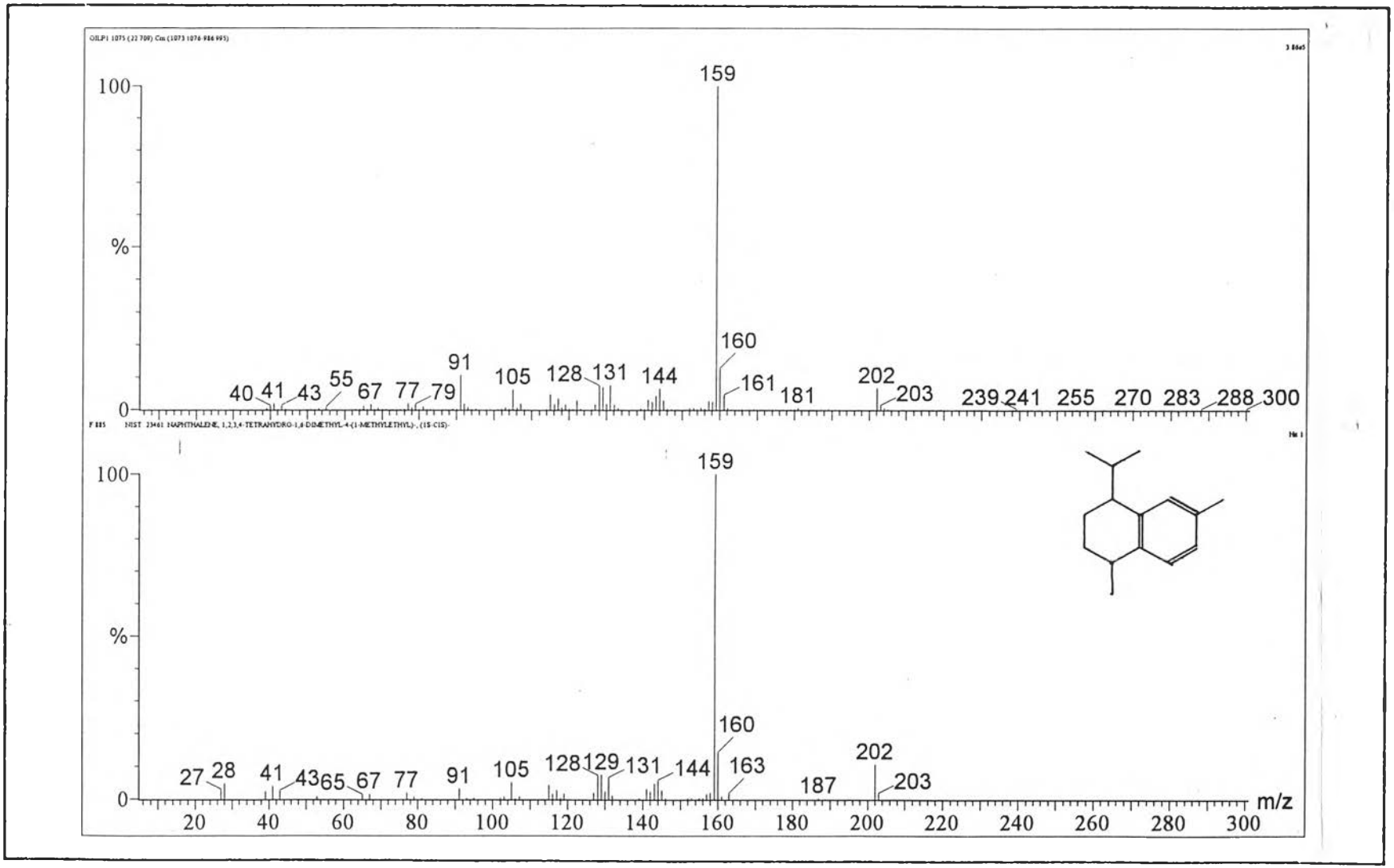

Figure 13 The mass spectrum of PA-1 at retention time 22.71 min.

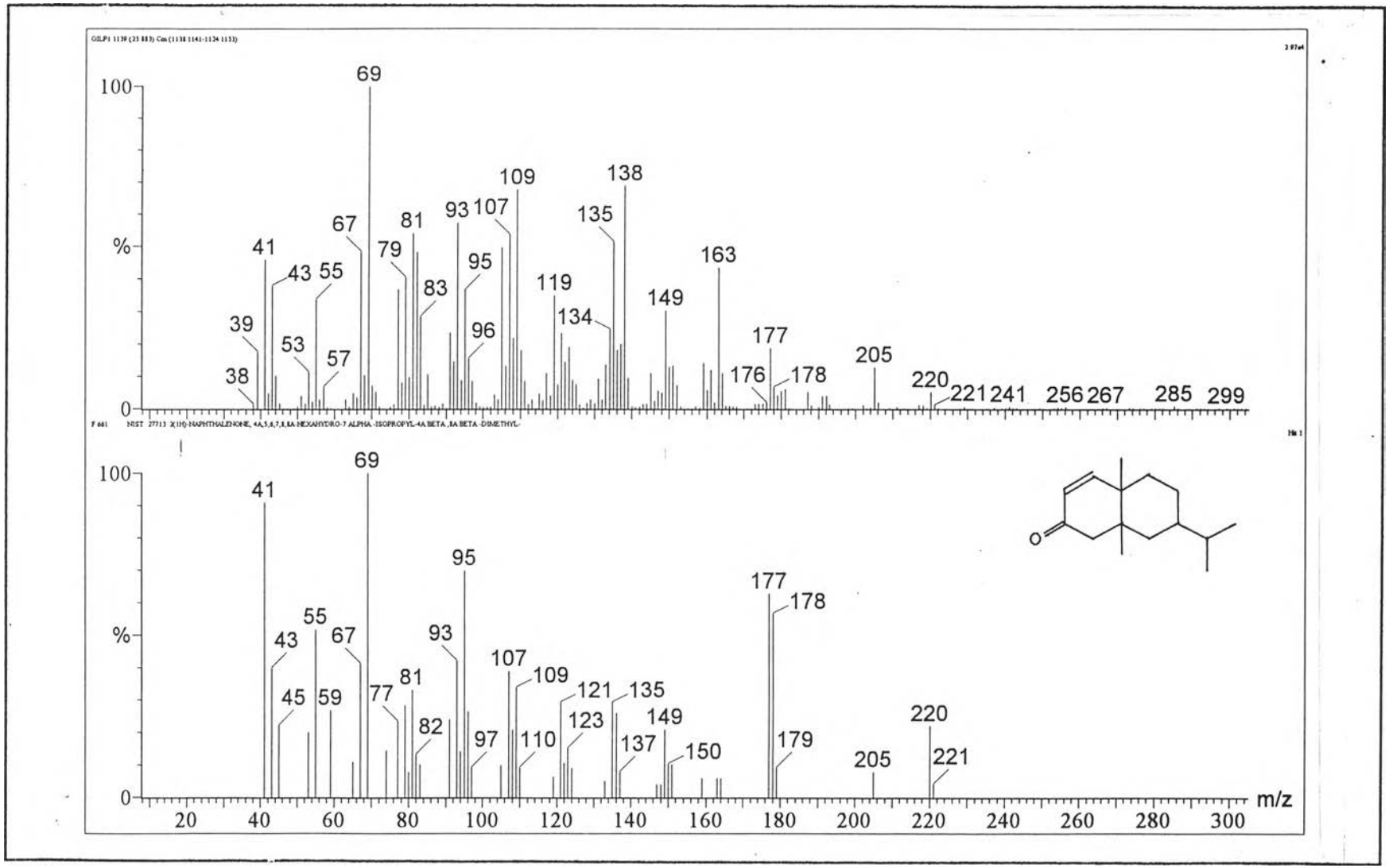

Figure 14 The mass spectrum of PA-1 at retention time 23.88 min.

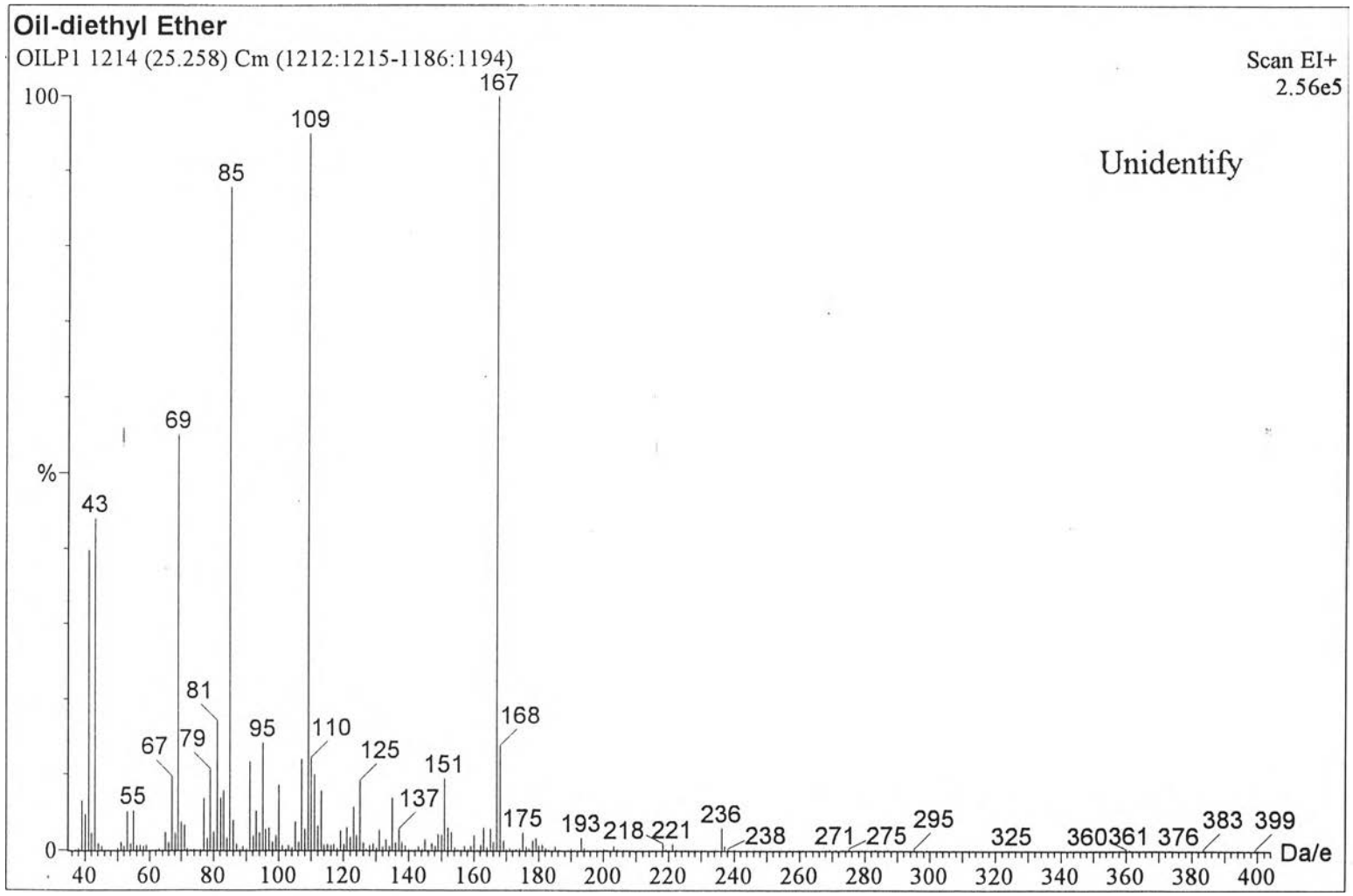

Figure 15 The mass spectrum of PA-1 at retention time 25.26 min.

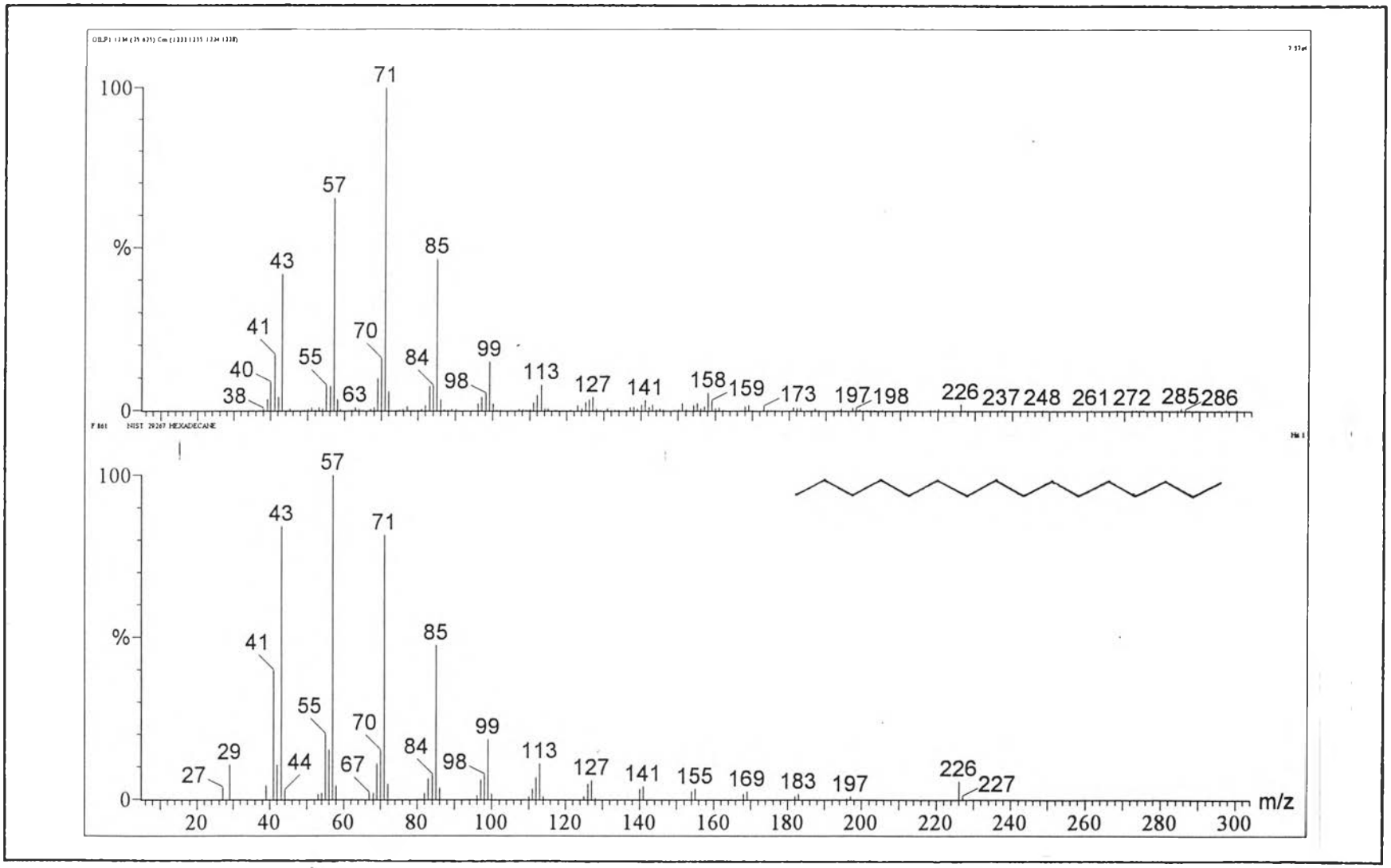

Figure 16 The mass spectrum of PA-1 at retention time 25.63 min.

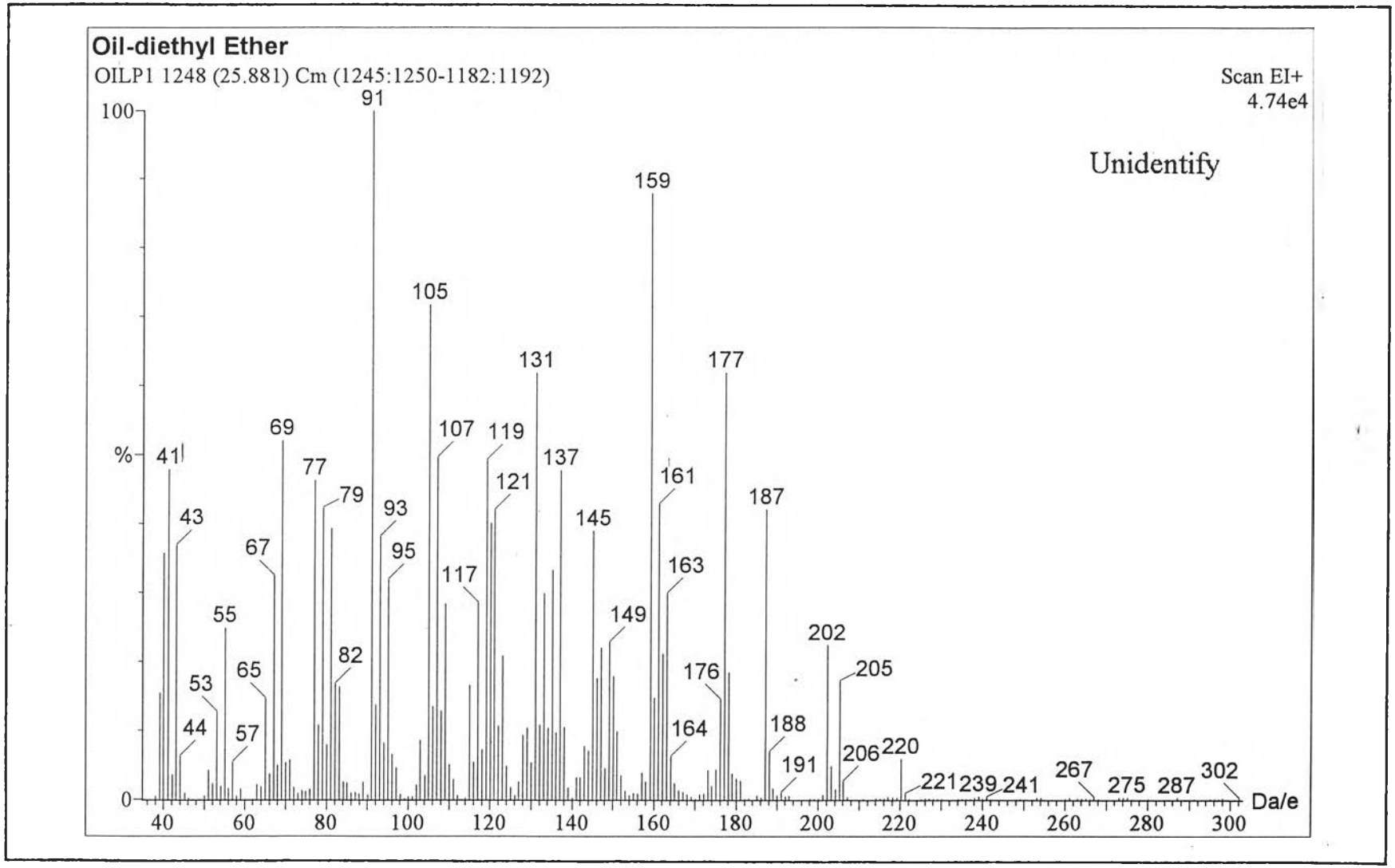

Figure 17 The mass spectrum of PA-1 at retention time 25.88 min.

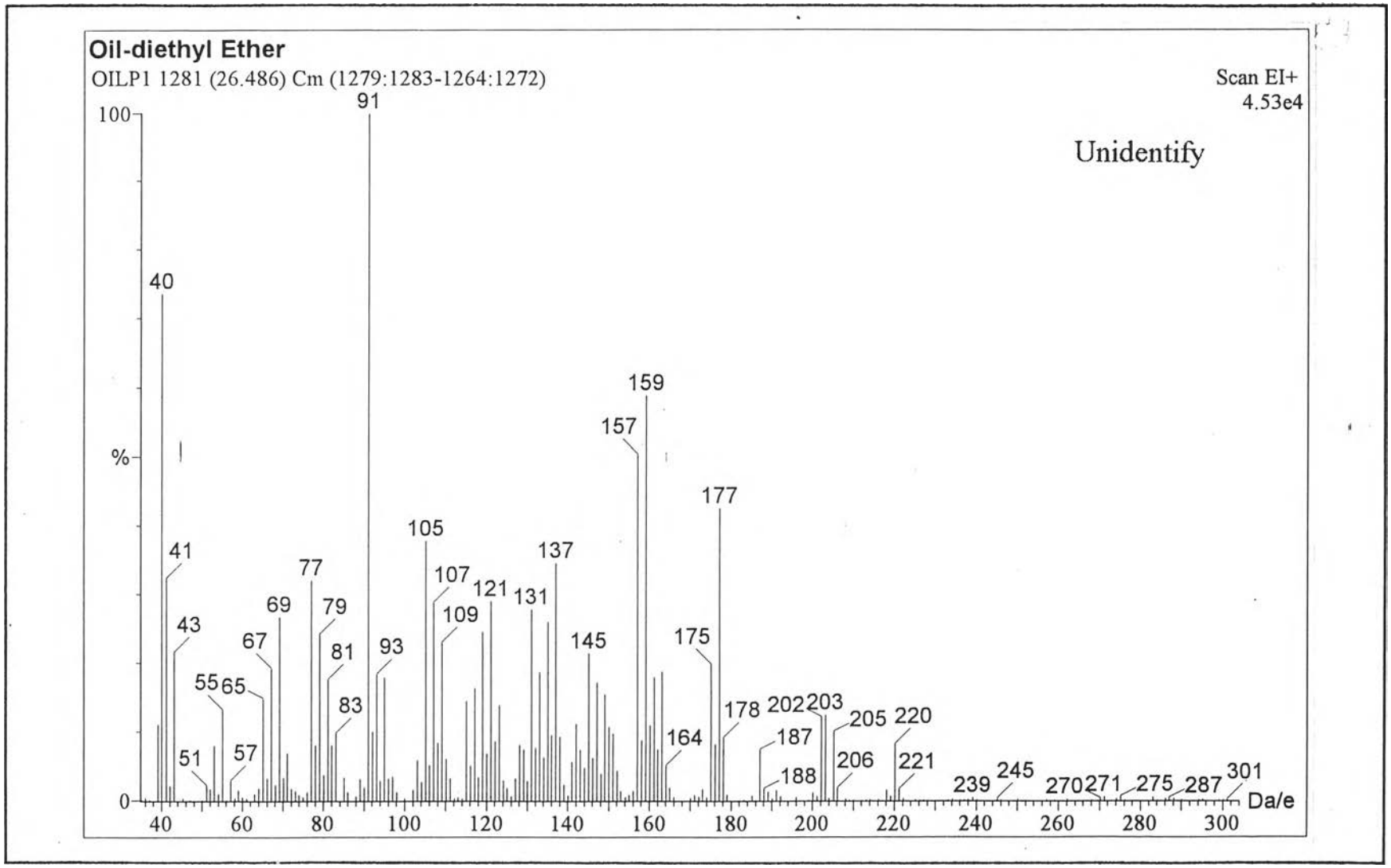

Figure 18 The mass spectrum of PA-1 at retention time 26.49 min.

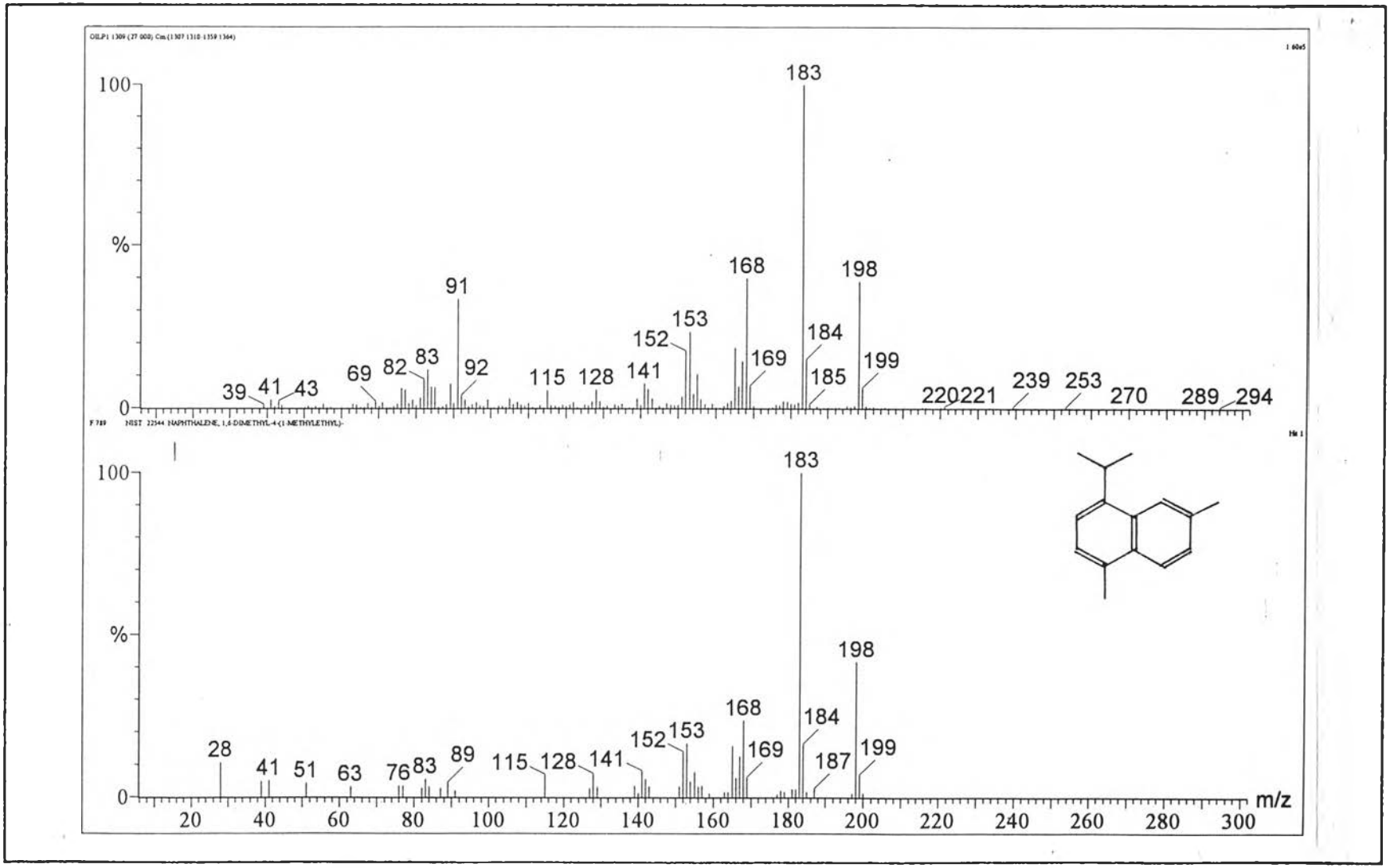

Figure 19 The mass spectrum of PA-1 at retention time 27.00 min.

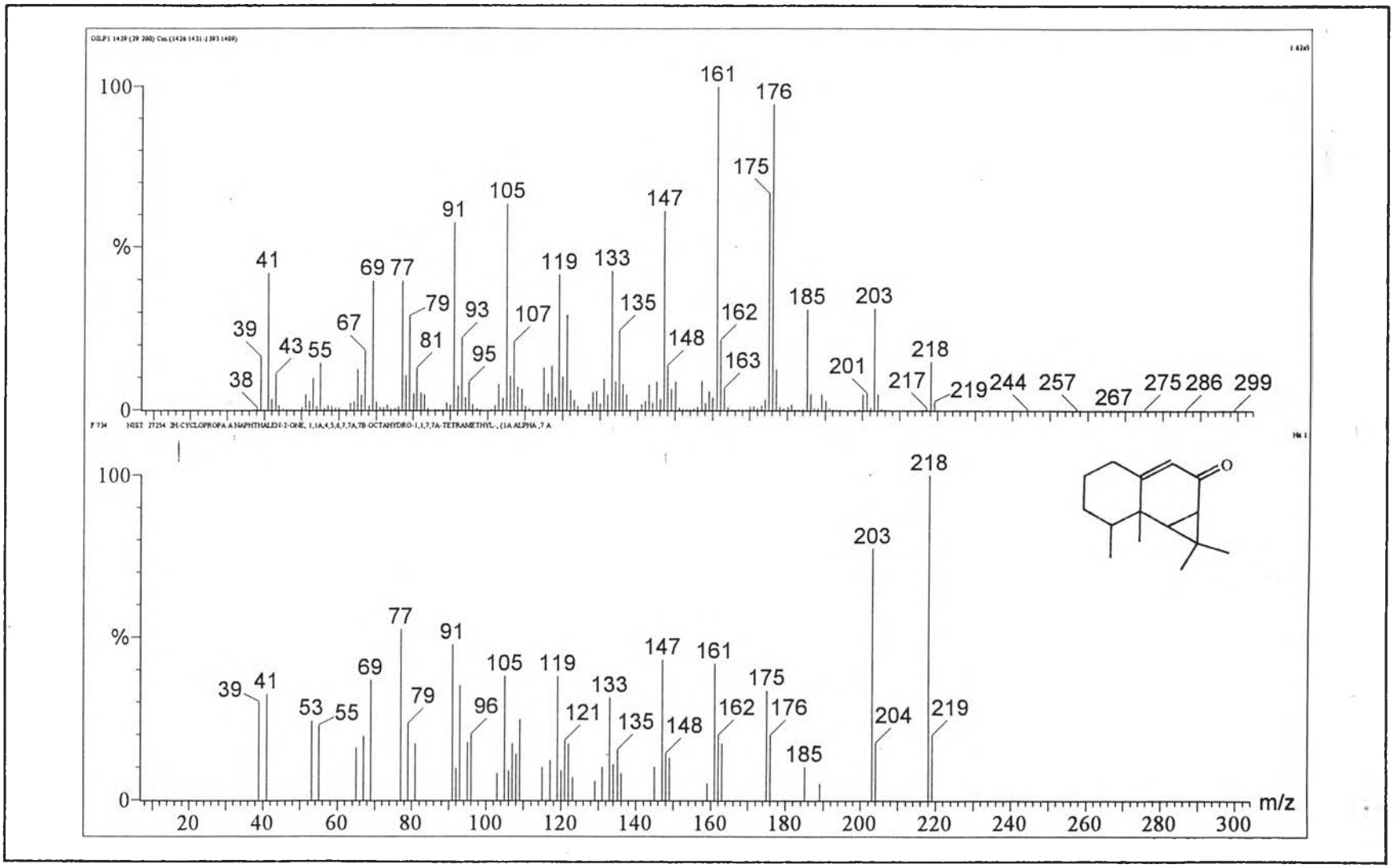

Figure 20 The mass spectrum of PA-1 at retention time 29.20 min.

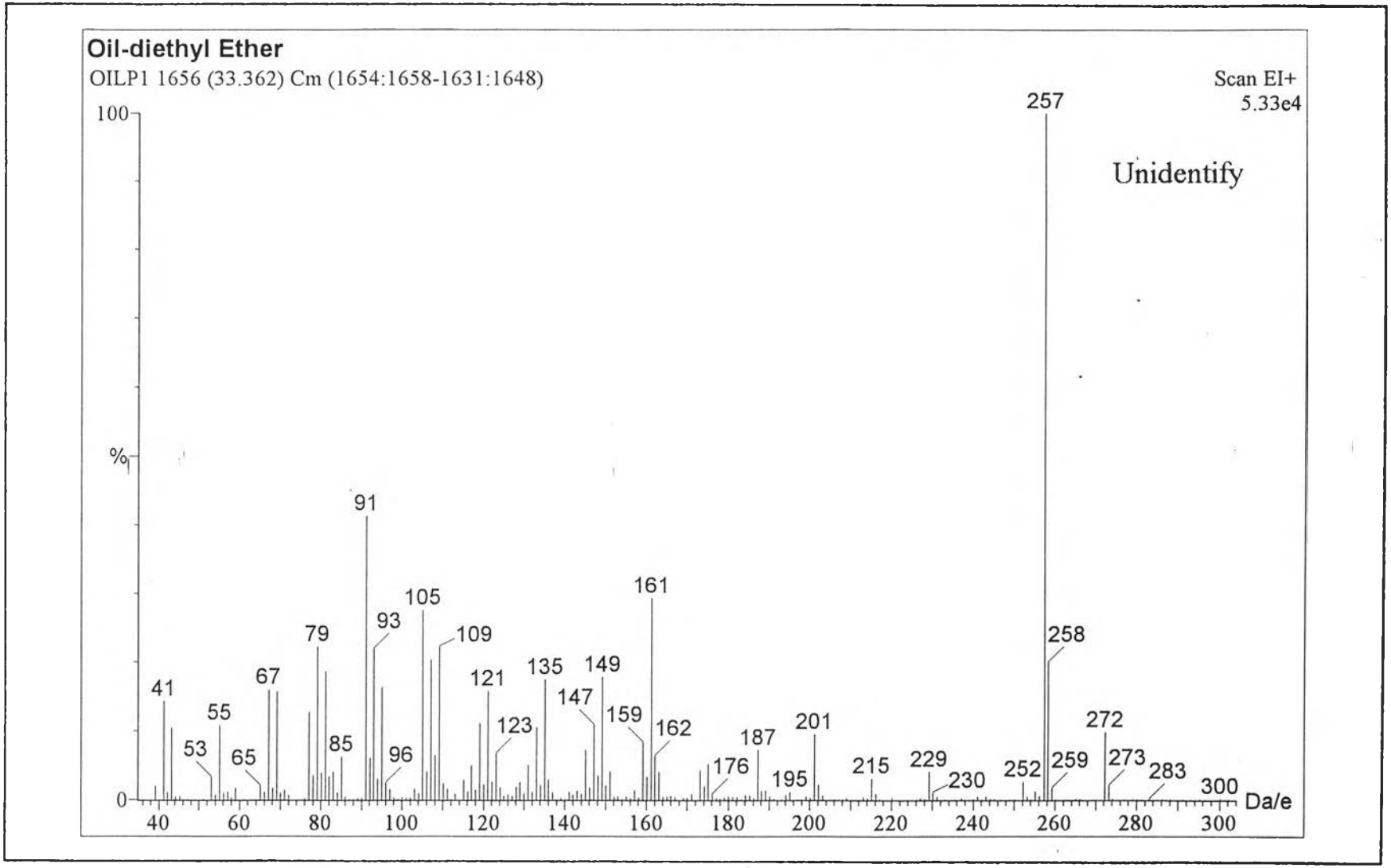

Figure 21 The mass spectrum of PA-1 at retention time 33.36 min.

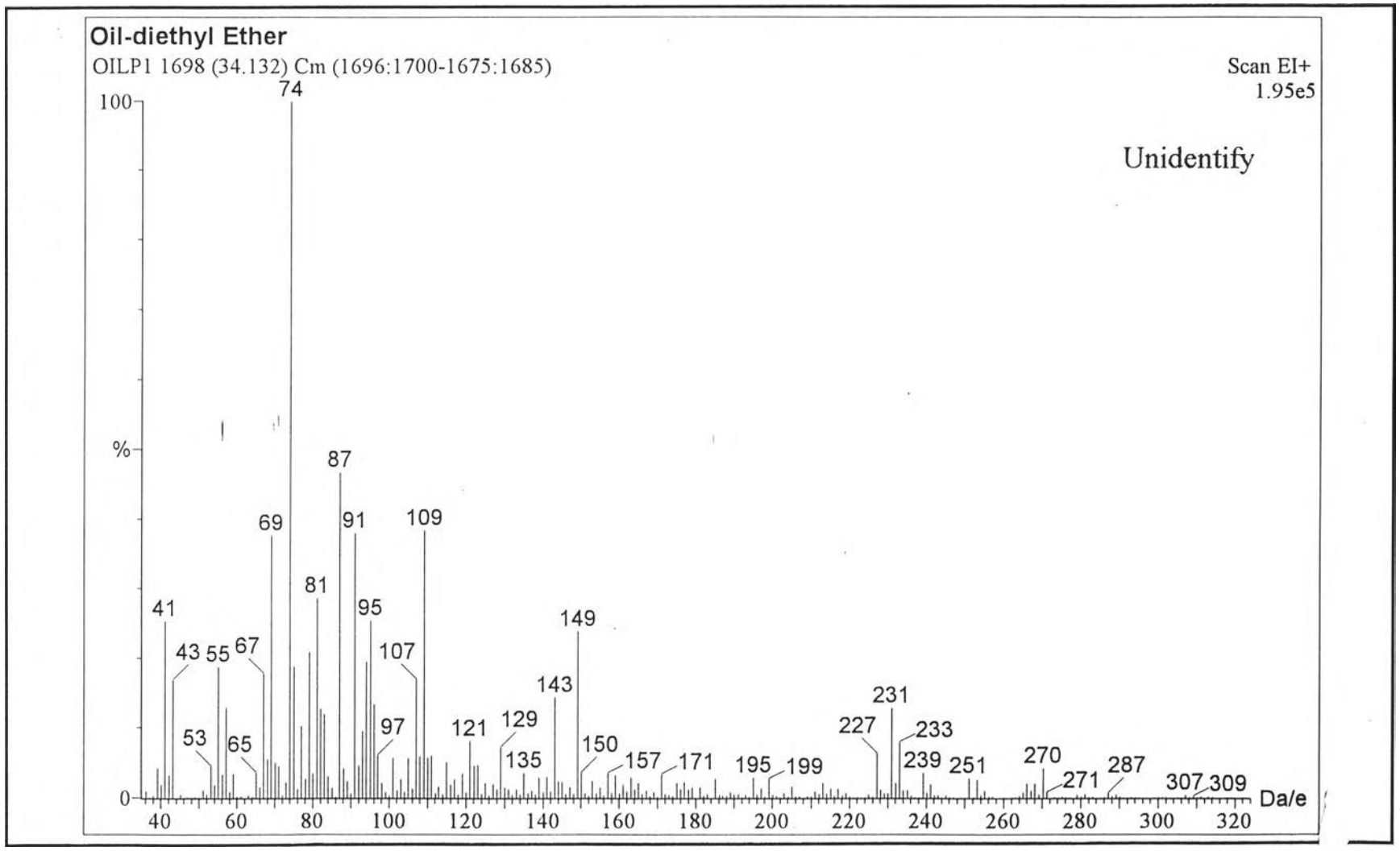

Figure 22 The mass spectrum of PA-1 at retention time 34.13 min.

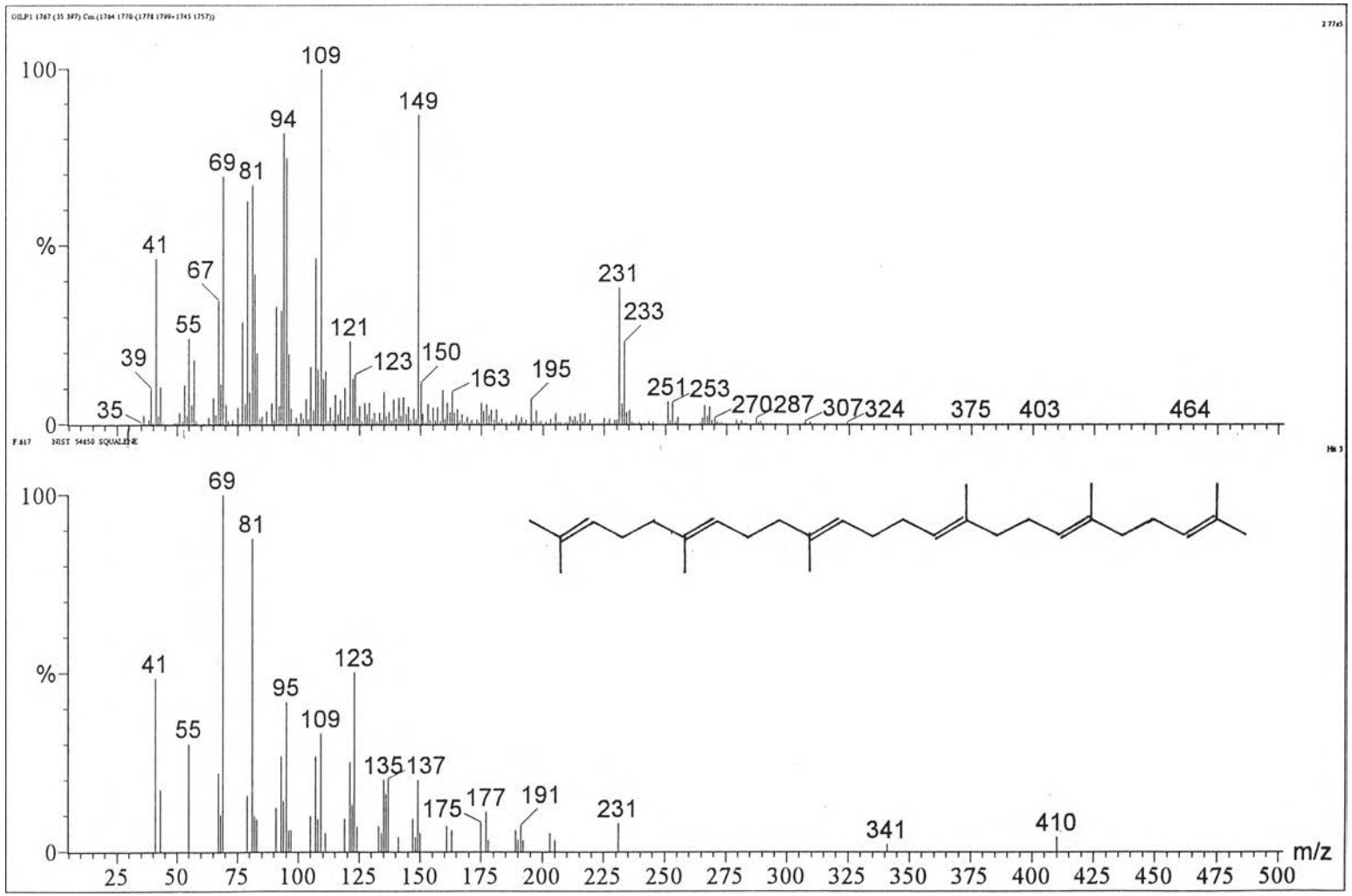

Figure 23 The mass spectrum of PA-1 at retention time 35.40 min.

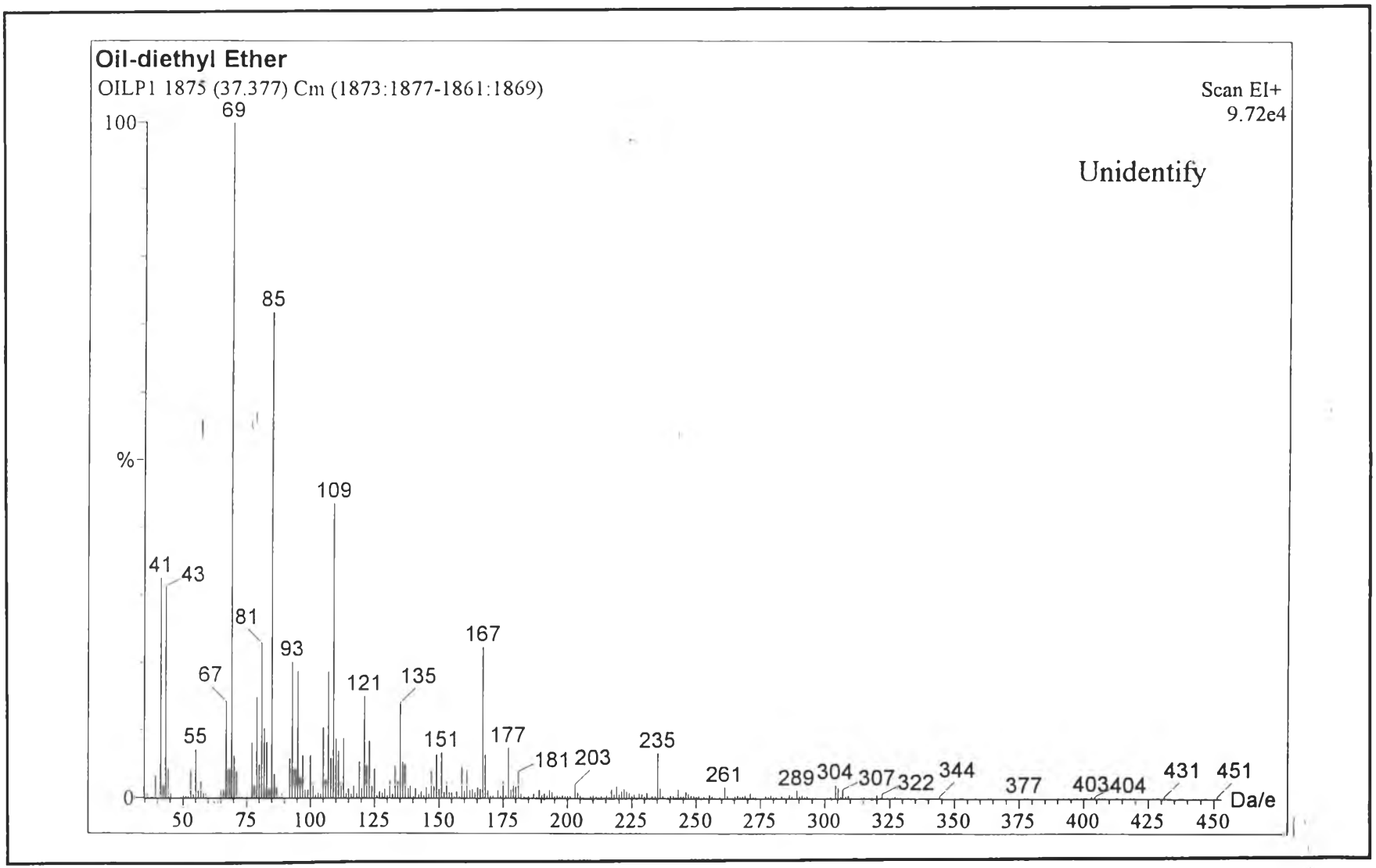

Figure 24 The mass spectrum of PA-1 at retention time 37.38 min.

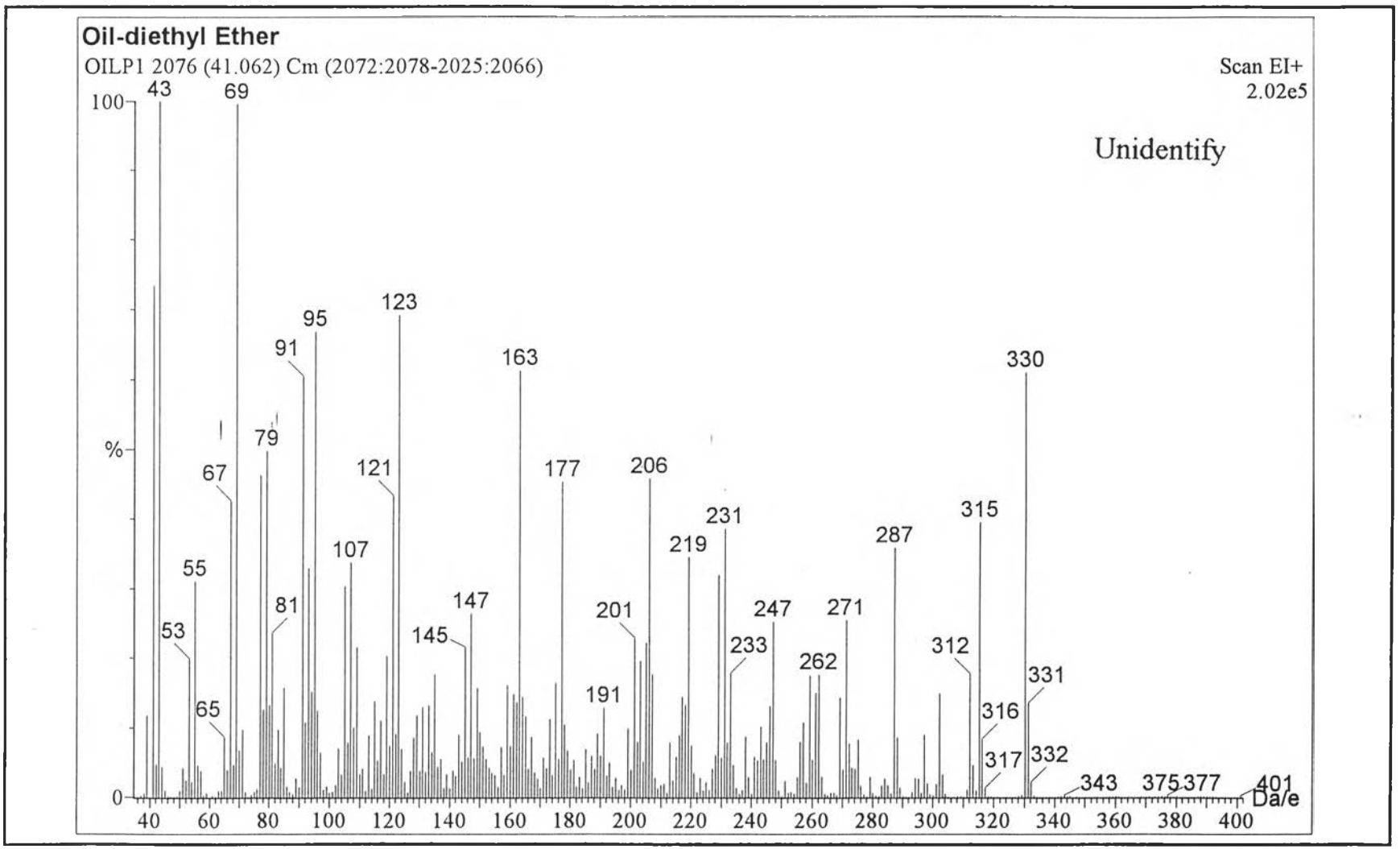

Figure 25 The mass spectrum of PA-1 at retention time 41.06 min.

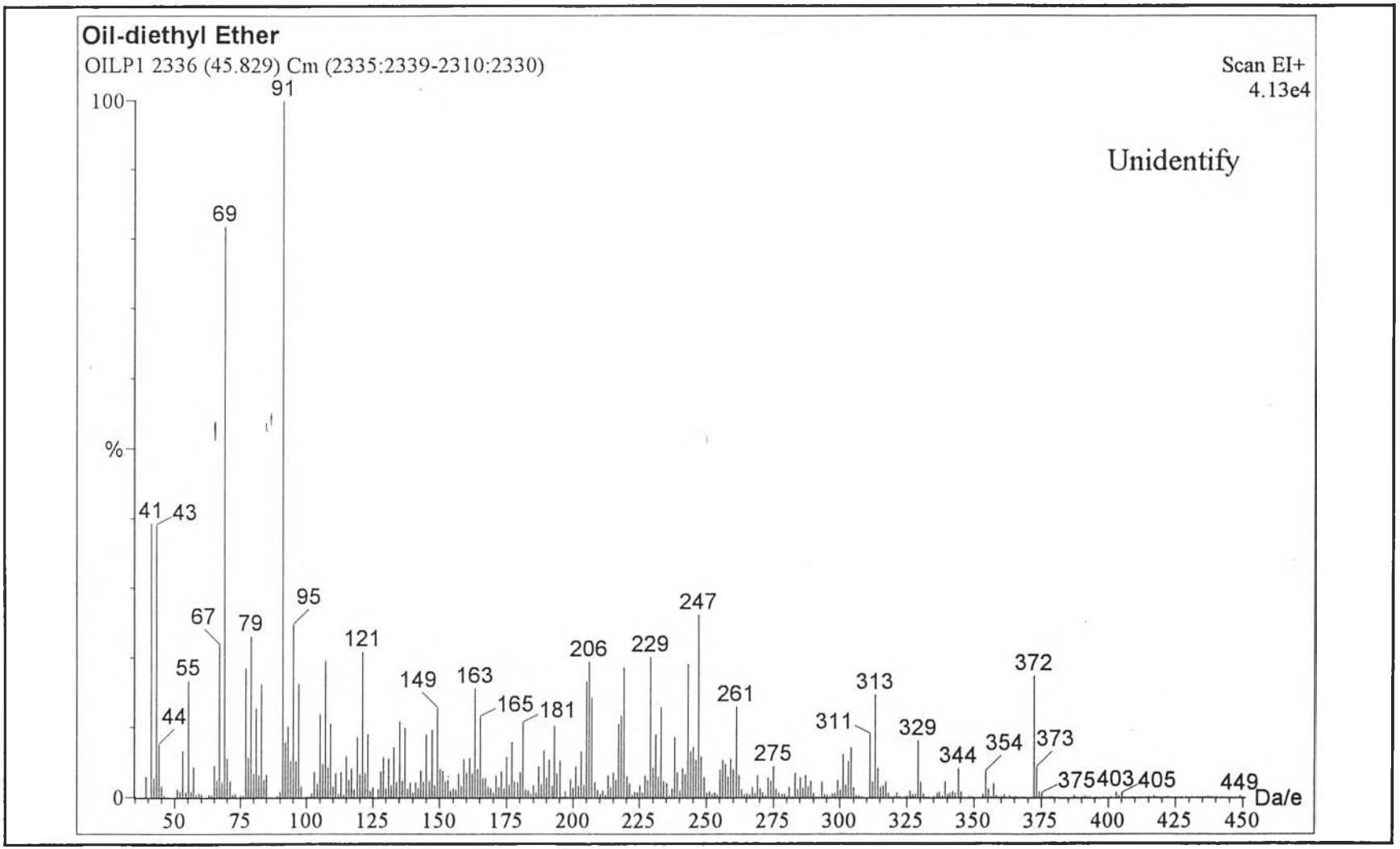

Figure 26 The mass spectrum of PA-1 at retention time 45.83 min.

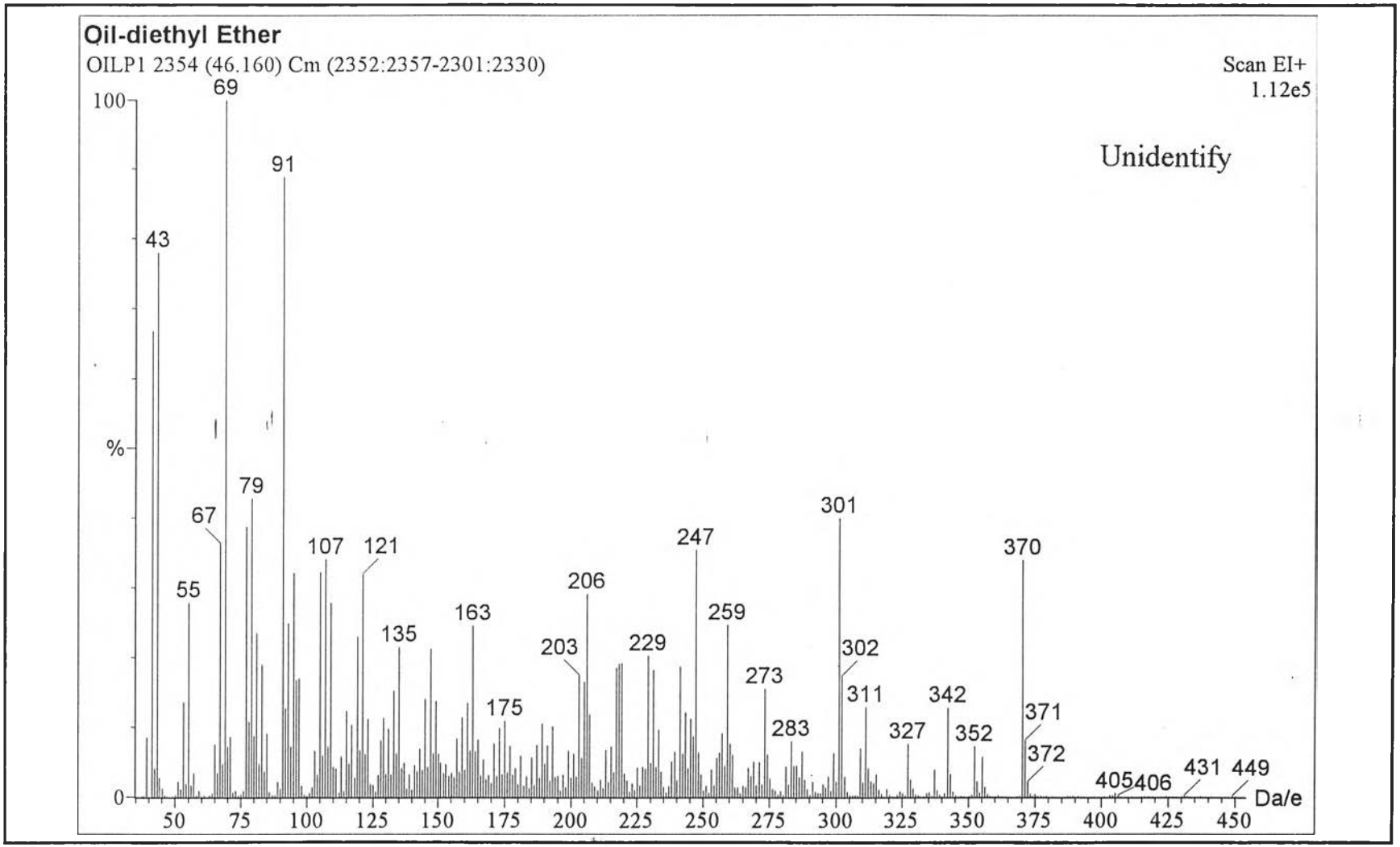

Figure 27 The mass spectrum of PA-1 at retention time 46.16 min.

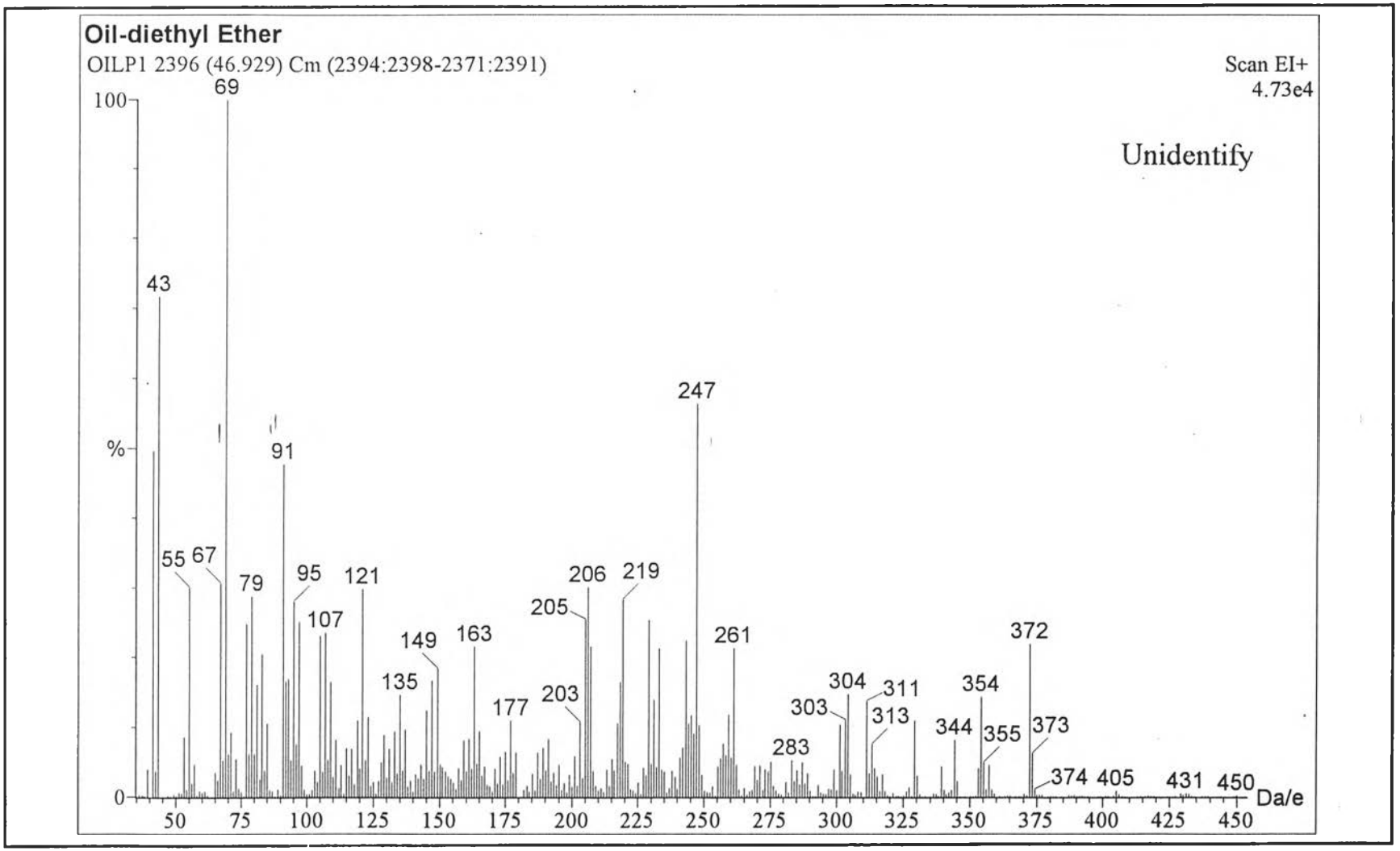

Figure 28 The mass spectrum of PA-1 at retention time 46.93 min.

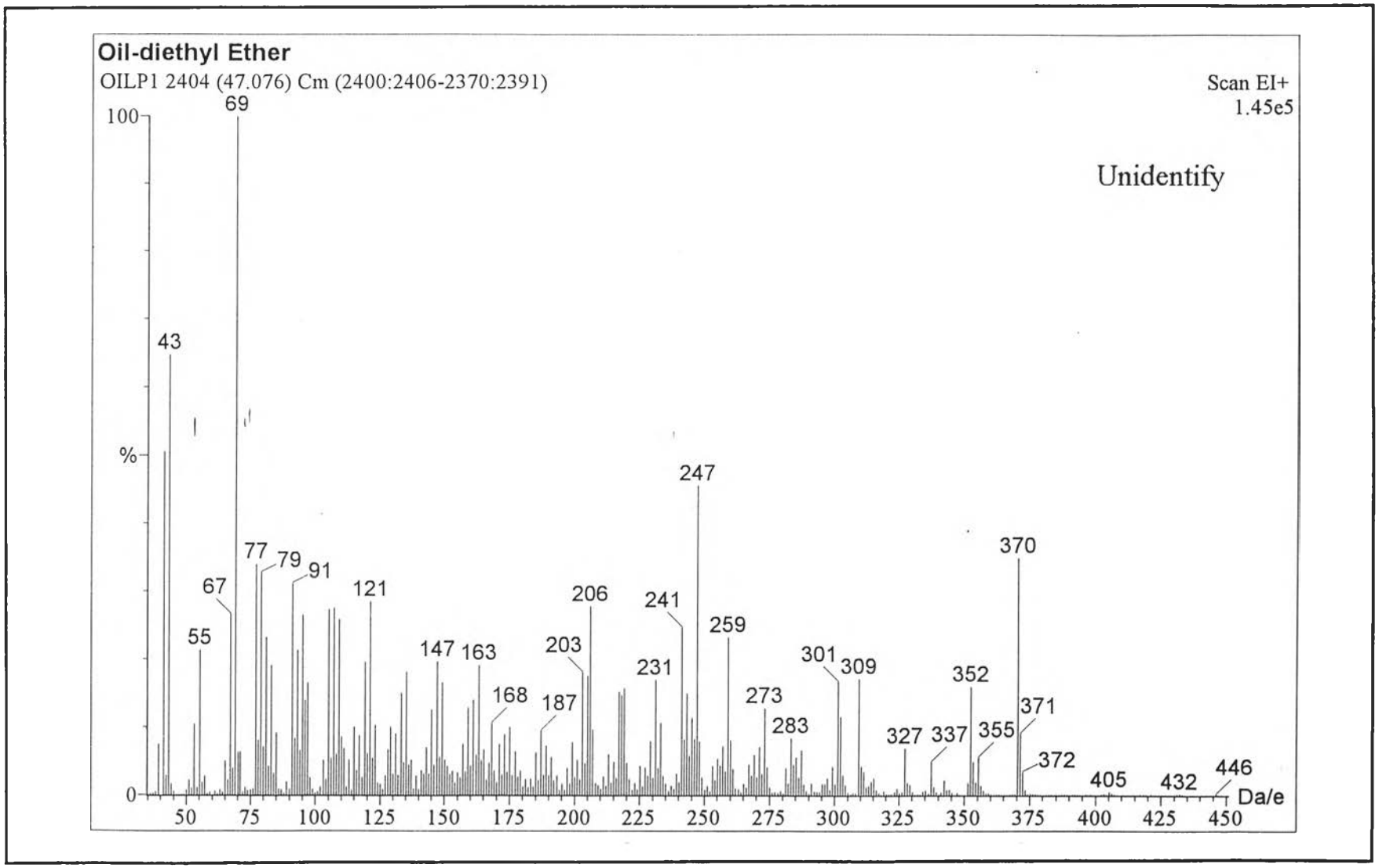

Figure 29 The mass spectrum of PA-1 at retention time 47.08 min.

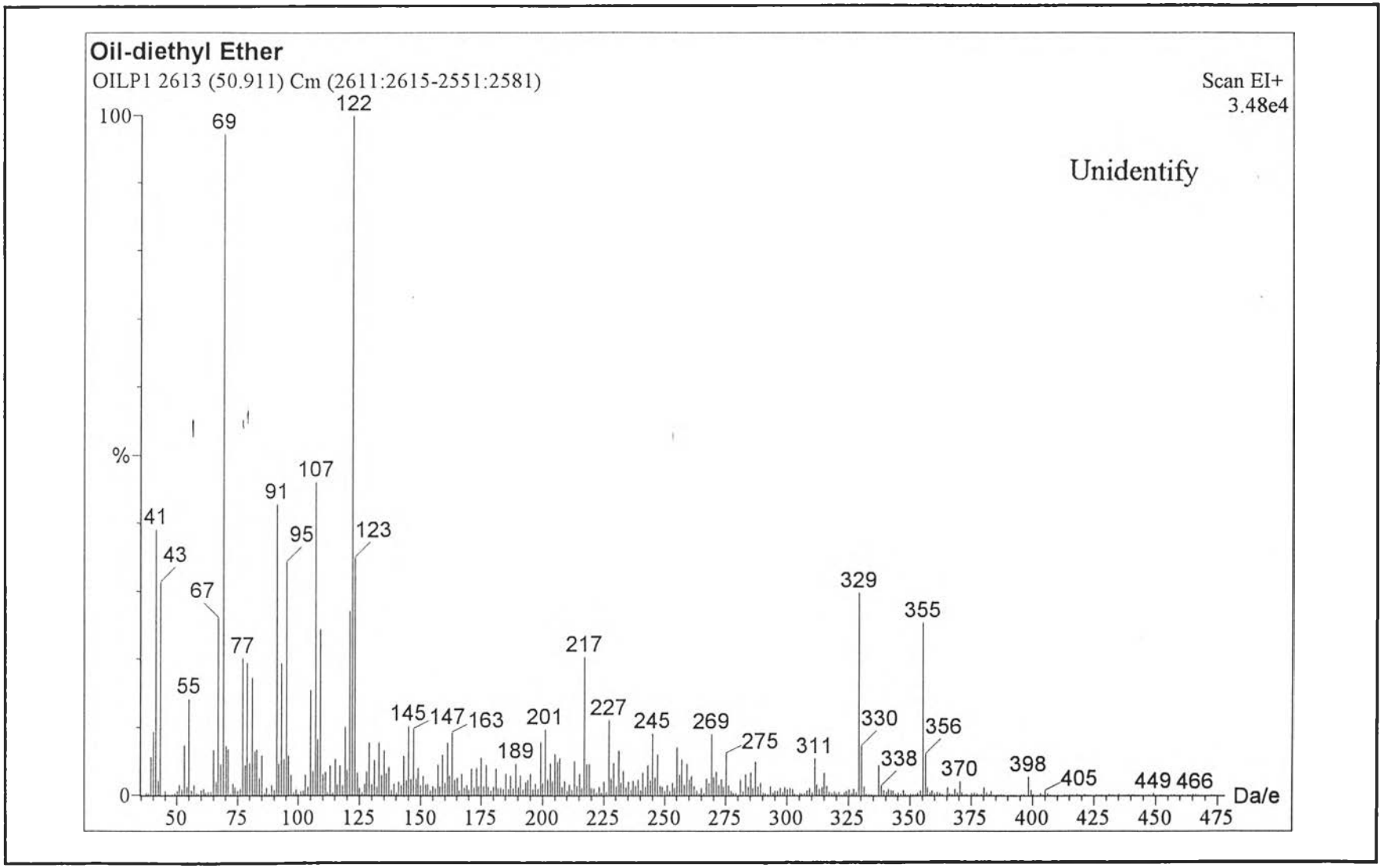

Figure 30 The mass spectrum of PA-1 at retention time 50.91 min.

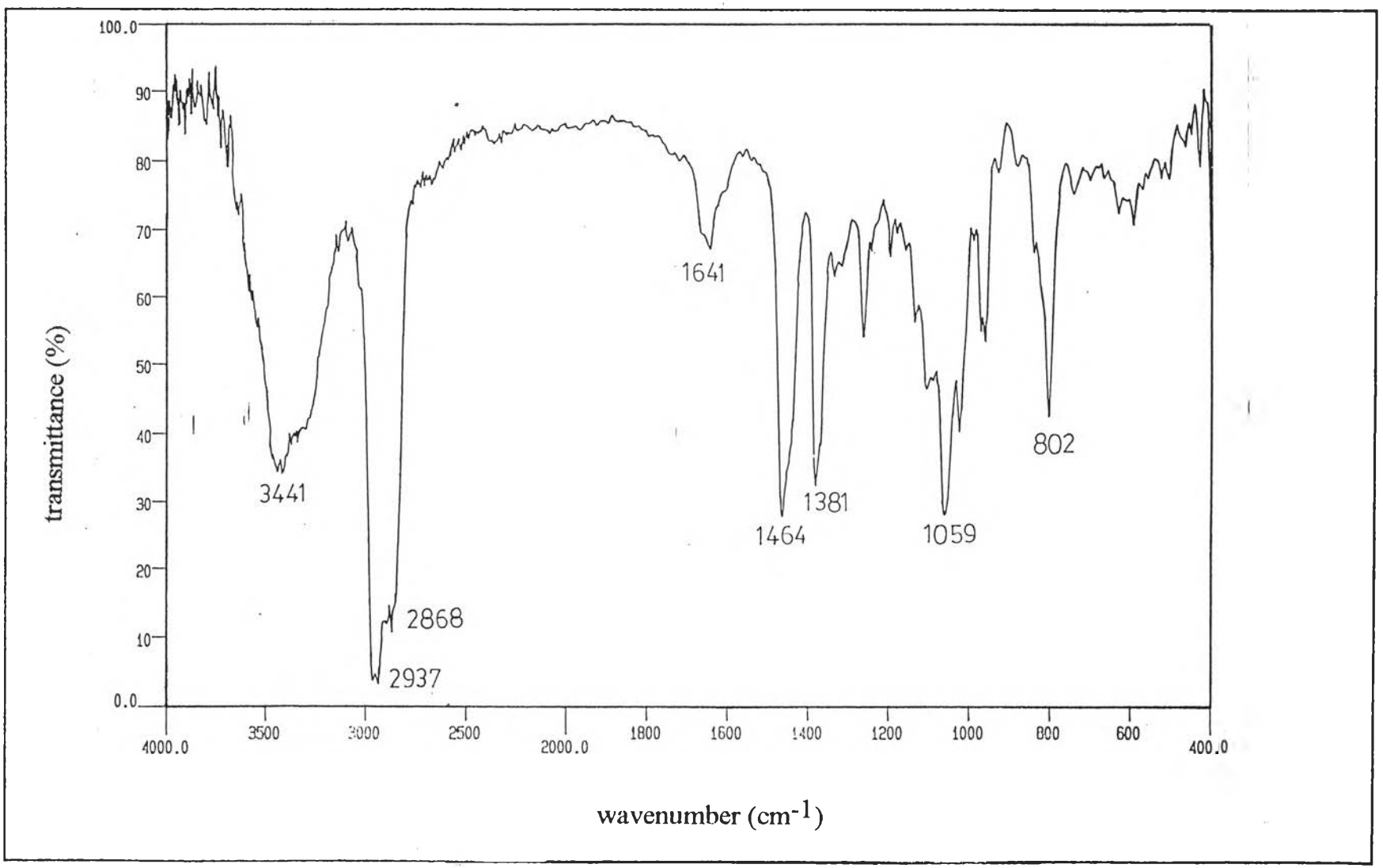

Figure 31 The IR spectrum of PA-2

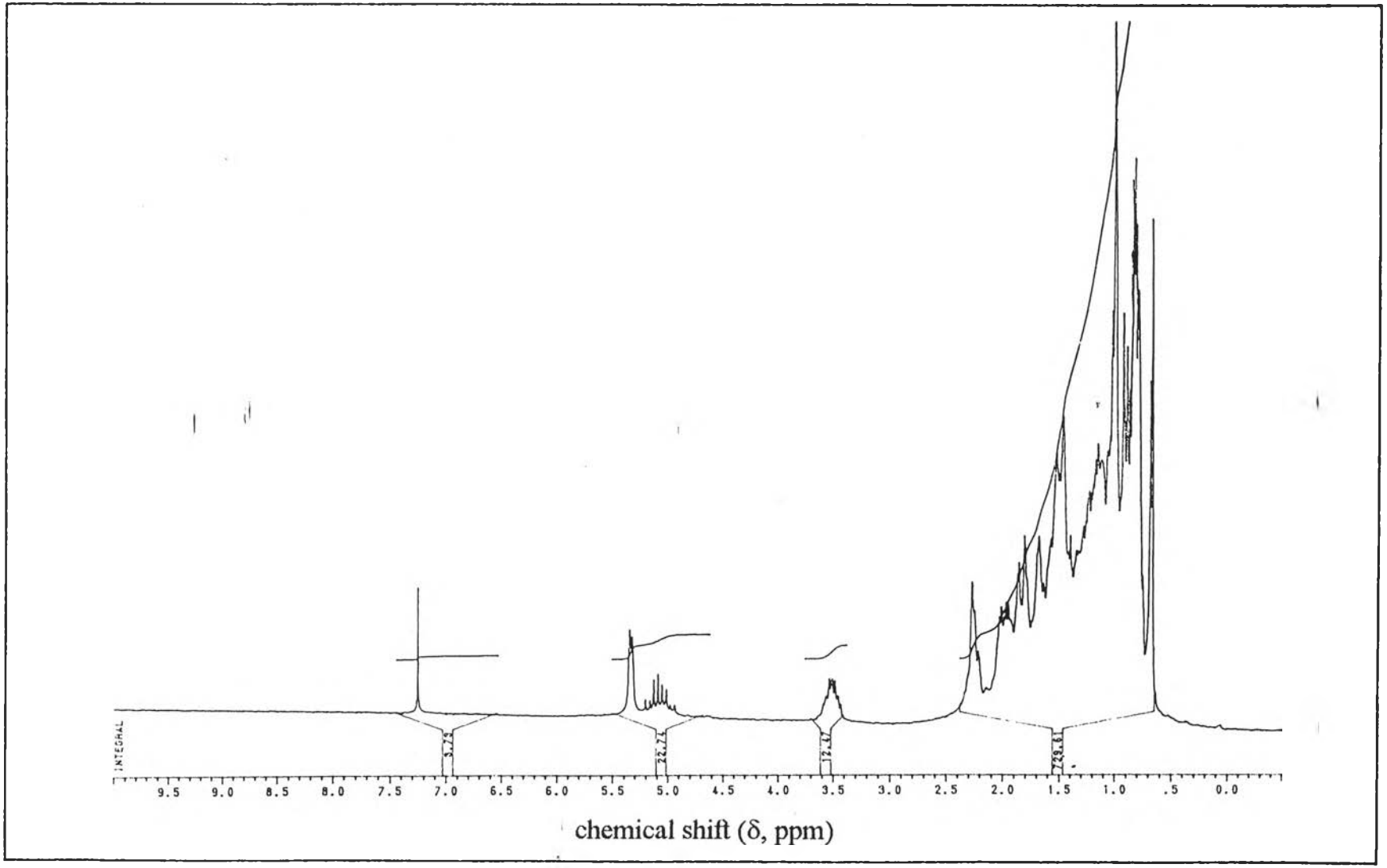

Figure 32 The ^{1}H NMR spectrum of PA-2

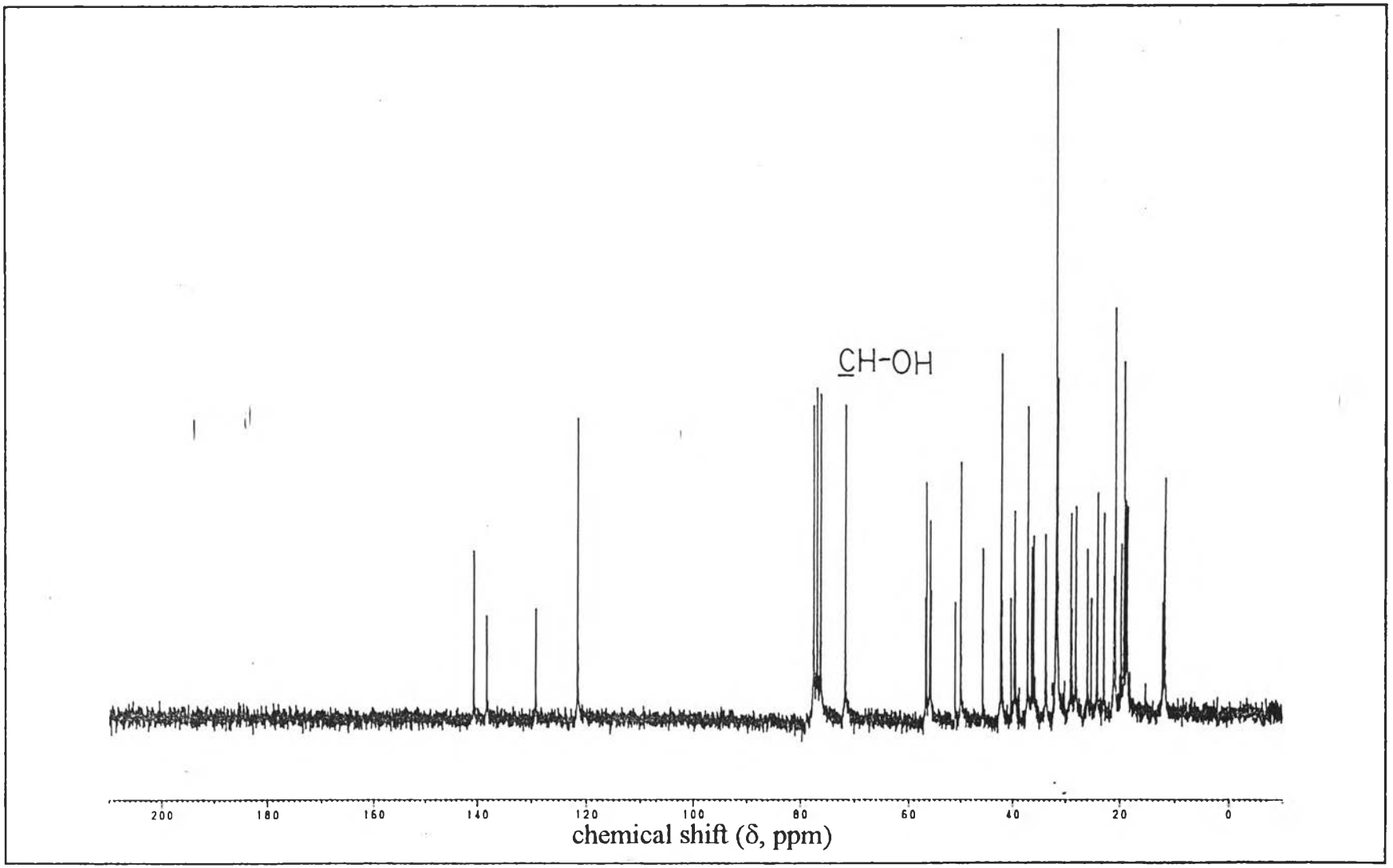

Figure 33 The ^{13}C NMR spectrum of PA-2

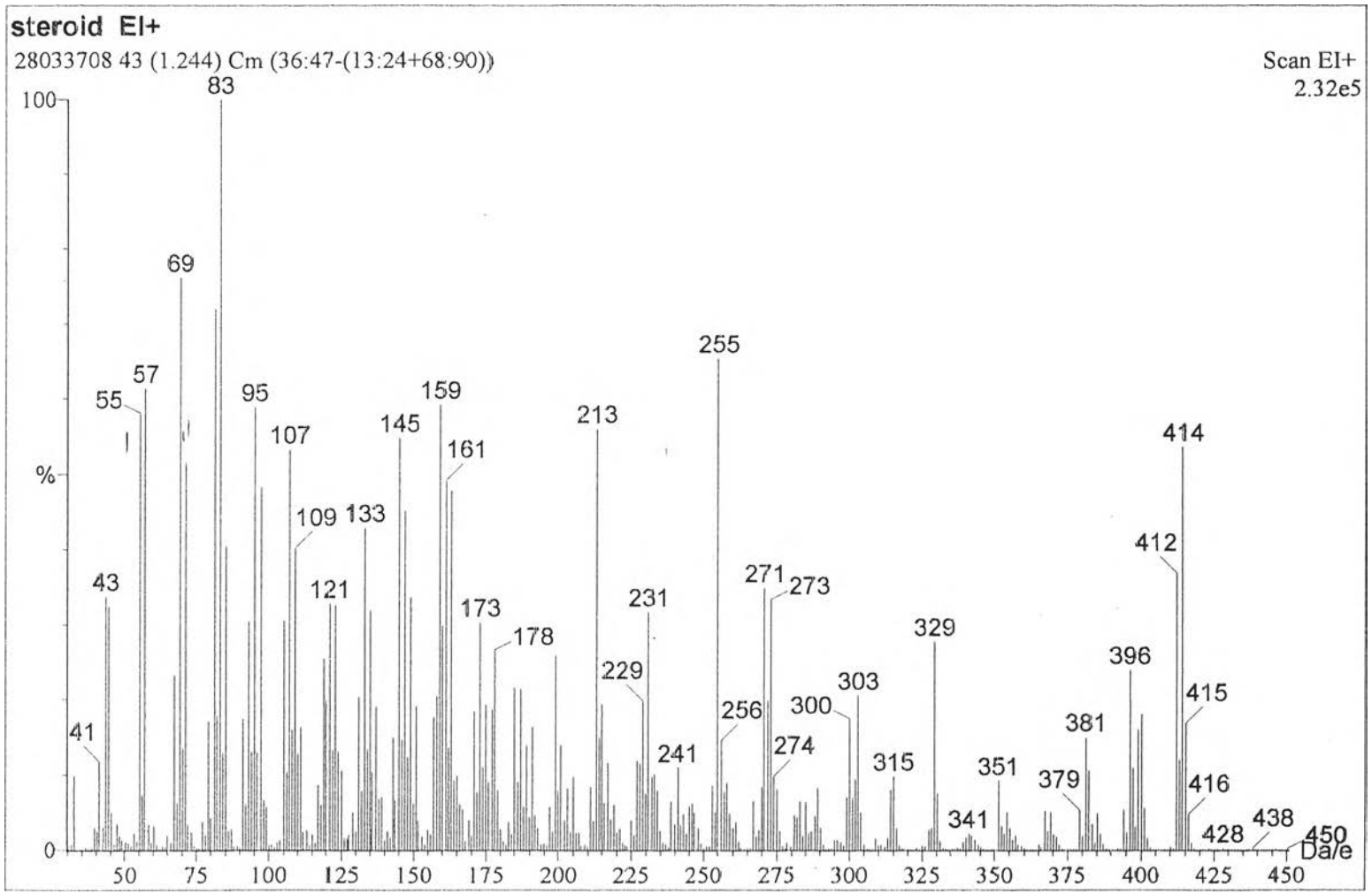

Figure 34 The EI mass spectrum of PA-2

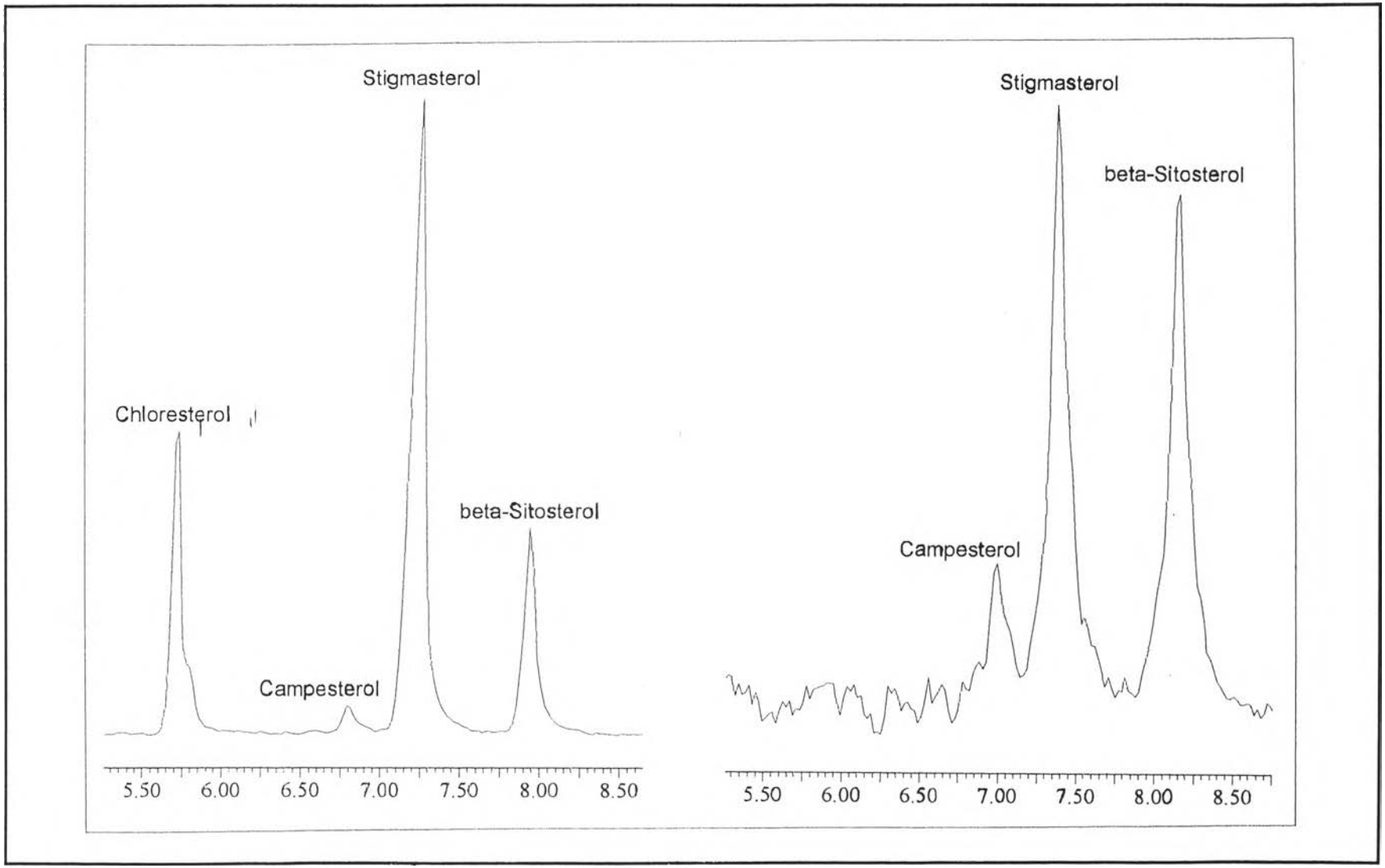

Figure 35 The GC-MS chromatogram of PA-2

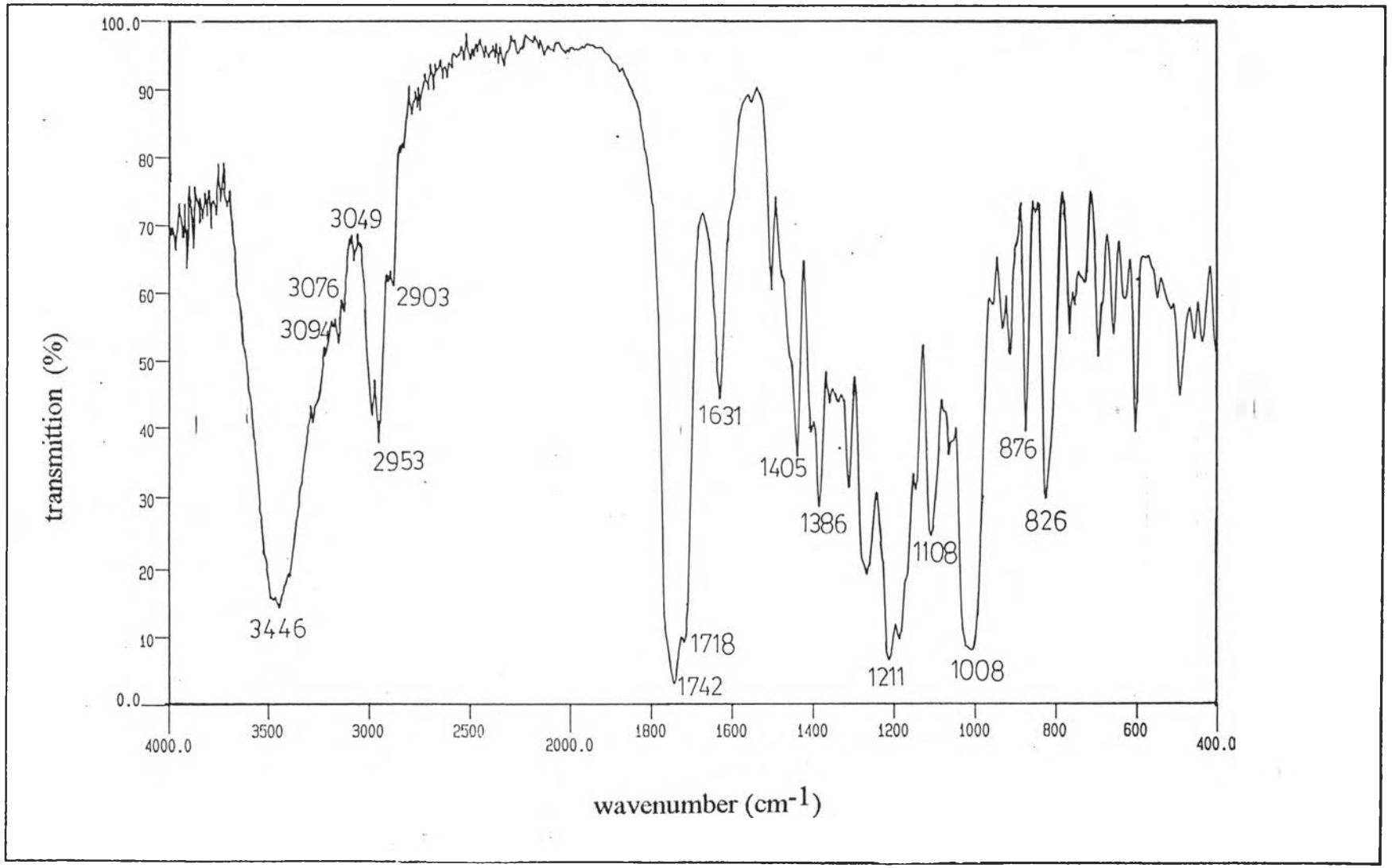

Figure 36 The IR spectrum of PA-3

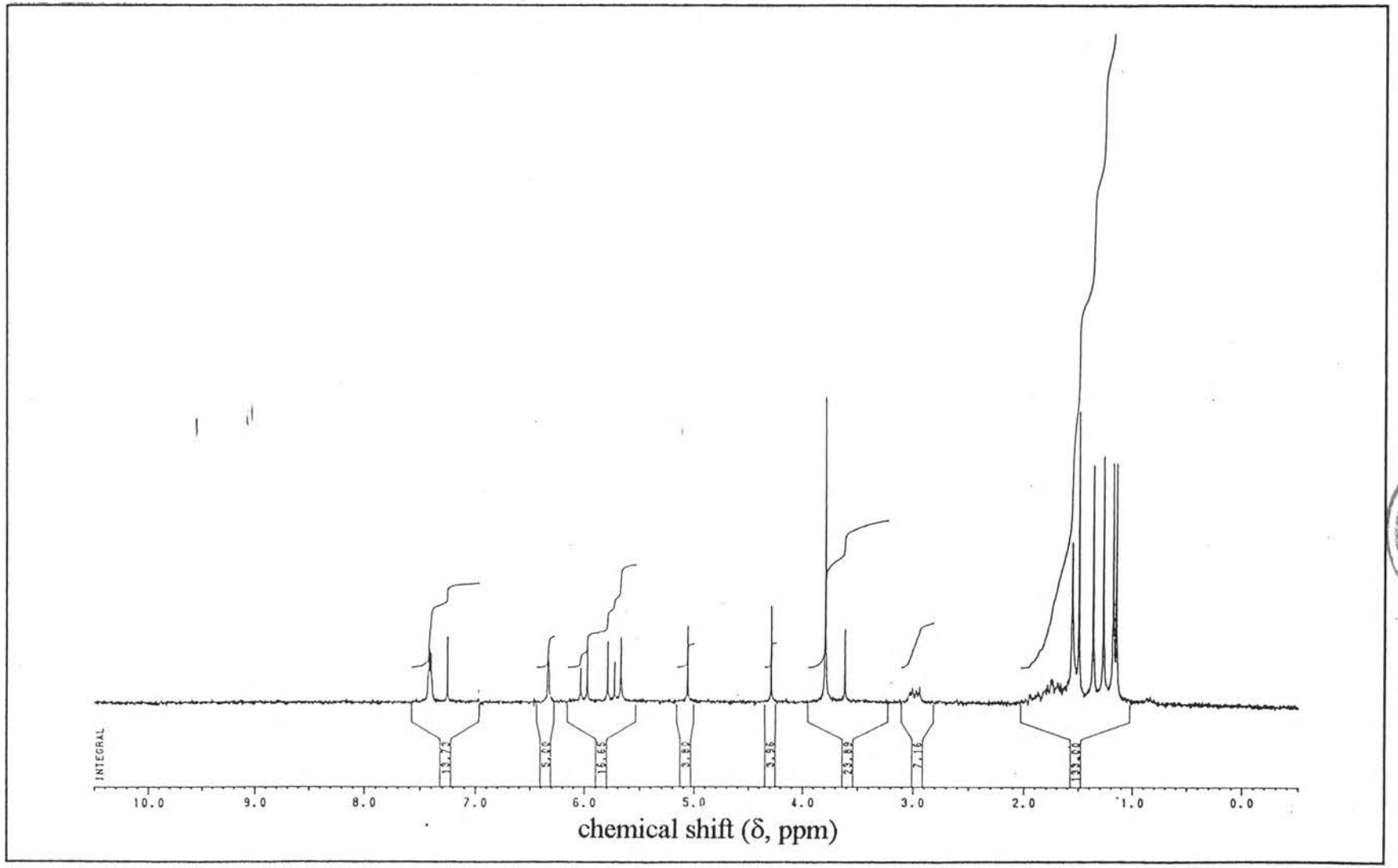

Figure 37 The ^{1}H NMR spectrum of PA-3

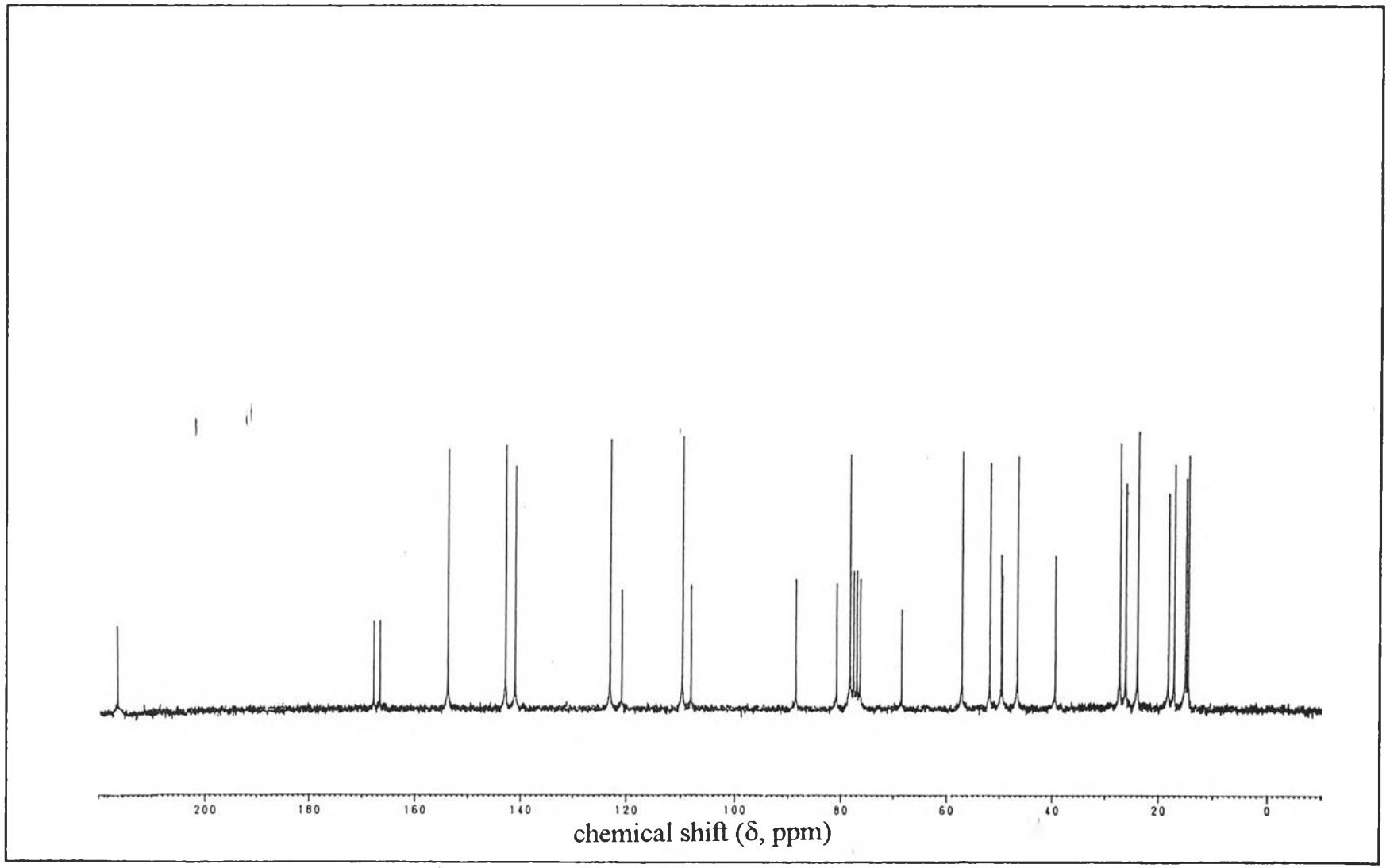

Figure 38 The ^{13}C NMR spectrum of PA-3

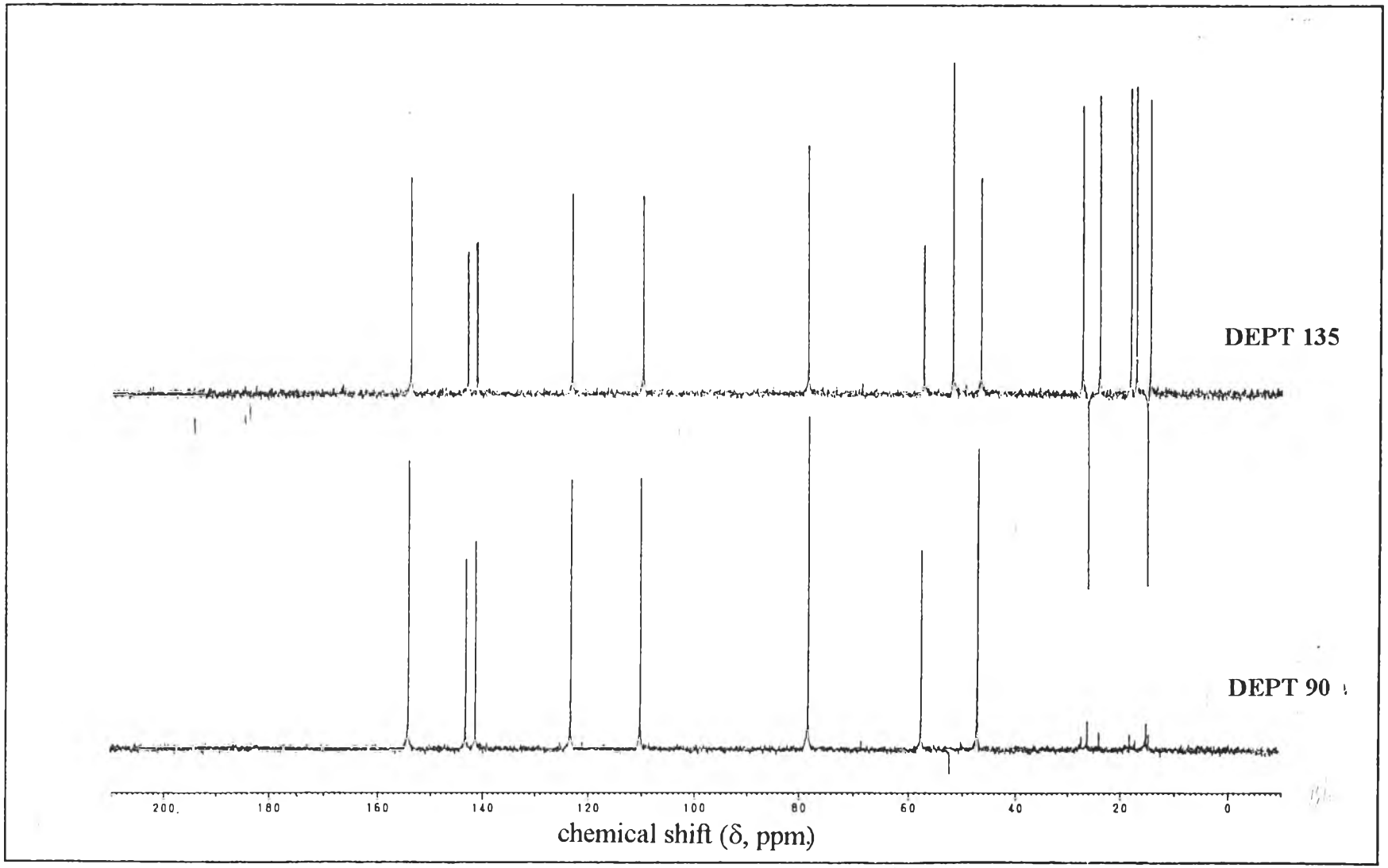

Figure 39 The DEPT-90 and DEPT-135 ^{13}C NMR spectrum of PA-3

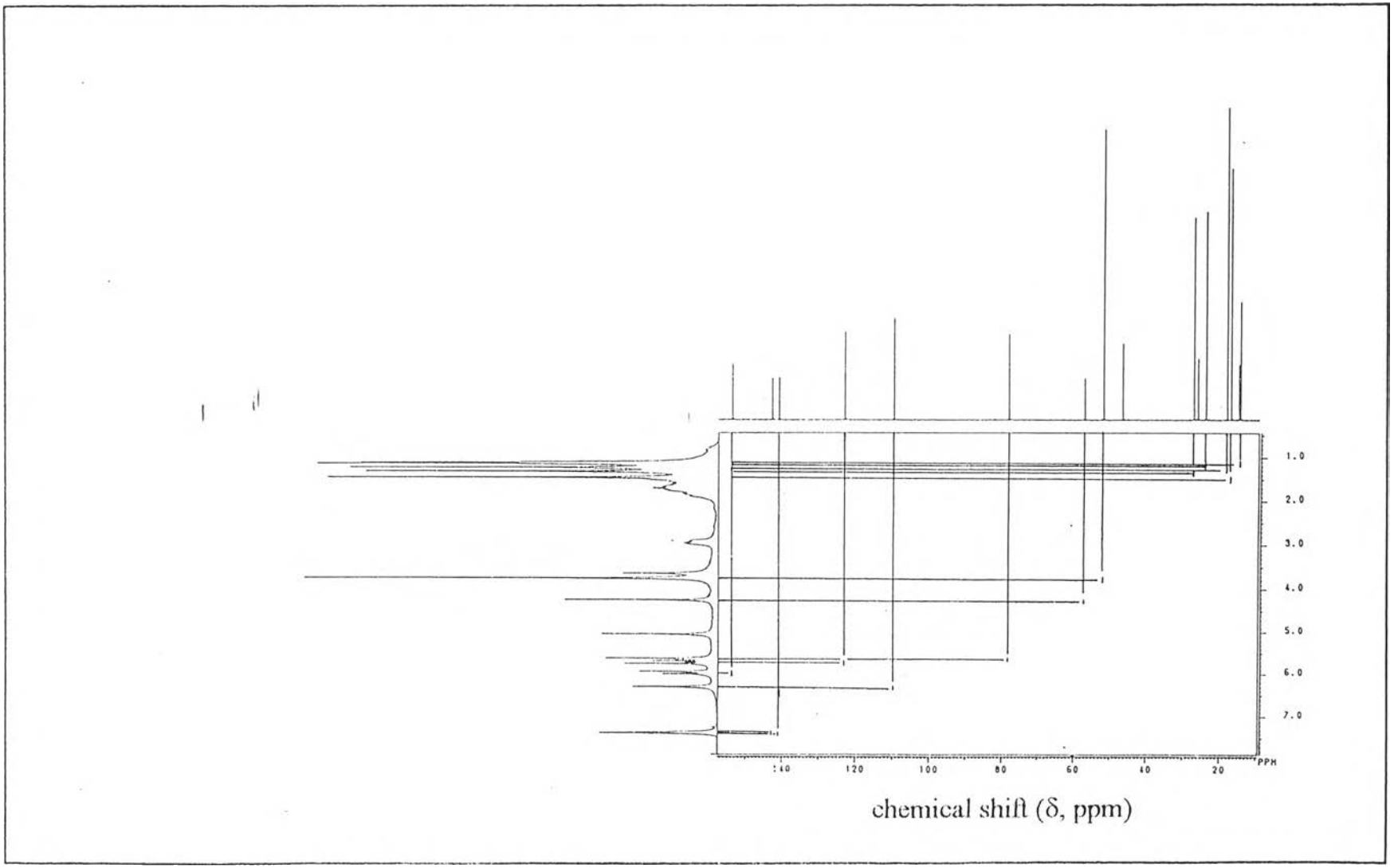

Figure 40 The ^{13}C-^{1}H correlation of PA-3

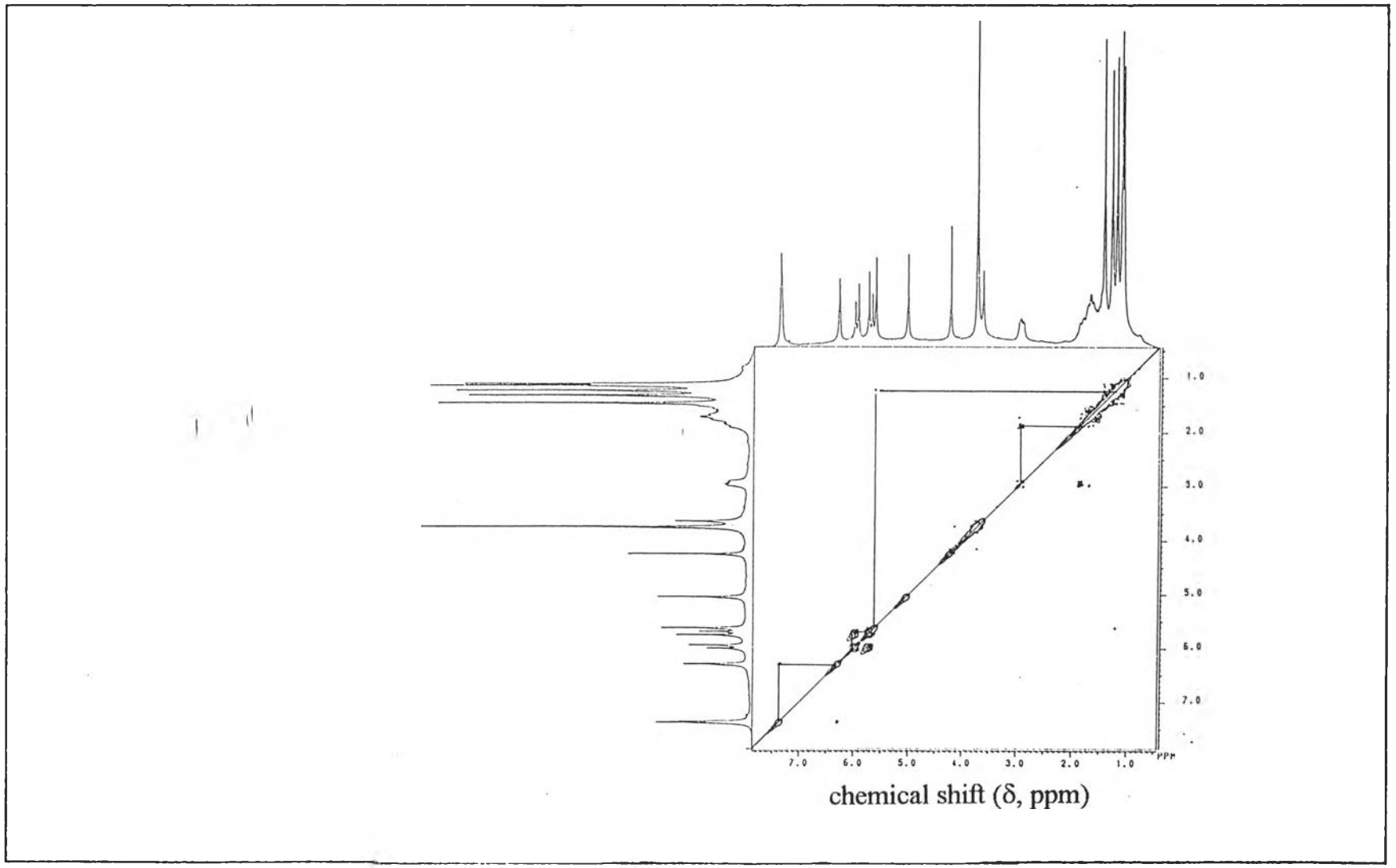

Figure 41 The ^{1}H-^{1}H COSY of PA-3

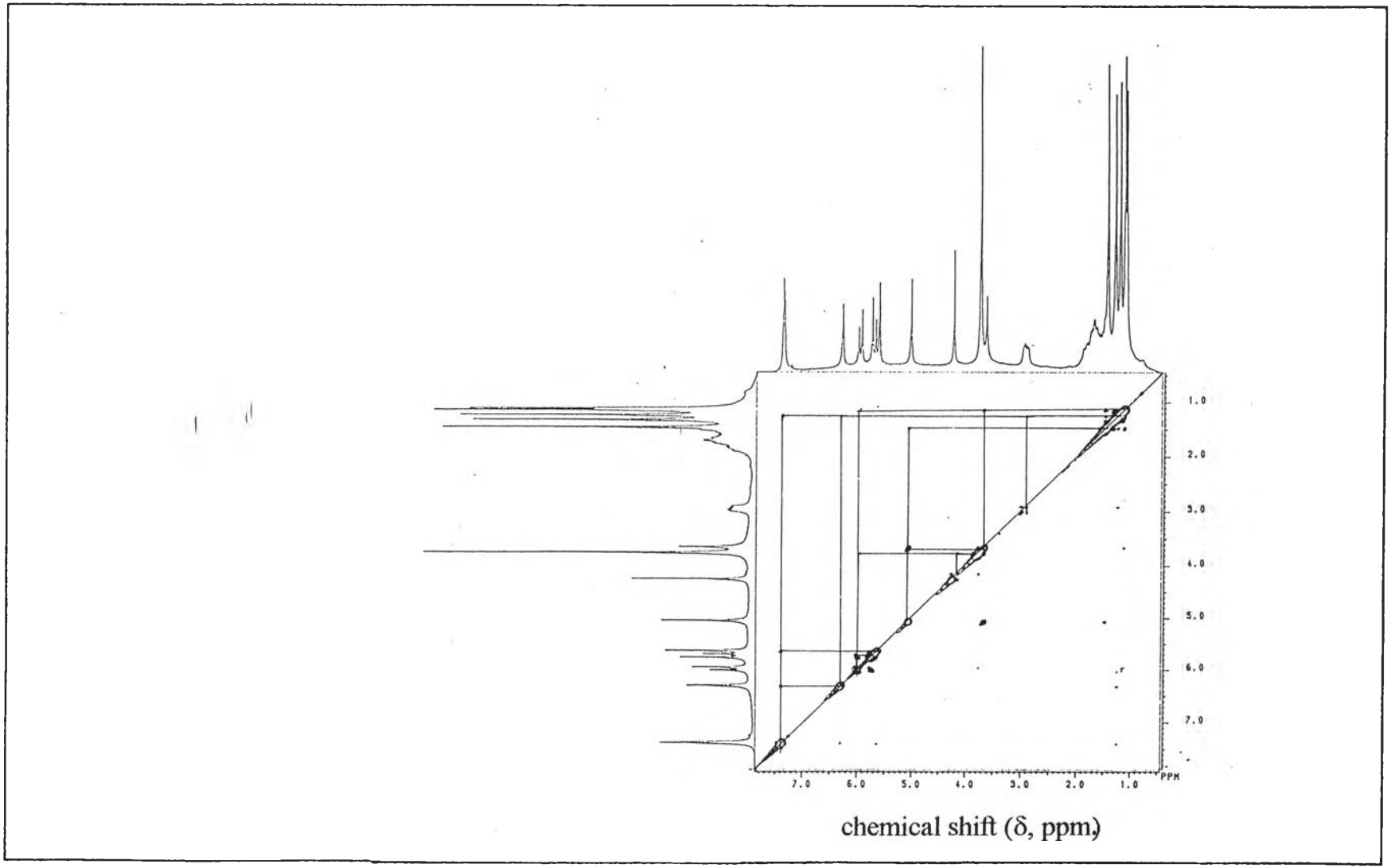

Figure 42 The ^{1}H-^{1}H NOESY of PA-3

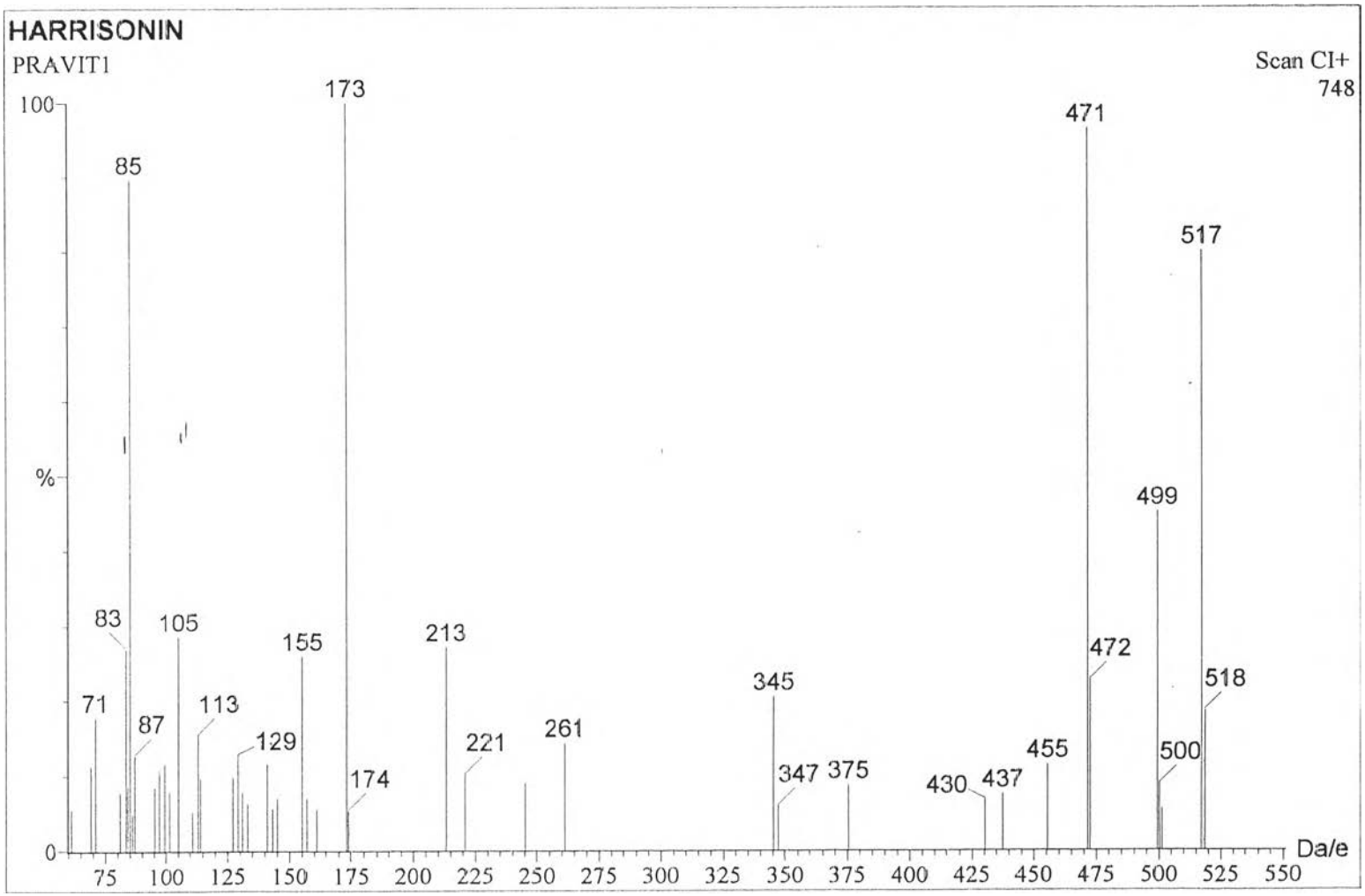

Figure 43 The CI mass spectrum of PA-3

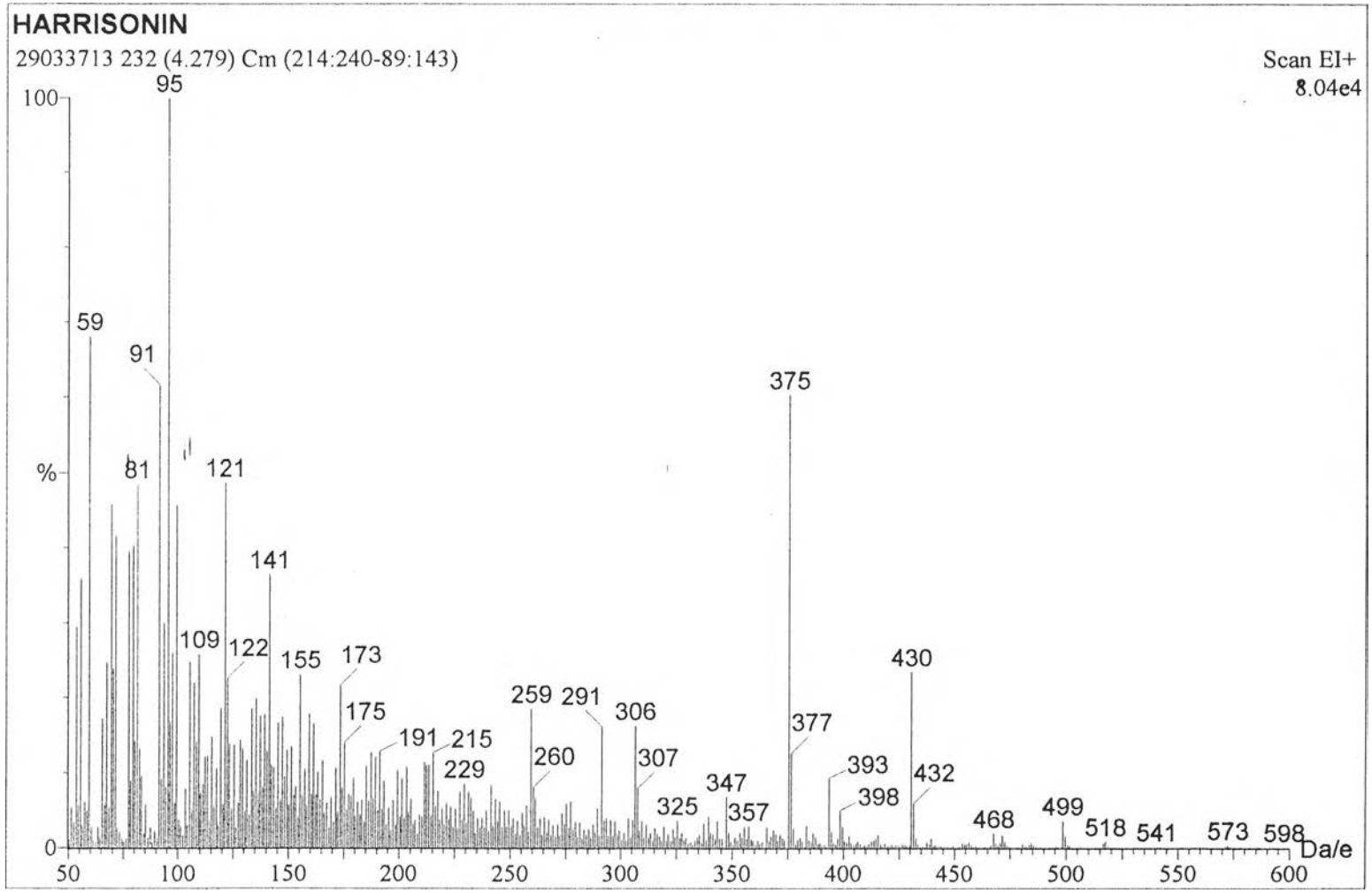

Figure 44 The EI mass spectrum of PA-3

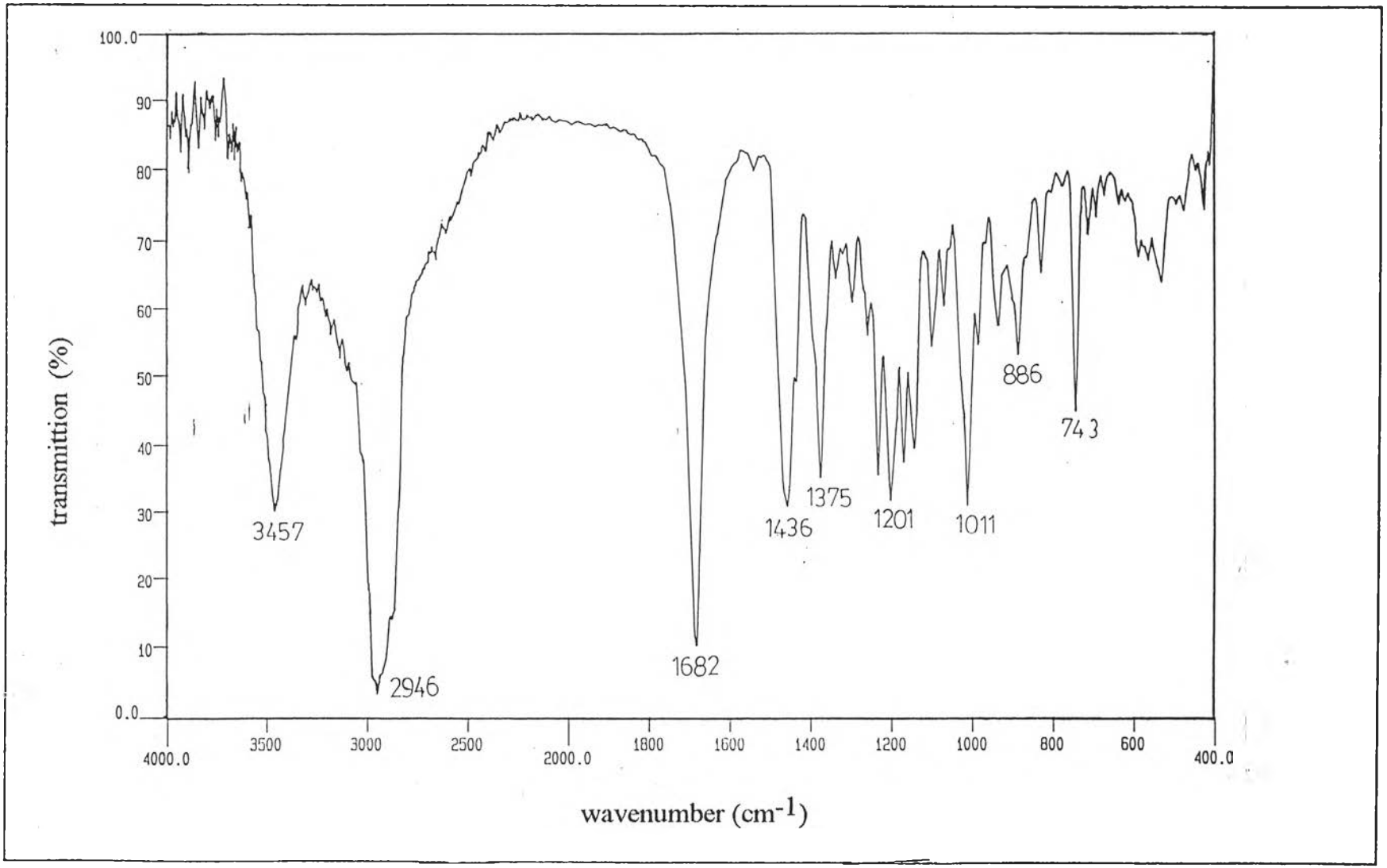

Figure 45 The IR spectrum of PA-4

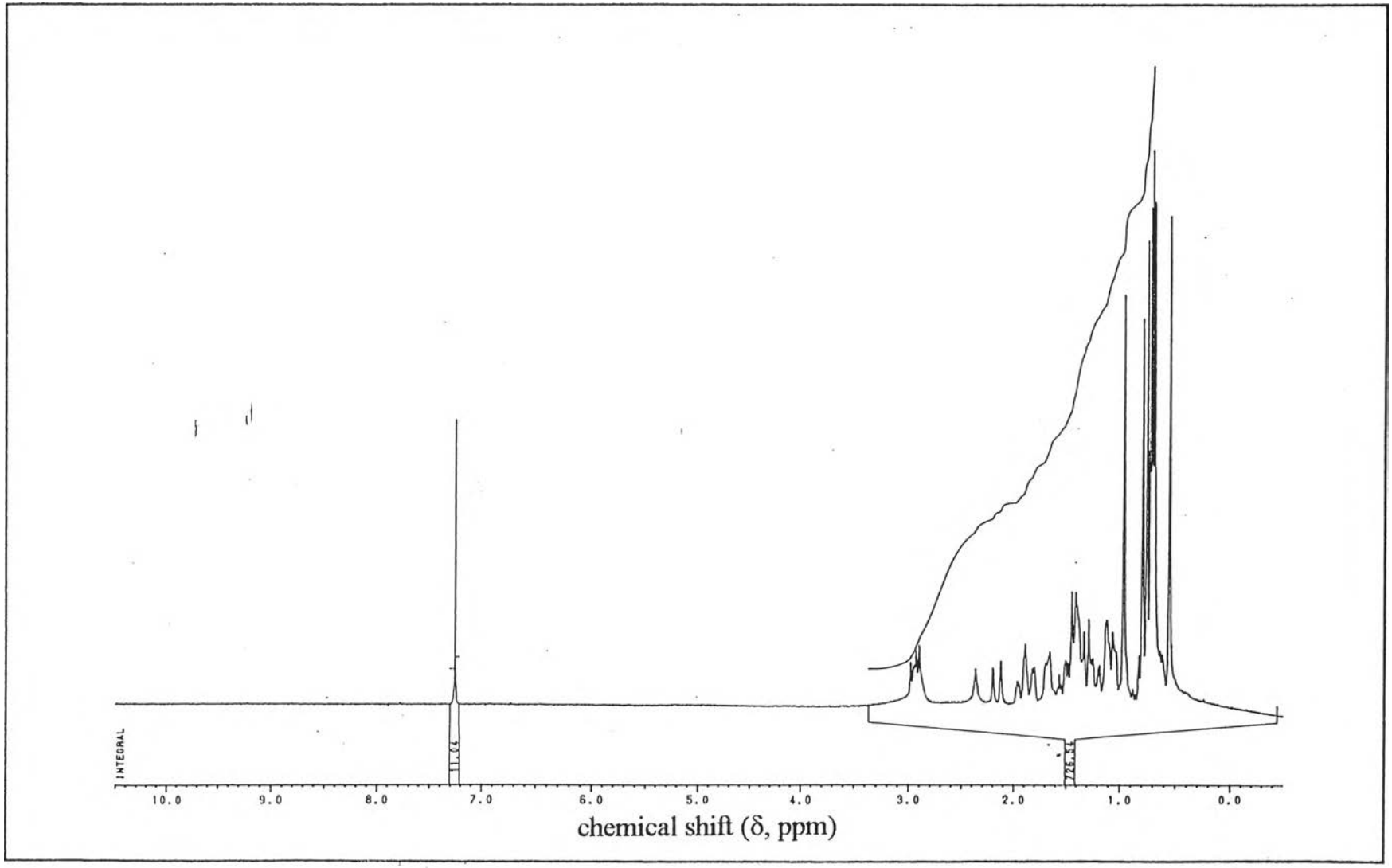

Figure 46 The ^{1}H NMR spectrum of PA-4

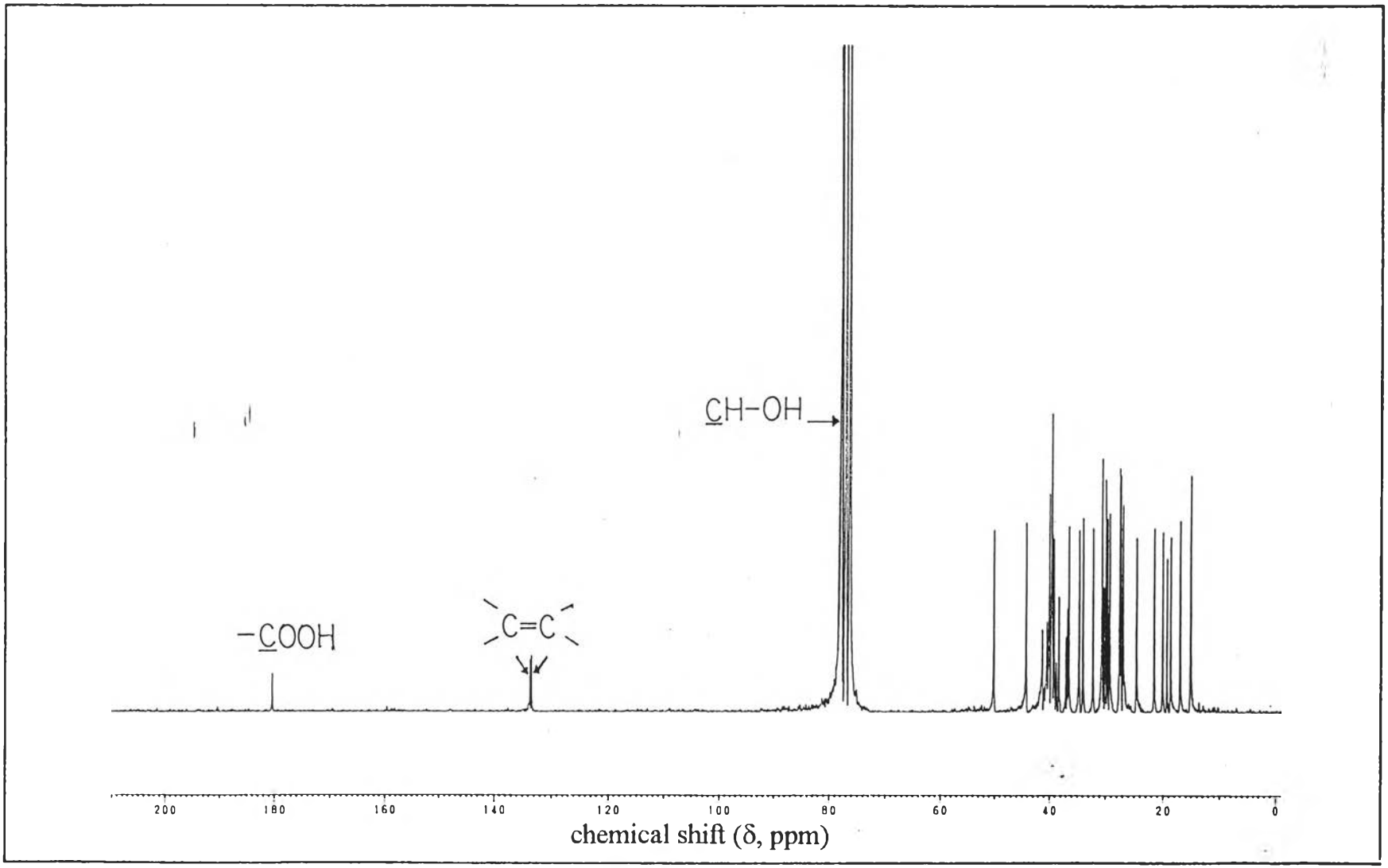

Figure 47 The ^{13}C NMR spectrum of PA-4

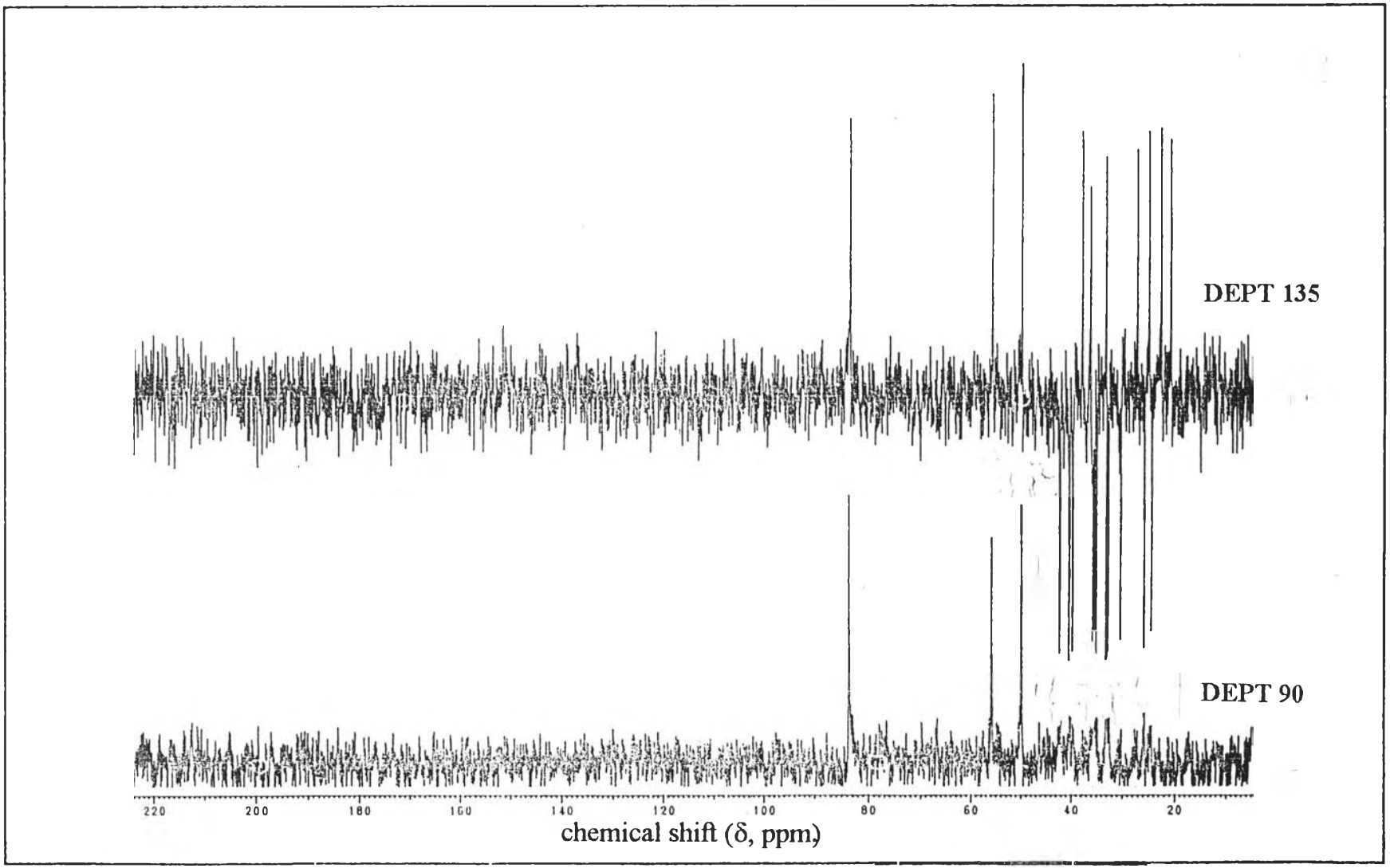

Figure 48 The DEPT-90 and DEPT-135 ^{13}C NMR spectrum of PA-4

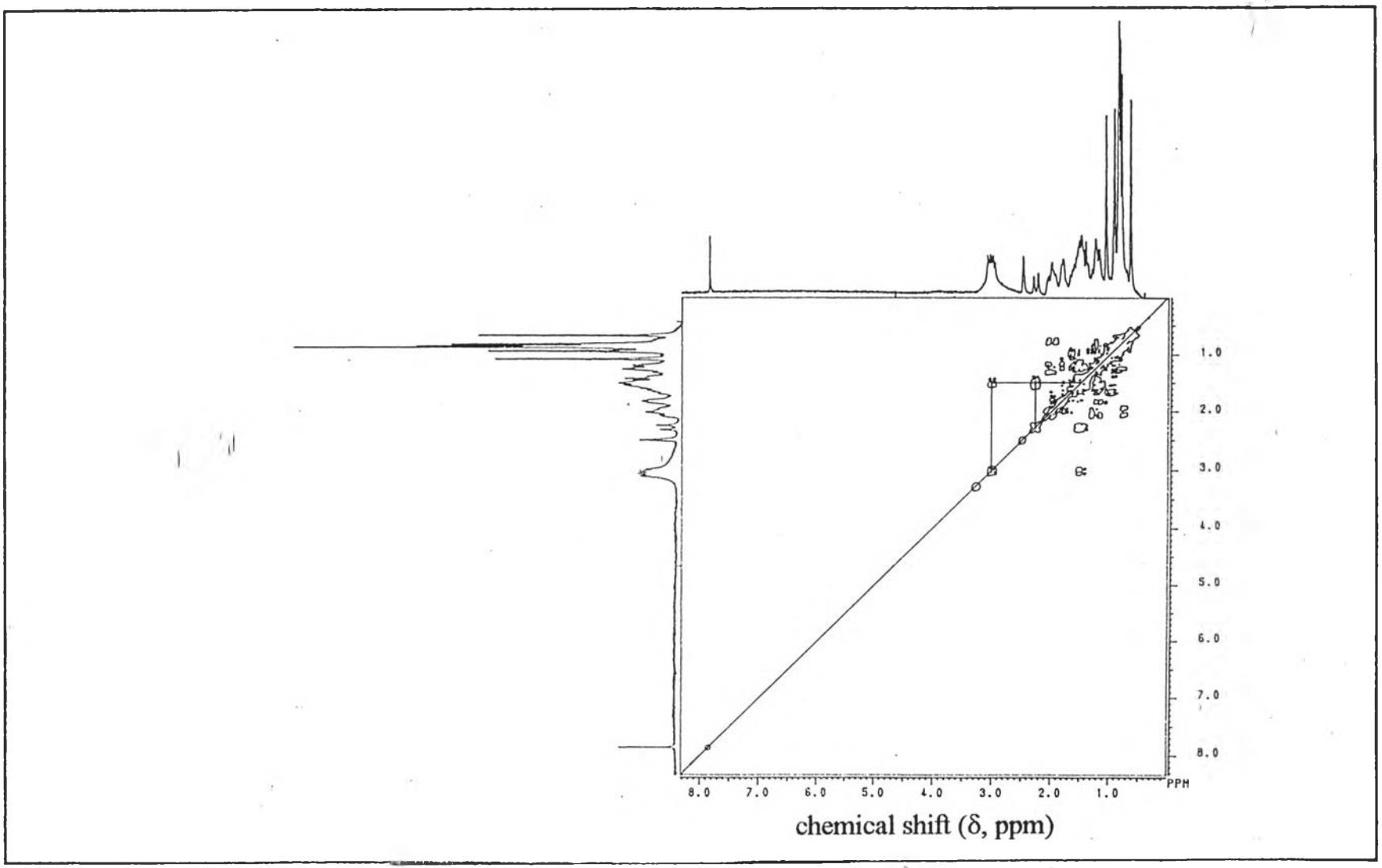

Figure 49 The ^{1}H-^{1}H COSY of PA-4

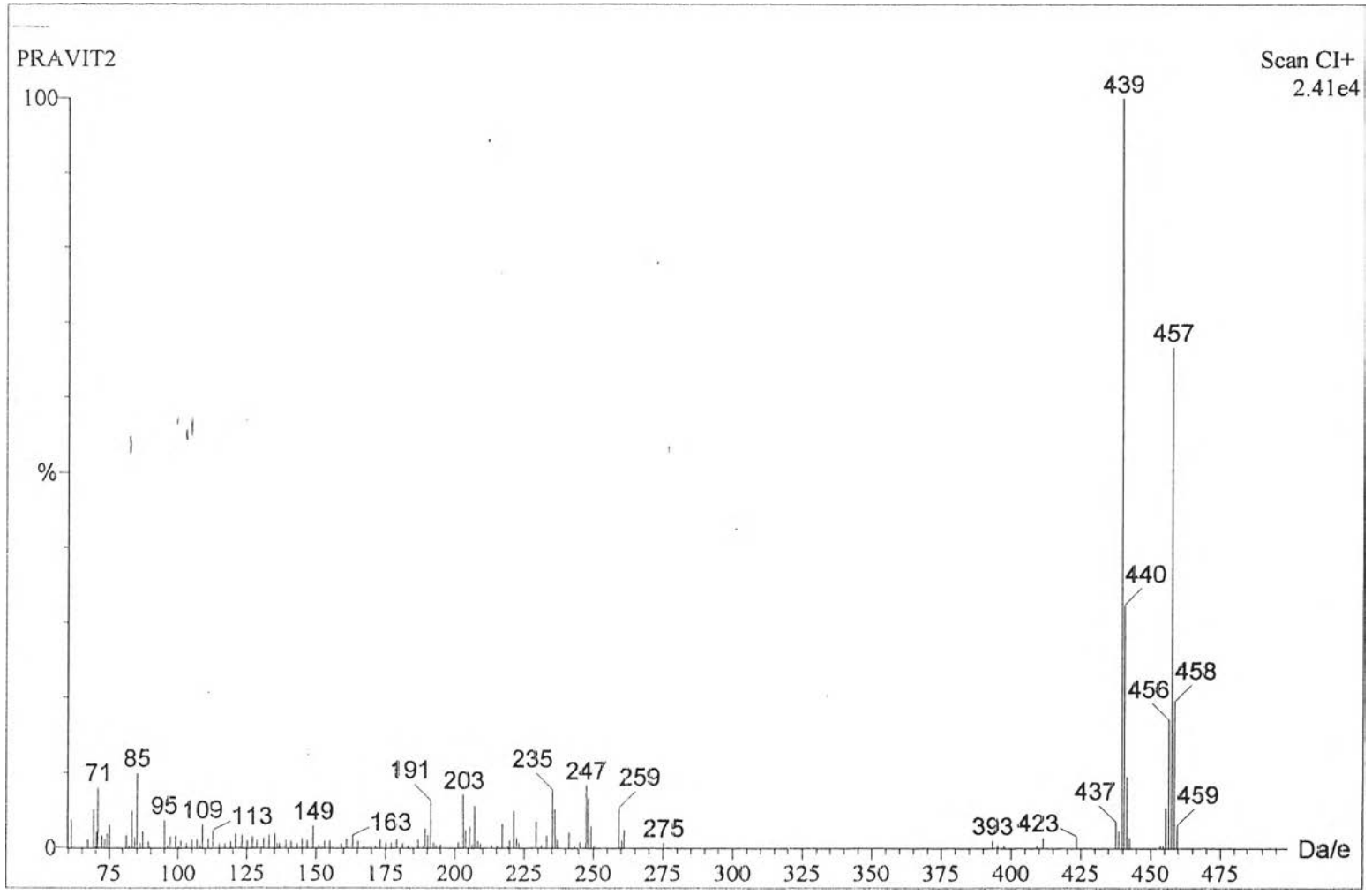

Figure 50 The CI mass spectrum of PA-4

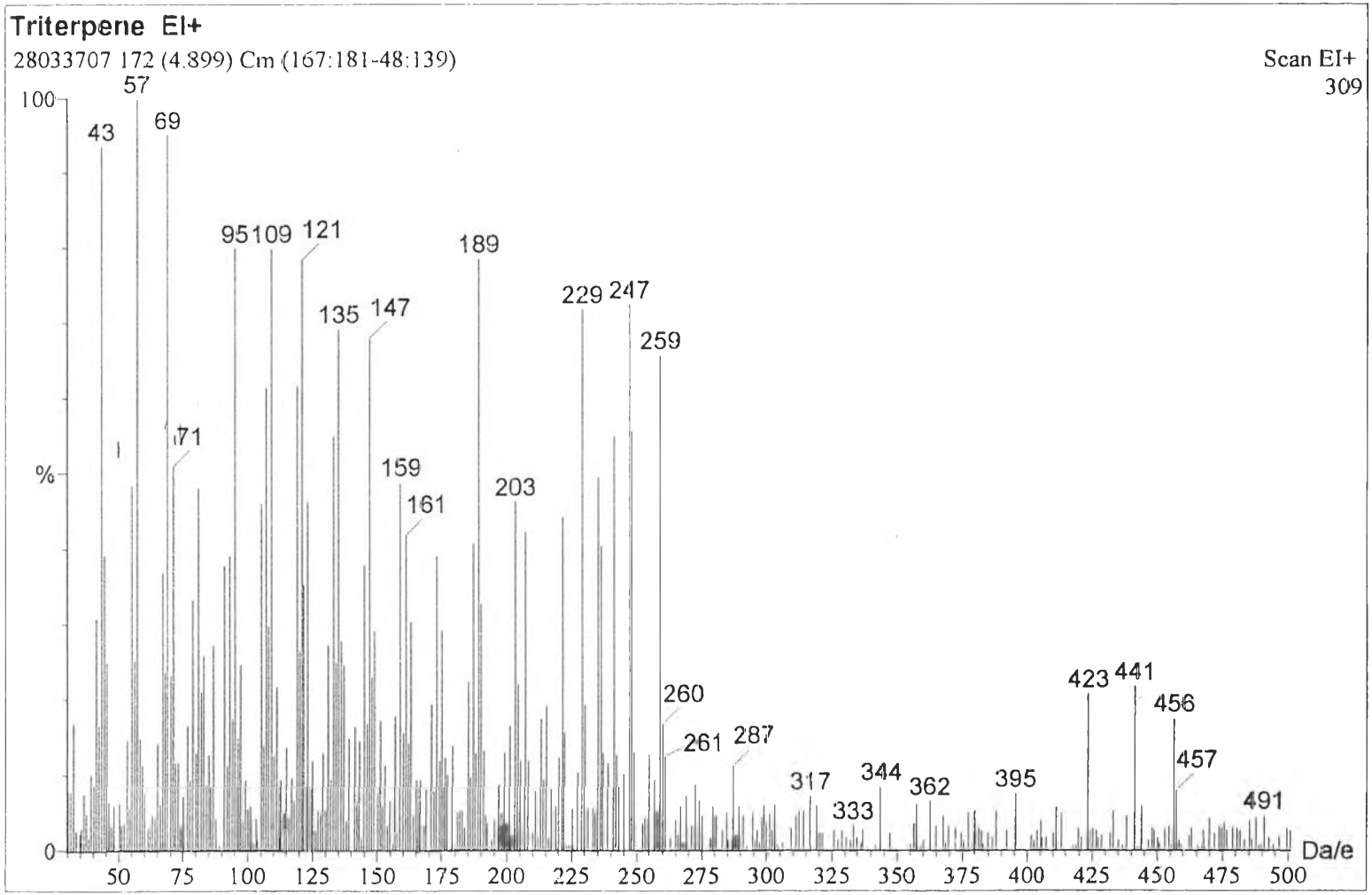

Figure 51 The EI mass spectrum of PA-4

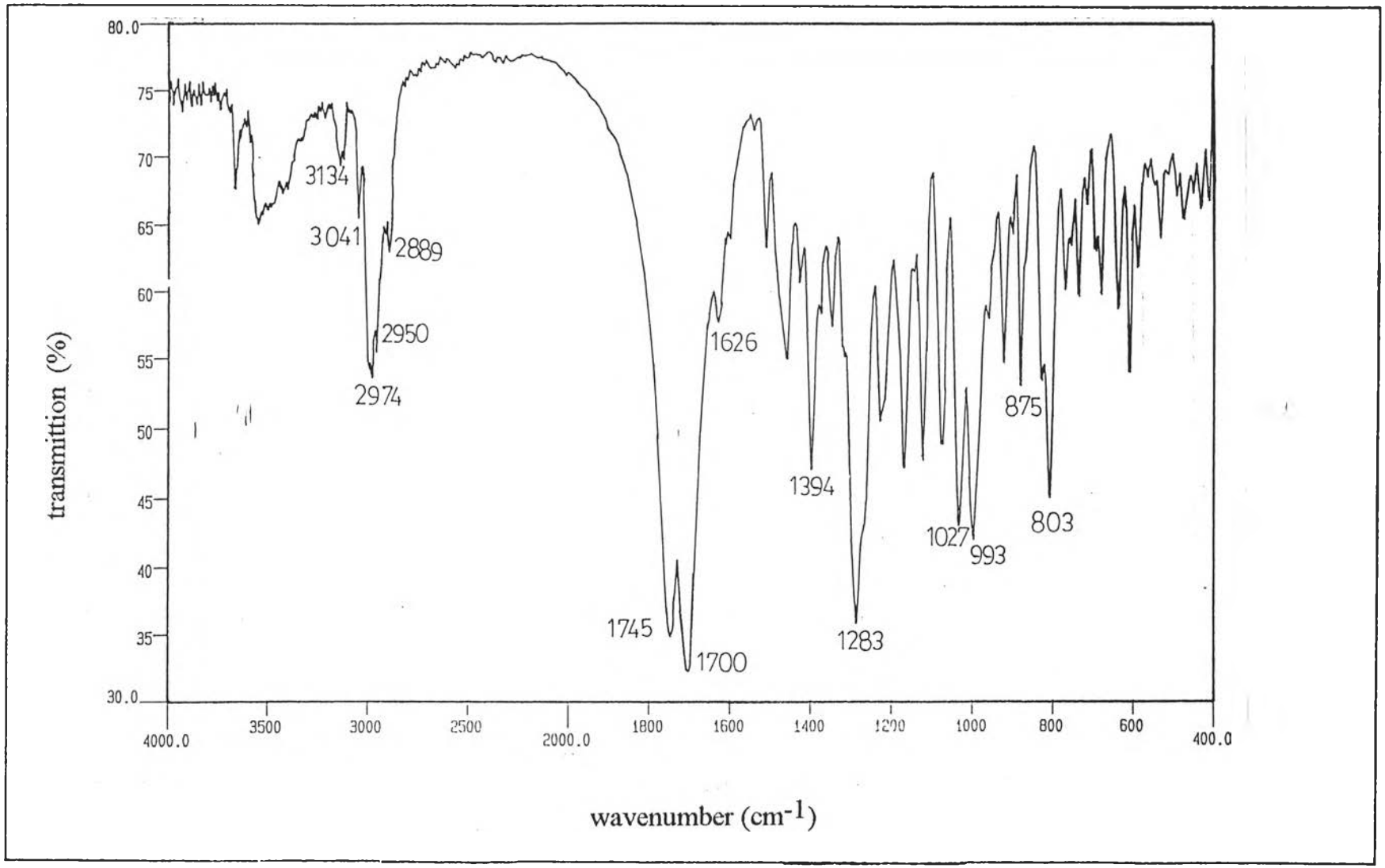

Figure 52 The IR spectrum of PA-5

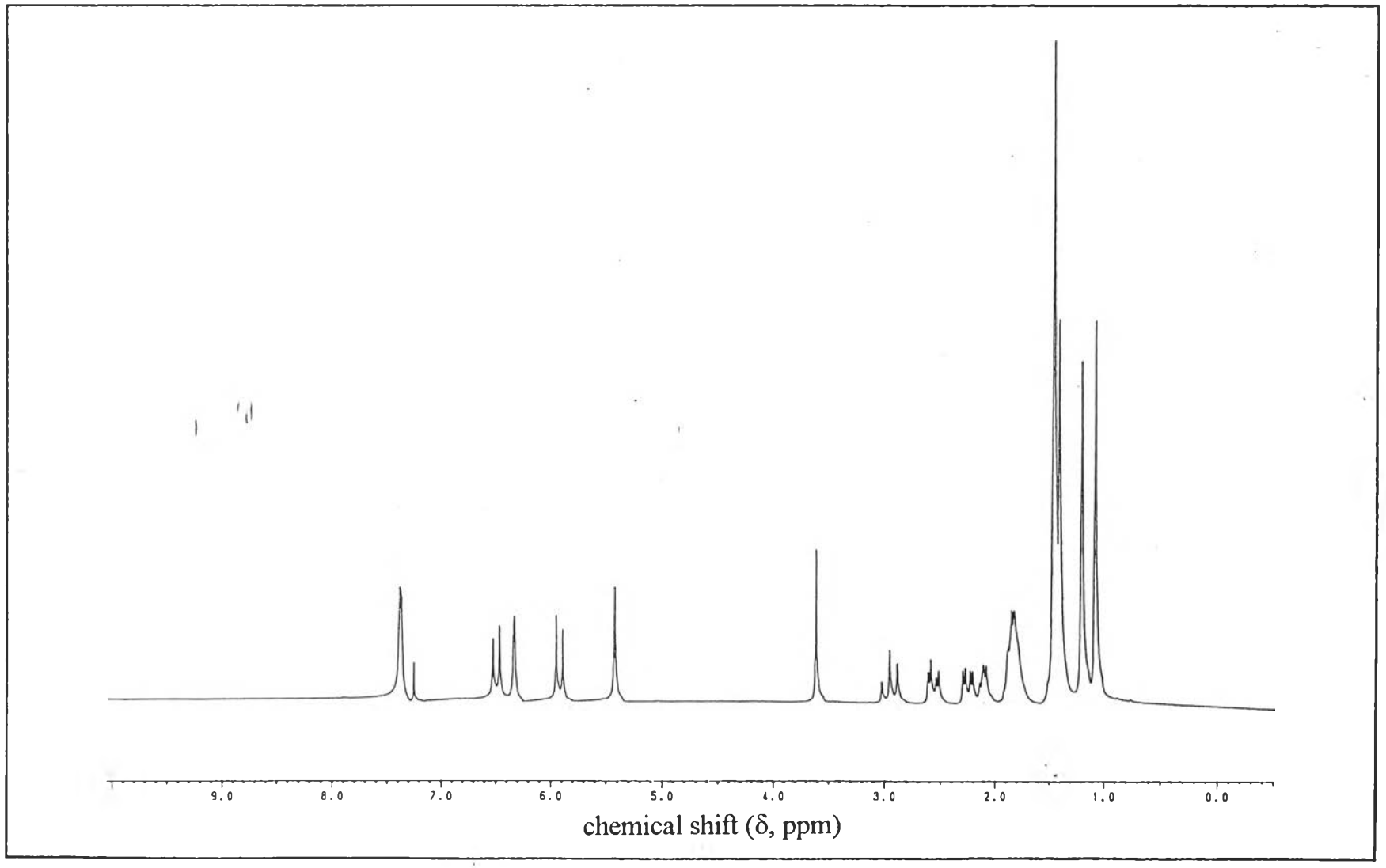

Figure 53 The ^{1}H NMR spectrum of PA-5

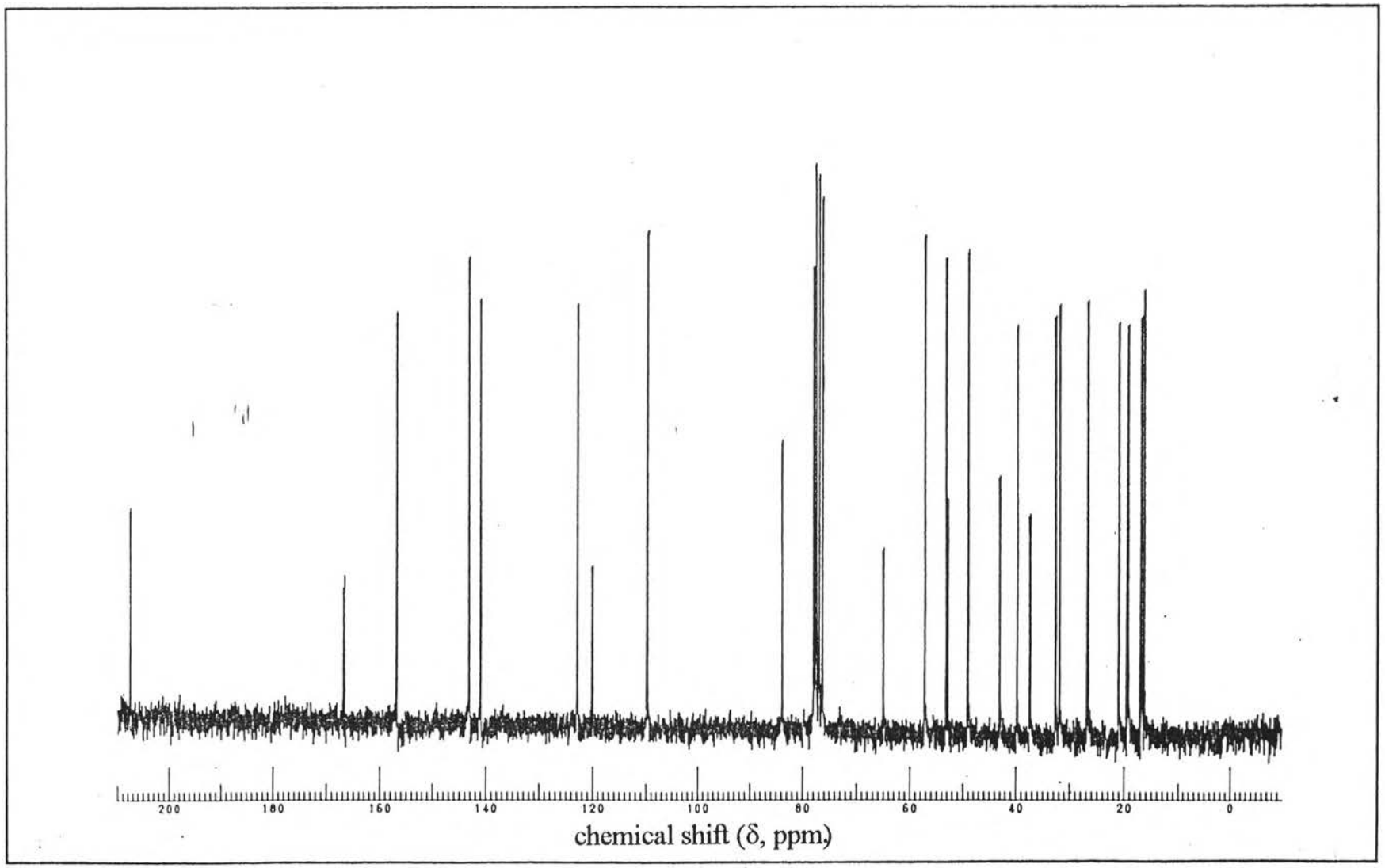

Figure 54 The ^{13}C NMR spectrum of PA-5

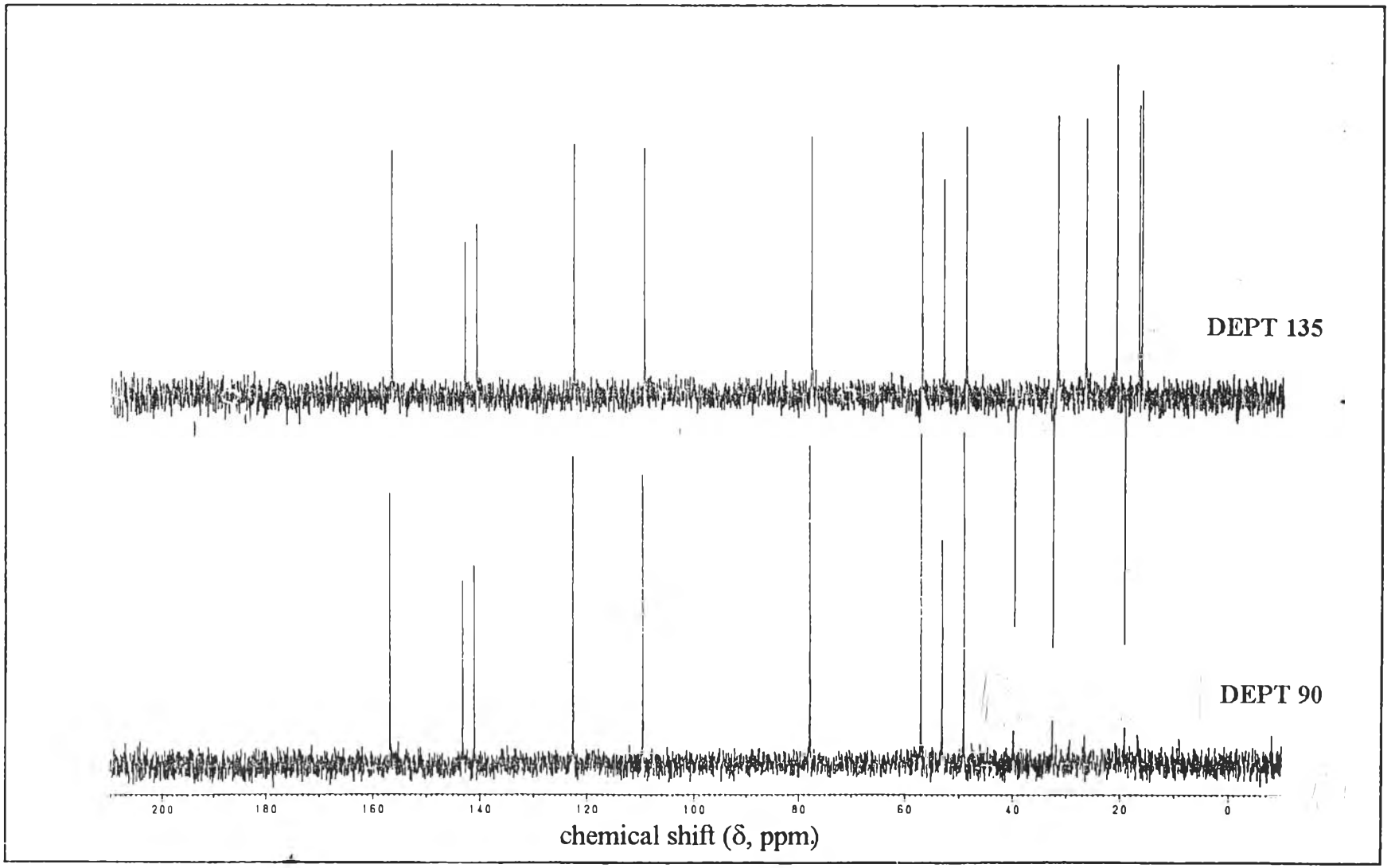

Figure 55 The DEPT-90 and DEPT-135 ^{13}C NMR spectrum of PA-5

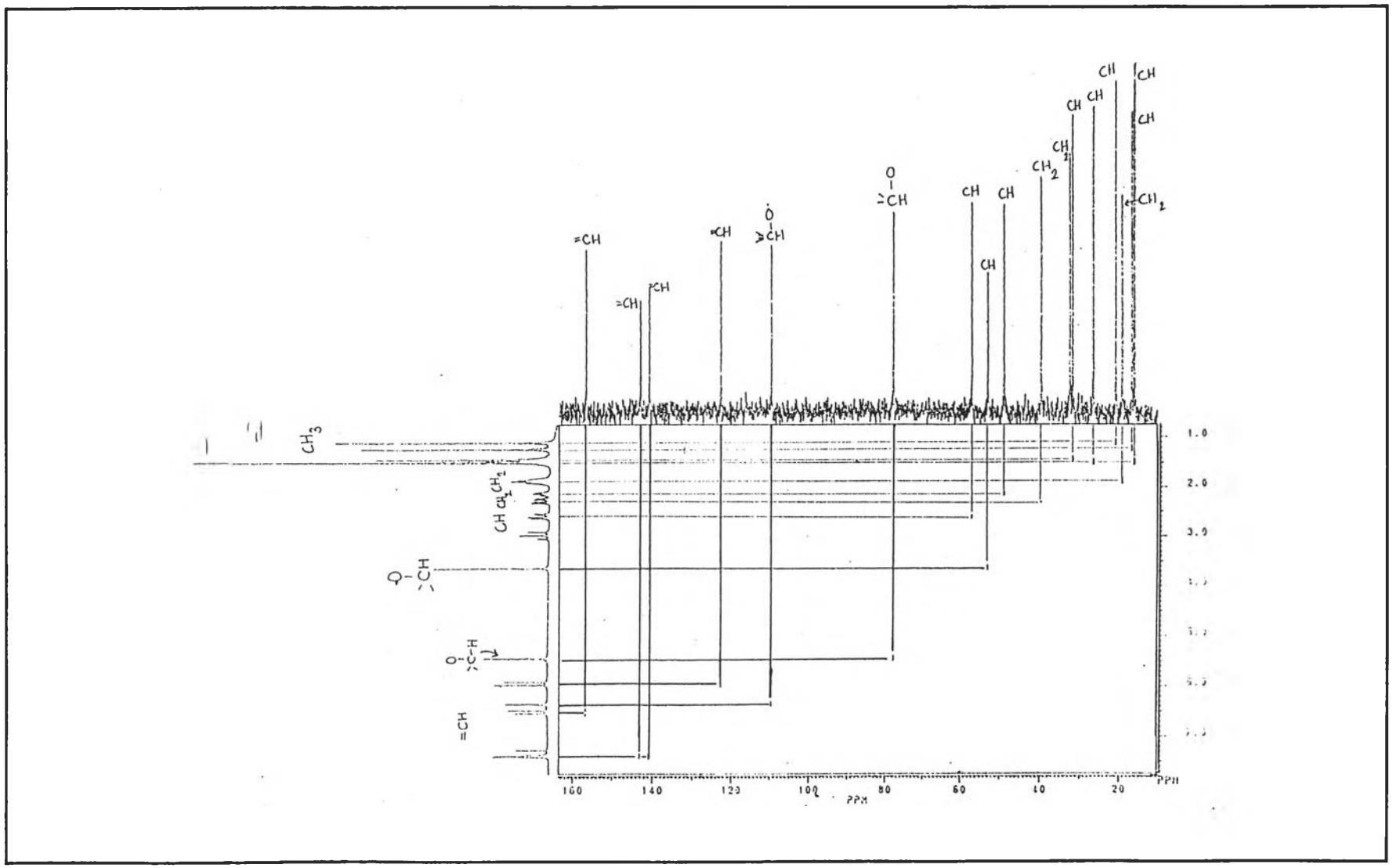

Figure 56 The ^{13}C-^{1}H correlation of PA-5

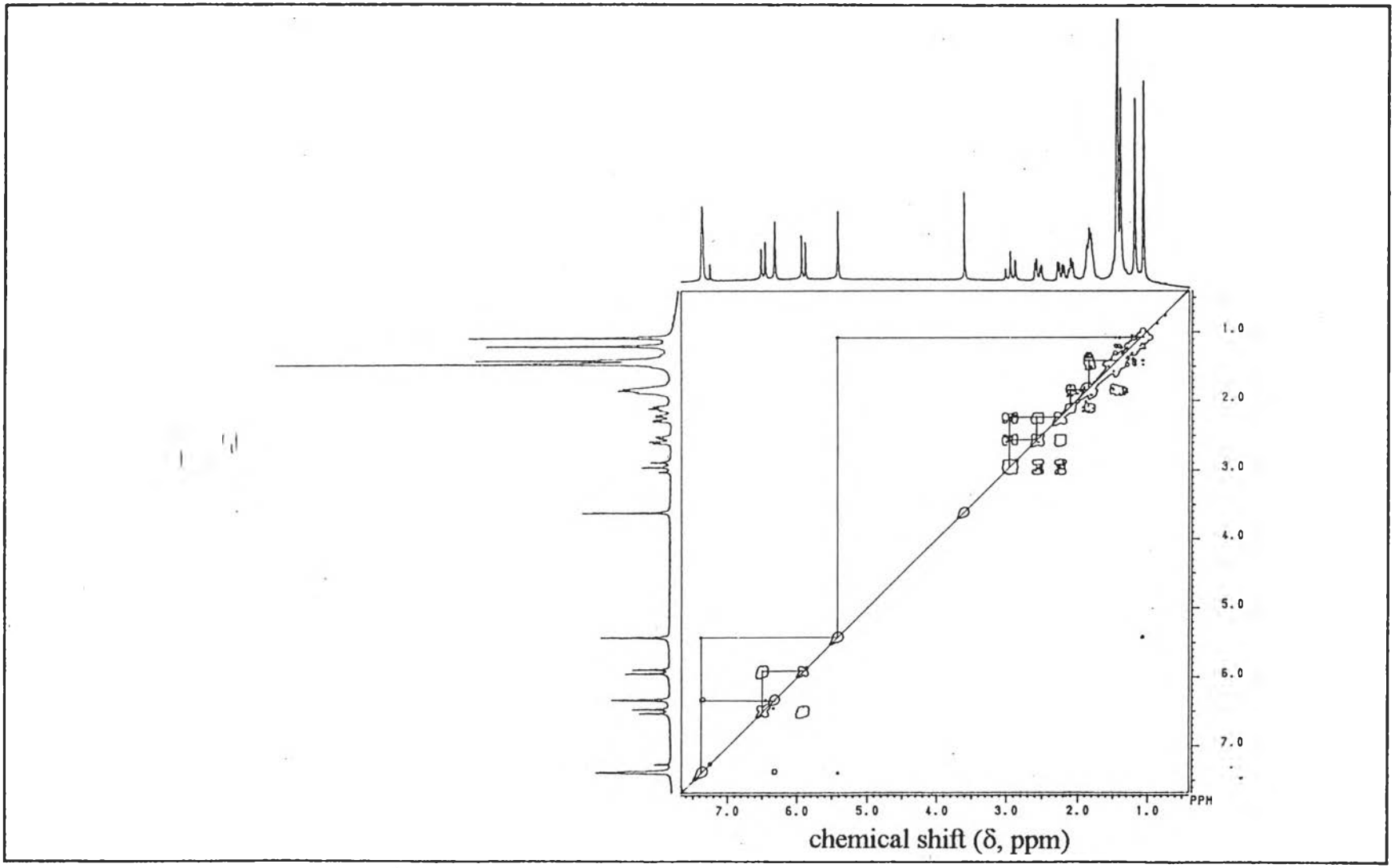

Figure 57 The ^{1}H-^{1}H COSY of PA-5

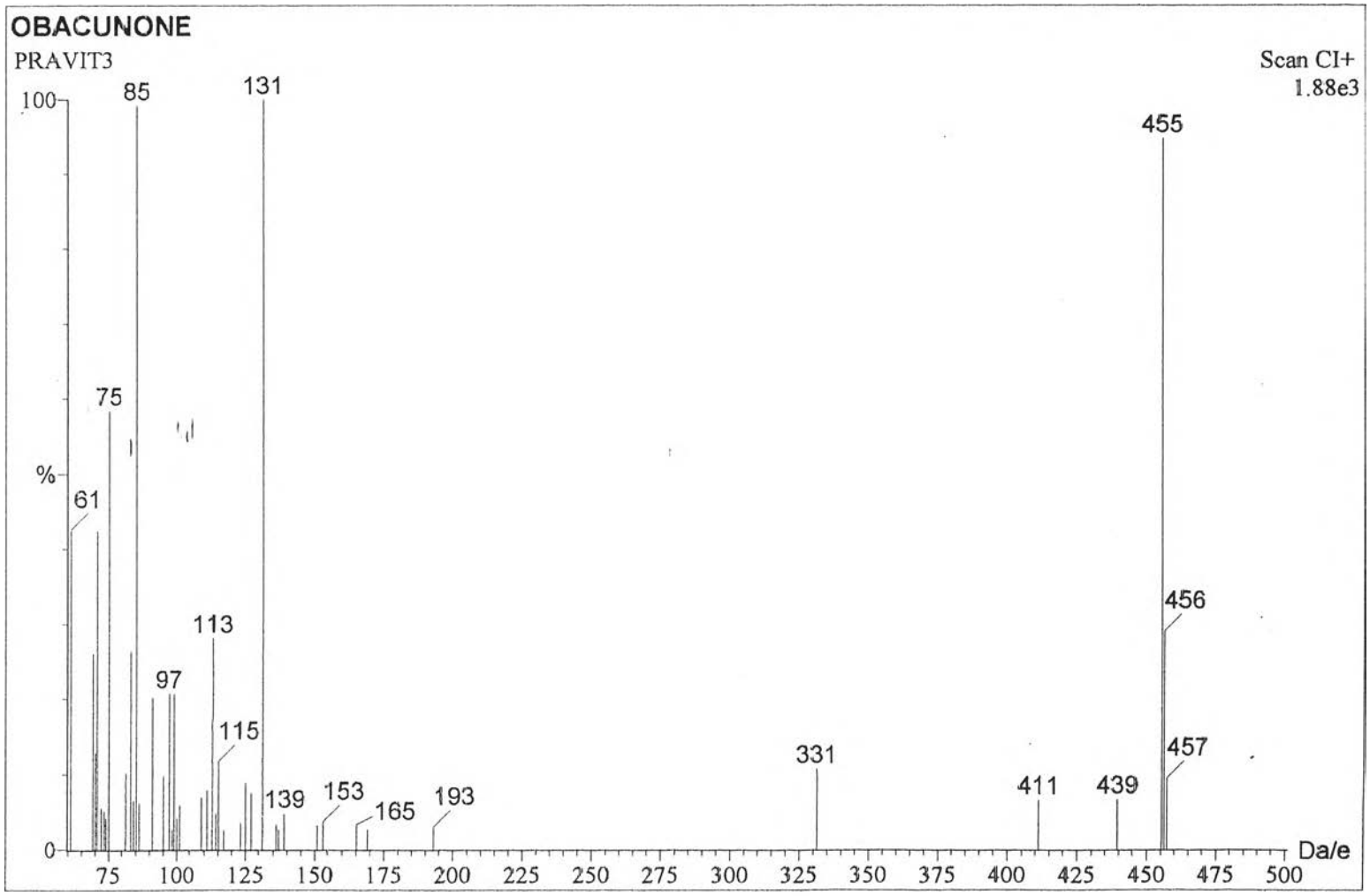

Figure 58 The CI mass spectrum of PA-5

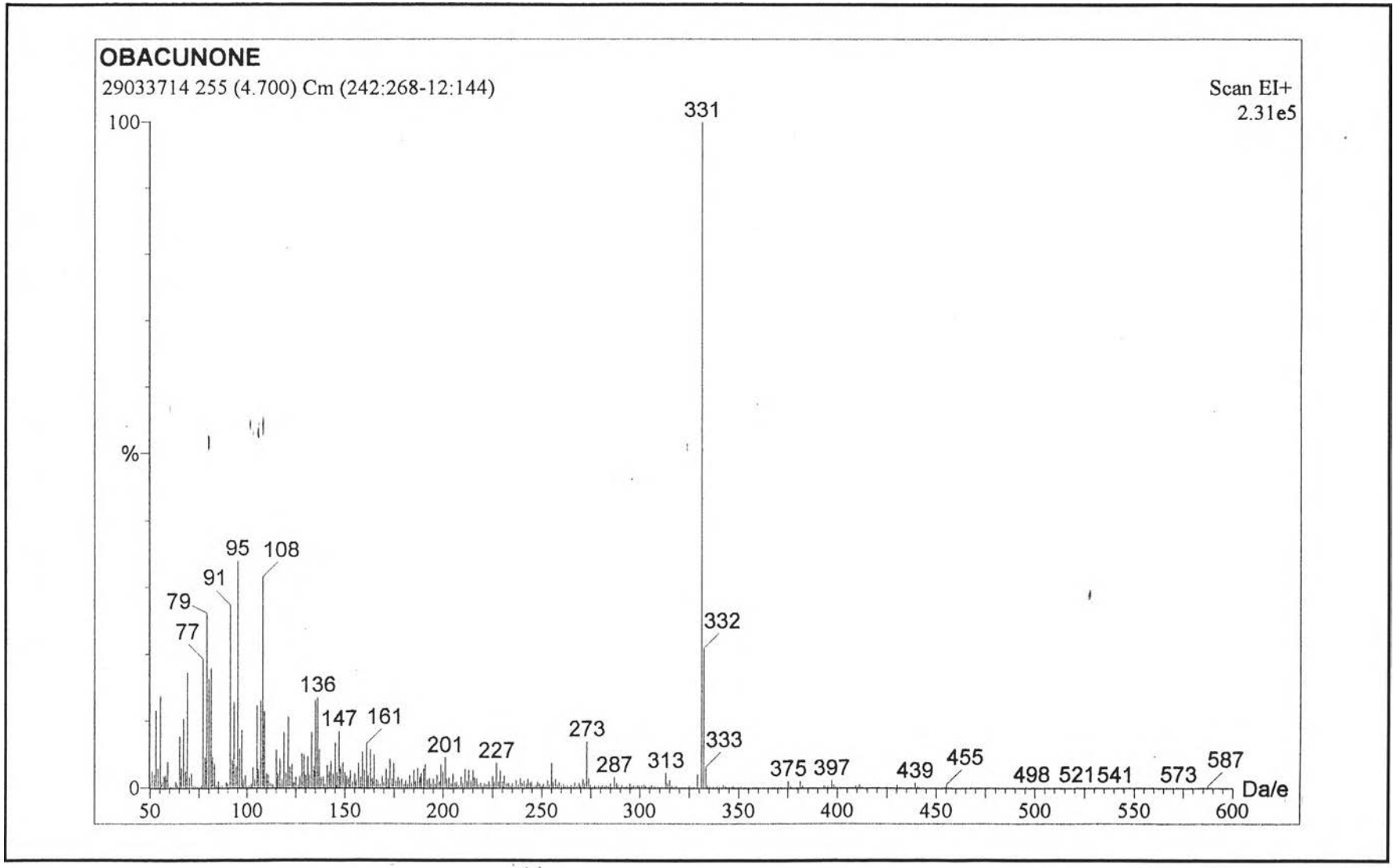

Figure 59 The EI mass spectrum of PA-5

VITA

Mr. Pravit Singtothong was born on May 20, 1970 in Bangkok, Thailand. I graduated in Bachelor Degree of Science of Chemistry from Chulalongkorn University in 1991. In the same year, he educated in Master Degree program in the Organic Chemistry branch at Chulalongkorn University. During the study towards the Master's degree, I was awarded a Rhone-Poulenc Lehn Scholarship during 1993 and a research grant for me Master's degree thesis from the Graduate School, Chulalongkorn University.