

REFERENCE

1. Hooker, J.D., *Flora of India*, vol. V, L.Reeve & Co. Ltd., 1885, 472-473.
2. Whitore, T.C., *Tree flora of Malaya*, Wing Tai Cheung Printing Co. Ltd., 1972, 96-97.
3. ลีนา ผู้พัฒนาพงศ์, สมุนไพรไทย ตอนที่ 5, พิมพ์ครั้งที่ 1, กรุงเทพมหานคร, น.จ.ก. ชูติมาการพิมพ์, 2530, หน้า 678
4. พเยาว์ เหมือนวงศ์ญาติ, ตำราวิทยาศาสตร์ สมุนไพร, พิมพ์ครั้งที่ 1, กรุงเทพมหานคร, ศูนย์การพิมพ์ พลชัย, 2529, หน้า 34
5. อำไพ บันทอง, ฤทธิ์การกระตุ้นการบีบตัวของมดลูกโดยต้นลิ้นกระบือ, บทคัดย่อการประชุมวิชาการ 2525 เรื่องวิทยาศาสตร์และเทคโนโลยีเพื่อ การพัฒนา ประเทศครั้งที่ 8 วันที่ 28-30 ตุลาคม 2525 : การพัฒนาสมุนไพรไทยด้านสาธารณสุข สมัยกรุงรัตนโกสินทร์ เล่ม 2, ผลงานวิจัยจุฬาลงกรณ์มหาวิทยาลัย, จุฬาลงกรณ์มหาวิทยาลัย, กรุงเทพมหานคร 2525, หน้า 604
6. ดวงตา กาญจนโพธิ์, ฤทธิ์ทางเภสัชวิทยาของต้นลิ้นกระบือ, บทคัดย่อการประชุมวิชาการ 2525 เรื่องวิทยาศาสตร์และเทคโนโลยีเพื่อ การพัฒนา ประเทศครั้งที่ 8 วันที่ 28-30 ตุลาคม 2525 : การพัฒนาสมุนไพรไทยด้านสาธารณสุข สมัยกรุงรัตนโกสินทร์ เล่ม 2, ผลงานวิจัยจุฬาลงกรณ์มหาวิทยาลัย, จุฬาลงกรณ์มหาวิทยาลัย, กรุงเทพมหานคร 2525, หน้า 603
7. Jiamin, X.; Yushu, C.; Shunian, Z.; Xiande, Z. *Zhongguo Zhongyao Zazhi* 1989, 14(5), 292-4 : CA 111:171131h
8. Wiriyaichitra, P.; Hajiwangoh, H.; Boonton, P.; Adolf, W.; Opferkuch, H.J.; Hecker, E. *Planta Med.* 1985, 5, 368-71 : CA 104:183257x
9. Karalai, C.; Wiriyaichitra, P.; Opfer kuch, H.J.; Hecker, E. *Planta Med.* 1994, 60(4), 351-5 : CA 121:223824q

10. Erickson, K.L.; Bentlar, J.A.; Cardellina, J.H.; McMahon, J.B.; Newman, D. J.; Boyd, M.R. *J. Nat. Prod.* 1995, **58**(5), 769-72 .
11. Qudrat-i-Khuda, M.; Erfan Ali, M.; Muslemuddin, M. *Sci. Res.* 1964, **1**(4), : CA 62:8015g
12. Hui, W.H. ; Sung,M.L. *Aust. J. Chem.* 1968, **21**(8), 2137-40 : CA 69:74455y
13. Kawashima, T.; Takahashi, T.; Inoue, Y.; Kodama, M.; Ito, S. *Phytochemistry* 1971, **10**(12), 3308-9 CA 76:56589k
14. Prukash, S.; Khan, M.A.; Khan, H.; Zaman, A. *Phytochemistry* 1983, **22**(80), 1836-7 : CA 100:3508r
15. Sasak, W. ; Chonjnacki, T. *Acta Biochim. Pol.* 1973, **20**(4), 343-50 : CA 80:68398t
16. Lin, J.H.; Tanaka, T.; Nonaka, G.; Nishioka, I.; Chen, I.S. *Chem. Pharm. Bull.* 1990, **38**(8), 2162-71 : CA 114:98138w
17. Fessenden, R.J. and Fessenden, J.S. *Technique and experiments for organic chemistry* , London , Willard Grant Press, 1983 .
18. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Vogel's Language Book Society* , Longman, 1989 .
19. Furniss, B.S.; Hannaford, A.J.; Boger, V.; Smith, P.W.G.; Tatchell, A.R. *Vogels Textbook of Practical Organic Chemistry 5th ed.* New York , John Willey and Sons, 1989 .
20. Maneechakr,P. *Chemical constituents and Biological Activities of Sphaeranthus africanus Linn.*, 1994.

21. Wiboonpun, N. *Chemical constituents of the root of Asparagus Wild.*, 1996 .
22. Breitmaier, E. and Voelter, W. *Carbon -13 NMR Spectroscopy* , VCH Publishers , New York, 1987 , 443 .
23. Ellsworth, Paul A. and Storm, Carlyle B. *J. Org. Chem.* 1978, 43(2), 281:
CA : 88: 59586r .
24. Pandey, R.K.; Shiao, F.Y.; Sumlin, A.B.; Dougherty, T.J.; Smith, K.M.
Bioorg. Med. Chem. Lett. 1992, 2(5),491-6 : CA : 119: 95199j
25. Chapman, J.D.; Engelhardt, E.L. WO 95 08,551 : CA : 123 : 32863h
26. Pandey, R.K.; Dougherty, T.J. U.S. US 5,198,460 : CA : 119 : 108983n
27. Harborne, J.B. *The Flavonoids Advances in research since 1986*, Chapman and Hall , 1993.
28. Breitmaier, E. and Voelter, W. *Carbon -13 NMR Spectroscopy* ,VCH Publishers, New York, 1987 , 453 .
29. Jinsart, W.; Ternai, B. and Polya, G.M. *Biol. Chem. Hoppe. Seyler* 1992, 373, 205-211 .
30. Jinsart, W.; Ternai, B. and Polya, G.M., *Biol. Chem. Hoppe. Seyler* 1991, 372, 819-829 .
31. Choi, J.S., Proceeding of UNESCO Regional Seminar on the Chemistry,
Pharmacology and Clinical use of Flavonoid Compounds, Chungnam National University ; Korea, October 11-15, 1995, 139-147.
32. Huong, H.T., Proceeding of UNESCO Regional Seminar on the Chemistry,
Pharmacology and Clinical use of Flavonoid Compounds, Chungnam National University ; Korea, October 11-15, 1995 , 207.

33. Bu'Lock, J.D. *The Biosynthesis of Natural Products*, McGraw-Hill, 1965 .
34. Budavari, S. *The Merck Index : An Encyclopedia of Chemicals, Drugs, and Biologicals, 11st ed.*, Merck & CO., 1989, 680.
35. Buchs, A.; Charollais, E. and Posternak, T. *Helvetica Chimica Acta* 1968, 51(4), 695 .
36. David, C. Billington, *The Inositol Phosphates Chemical synthesis and biological significance*, Weinheim, 1993 .
37. Stephen, J.; Angyal and Leon Odier, *Carbohydrate Research* 1982, 100, 43 .
38. *Dictionary of Organic Compounds 5th ed. vol.3*, Chapman and Hall, New York, 1982 .
39. Larner, J.; Kennington, A.; Huang, L.C. WO 93/16692 : CA : 117: 163880k
40. สุรางค์ อนุกุล, ปฏิบัติการเคมีคุณภาพวิเคราะห์, พิมพ์ครั้งที่ 2, สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย, 2535 .

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

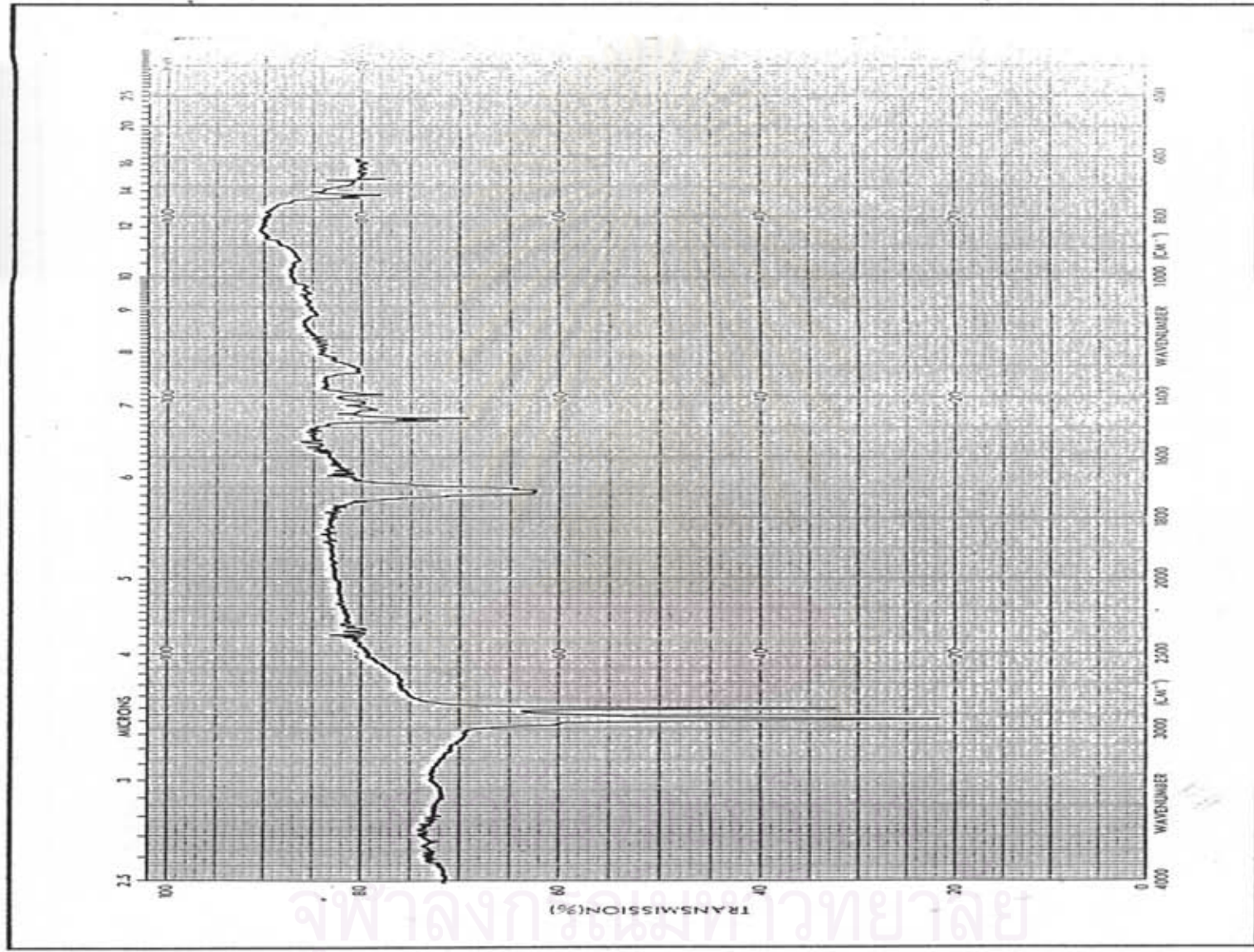


Figure 3 The IR spectrum of Mixture I

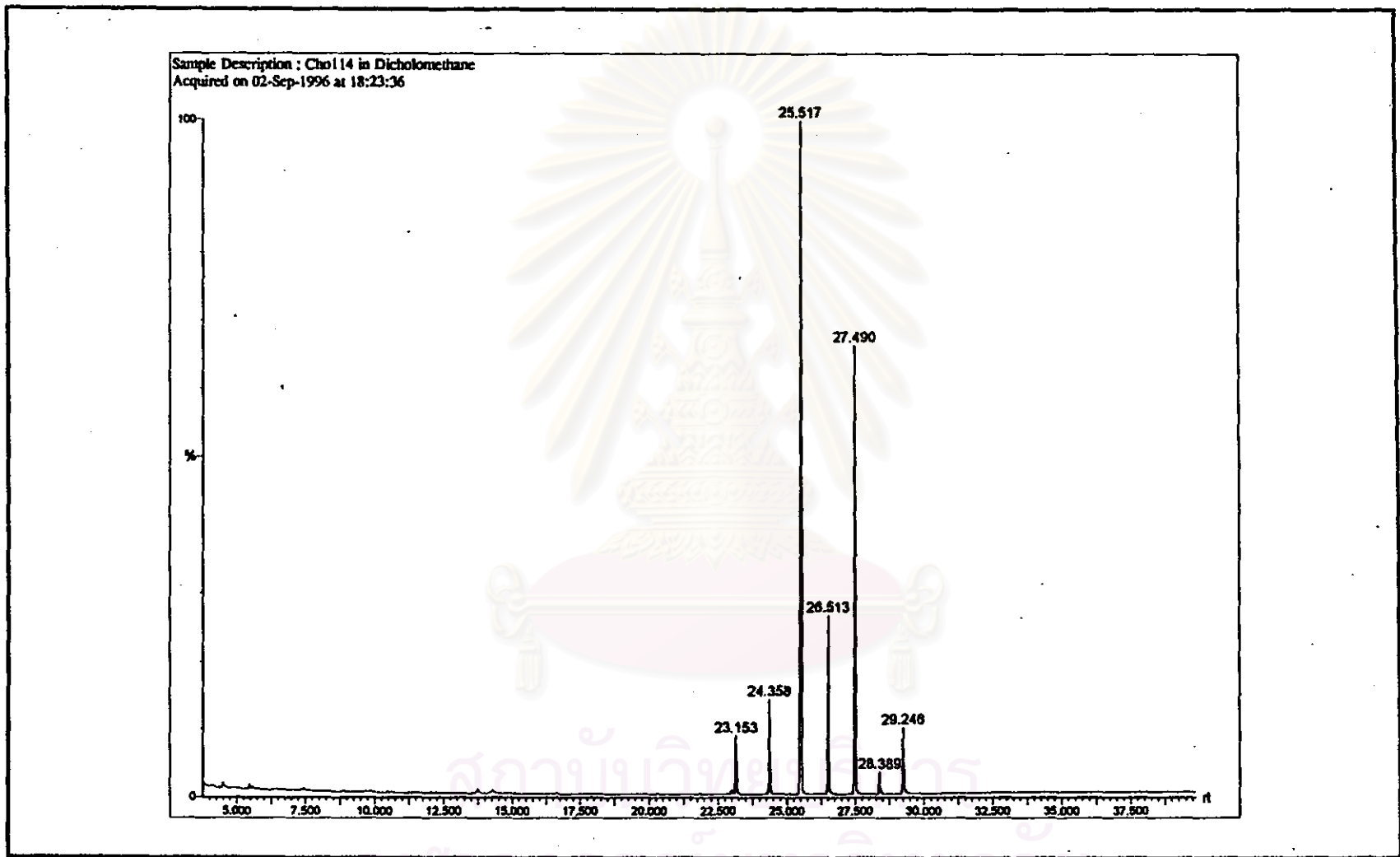


Figure 4 The GC-MS chromatogram of methyl ester of Mixture I

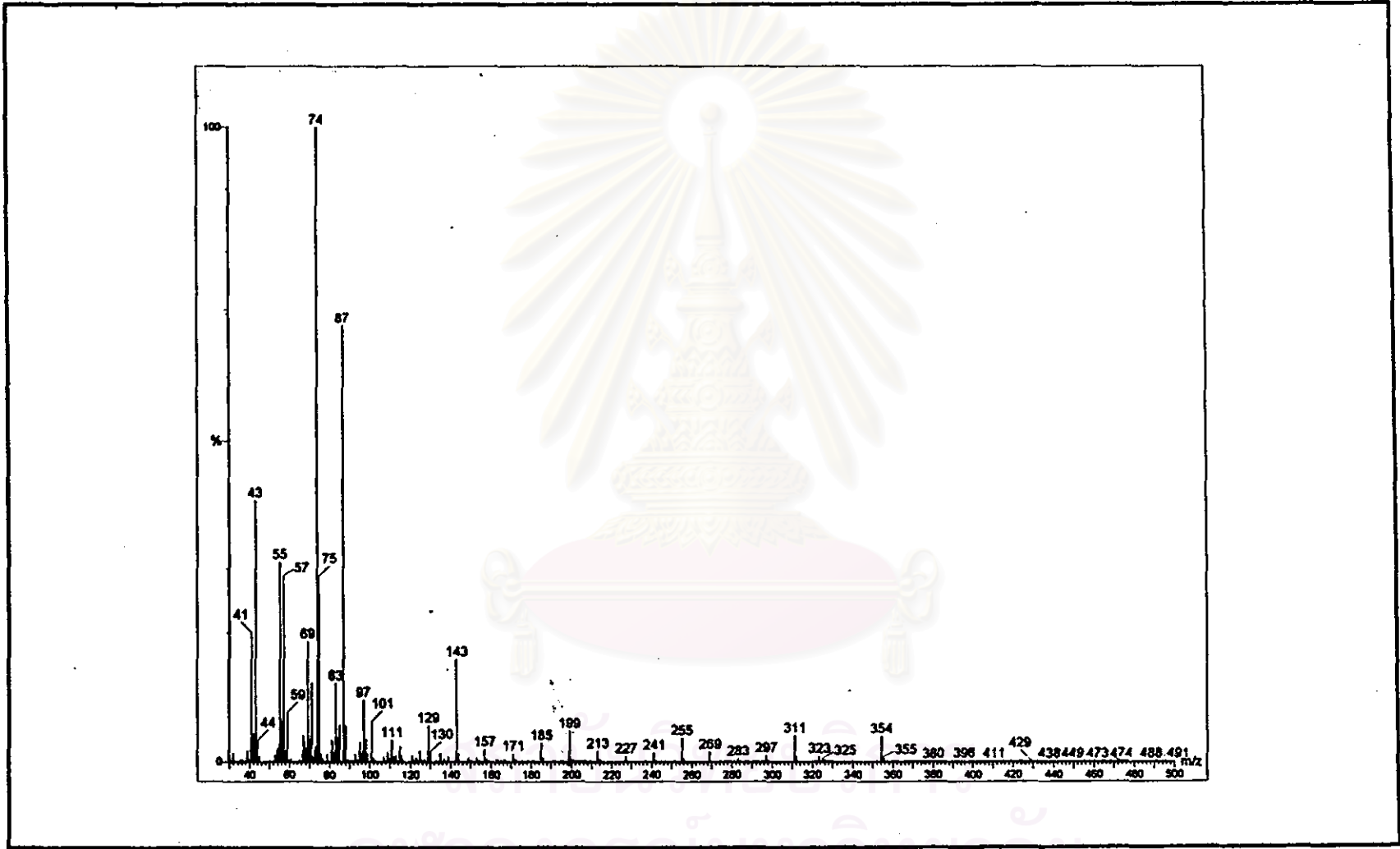


Figure 5 The mass spectrum of Mixture I at retention time 23.15

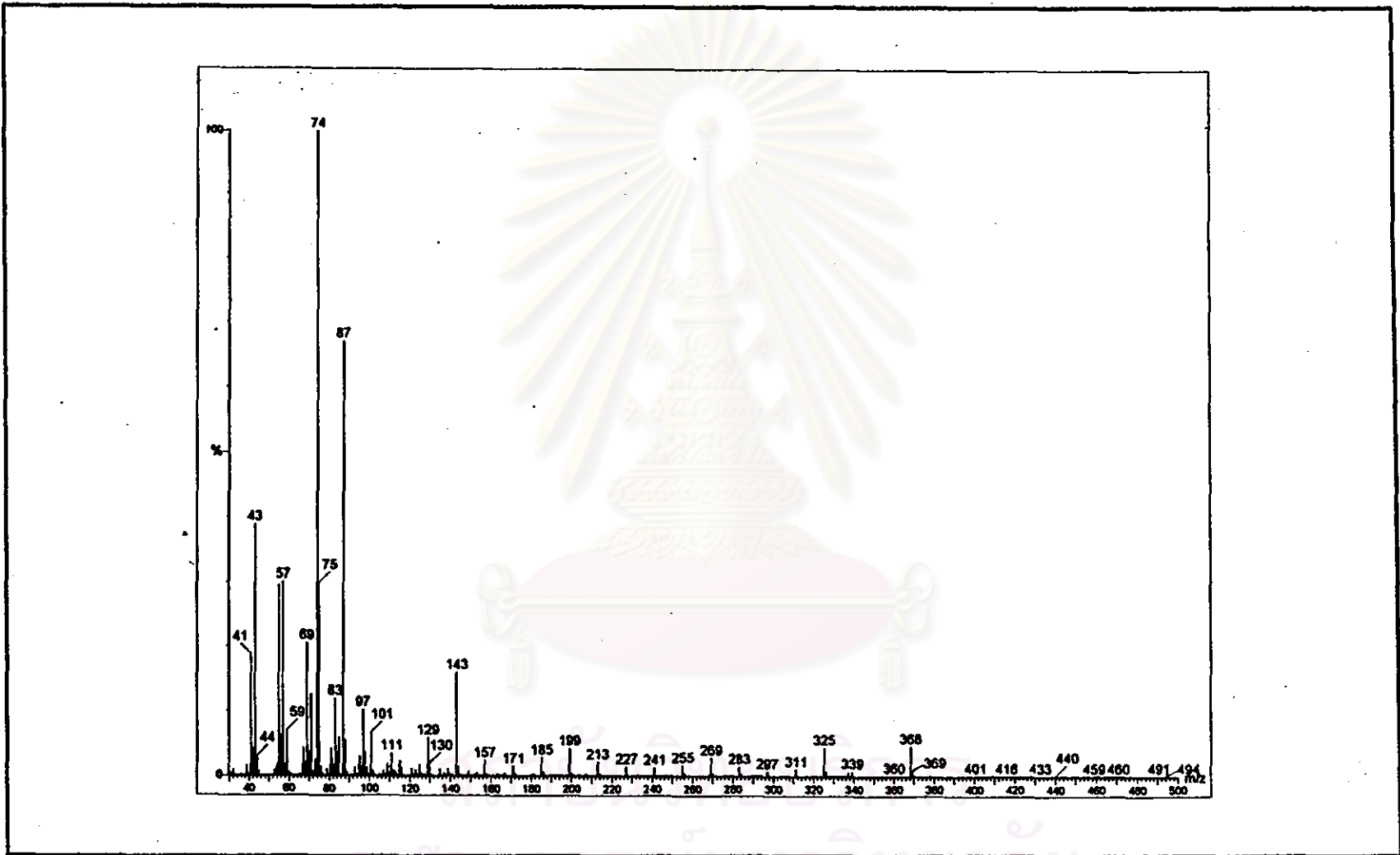


Figure 6 The mass spectrum of Mixture I at retention time 24.36

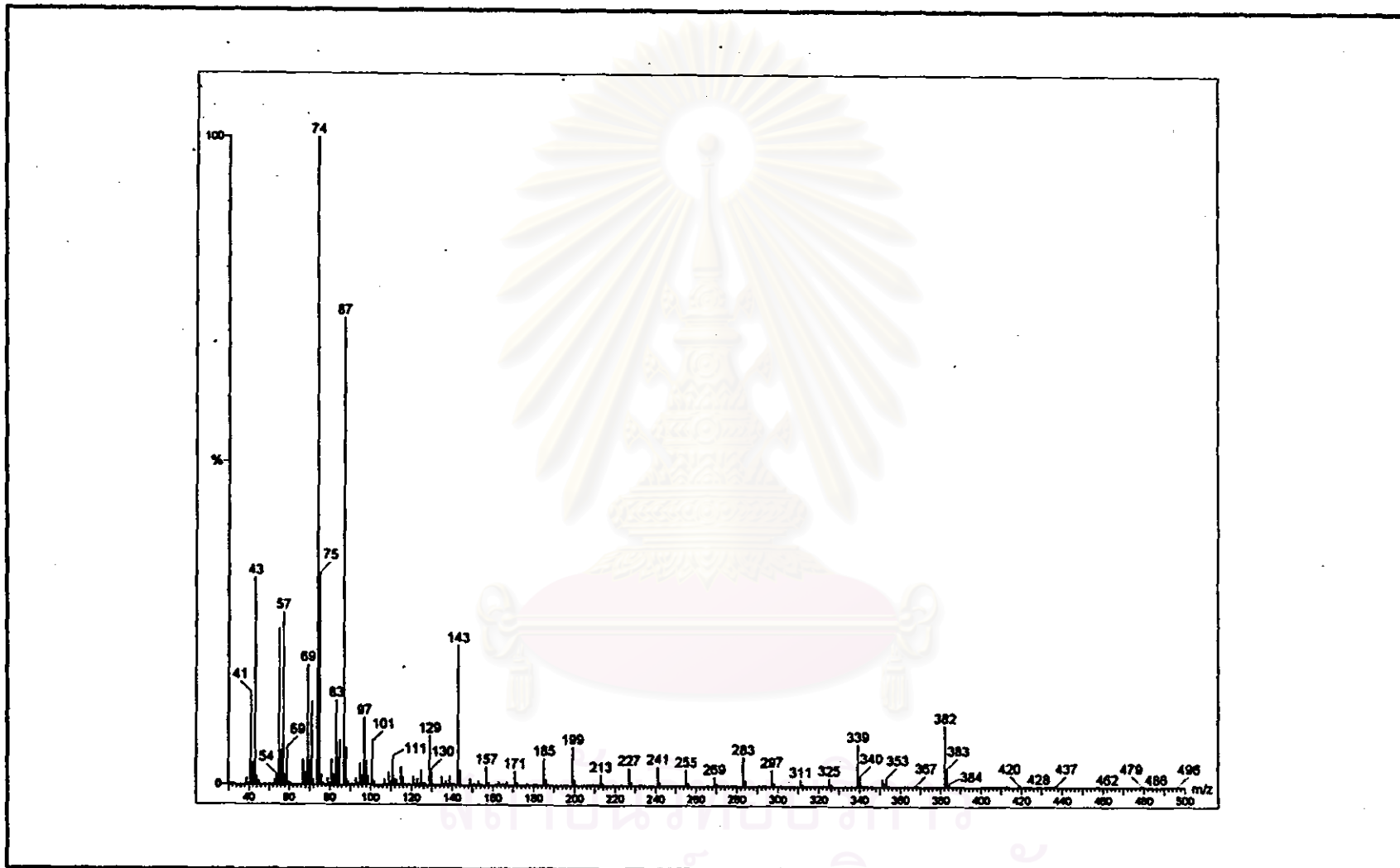


Figure 7 The mass spectrum of Mixture I at retention time 25.52

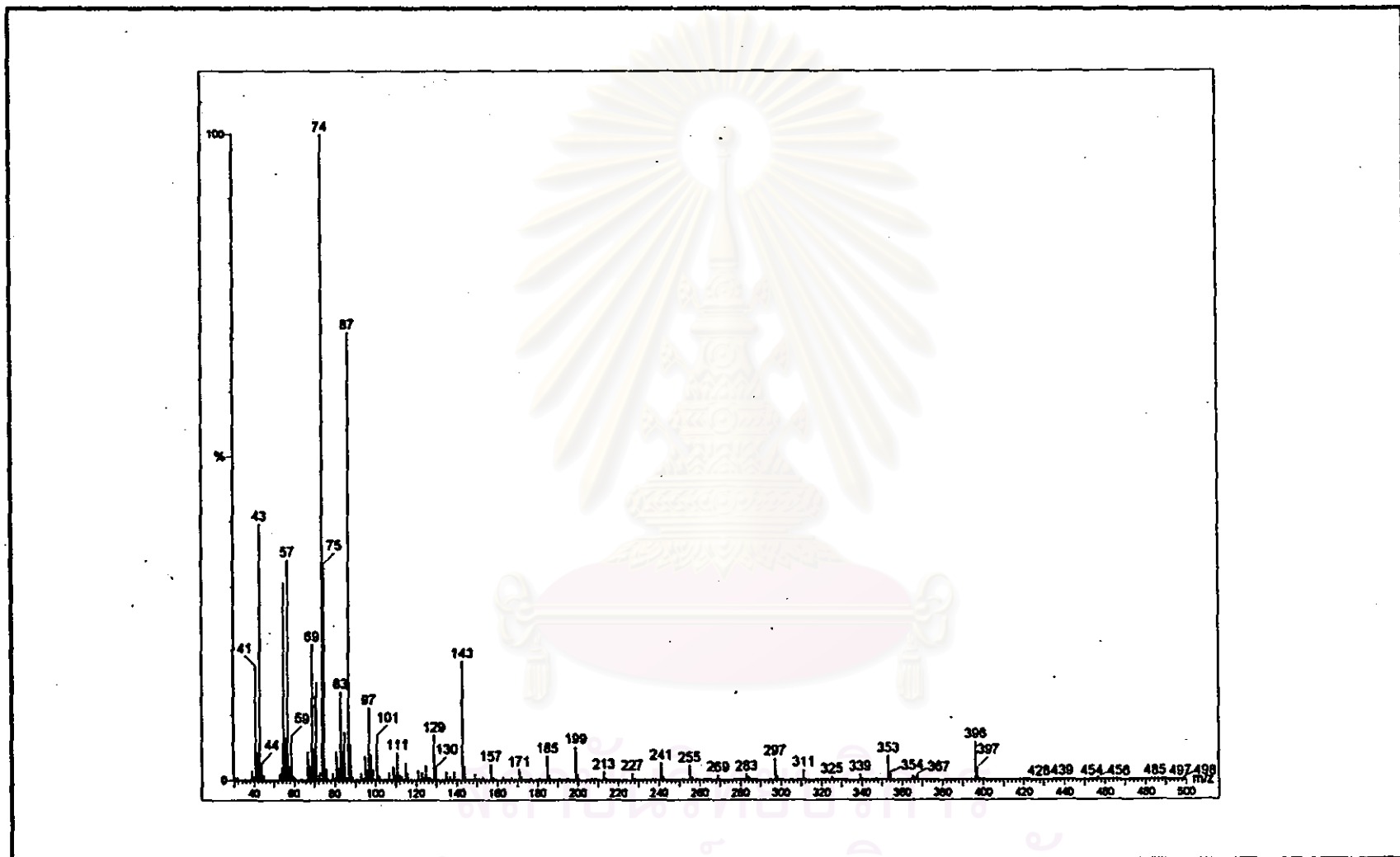


Figure 8 The mass spectrum of Mixture I at retention time 26.51

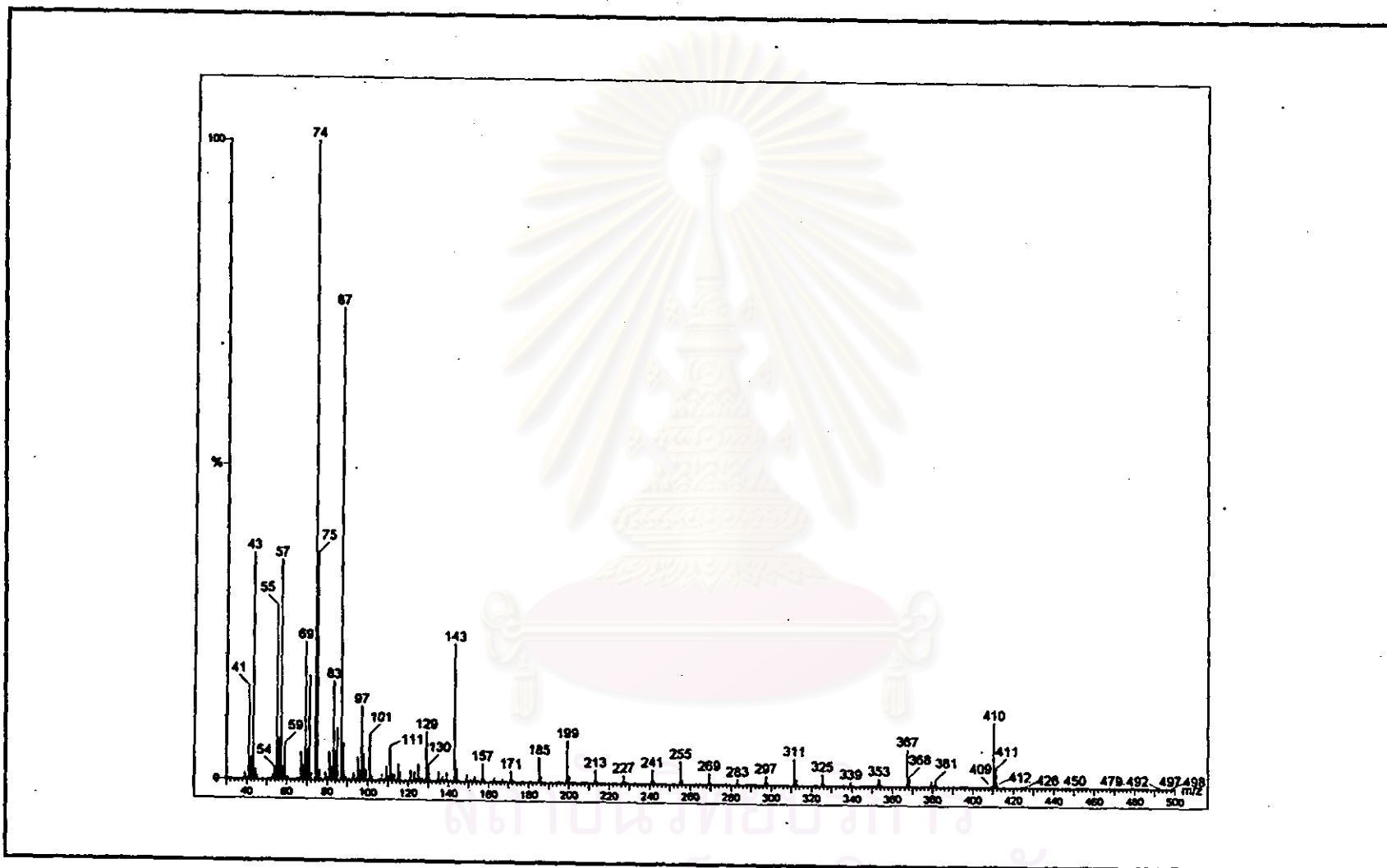


Figure 9 The mass spectrum of Mixture I at retention time 27.49

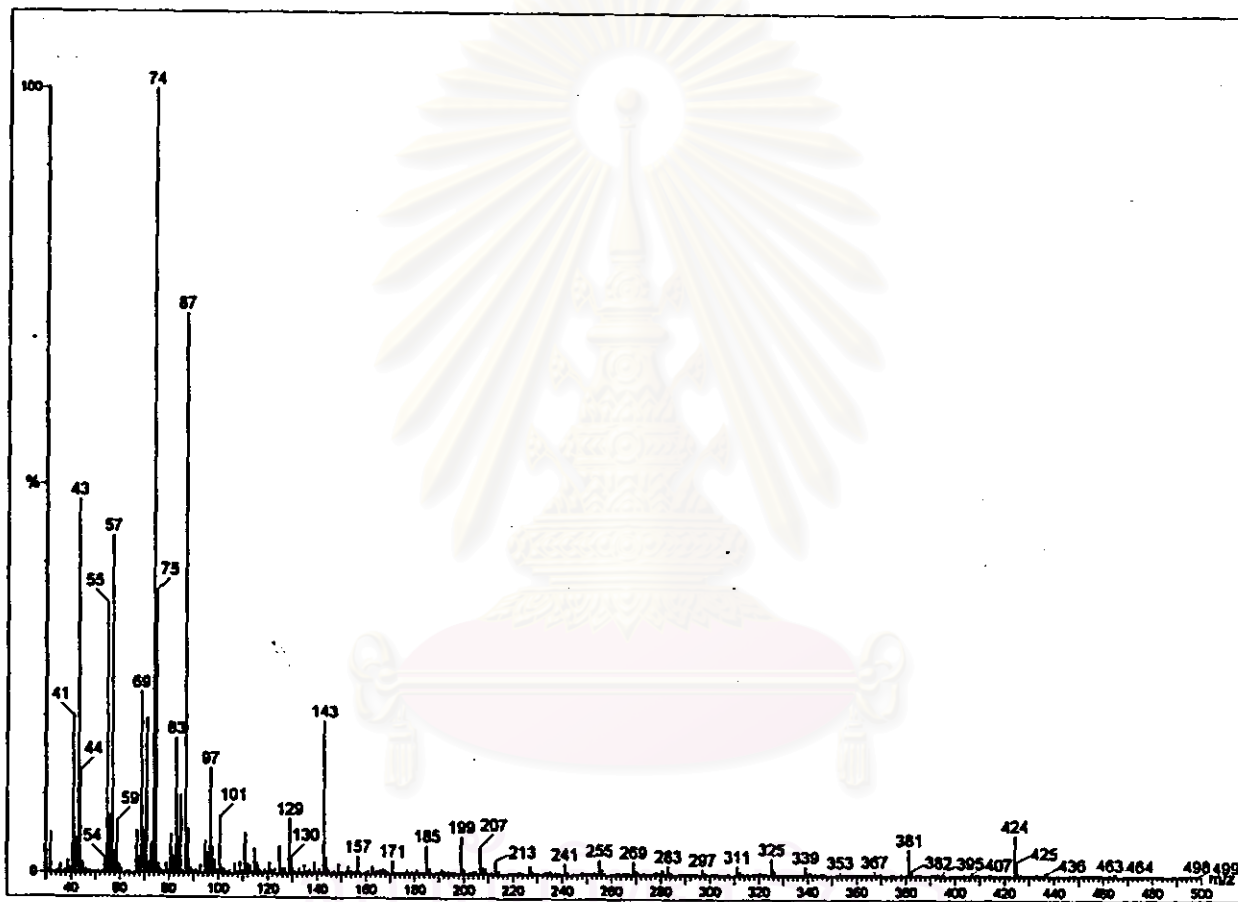


Figure 10 The mass spectrum of Mixture I at retention time 28.39

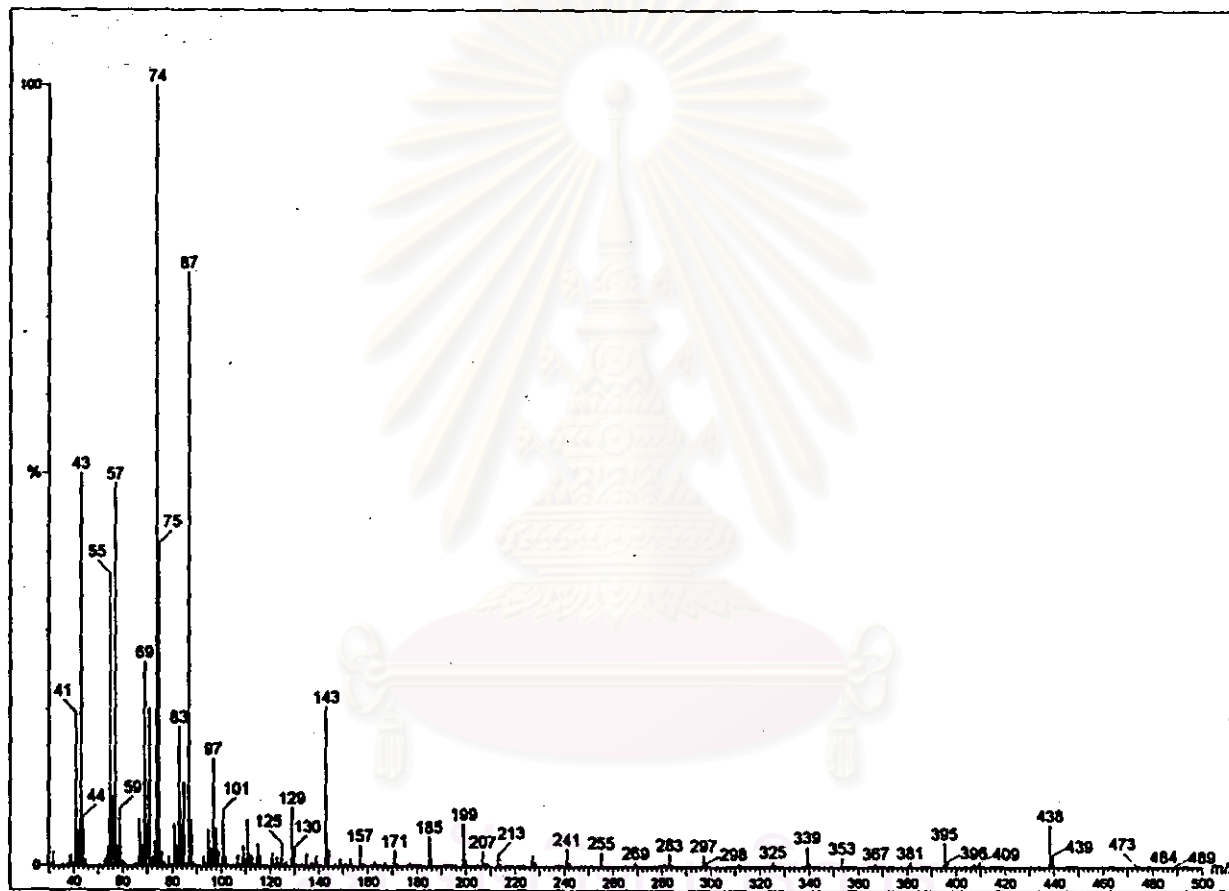


Figure 11 The mass spectrum of Mixture I at retention time 29.25

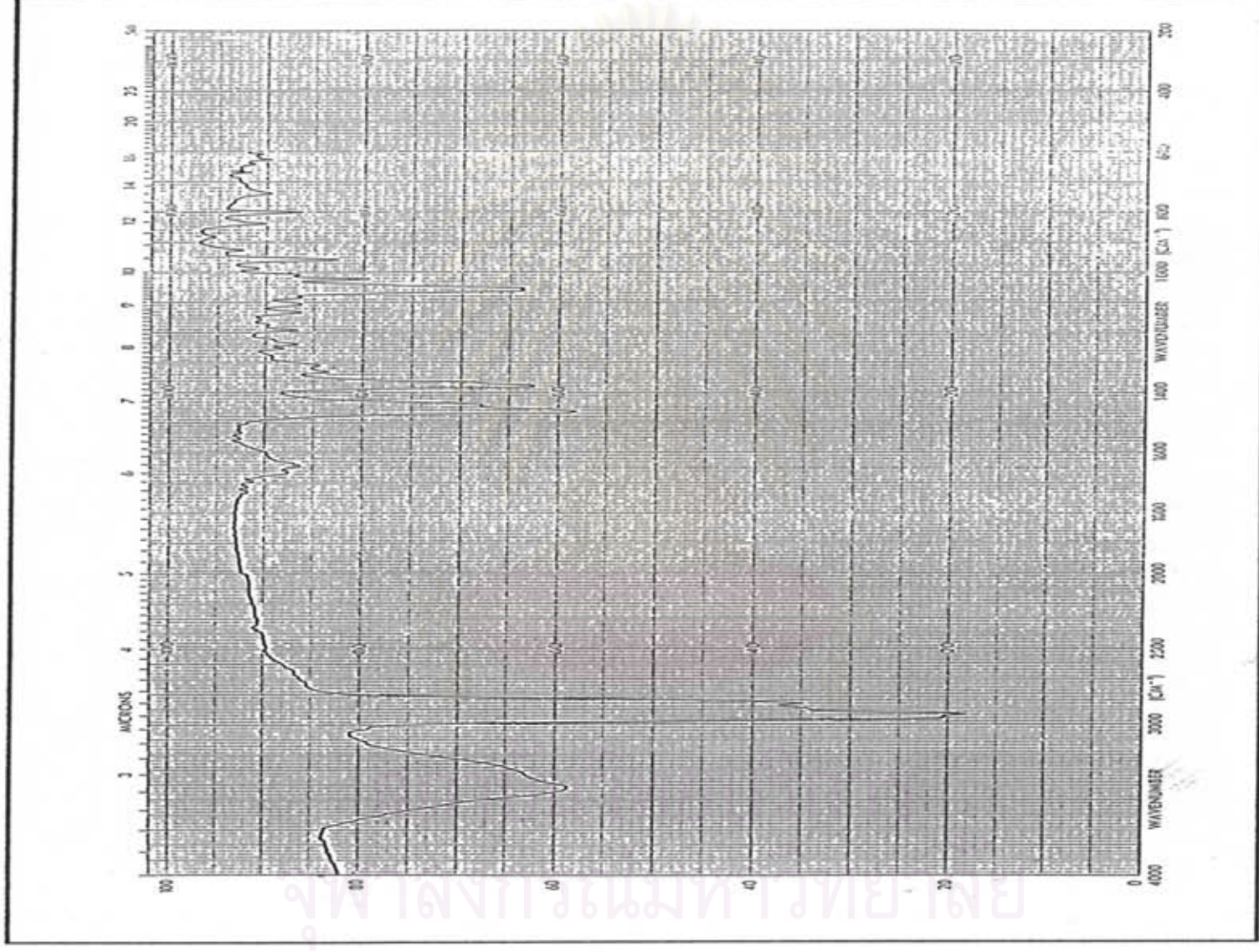


Figure 12 The IR spectrum of Compound II

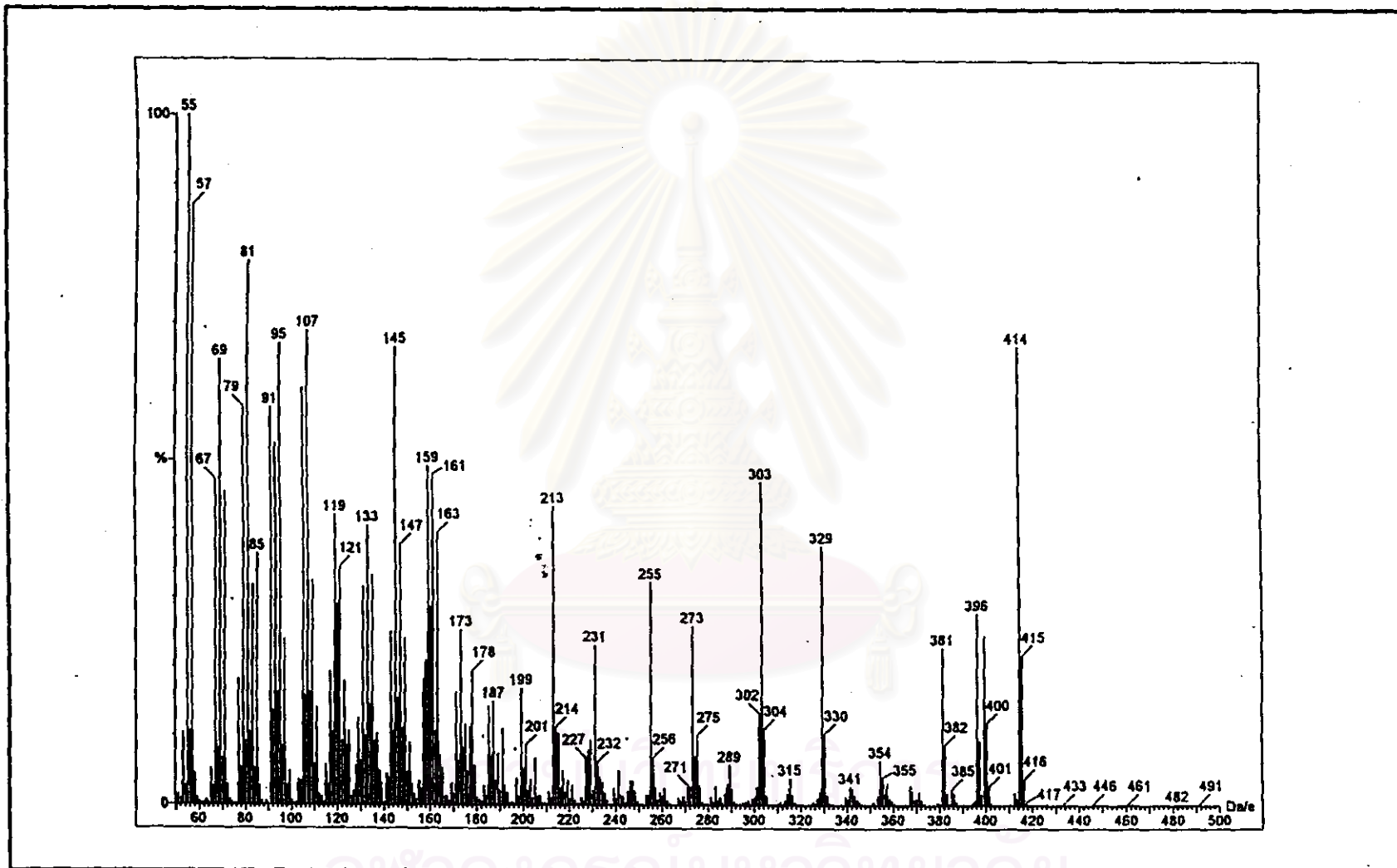


Figure 13 The mass spectrum of Compound II

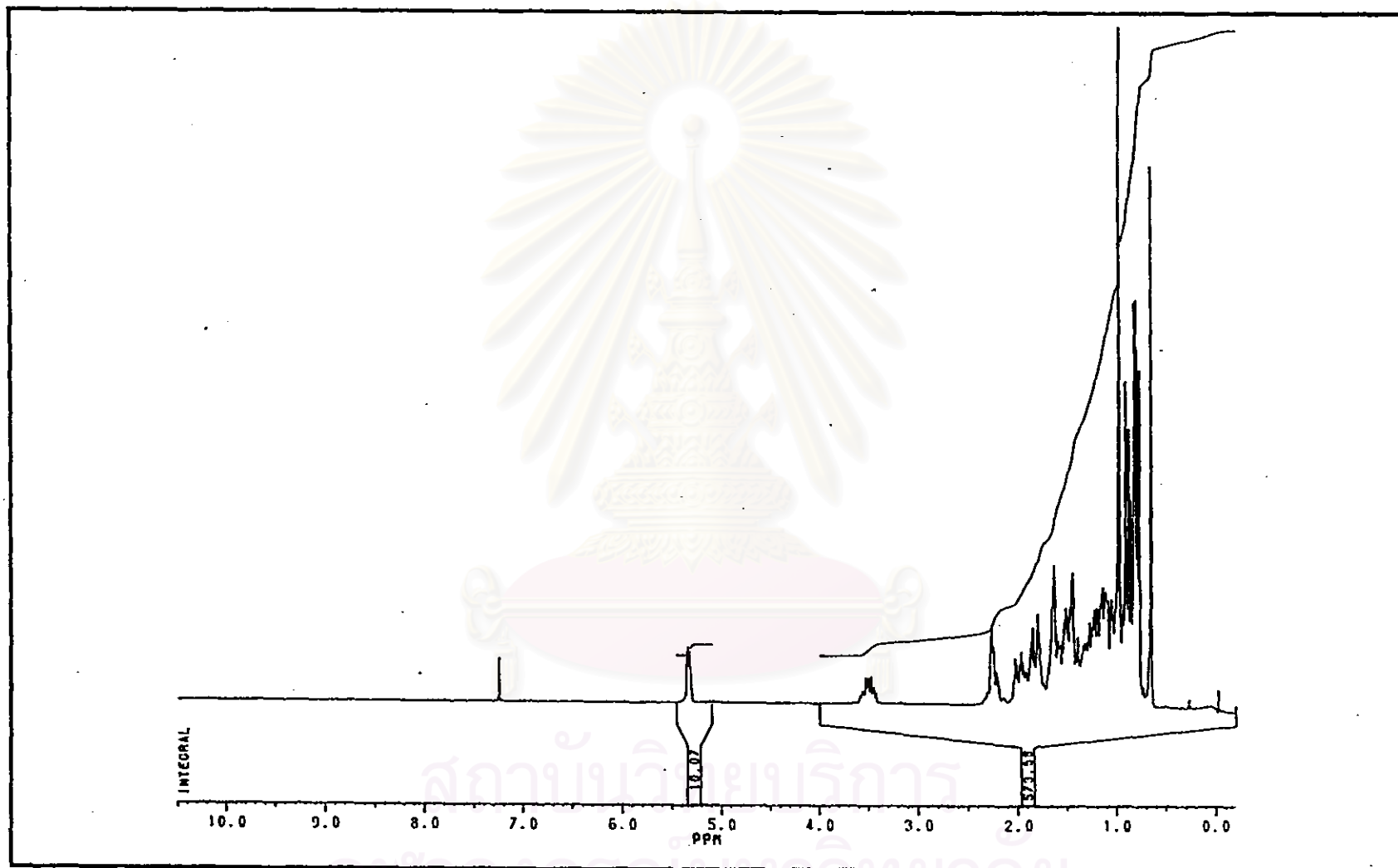


Figure 14 The $^1\text{H-NMR}$ spectrum of Compound II

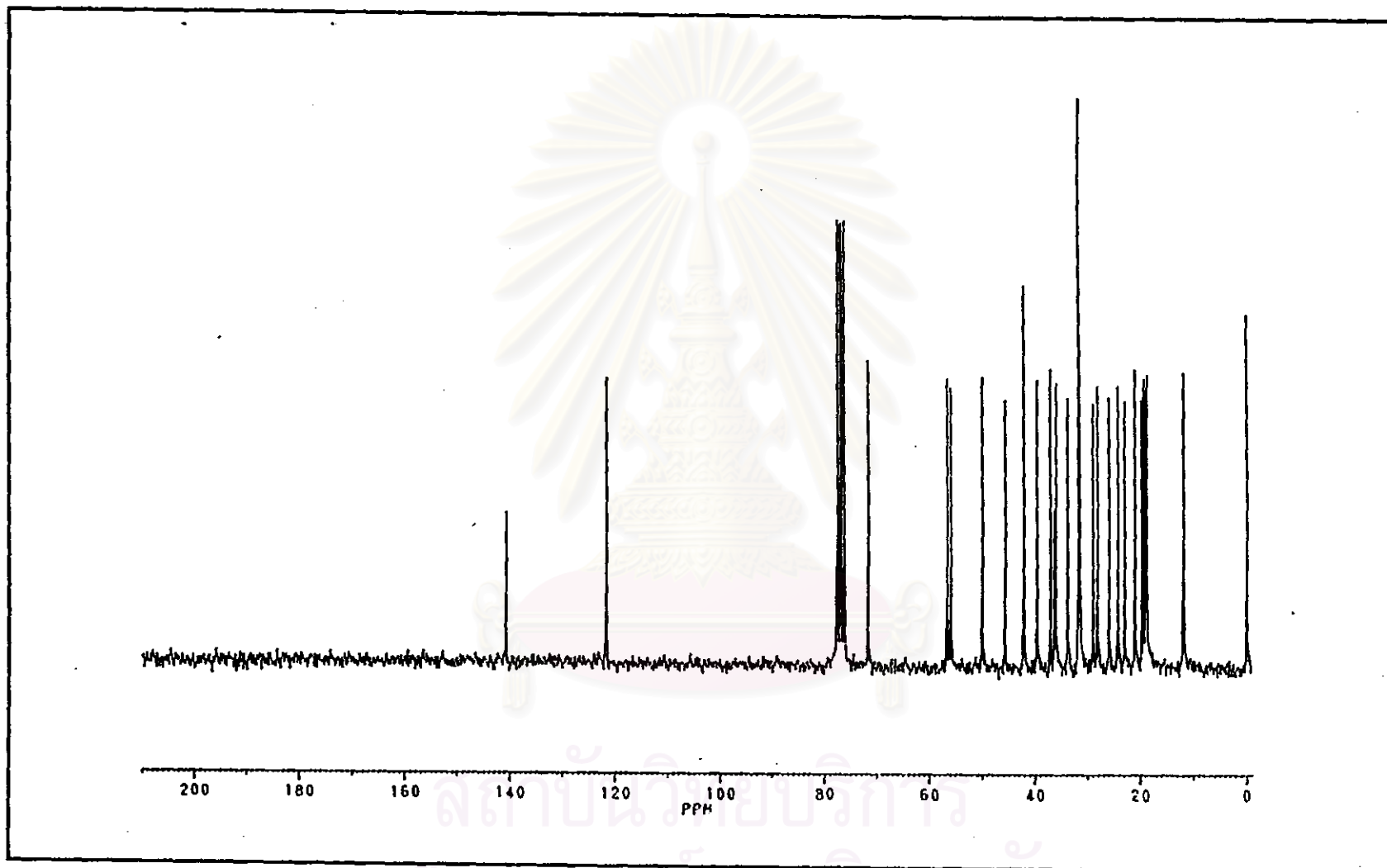


Figure15 The ^{13}C -NMR spectrum of Compound II

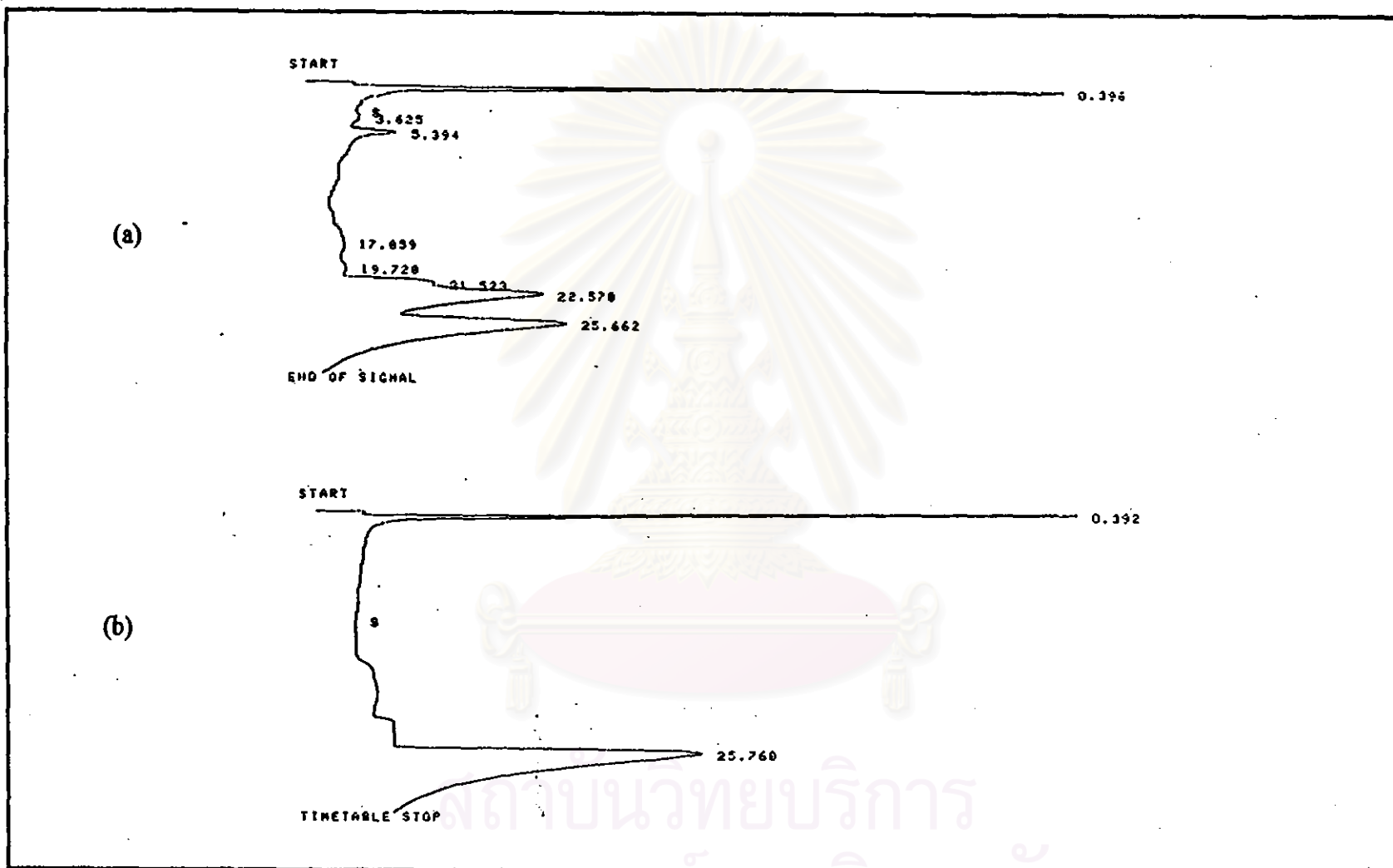


Figure 16 The GLC chromatograms of

(a) standard steroid : campesterol, stigmasterol, β -sitosterol

(b) Compound II

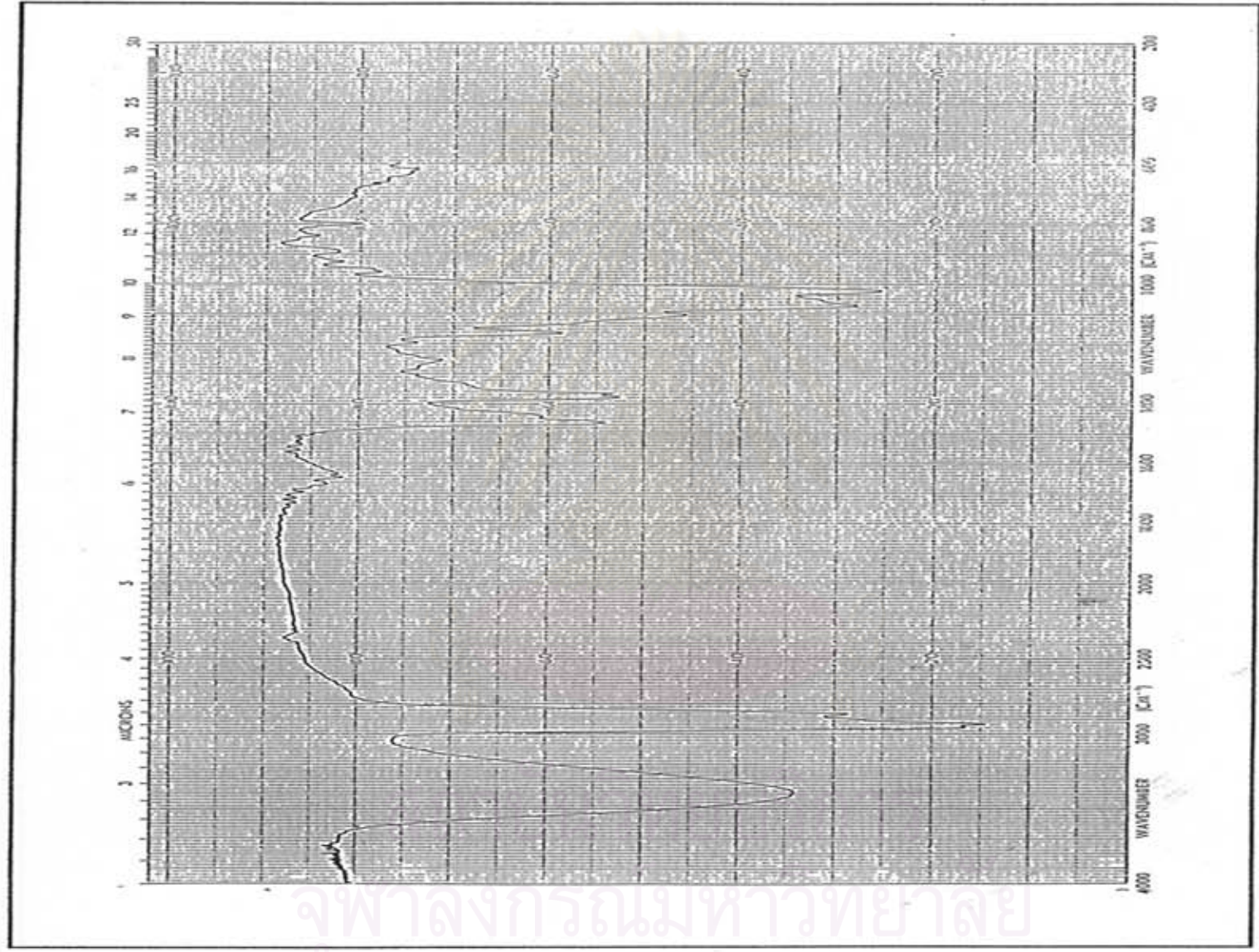


Figure 17 The IR spectrum of Compound III

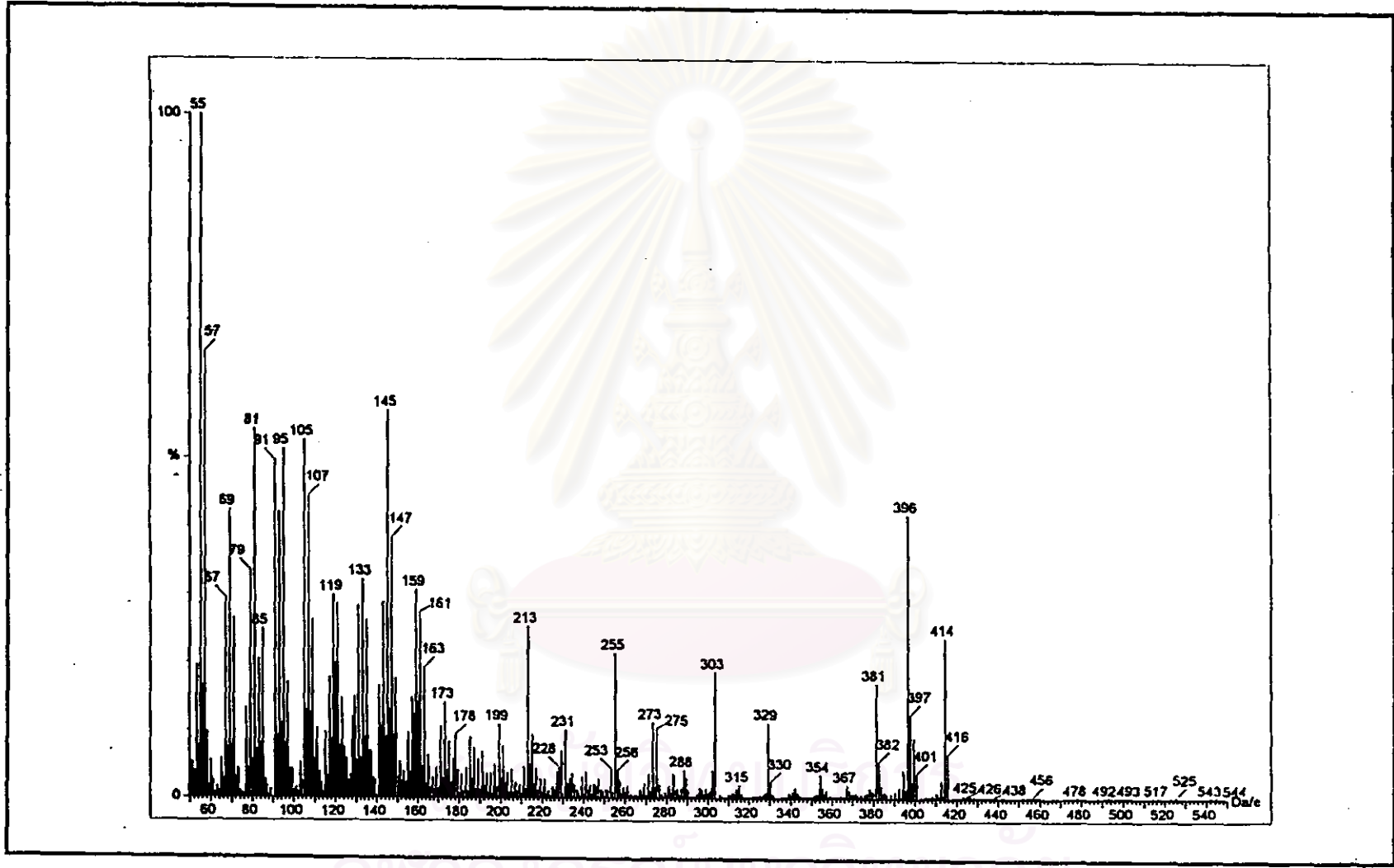


Figure 18 The mass spectrum of Compound III

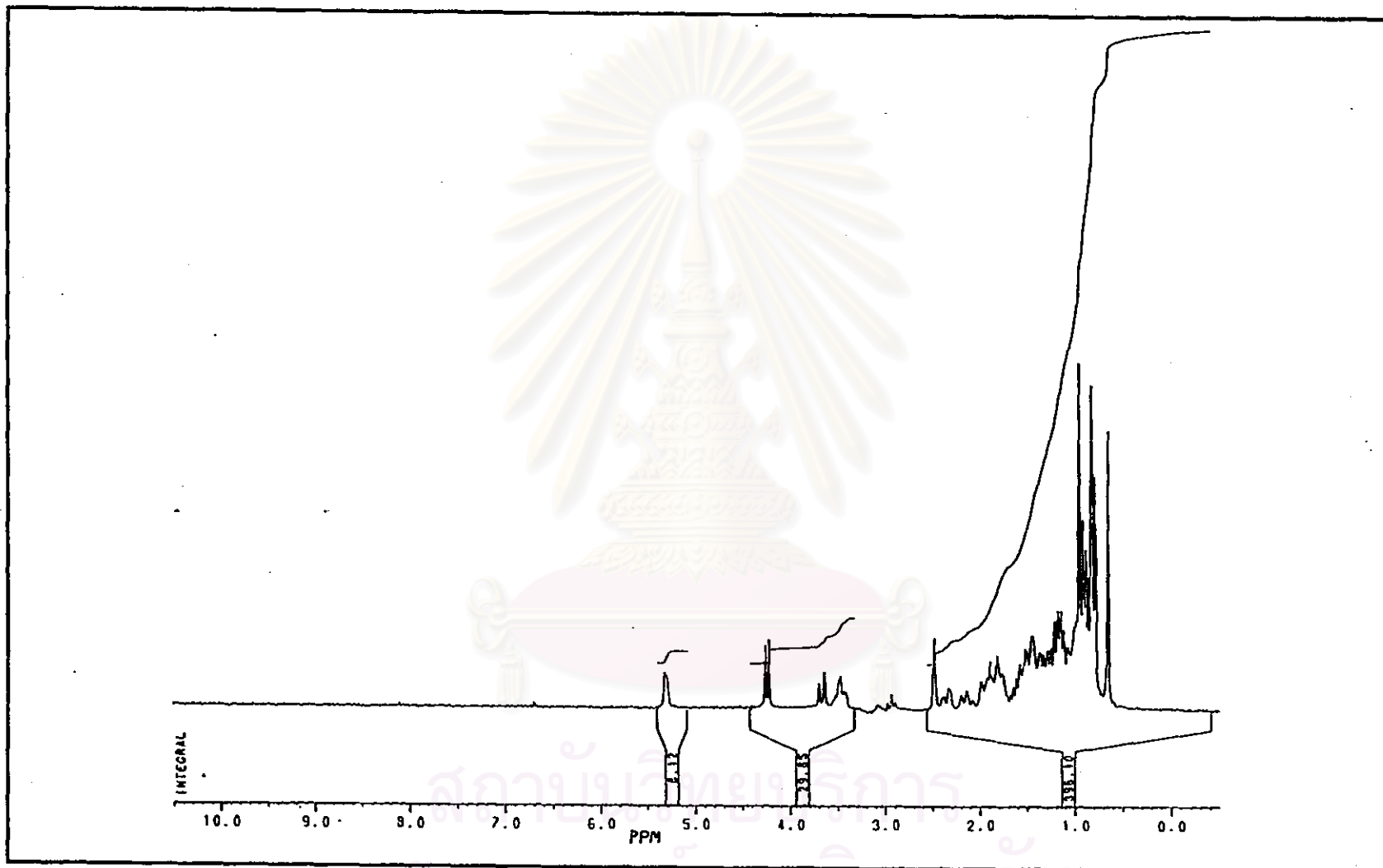


Figure 19 The $^1\text{H-NMR}$ spectrum of Compound III

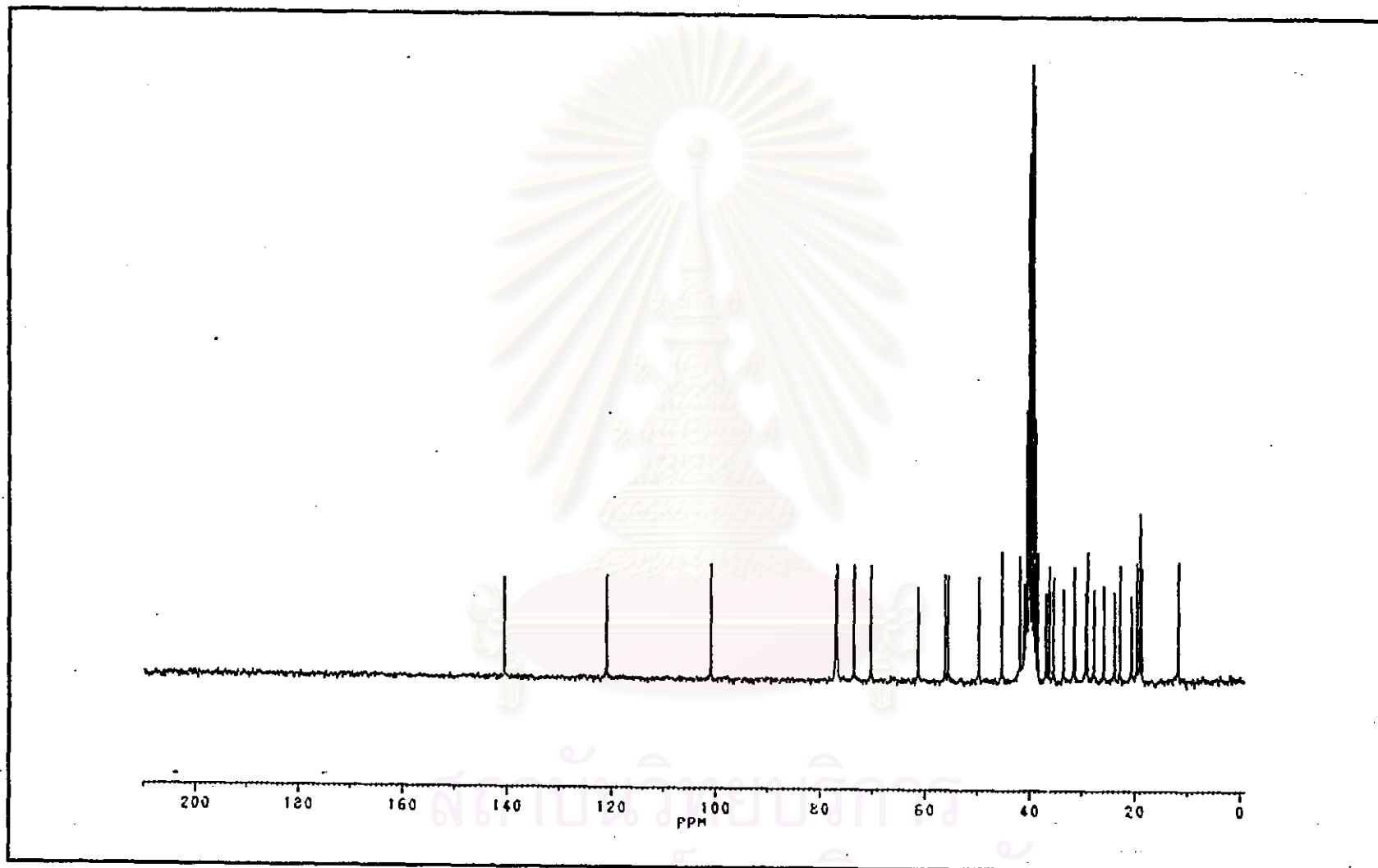


Figure 20 The ^{13}C -NMR spectrum of Compound III

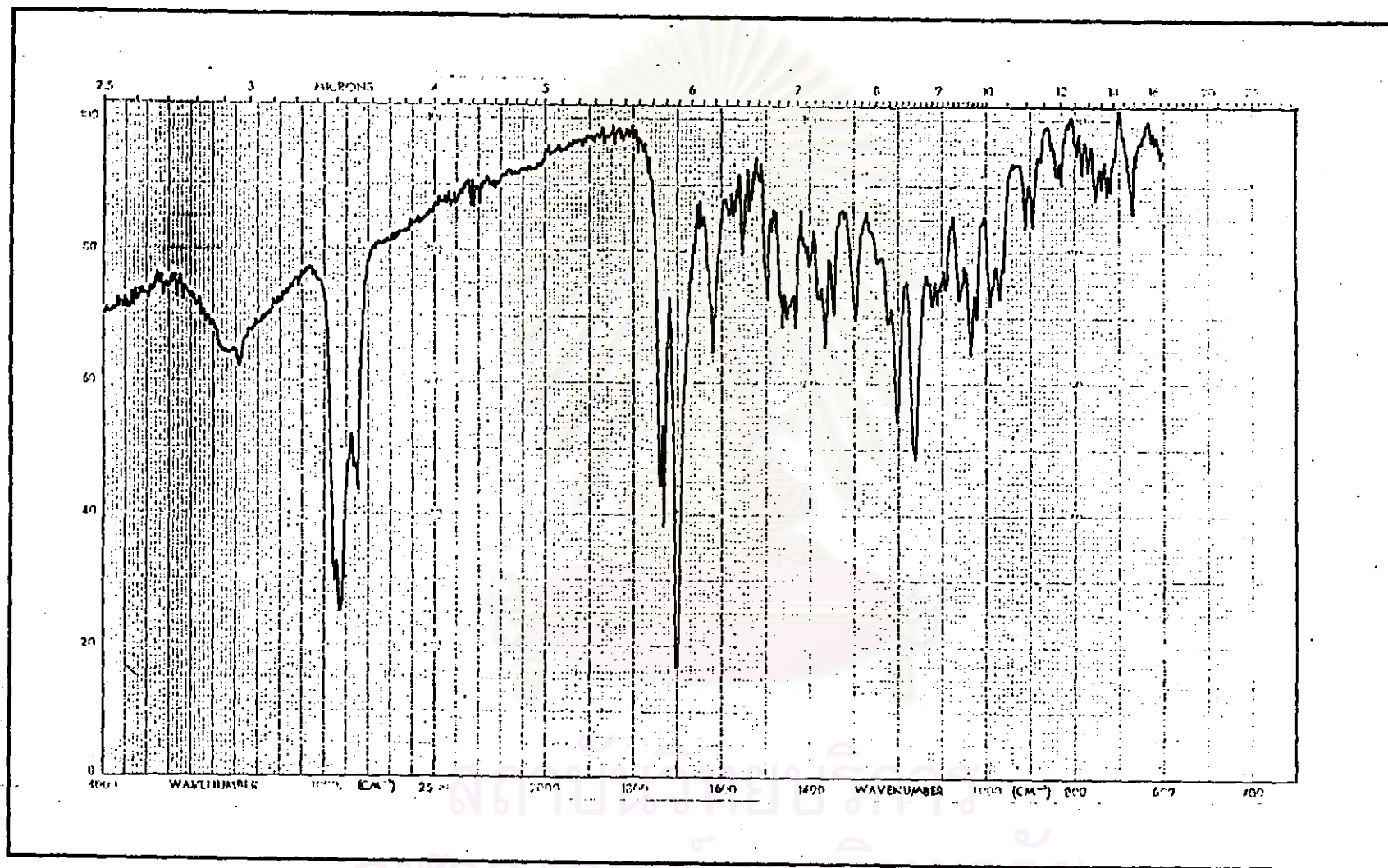


Figure 21 The IR spectrum of Compound IV

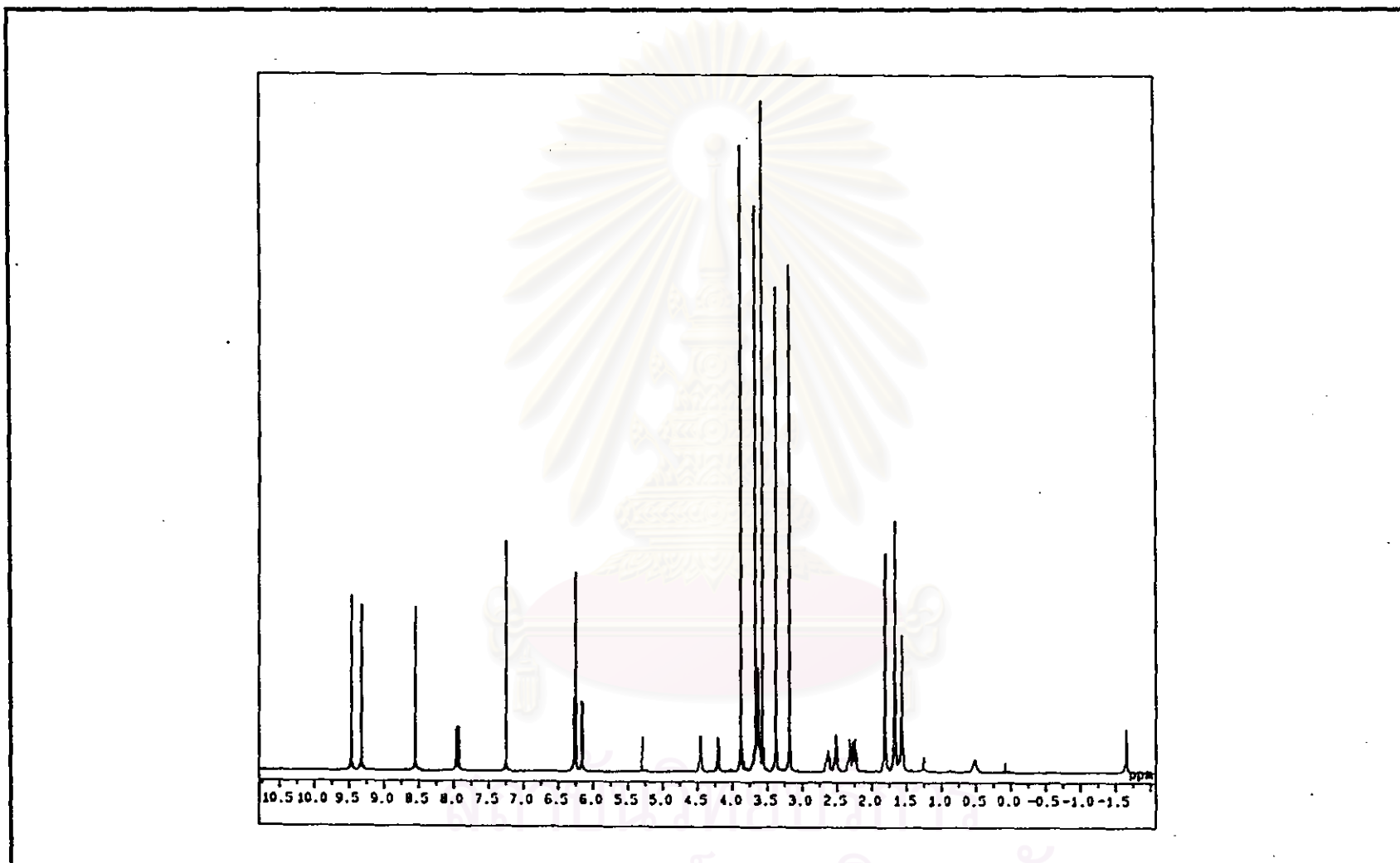


Figure 22 The $^1\text{H-NMR}$ spectrum of Compound IV

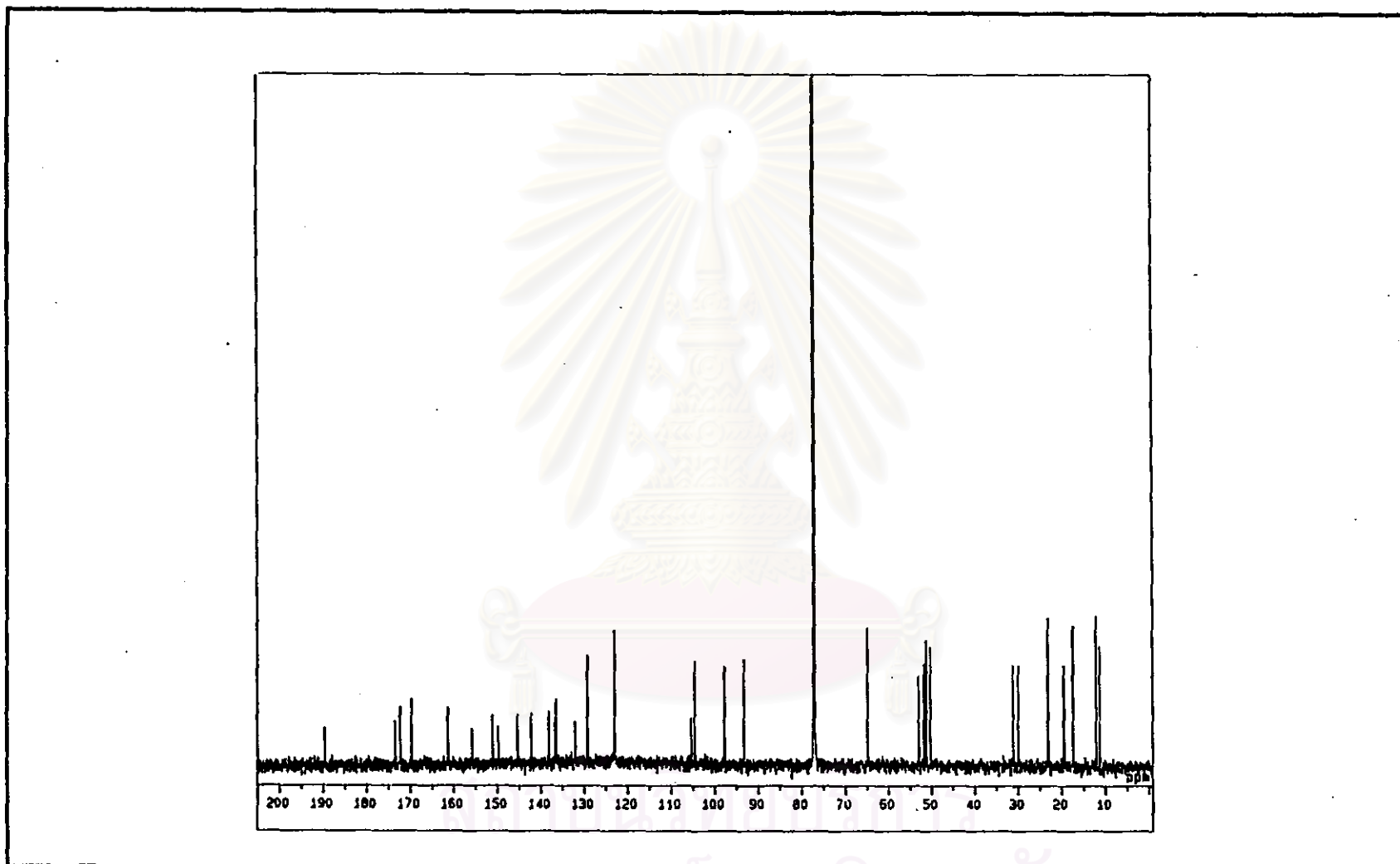


Figure 23 The ^{13}C -NMR spectrum of Compound IV

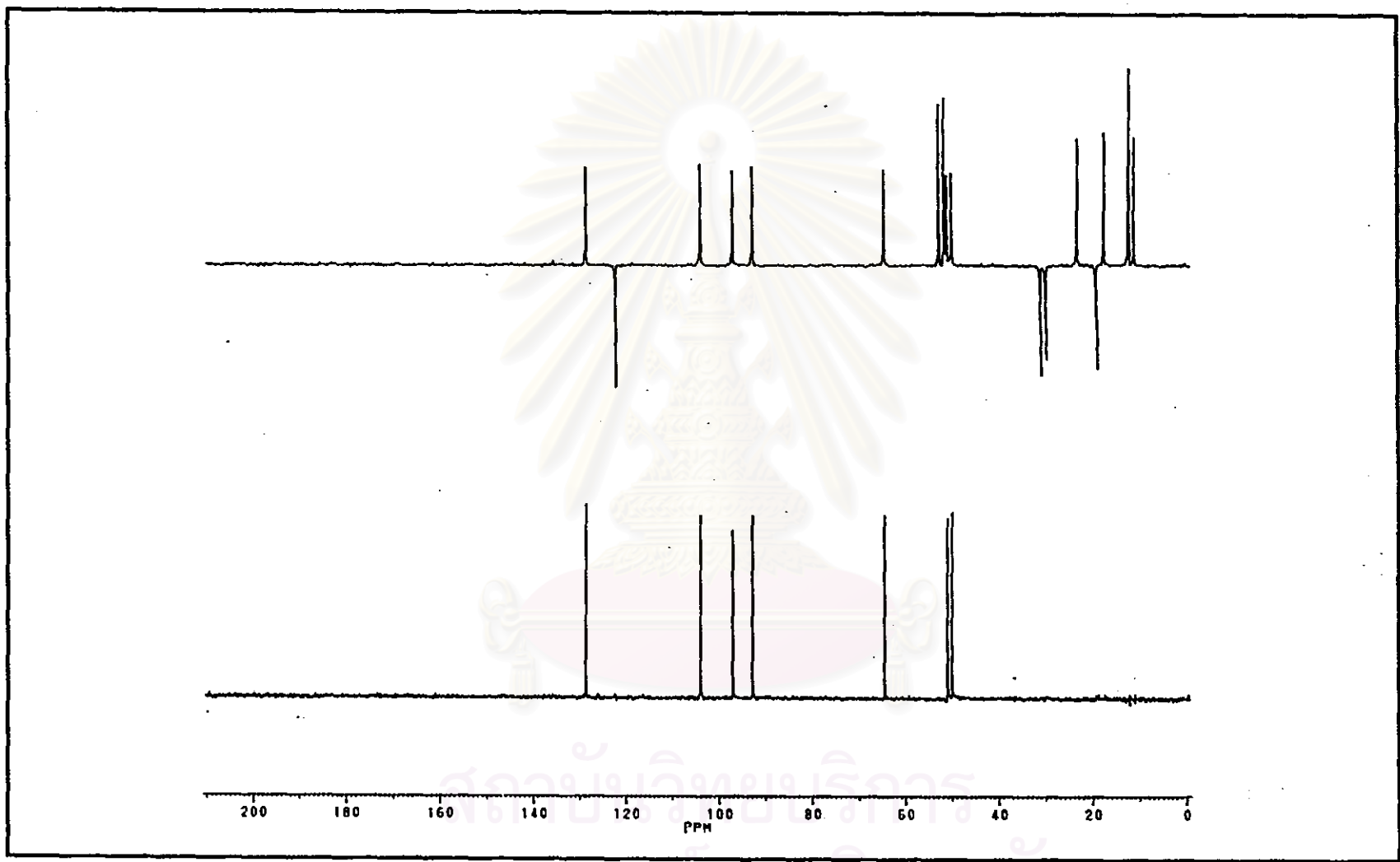


Figure 24 The DEPT 135 and DEPT 90 NMR spectrum of Compound IV

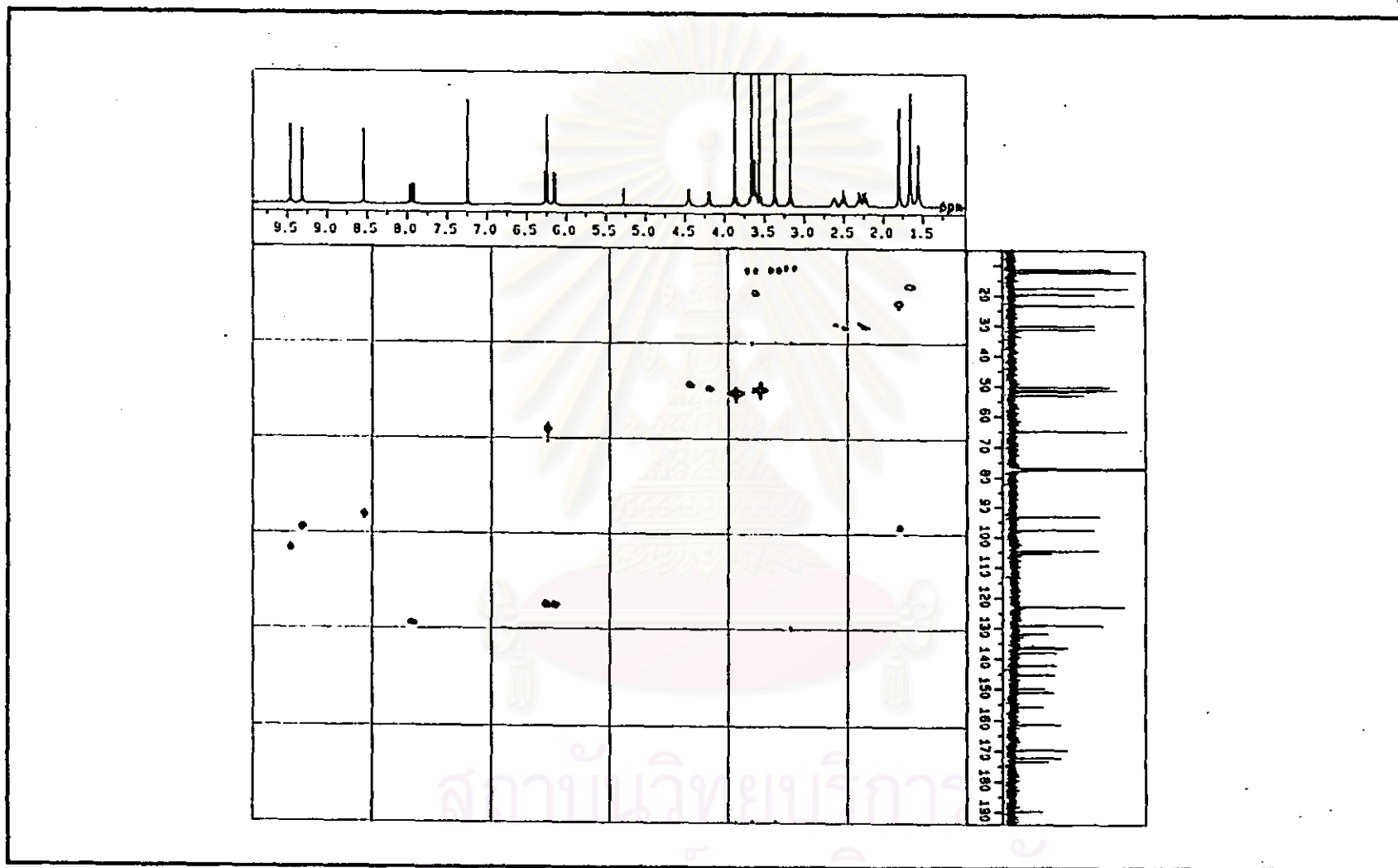


Figure 25 The HMQC spectrum of Compound IV

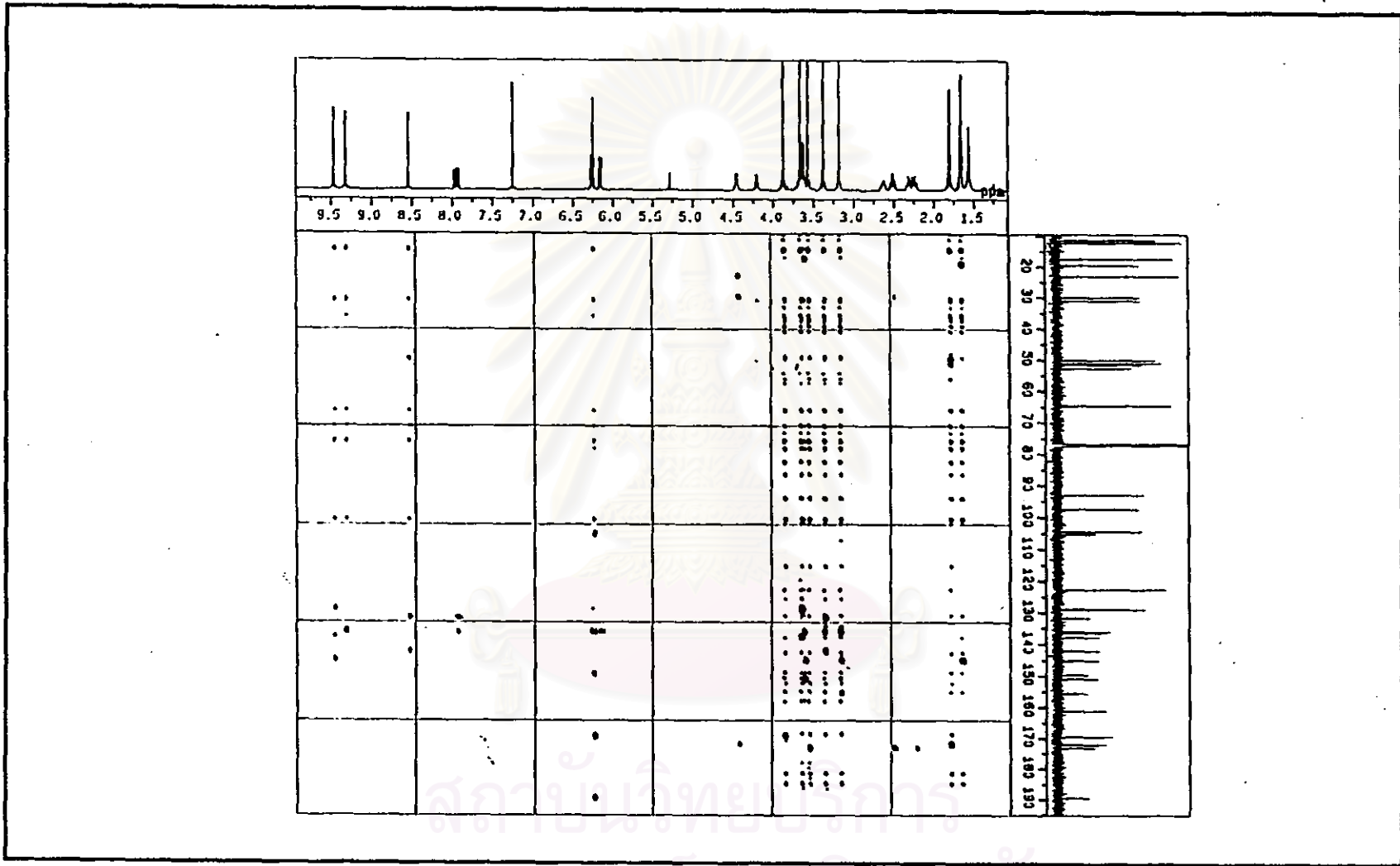


Figure 26 The HMBC spectrum of Compound IV

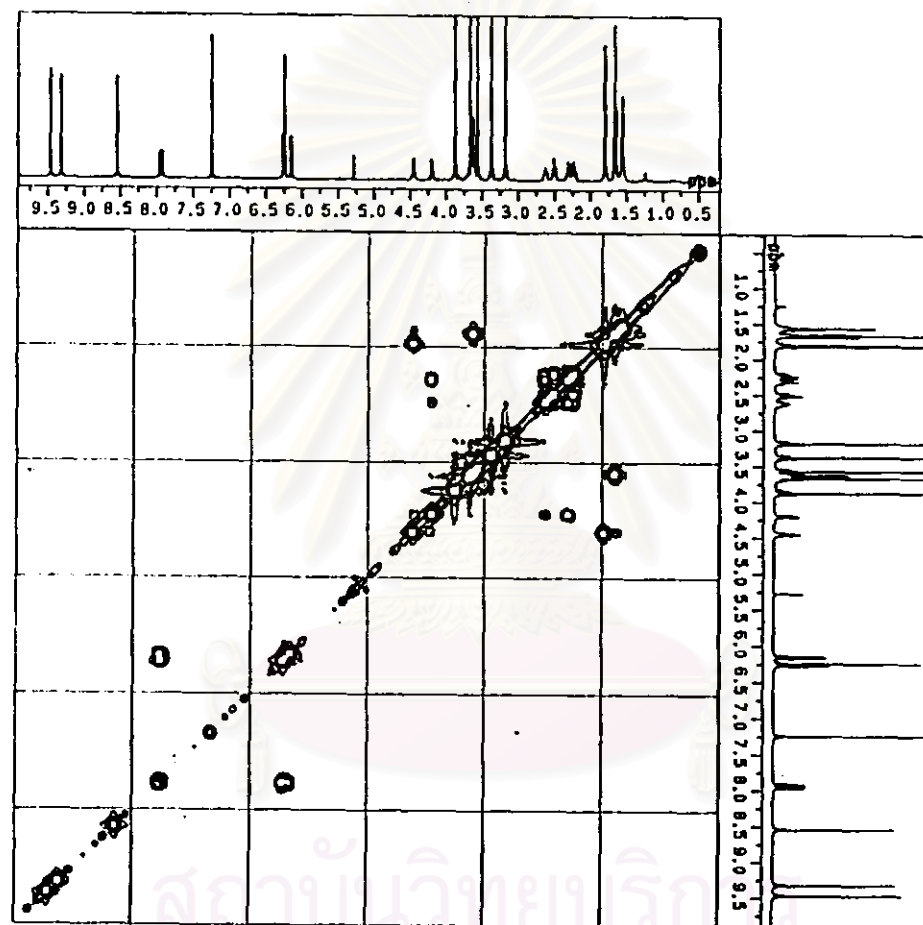


Figure 27 The COSY of Compound IV

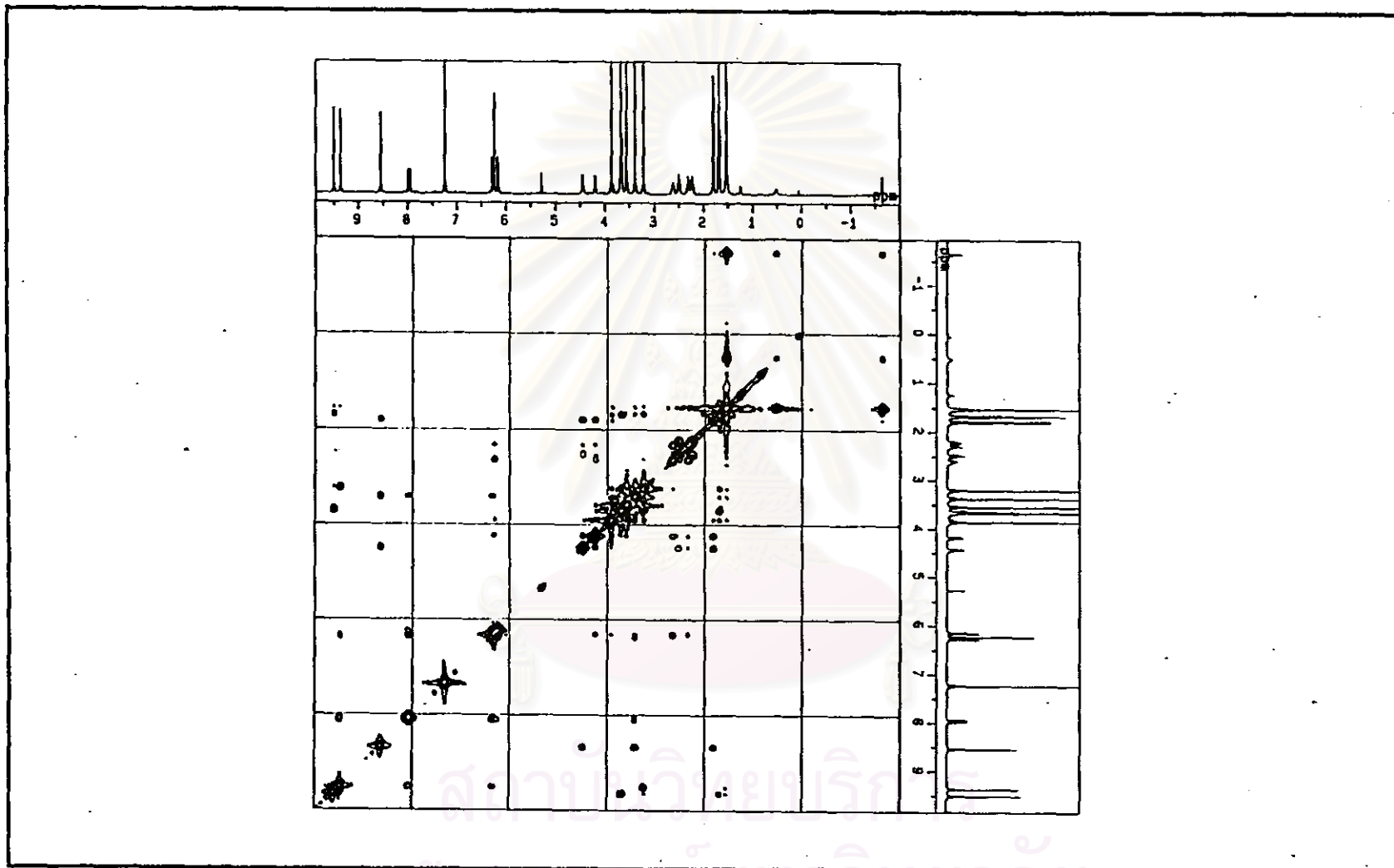


Figure 28 The NOESY of Compound IV

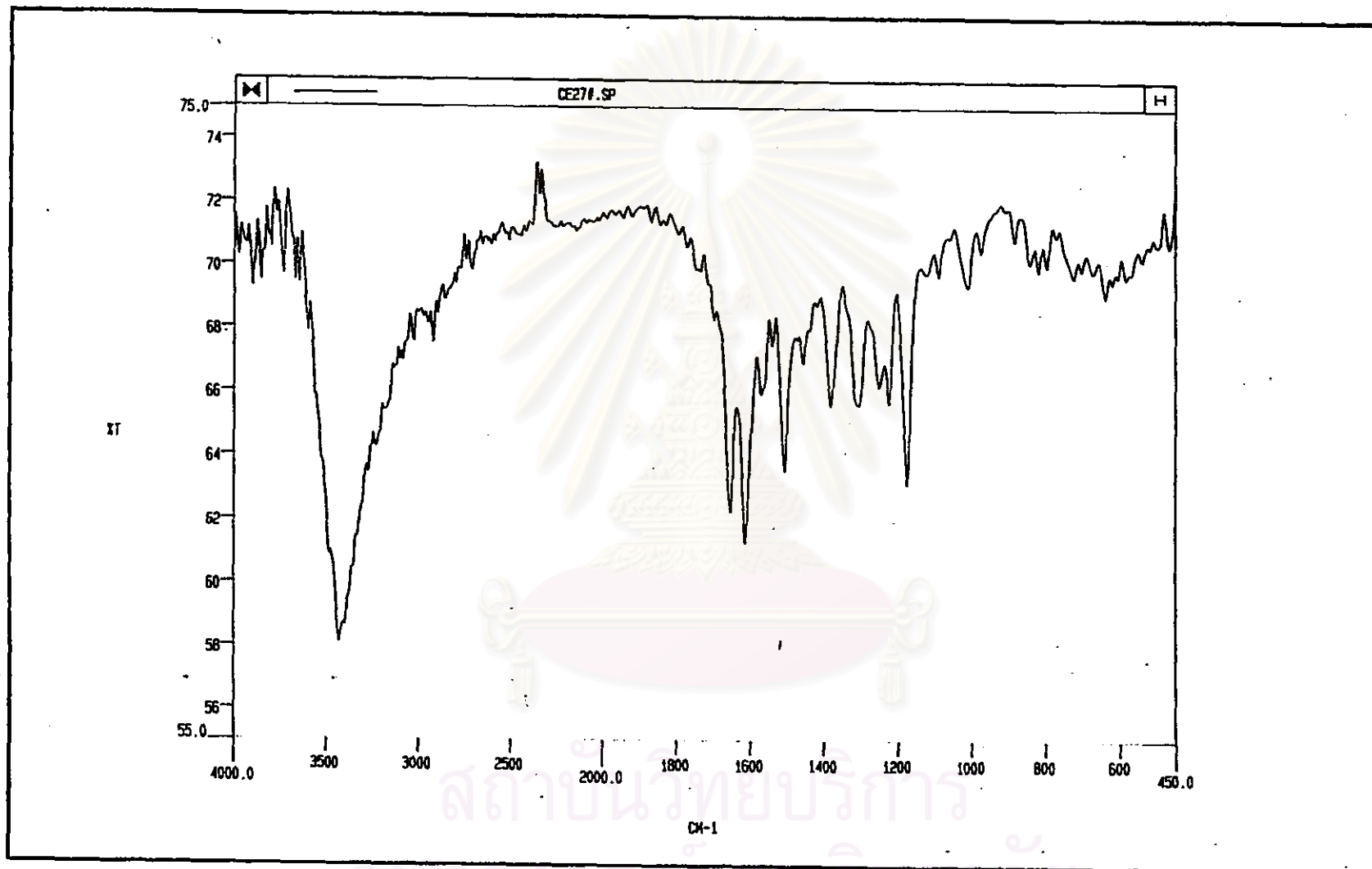


Figure 29 The IR spectrum of Compound V

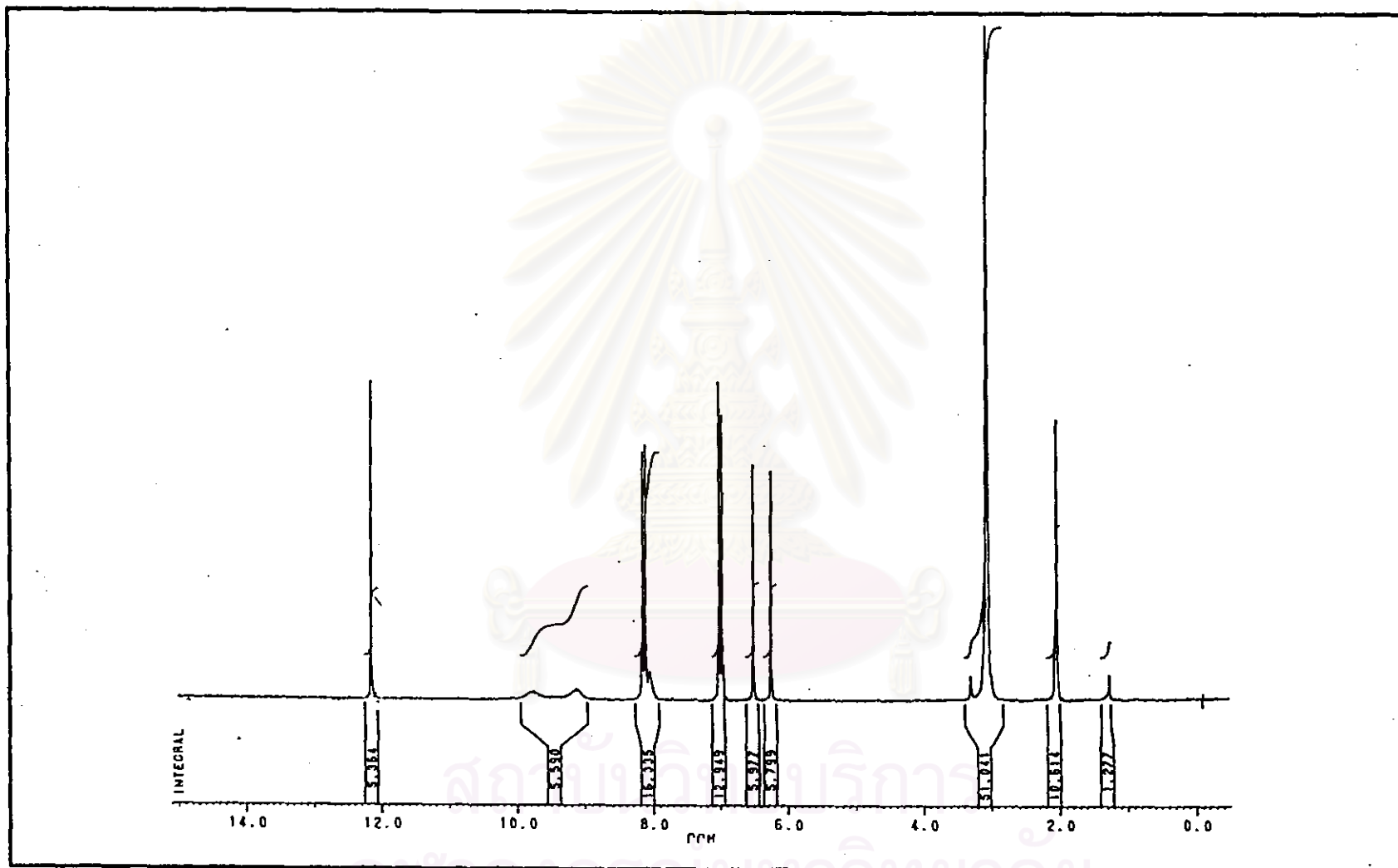


Figure 30 The $^1\text{H-NMR}$ spectrum of Compound V

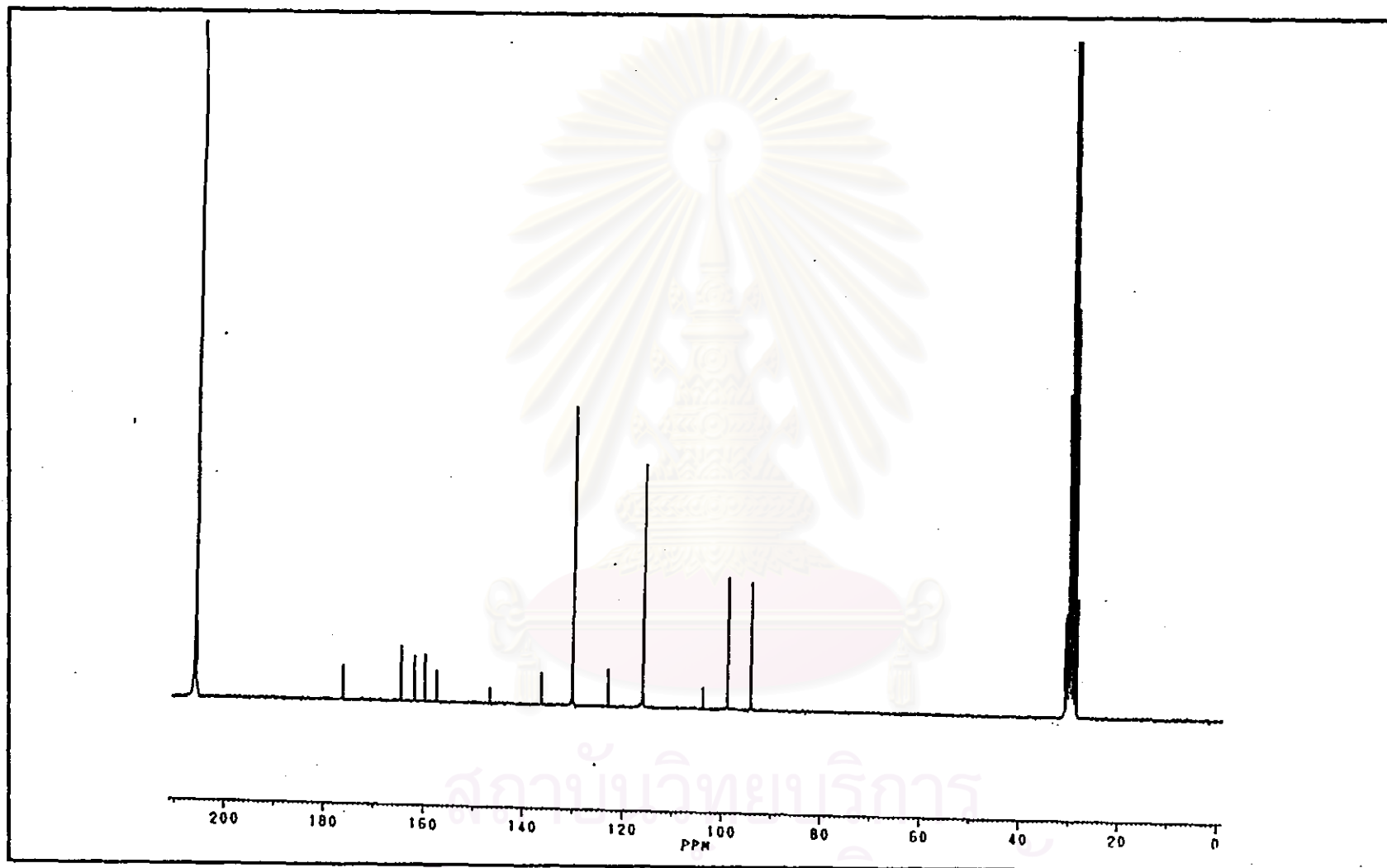


Figure 31 The ^{13}C -NMR spectrum of Compound V

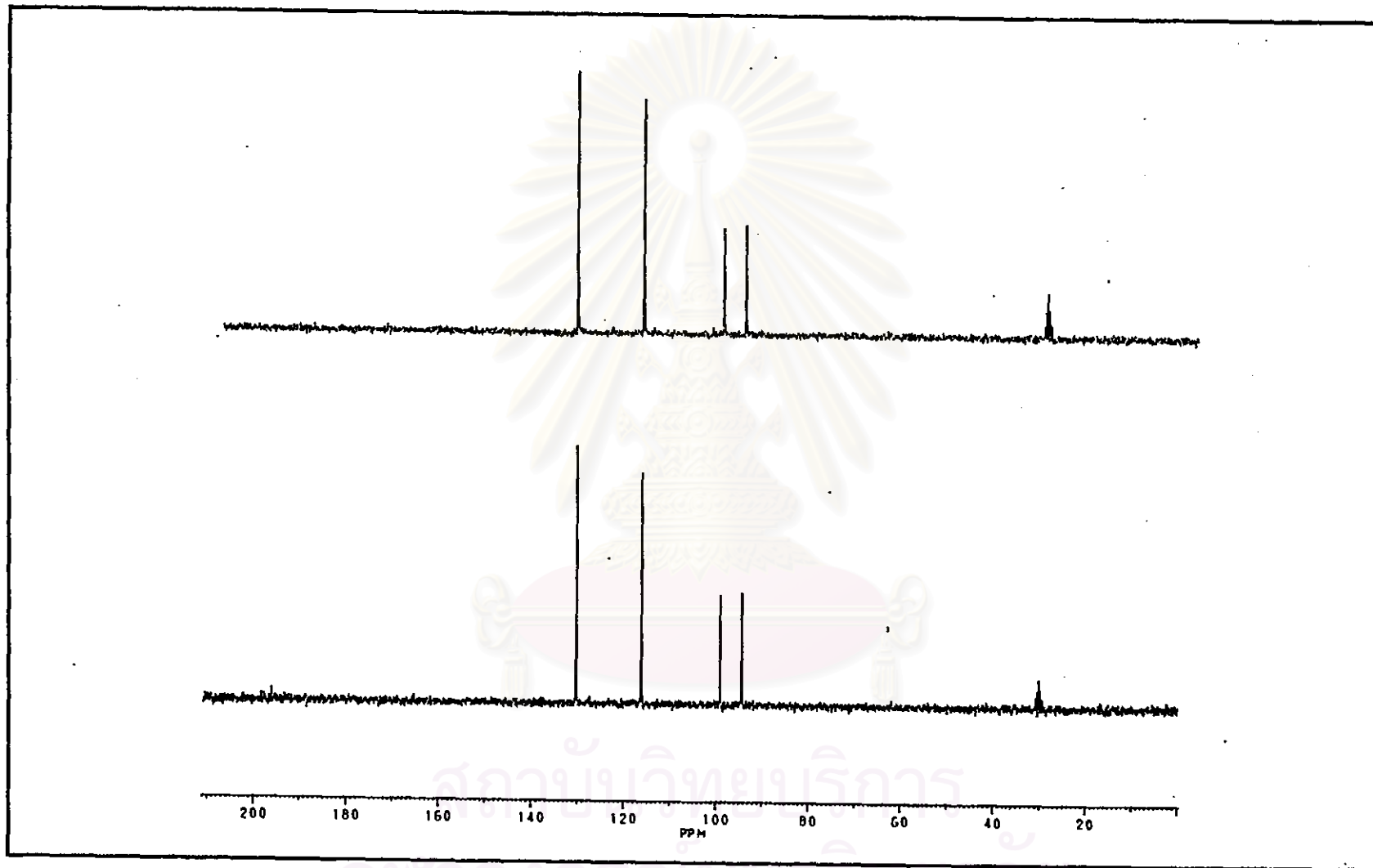


Figure 32 The DEPT 130 and DEPT 90 NMR spectrum of Compound V

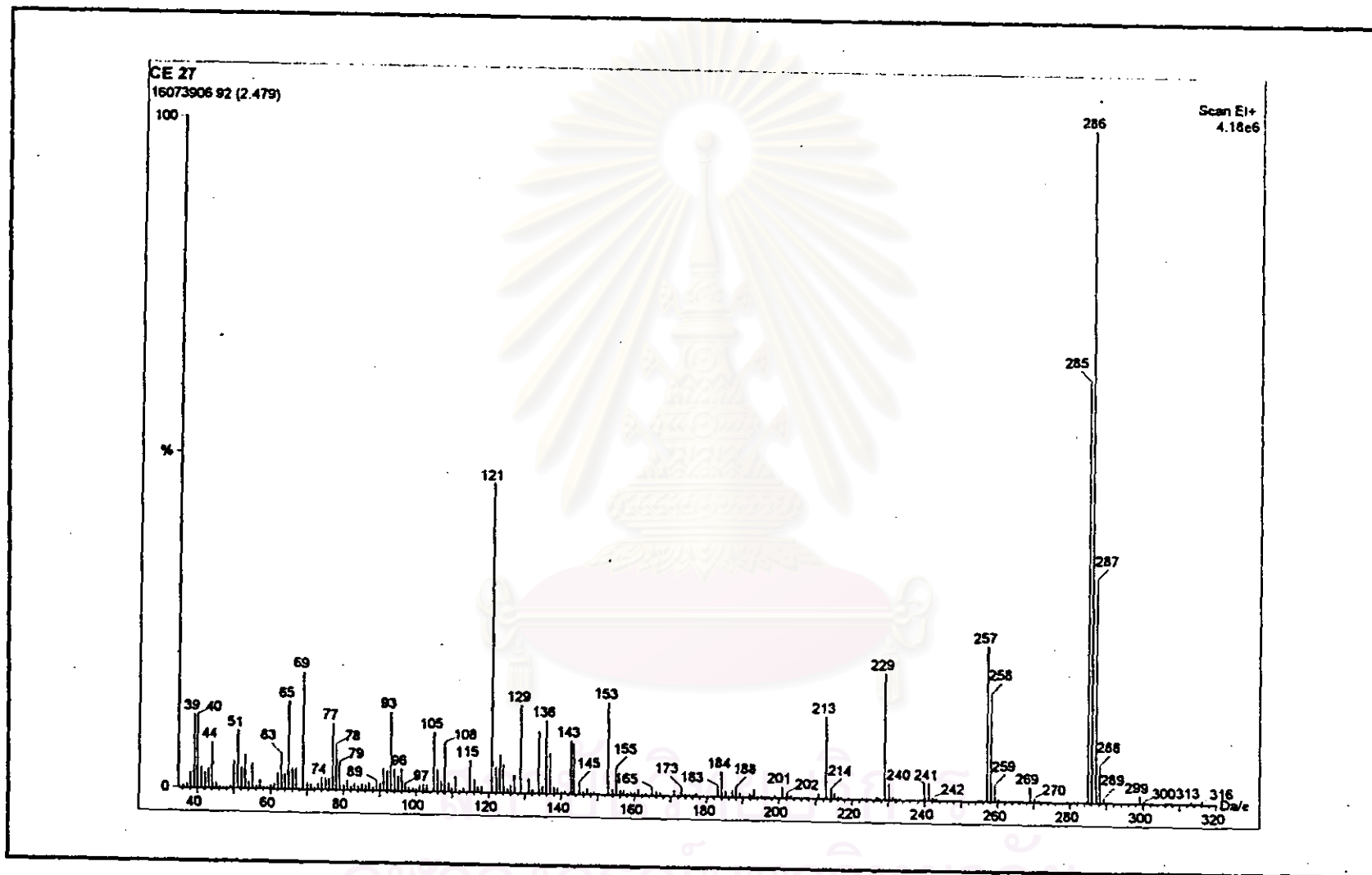


Figure 33 The mass spectrum of Compound V

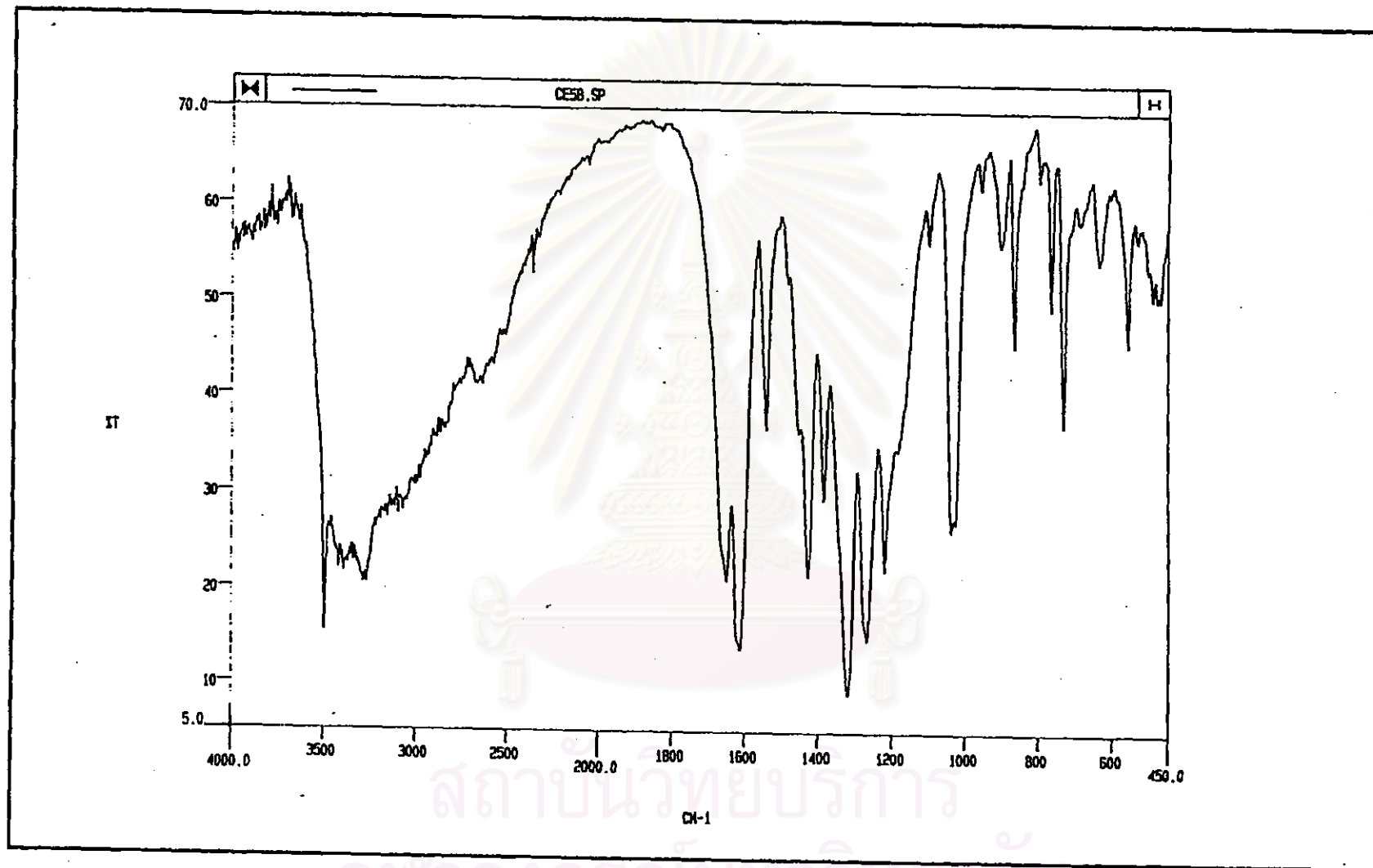


Figure 34 The IR spectrum of Compound VI

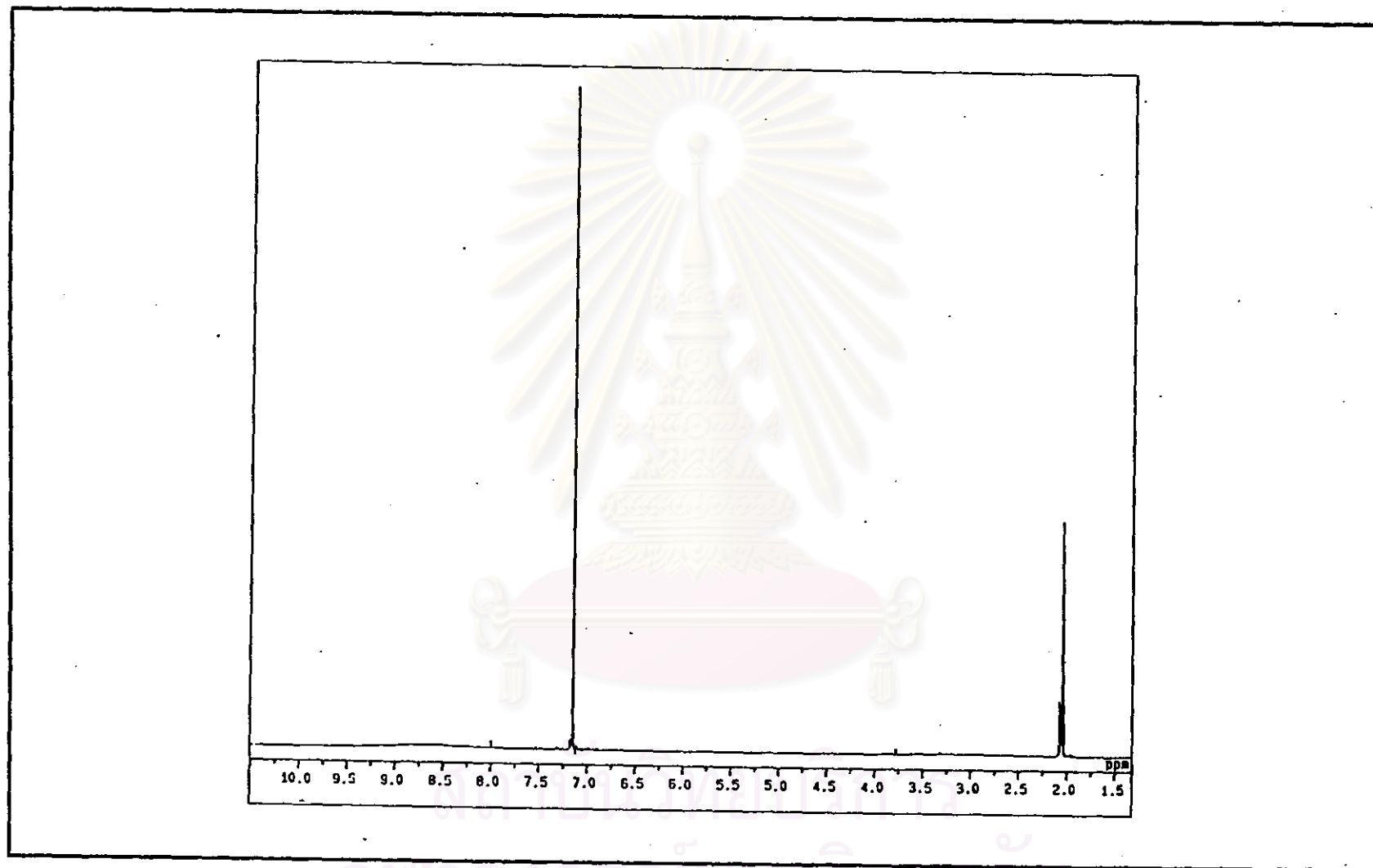


Figure 35 The $^1\text{H-NMR}$ spectrum of Compound VI

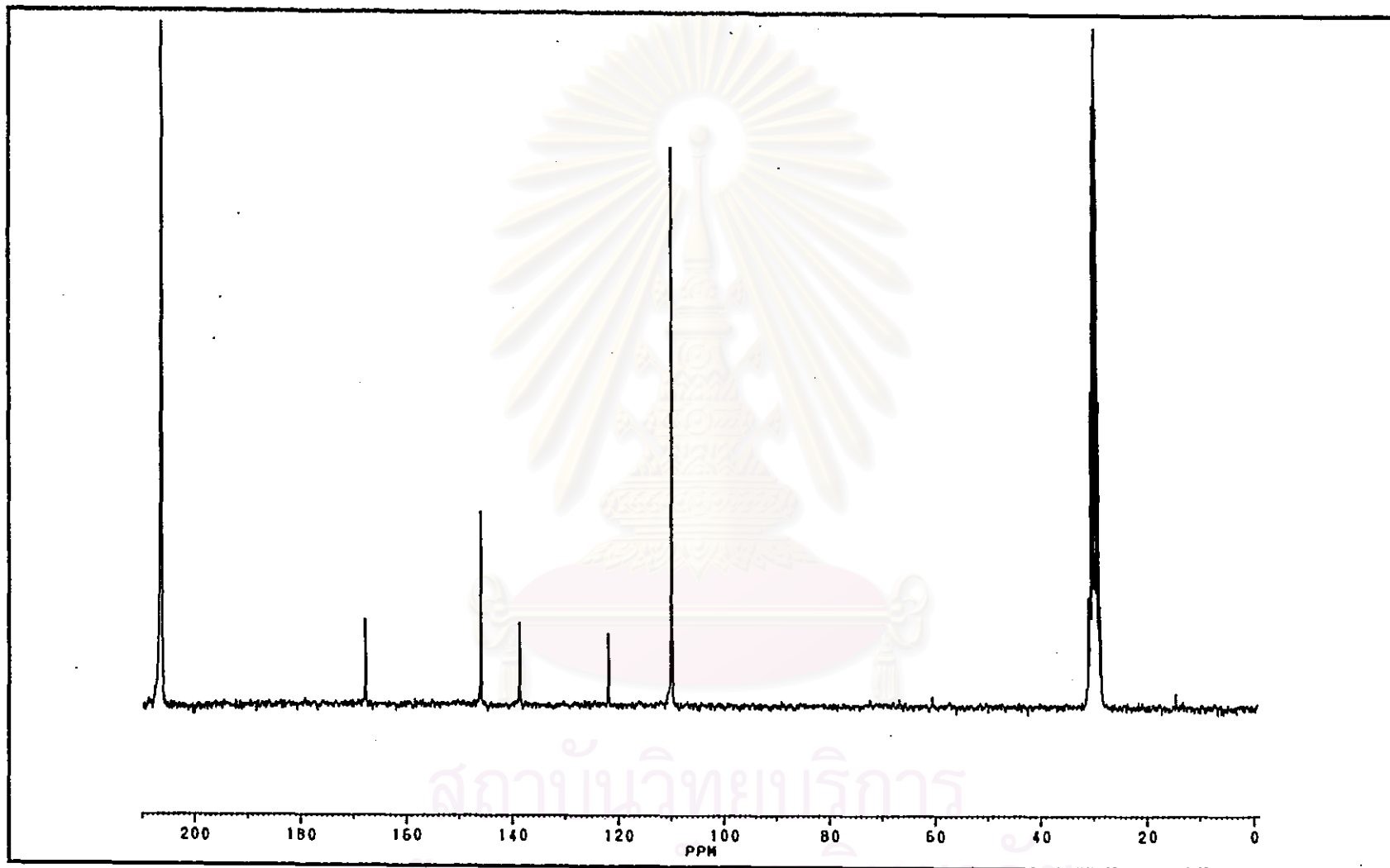


Figure 36 The ^{13}C -NMR spectrum of Compound VI

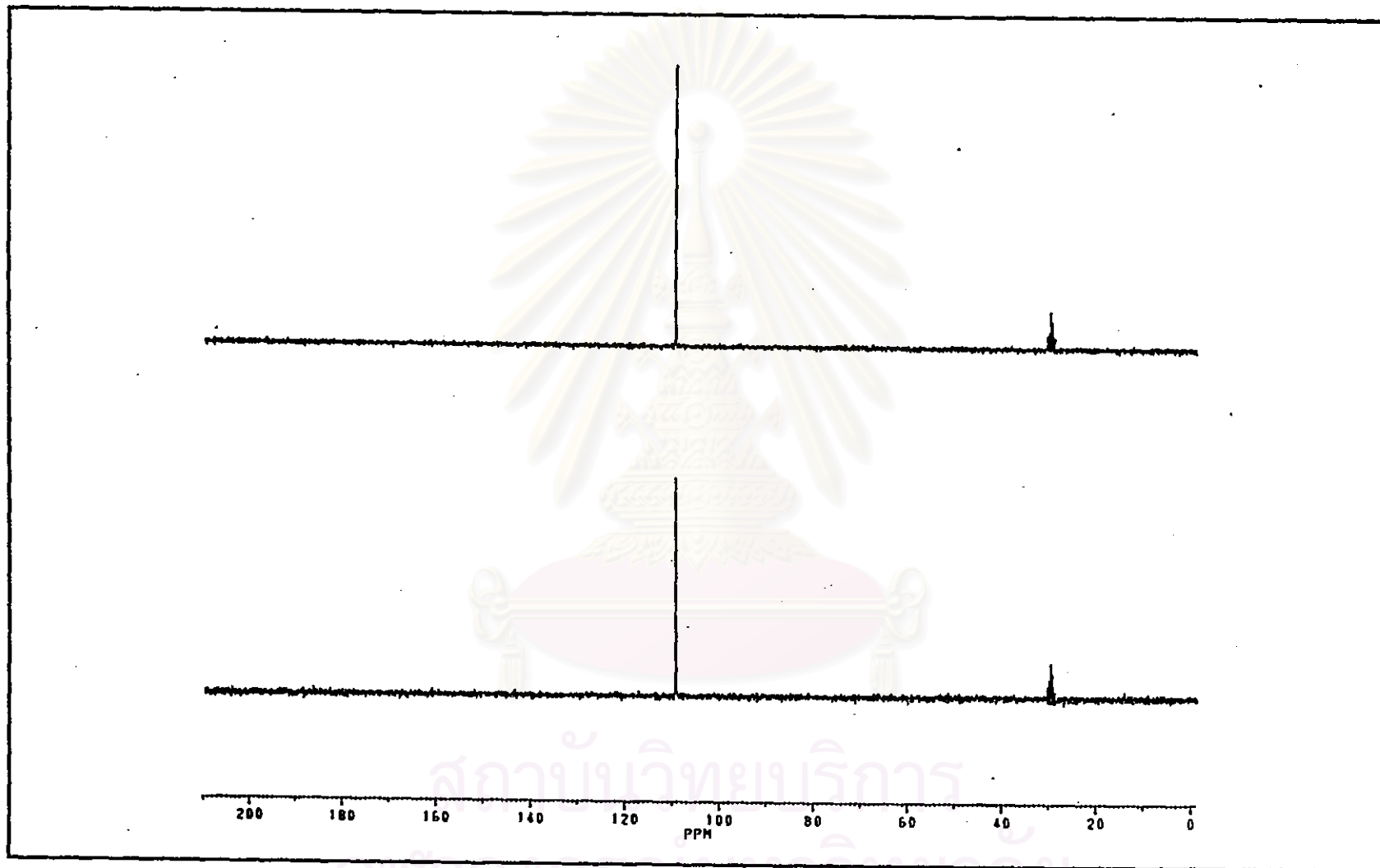


Figure 37 The DEPT 135 and DEPT 90 NMR spectrum of Compound VI

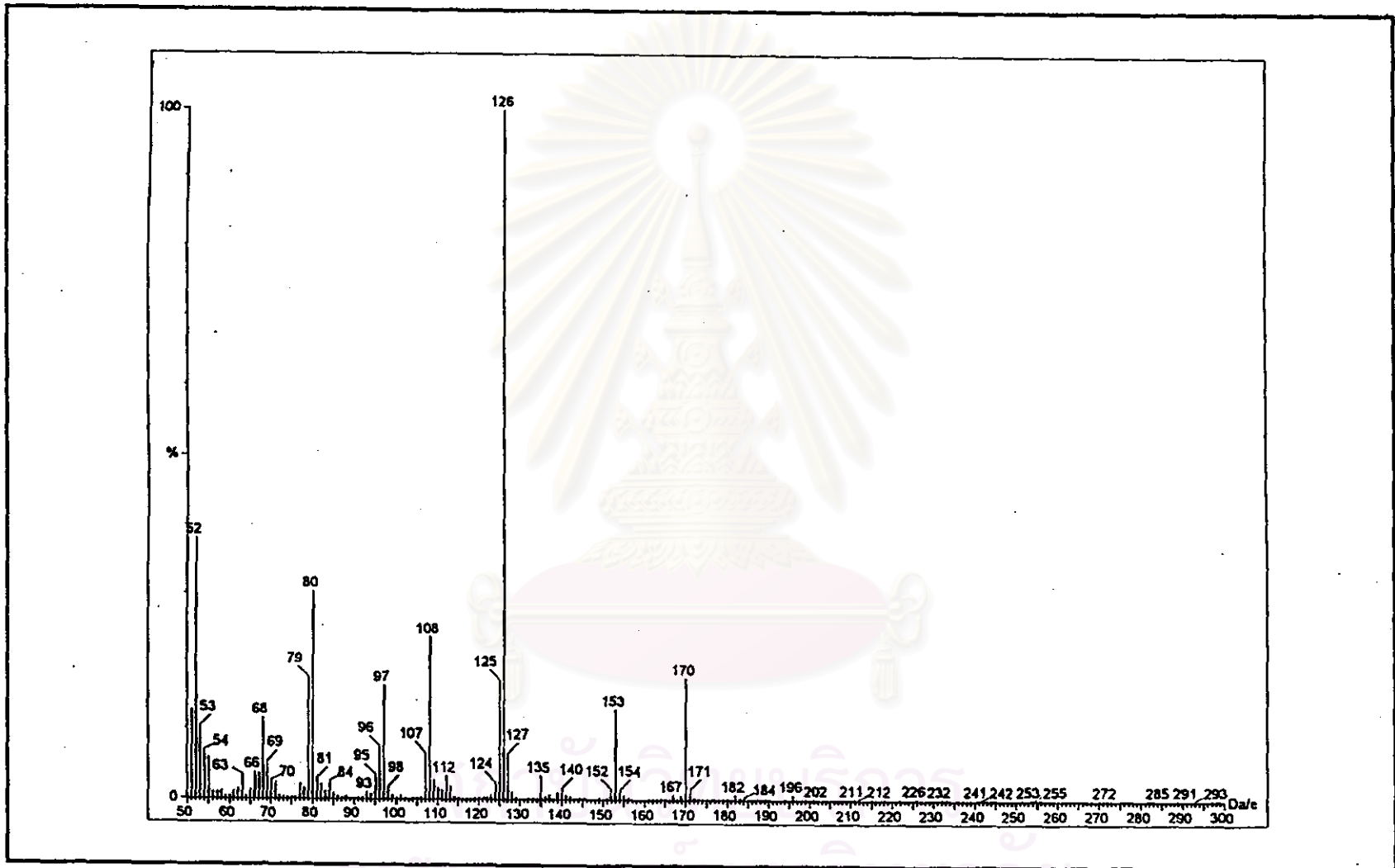


Figure 38 The mass spectrum of Compound VI

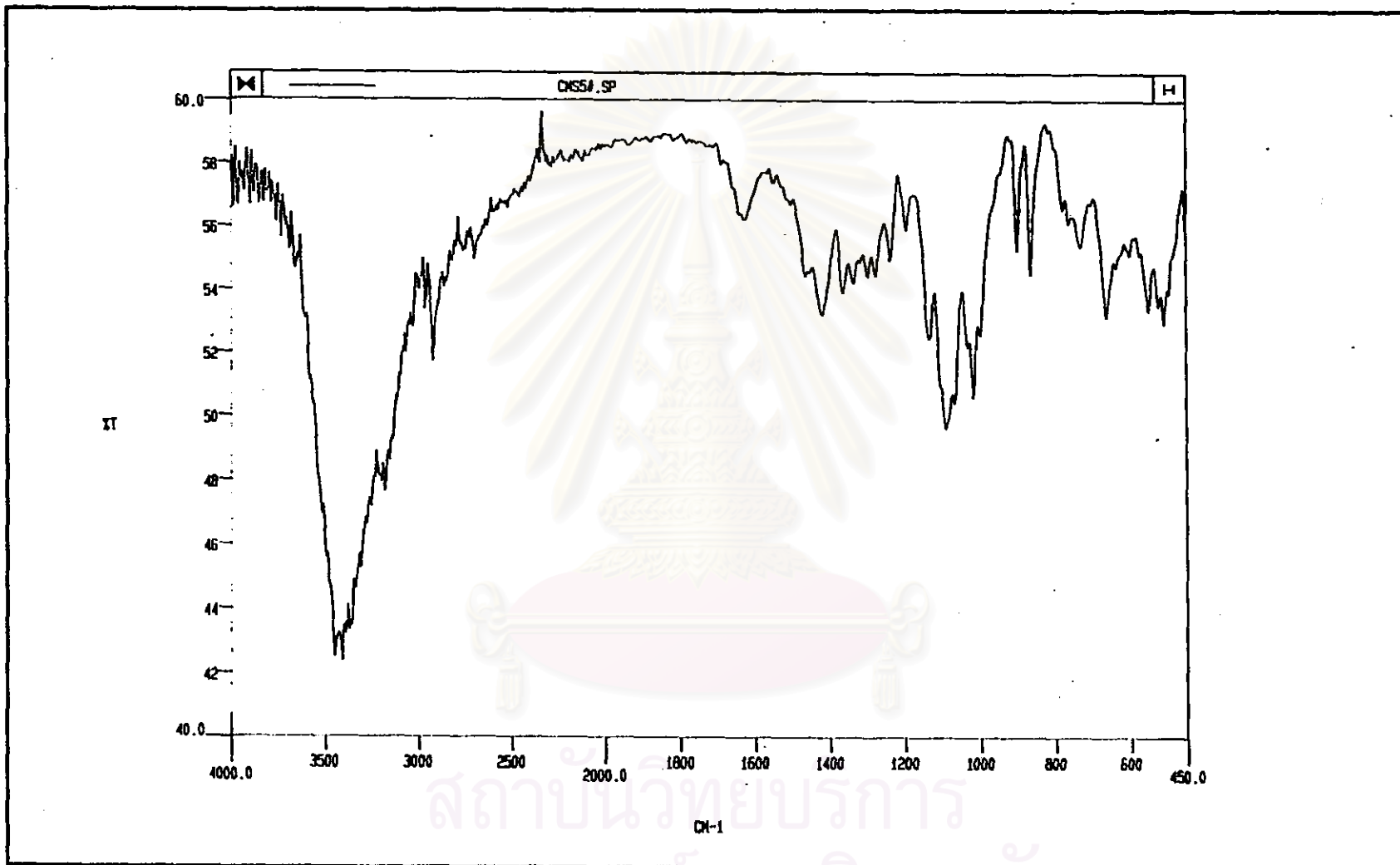


Figure 39 The IR spectrum of Compound VII

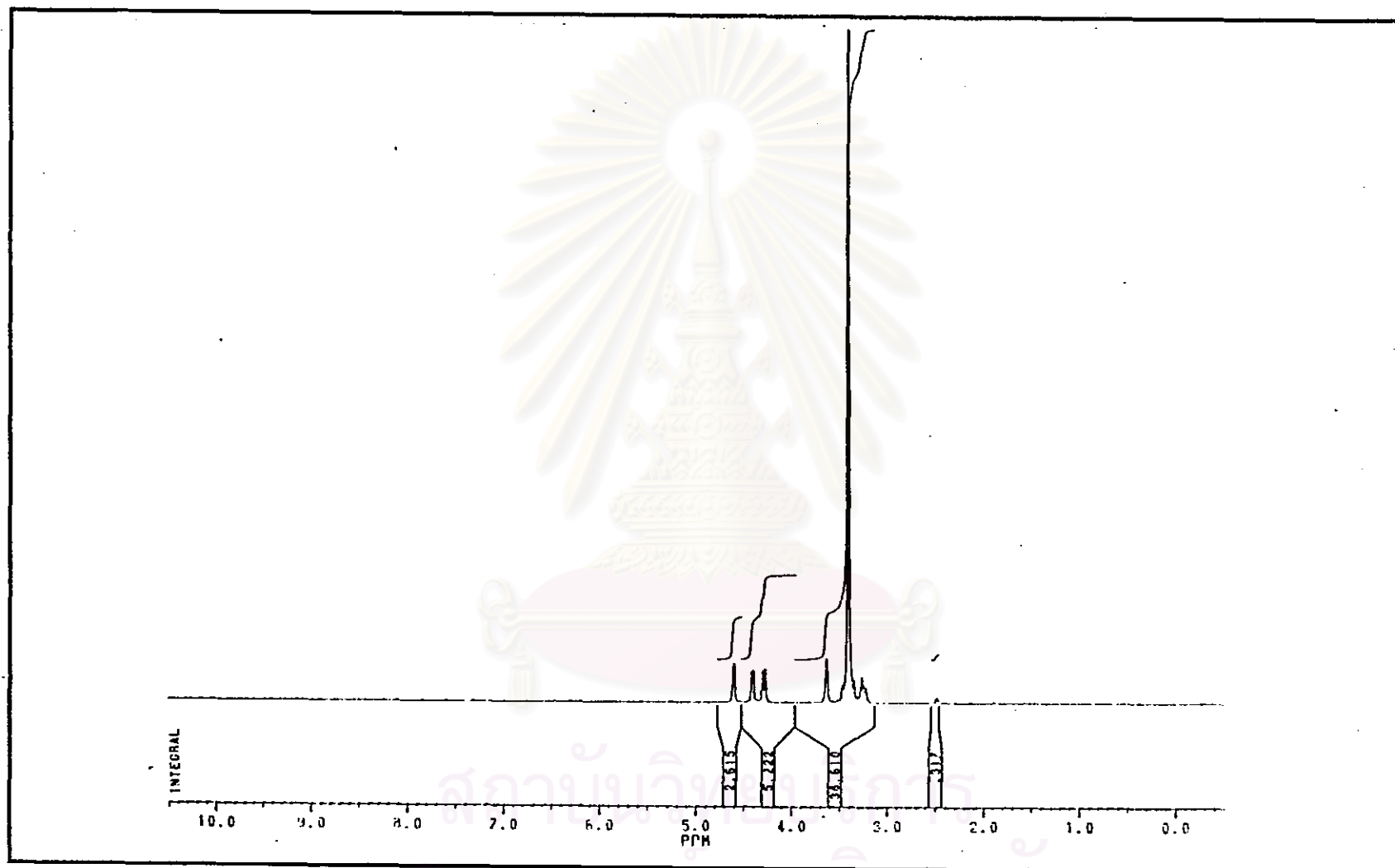


Figure 40 The $^1\text{H-NMR}$ spectrum of Compound VII

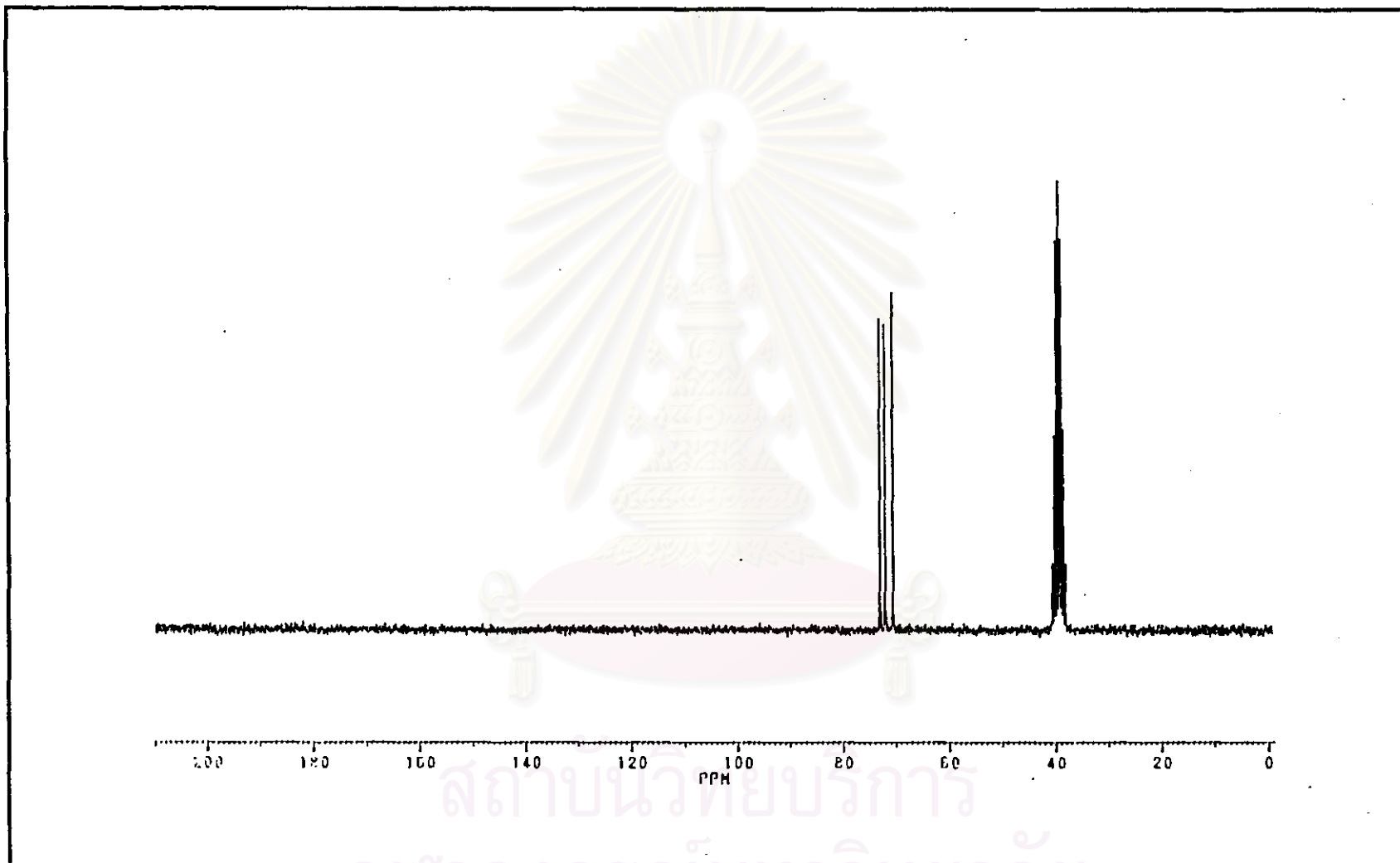


Figure 41 The ^{13}C -NMR spectrum of Compound VII

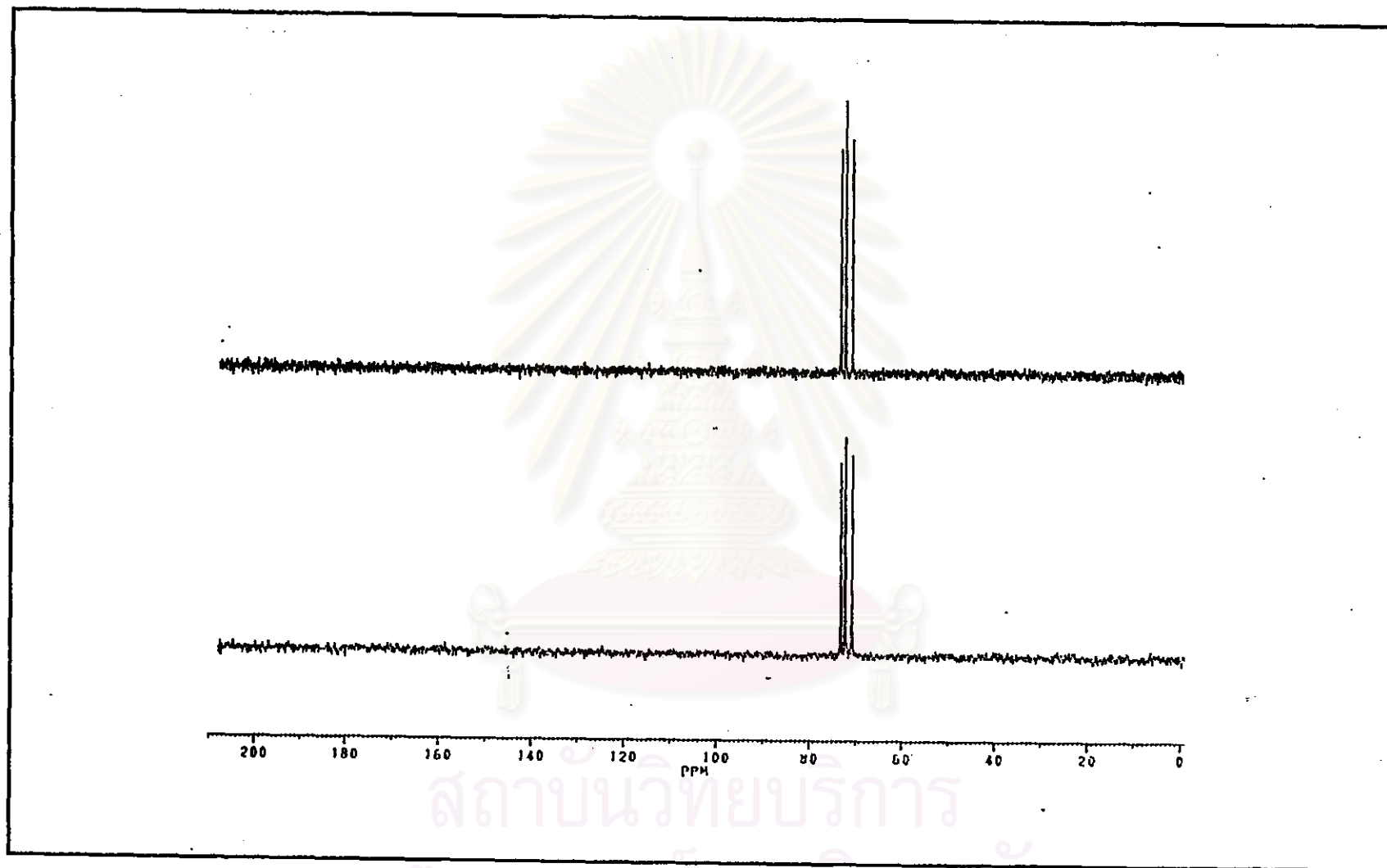


Figure 42. The DEPT 135 and DEPT 90 NMR spectrum of Compound VII

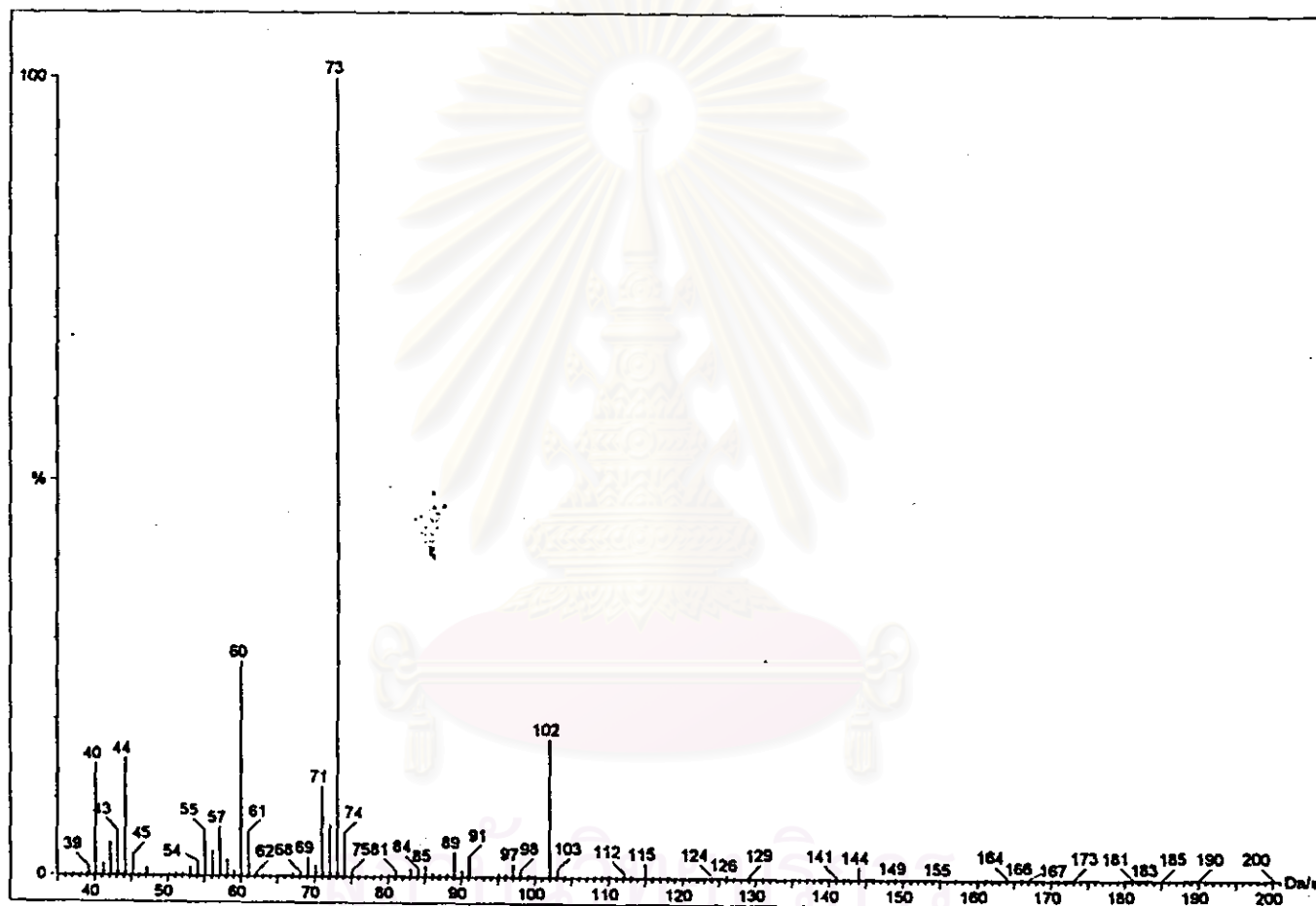


Figure 43 The mass spectrum of Compound VII

VITA

Miss Choladda Choksomboonkul was born on March 25, 1972 in Bangkok, Thailand. She received the Bachelor Degree of Science in Chemistry at Chulalongkorn University in 1994. Since 1994, she has been a graduate student studying Organic Chemistry at Chulalongkorn University. During her studies towards the Master's degree, she was awarded a Rhône-Poulenc Professor Lehn Scholarship in 1994, a teacher assistantship by the faculty of Science during 1995-1996 and was supported by research grant for her Master degree's thesis from the Graduate School, Chulalongkorn University.



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย