

REFERENCES

1. Bisset, N.G., Leenhouts, P.W., Leewenberg, A. J. M., Philcox, D., Tierel-Roudet, C. and Vidal, J. E. 1973. The Asian species of *Strychnos* part II. Typification, Miscellaneous notes, synoptic key, and sectional classification. *Lloydia* 36 : 179-201.
2. Tem Smitinand, 1980. Thai plant names (Botanical names-vernacular names), 2nd ed., pp.319-320. Bangkok: Funny publishing.
3. Bisset, N. G., and Phillipson, J. D. 1976. The Asian species of *Strychnos*. Part IV. The alkaloids. *Lloydia* 39 : 263-325.
4. Aimi, N., Sakai, S., and Ban, Y. 1989. Alkaloids of *Strychnos* and *Gardneria* species. In the alkaloids, vol.36, pp. 1-47. New York : Academic Press.
5. Bhavovada, R. 1983. Alkaloids of Asian *Strychnos* species. Ph.D. dissertation. University of London.
6. Pingsuthiwong, C. 1986. Alkaloids from the stem of *Strychnos ignatii* Berg. Master's thesis. Chulalongkorn University.
7. Sotanaphun, U. 1990. Phytochemical study of *Strychnos minor* Dennst. Stem. Master's thesis Chulalongkorn University
8. Sukhakul, T. 1994. Phytochemical study of *Strychnos thorelli* stem. Master's thesis Chulalongkorn University
9. Bisset, N. G. 1974. The Asian species of *Strychnos*. Part III. The ethnobotany. *Lloydia* 35 : 95-116.
10. Khanh, T. C. 1986. Beitrag zur kenntnis der Sippenstruktur des Genus *Strychnos* L. in der Flora Vietnams. Tiel 1 : Allgemeiner Teil. *Feddes Repertorium* 97 : 713-751.
11. Leeuwenberg, A. J. M. 1969. The Loganiaceae of Africa. VIII. *Strychnos* III. (Revision of the African species with notes on the extra-African). *Mededel. Landhogsch. Wageningen* 69 : 1-316.
12. Krukoff, B. A. 1972. American species of *Strychnos*. *Lloydia* 35 : 193-194.
13. Massiot, G., and Delaude, C. 1988. African *Strychnos* species. In *The alkaloids*, vol.34, pp. 211-329. San Diego: Academic Press.
14. Leenhouts, P. W. 1962. Loganiaceae. In C.G.G.J. van Steenis (ed.), *Flora*

- Malesiana** (ser.I, vol.6), pp.354-356. Groningen, Netherlands : Wolters-Noordhoff.
15. Leeuwenberg, A. J. M. 1980. The taxonomy position of some genera in the Loganiaceae, Apocynaceae and Rubiaceae, related families which contain indole alkaloids. In J. D. Phillipson and M. H. Zenk (eds.), **Indole and biologically related alkaloids**, pp. 1-10. London : Academic Press.
 16. Bisset, N. G. 1970. The African species of *Strychnos*. Part I. The ethnobotany. **Lloydia** 33 : 201-243.
 17. Bisset, N. G. 1972. The Asian species of *Strychnos* part I. *Strychnos* as a source of drug Lignum colubrinum (snake-wood). **Lloydia** 35 : 95-116.
 18. Bisset, N. G., and Phillipson, J. D.. 1971. The African species of *Strychnos*. Part II. The alkaloids. **Lloydia** 34 : 1-60.
 19. Marini-Bettolo, G. B., 1959. Curarizing alkaloids of *Strychnos*. In D. Bovet, F. Bovet -Nitti, and G. B. marini-Bettolo (eds.), **Curare and curare-like agents**, pp.137-148. Amsterdam-London-New York-Princeton : Elsevier Publishing Company.
 20. Bisset, N. G. 1966. The arrow and dart poisons of South-East Asia, with particular references to the *Strychnos* species used in them. Part I. Indonesia, Borneo, Phillipines, Hainan and Indochina. **Lloydia** 29 : 1-18.
 21. Bisset, N. G. and Woods, M. C. 1966. The arrow and dart poisons of South-East Asia, with particular references to the *Strychnos* species used in them. Part II. Burma, Thailand and Malaya. **Lloydia** 29 : 172-195.
 22. Bisset, N. G., Baser, K. H. C., Phillipson, J. D., Bohlin, L., and Sandberg, F. 1977. Muscle-relaxant activity in Asian *Strychnos* species. A re-examination of two western Malaysian dart poisons. **Lloydia** 40 : 546-560
 23. Bisset, N. G. and Leeuwenberg, A. J. M. 1968. The use of *Strychnos* species in Central African ordeal and arrow poisons. **Lloydia** 31: 208-222.
 24. Bohlin, L., Rolfsen, W., Strombom, J., and Verpoorte, R. 1979. Alkaloids and biological activity of *Strychnos angolensis*. **Planta Med.** 35 : 19-30.
 25. Bohlin, L. 1978. **Some *Strychnos* alkaloids : Their occurrence. Structure and biological activity.** Ph.D. dissertation. Uppsala University.

26. Singh, H., Kapoor, V.K., and Manhas, M. S. 1975. Study of triterpenes and sterols of *Strychnos potatorum* seeds. **Planta Med.** 28 : 392-396.
27. Verporte, R., and Baerheim-Svendsen, A. 1978. On the occurrence of Filican-3-one in *Strychnos dolichostrysa*. **Phytochemistry** 17 : 817-818.
28. Angenot, L., and Tits, M. 1981. Isolation of a new alkaloid and a triterpene from *Strychnos henningsii*. **Planta Med.** 41 : 240-243.
29. Singh, H., Kapoor, V. K., Piozzi, F., Oassannanti, S., and Paternostro, M. 1978. Isomotiilol, A new triterpene from *Strychnos potatorum*. **Phytochemistry** 17: 154-155.
30. Singh, A. K. and Dhar, D. N. 1977. Studies on the chemical constituents of the seeds of *Strychnos potatorum*. Part I. **Planta Med. Suppl.** 32 : 362-367.
31. Verporte, R., Groenink, H., and Baerheim-Svendsen, A. 1980. Minor alkaloids and sterols in *Strychnos afzeli*. **Planta Med.** 39 : 388-390.
32. Siwon, J., Verpoorte, R., and Baerheim-Svendsen, A. 1977. Sterol from *Strychnos dolichostrysa*. **Planta Med.** 31 : 57-59.
33. Verporte, R., Joosse, F. T., Groenink, H. and Svendsen, A. B.. 1981. Alkaloids from *Strychnos floribunda*. **Planta Med.** 42 : 32-36.
34. Desai, P. D. et al. 1967. Chemical study of some Indian Plants Part III. **Indian J. Chem.** 5 : 523.
35. Brasseur, T., and Angenot, L. 1986. Flavonol glycosides from leaves of *Strychnos variabilis*. **Phytochemistry** 25 : 563-564.
36. Nicoletti, M., Goulart, M. O. F., De Lima, R. A., Goulart, A. E., Monache, D. F., and Marini-Bettolo, G. B. 1984. Flavonoids and alkaloids from *Strychnos pseudoquina*. **J. Nat. Prod.** 47 ; 953-957.
37. Brasseur, T., and Angenot, L. 1987. Four acylated flavonol glycosides from leaves of *Strychnos variabilis*. **Phytochemistry** 26 : 3331-3334.
38. Brasseur, T., and Angenot, L. 1988. Six flavonol glycosides from leaves of *Strychnos variabilis*. **Phytochemistry** 27 : 1487-1490.
39. Bisset, N.G., Choudhury, A. K., Houghton, P. J. 1989. Phenolic glycosides from the fruit of *Strychnos nux-vomica*. **Phytochemistry** 28 : 1553-1554.
40. Michel, S., Tillequin, F., and Koch, M. 1982. Alkaloids from the stem bark of *Strychnos dinklagei*. **J. Nat. Prod.** 45 : 489-494.

41. Rao, E. V., Ramana, S. R., and Rao, M. V. 1991. Revised structure and antihypercholesterolemic activity of a mannagalactan from *Strychnos potatorum*. **Indian J. Pharm. Sci.** 53 : 53-57.
42. Singh, H., et al. 1975. Chemical examination of the fixed oil from the seeds of *Strychnos potatorum*. **J. Indian Chem. Soc.** 52 : 768.
43. Kisakurek, M.V., and Hesse, M. 1980. Chemotaxonomy studies of the Apocynaceae, Loganiaceae, and Rubiaceae, with reference to indole alkaloids. In J. D. Phillipson, and M. H. Zenk (eds.), **Indole and biogenetically related alkaloids**, pp.11-26. London : Academic Press.
44. Coune, C. 1980. Contribution a l'etude du *Strychnos gossweileri* du Zaïre : isolement et détermination de structure de nouveaux alcaloïdes. Ph.D. dissertation. Université de Liège. Quoted in Ohiri, F. C., Verpoorte, R., and Baerheim Svendsen, A. 1983. The African *Strychnos* species and their alkaloids : A review. **J. of Ethnopharmacology** 9 : 167-223.
45. Baser, K. H. C. 1978. **Alkaloids of *Strychnos nux-vomica***, Ph.D. Thesis, University of London.
46. Mavar-Manga, H., Quetin-Leclercq, J., Llabres, G., Belem-Pinheiro, M. L., Da Rocha, A. F. I., and Angenot, L. 1996. 9-Methoxygeissoschizol, an alkaloid from bark of *Strychnos guianensis*. **Phytochemistry** 43 : 1125-1127.
47. Quetin-Leclercq, J., Dive, G., Delaude, C., Warin, R., Bassleer, R., and Angenot, L. 1994. 2,7-Dihydroxyapogeissoschizine from root bark of *Strychnos gossweileri*. **Phytochemistry** 35 : 533-536.
48. Massiot, G., Thepenier, P., Jacquier, M. J., Le Men-Oliver, L., Verpoorte, R., and Delaude, C. 1987. Alkaloids of *Strychnos johnsonii*. **Phytochemistry** 26 : 2839-2846.
49. Quetin-Leclercq, J., and Angenot, L. 1988. A new alkaloid from the stem bark of *Strychnos usambarensis*. **Phytochemistry** 27 : 1923-1926.
50. Souhthon, J. W., and Buckingham, J. 1989. **Dictionary of alkaloids**. London : Chapman and Hall.
51. Baser, K. H. C. and Bisset, N. G. 1982. Alkaloids of Sri Lankan *Strychnos nux-vomica*. **Phytochemistry** 21 : 1423-1429.
52. Datta, B., and Bisset, N. G. 1990. Alkaloids of *Strychnos ignatii*. **Planta Med.** 56 :

133.

53. Thepenier, P., Jacquier, M., Henin, J., Massiot, G., Le Men-Oliver, L., and Delaude, C. 1990. Alkaloids from *Strychnos pugens*. *Phytochemistry* **29** : 2384-2386.
54. Delaude, C. 1984. Dehydroisostrychnobiline, matopensine and other alkaloids from *Strychnos kasengaensis*. *Phytochemistry* **23** : 2659-2663.
55. Massiot, G. et al. 1988. Alkaloids from roots of *Strychnos matopensis*. *Phytochemistry* **27** : 3293-3304.
56. Marini-Bettolo, G. B., Galeffi, C., Nicoletti, M., and Messana, I. 1980. Alkaloids of *Strychnos rubiginosa*. *Phytochemistry* **19** : 992-994.
57. Coune, C. 1978. Novel alkaloids from *Strychnos gossweileri*. *Plant Med. Phytother.* **12** : 106.
58. Coune, C. A., and Angenot, L. J. G. 1980. *Herb. Hung* **19** : 189. Quoted in Aimi, N., Sakai, S., and Ban, Y. 1989. Alkaloids of *Strychnos* and *Gardneria* species. In the alkaloids, vol.36, pp. 1-47. New York : Academic Press.
59. Verpoorte, R., and Sandberg, F. 1971. *Acta Pharm. Suec.* **8** : 119.
60. Verpoorte, R., Bohlin, L., Dwuma-Badu, D., Rolfsen, W., and Strombom, J. 1983. 11-Methoxymacusine A. A new alkaloid from *Strychnos angolensis*. *J. Nat. Prod.* **46** : 572-575.
61. Massiot, G., Thepenier, P., Jacquier, M.J., Le Men-Oliver, L. and Delaude, C. 1992. Alkaloids from roots of *Strychnos potatorum*. *Phytochemistry* **31** : 2873-2876.
62. Rolfsen, W., Olaniyi, A. A., Verpoorte, R., and Bohlin, L. 1981. Some new Decussine-type alkaloids from *Strychnos decussata*, *S. dale*, *S. elaeocarpa*. *J. Nat. Prod.* **44** : 415-421.
63. Angenot, L. 1975. New quarternary alkaloids from *Strychnos usambarensis*. *Planta Medica* **27** : 24-30.
64. Galeffi, C. et al. 1973. *Strychnos amazonica* and *S. brachiata* alkaloids. *Ann. Chim. (Rome)* **63** : 849.
65. Galeffi, C., Nicoletti, M., Messana, I., Patamia, M., Marini-Bettolo, G. B. 1980. A new alkaloids of *Strychnos cathayansis*. *Hua Hsueh Hsueh Pao* **43** : 775-777.

66. Verpoorte, R., Verzijl, M. J., and Svendsen, A. B. 1982. Further alkaloids from *Strychnos dolichothrysa*. *Planta Med.* 44, 21, 1982.
67. Verpoorte, R. 1978. *Pharm. Weekbl.* 113 : 1249. Quoted in Massiot, G., and Delaude, C. 1988. African *Strychnos* species. In *The alkaloids*, vol.34, pp. 211-329. San Diego: Academic Press
68. Rasonaivo, P., Galeffi, G., De Vicente, Y., and Nicoletti, M. 1991. Malagashine and Malagashanine, Two alkaloids of *Strychnos mostueoides*. *Rev. Latinoamer.Quim.* 22 : 32-34 quoted in Sukhakul, T. 1994. Phytochemical study of *Strychnos thorellii* stem. Master's thesis Chulalongkorn University.
69. Mukherjee, R., Da Silva, B. A., Das, B. c., Keifer, P. A. and Shoolery, J. N. 1991. Structure and stereochemistry of divaricine, A new bisindole alkaloid from *Strychnos devaricans*. *Heterocycles* 32 : 985-990.
70. Forgacs, P. et al. 1986. An indole alkaloid from *Strychnos erichsonii*. *Phytochemistry* 25 : 969-971.
71. Marini-Bettolo, G. B. 1970. *Farmaco, Ed. Sci.* 25 : 150. Quoted in
72. Caprasse, M. and Angenot, L. 1981. Major alkaloids of *Strychnos scheffleri* from Zaire. *Planta Med.* 42 : 364-370.
73. Tits, M., Franz, M., Tavernier, D., and Angenot, L. 1981. The Major Alkaloids of *Strychnos variabilis*. *Planta Med.* 42 : 371-374.
74. Gugginberg, A., M. Hesse, H. Schmid, and P. Karrer. 1966. Notiz uber das Vorkommen von C-Mavacurin in der wurzelrinde von *Strychnos nuxvomica* L. *Helv. Chim. Acta.* 49, pp.1-4.
75. Baser, K. H. C., and Bisset, N. G., 1982. Alkaloid of SriLankan *Strychnos nuxvomica*, *Phytochemistry* 21 : 1423-1429
76. Massiot, G., Thepenier, P., Jacquier, M.J., La Men-Oliver, L., and Delaude, C. 1989. Normavacurine and Minfiensine, Two new alkaloids with $C_{19}H_{22}N_2O$ formula from *Strychnos* species. *Heterocycles* 29: 1435-1438.
77. Marini-Bettolo, G. B., Messina, I., Nicoletti, M., Patamia, M., and Galeffi, C. 1980. The occurrence of akagerine in South American *Strychnos*. *J.Nat.Prod.* 43 : 717-720.

78. Okuakwa, J. U., Nicoletti, M., Messana, I., Galeffi, C., and Marini-Bettolo, G. B. 1978. *Am. Acad. Naz., Lincei-cl. Sci-Fis. Mat. Nat. Rend.* 65 : 299. Quoted in Massiot, G., and Delaude, C. 1988. African *Strychnos* species. In *The alkaloids*, vol.34, pp. 211-329. San Diego: Academic Press.
79. Nicoletti, M., Okuakwa, J. U., and Messana, I. 1980. Alkaloids of *Strychnos nigriflora* and *Strychnos barteri*. *Fitoterapia* 51 : 131-134.
80. Rolfsen, W., Olaniyi, A.A., and Hylands, P.J. 1980. New tertiary alkaloids of *Strychnos decussata*. *J. Nat. Prod.* 43 : 97-102.
81. Rolfsen, W., Bohlin, L., Yeboah, S. K., Geevaratne, M., and Verpoorte, R. 1978. New indole alkaloids of *Strychnos dale* and *Strychnos elaeocarpa*. *Planta Med.* 34 : 264-273.
82. Angenot, L., Dideberg, O., and Dupont, L. 1975. Isolation and structure of akagerine : A new type of indole alkaloid. *Tetrahedron Lett.* pp. 1357-1358.
83. Verpoorte, R., Baerheim-Svendsen, A. and Sanberg, F. 1975. Alkaloids of *Strychnos camptoneura*. *Acta Pharm. Suec.* 12 : 445.
84. Olaniyi, A. A., and Rolfsen, W. 1980. Two new alkaloids of *Strychnos decussata*. *J. Nat. Prod.* 43 : 595-597.
85. Okuakwa, J. U., Galeffi, C., Nicoletti, M., Messana, I., Payamia, M., and Marini-Bettolo, G. B. 1980. The alkaloids of *Strychnos spinosa*. *Gazz. Chim. Ital.* 110 : 97-100.
86. Ohiri, F. C., Verpoorte, R., and Baerheim-Svendsen., 1983. The African *Strychnos* species and their alkaloids : A review. *J. of Ethnopharmacol.* 9 : 167-223.
87. Quetin-Leclercq, J., and Angenot, L., 1984. Dolichantoside, Main alkaloid from stem bark of *Strychnos tricalysioides*. *Planta Med.* 5 : 457-458.
88. Rolfsen, W., Olaniyi, A. A., Sandberg, F., and Kvick, A. H. 1980. Muscle-relaxant activity of decussine. *Acta. Pharm. Suec.* 17 : 105-111.
89. Petitjean, A., Rasoanaivo, P., and Razafintsalama, J. M. 1977. New glycoalkaloids from *Strychnos decussata*. *Phytochemistry* 16 : 154-155.
90. Waterman, P.G., and Zhong, S. M., 1982. Vallesiachotamine and isovallesiachotamine from seeds of *Strychnos tricalysioides*. *Planta Med.* 45 : 28-30.

91. Caprasse, M., Tavernier, D., Anteonis, M. J. O., Angenot, L. 1984. Isolation of *N*_b-methyl-antirrhine, malindine and isomalindine from *Strychnos usambarensis*. *Planta Med.* 1 : 27-30.
92. Bisset, N. G., and Phillipson, J. D., 1974. *Phytochemistry* 13 : 973.
93. Phillipson, J. D., Hemingway, S. R., Bisset, N. G., Houghton, P. J., and Shellard, E. J., *Phytochemistry* 13 : 973.
94. Au, T. Y., Cheung, H. T., and Sternhell, S., 1973. *J. Chem. Soc., Perkin trans.* 13.
95. Massiot, G., Thepenier, P., Jacquier, M.J., Henin, J., Le Men-Oliver, L., and Delaude, C. 1991. Alkaloids from *Strychnos henningsii*. *Phytochemistry* 30 : 3449-3456.
96. Thepenier, P., Jacquier, M., Massiot, G., Le Men-Oliver, L.L., and Delaude, C. 1984. Dehydroisostrychnobiline, Matopensine and Other Alkaloids from *Strychnos Kasengaensis*. *Phytochemistry* 23 : 2659-2663.
97. Tits, M., and Tavernier, D. 1978. Novel Alkaloids from *Strychnos variabilis*. *Plant Med. Phytother.* 12 : 92-95.
98. Nuzillard, J., Thepenier, P., Jacquier, M., Massiot, G. Le Men-Oliver, L., and Delaude, T. 1996. Alkaloids from rood bark of *Strychnos panganensis*. *Phytochemistry* 43 : 897-902.
99. Massiot, G., *et al.* 1983. Further Alkaloids from *Strychnos longicaudata* and *Strychnos ngouniensis* *Tetrahedron* 39 : 3645-3656.
100. Tits, M., and Angenot, L. 1980. New Indole Aldehydic Alkaloids *Strychnos variabilis*. *Tetrahedron Lett.* 21 : 2439-2442.
101. Kach, M., Fellion, E., and Plat, M. 1976. Five New Alkaloids from *Strychnos henningsii*. *Phytochemistry* 15 : 321-324.
102. Thepenier, P., Jacquire, M., Massiot, G., Le Men-Oliver, L., and Delaude, C. 1990. Alkaloids from Seeds of *Strychnos variabilis* and *S. longicaudata*. *Phytochemistry* 29 : 686-687.
103. Tits, M., Tavernier, D., and Angenot, L. 1980. Indole Alkaloids of *Strychnos variabilis*. *Phytochemistry* 19 : 1531-1534.
104. Delaude, C., Thepenier, Jacquier, M.J., massiot, G., and Le men-Oliver, L. 1992. African *Strychnos* Alkaloids. *Bull. Soc. R. Sci. Liege* 61(1992) : 429-440. *Chemical Abstract* 119 : 429-440.

105. Quetin-Leclercq, Coune, C., Delaude, C., Warin, R., Bassleer, R., Angenot, L. 1992. Revision of the structure of strychnofluorine, An alkaloid of *Strychnos gossweileri*.
106. Tits, M., Tavernier, D., and Angenot, L. 1985. Strychnozairine, an Indole Alkaloid from *Strychnos variabilis*. *Phytochemistry* 24 : 205-207.
107. Marini-Bettolo, G.B., Messina, I., Nicoletti, M., Patamia, M., and Galeffi, C. 1982. Alvimine and Alviminine from *Strychnos alvimiana*. *An. Asoc. Quim. Argent.* 70 : 263-270.
108. Verpoorte, R., Groenink, H., and Baerheim-Svendsen, A. 1980. Minor Alkaloids and Sterols in *Strychnos afzeli*. *Planta Med.* 39 : 388-390.
109. Galeffi, C., Nicoletti, M., Mesana, I., Patamia, M., and Marini-Bettolo, G.B. 1980. A New Alkaloid of *Strychnos castelneana*. *Planta Med.* 39 : 208.
110. Galeffi, C., and Marini-Bettolo, G.B. 1980. The Alkaloids of *Strychnos fendleri*. *Gazz. Chim. Ital.* 110 : 81-85.
111. Chapya, W.A. 1983. Research on African Medicinal Plants VI. *Gazz. Chim. Ital.* 113 : 773-775.
112. Lu, R.R., Liu, L.D. 1985. Alkaloids of *Strychnos cathayensis*. *Hua Hsueh Hsueh Pao* 43 : 775-777.
113. Bisset, N.G. 1972. Chemical studies on the alkaloids of Asian and African *Strychnos* species. *Lloydia* 35 : 203-206.
114. Bohlin, L., Polfsen, W., Strombom, J., and Verpoorte, R. 1979. Alkaloids and biological activity of *Strychnos angolensis*. *Planta Med.* 35 : 19-30.
115. Verpoorte, R., Verzijl, M. J., and Svendsen, A. B. 1982. Further alkaloids from *Strychnos dolichothrysa*. *Planta Med.* 44, 21, 1982.
116. Verpoorte, R., and Svendsen, A. B. 1974. 11-Methoxydiaboline in *Strychnos malacoclados*. *Phytochemistry* 13 : 2011.
117. Thepenier, P., Jacquire, M., Massiot, G., Le Men-Oliver, L., and Delaude, C. 1988. Alkaloids from *Strychnos staudtii*. *Phytochemistry* 27 : 657- 659.
118. Ohiri, F.C., Verpoorte, R., and Baerheim-Svendsen, A. 1984. 12-Hydroxy-11-methoxy-diaboline : A New Alkaloid from *Strychnos spinosa*. *Planta Med.* 50 : 446-447.

119. Galeffi, C. et al. 1973. *Strychnos amazonica* and *Strychnos brachiata* Alkaloids. **Ann.Chim.(Rome)** 63 : 849.
120. Strombom, J., Huy, O., and Bisset, N.G. 1982. Alkaloids of *Strychnos Wallichiana*. **Acta Pharm. Suec.** 19 : 321-326.
121. Starfati, R., Paris, M., and Jarreau, F.-X. 1970. **Phytochemistry** 9 : 1107.
122. Bisset, N.G., Bosly, J., Das, B.C., and Spitteller, G. 1975. **Phytochemistry** 14: 1411.
123. Weeratunga, G., Goonetilleke, A., Rolfsen, W., Bohlin, L., and Sandberg, F. 1984. Alkaloids in *Strychnos aculeata*. **Acta Pharm. Suec.** 21 : 135- 140.
124. Goonetilleke, A., Bolfsen, W., and Rajapakse, L. 1980 Tertiary Indole Alkaloids of *Strychnos aculeata*. **Planta Med.** 39 : 208.
125. Mirand, C., Delaude, C., Levy, J., Lemen-qliver, J., and Lemen, J.1979. Alkaloids of *Strychnos aculeata*. **Plant Med. Phytother.** 13 : 84-86.
126. Ohiri, F.C., Verpoorte, R., Baerheim-Svendsen, A., Karlsen, J., and Mostad, A. 1983. Alkaloids of *Strychnos soubrensis*. **J. Nat. Prod.** 46 3 : 369-373.
127. Iwataki, I., and Comin, J. 1971. Studies on Argentine plant. XXXI. Alkaloids from *Strychnos brasiliensis*. **Tetrahedron** 27 : 2541.
128. Angenot, L., Belem-Pinheiro, M.L., Da Rocha, A.F.I., Poukens-Renwart, P., Quetin-Leclercq, J., and Warin, R. 1990. An Indolinic Cryptoalkaloid from *Strychnos mattogrossensis*. **Phytochemistry** 29 : 2746-2749.
129. Baser, K., Bisset, N.G., and Hylands, P. 1979. Protostrychnine, A New Alkaloid from *Strychnos nux-vomica*. **Phytochemistry** 18 : 512-514.
130. Cai, B.C., Yang, X.W., Hattori, M., and Namba, T. 1990. Four New Alkaloids from the Processed seeds of *Strychnos nux-vomica*, **Shoyakugaku Zasshi** 44 : 42-46.
131. Kambu, K., Coune, C., and Angenot, L. 1979. New Alkaloids from the Roots of *Strychnos icaja*. **Planta Med.** 37 : 161-164.
132. De, B., and Bisset, N. G. 1991. Separation of *Strychnos nux-vomica* alkaloids by HPLC. **J. Chromatog.** 587 : 318-320.
133. Marini-Bettolo, G. B., Ciaca, M. A., Galeffi, C., Bisset, N. G., and Krukoff, B. A. 1972. The occurrence of strychnine and brucine in an American species of *Strychnos*. **Phytochemistry** 11 : 381-384.

134. Bisset, N. G. 1973. Alkaloids from the seeds of *Strychnos wallichiana* Steud. Ex DC. (*Strychnos cinnamomifolia* Thwaites var. *wightii* A. W. Hill). **J. Phar. Pharmac.** 25 : 563-569.
135. Asai, F., Inuma, M., Tanaka, T., and Matsuura, S. 1982. Study on the Components of the Folk Medicine, Kaju Ular, in Timor Island. **Shoyakugaku Zasshi** 102 : 690-694.
136. Bisset, N.G., and Choudhury, A.K. 1974. Alkaloids and Iridoids from *Strychnos nux-vomica* Fruits. **Phytochemistry** 13 : 265-269.
137. Bisset, N. G., and Choudhury; A. K. 1974. Alkaloids from the leaves of *Strychnos wallichiana*. **Phytochemistry** 13 : 259-263.
138. Bisset, N. G., and Walker, M. D. 1974. Alkaloids from the stem bark of *Strychnos ignatii*. **Phytochemistry** 13 : 525-526.
139. Bisset, N. G., Das, B. C., and Parello, J. 1973. Alkaloids from the leaves of *Strychnos icaja* Bail. **Tetrahedron** 29 : 4137.
140. Bisset, N.G., and Knolil, A.A. 1976. New Alkaloids from *Strychnos icaja*. **Phytochemistry** 15 : 1973-1976.
141. Heimberger, S. I., and Scott, A. I. 1973. Biosynthesis of strychnine. **J. C. S. Chem. Comm.** : 217-219.
142. Michel, S., Skaltsounis, A.L., Tillequin, F., Koch, M., Ake, and Assi, L. 1985. Leaf Alkaloids of *Strychnos dinklagei*. **J. Nat. Prod.** 48 : 86-92.
143. Michel, S., Tillequin, F., Koch, M. 1986. Brafouedine and Isobrafouedine : Novel Indole Alkaloids from *Strychnos dinklagei*. **J. Nat. Prod.** 46 : 452-455.
144. Caprasse, M., Coune, C., and Angenot, L. 1983. isolation and Structure Elucidation of Three Anhydronium Bases from *Strychnos usambarensis*. **J. Pharm. Belg.** 38 : 135-139.
145. Coune, C. 1978. Novel Alkaloids from *Strychnos gossweileri*. **Plant Med. Phytother.** 12 : 106.
146. Galeffi, C., and Marini-Bettolo, G.B. 1981. The Alkaloids of *Strychnos hirsuta*. **Tetrahedron Lett.** 37 : 3167-3170.
147. Angenot, L., et al. 1975. Chemical Structure and Pharmacological (Curarizing) Properties of Various Indole Alkaloids from an African *Strychnos*. **Arch. Int. Pharmacodyn. Ther.** 215 : 246.

148. Richard, C., Delaude, C., Le Men-Oliver, L., and Le Men, J. 1978. Alkaloids from *Strychnos tchibangensis*. **Phytochemistry** 17 : 539-541.
149. Quetin-Leclercq, Tits, M., Angenot, L., and Bisset, N.G. 1991. Alkaloids of *Strychnos usambarensis* Stem Bark. **Planta Med.** 57 5 : 501.
150. Caprasse, M., Tavernier, D., and Angenot, L. 1983. Two New Quaternary Alkaloids from *Strychnos usambarensis* Leaves. **J. Pharm. Belg.** 38 : 211-218.
151. Bassleer, R. *et al.* 1982 Effects of Three Alkaloids from *Strychnos usambarensis* on Cancer Cells in Culture. **Planta Med.** 45 : 123-126.
152. Angenot, L. 1978. Novel oxindole alkaloids from *Strychnos usambarensis*. **Plant Med. Phytother.** 12 : 123.
153. Capresse, M., Angenot, L., Tavernier, D., and Anteunis, M.J.O. 1984. The Isolation and Structure Elucidation of Afrocurarine, **Planta Med.** 50 : 131-133.
154. Massict, G. *et al.* 1983 **J. Org Chem** 48 : 1869.
155. Muknerjee, R., De M Santos, C.A., Das, B.C., and Guittet, E. 1990 Trinervine, A New Indole Alkaloid from *Strychnos trinervis*. **Heterocycles** 31 : 1819-1822.
156. Verpoorte, R., Kodde, E.W., and Baerheim-Svendsen, A. 1978. A Chromatographic Comparison of *Strychnos urceolata*. **Planta Med.** 34 : 62-65.
157. Verpoorte, and Baerheim-Svendsen, A. 1976. The Alkaloids of *Strychnos dolichothyrsa*, **Lloydia** 39 : 357-362.
158. Verpoorte, R., and Baerheim-Svendsen, A. 1978. Alkaloids of *Strychnos dolichothyrsa*. **J. Pharm. Sci.** 67 : 171-174.
159. Tits, M., Angenot, L., and Tavernier, D. 1983. 12'-Hydroxy-strychnobiline, A New Bisindole Alkaloid from *Strychnos variabilis*. **J. Nat. Prod.** 46 : 638-645.
160. Quetin-Leclercq, J., Llabres, G., Warin, R., Belem-Pinheivo, M.L., Mavar-Manga, H., and Angenot L. 1995. Guianensine, a zwitterionic alkaloid from *Strychnos guianensis* **Phytochemistry** 40 : 1557-1560.
161. Nuzillard, J., Thepenier, P., Jacquier, M., Massiot, G. Le Men-Oliver, L., and Delaude, T. 1996. Alkaloids from rood bark of *Strychnos panganensis*. **Phytochemistry** 43 : 897-902.
162. Stockigt, J. 1980. The biosynthesis of heteroyohimbine-type alkaloids. In J. D. Philipson, and M. H. Zenk (eds.), **Indole and biologically related alkaloids**. pp. 113-1416. London : Academic Press.

163. Rueffer, M., Nagakura, N., and Zenk, M. H. 1978. Strictosidine, the common precursor for monoterpenoid indole alkaloids with 3 α and 3 β configuration. *Tetrahedron Lett.* 18 : 1593-1596.
164. Heimberger, S. I., and Scott, A. I. 1973. Biosynthesis of strychnine. *J. C. S. Chem. Comm.* : 217-219.
165. Cordell, G. A. 1974. The biosynthesis of indole alkaloids. *Lloydia* 37 : 219-298.
166. Rueffer, M., Kan-Fan, C., Husson, H.-P., Stockigt, J., and Zenk, M. H. 1979. 4, 21-Dehydrogeissoschizine, an intermediate in heteroyohimbine alkaloid biosynthesis. *J. C. S. Chem. Comm.* : 1016-1018.
167. Bisset, N. G. 1980. Alkaloids of the Loganiaceae. In J. D. Phillipson, and M. H. Zenk (eds.), *Indole and biologically related alkaloids*, pp. 27-61. London : Academic Press.
168. Verpoorte, R., Bohlin, L., Dwuma-Badu, D., Rolfsen, W., and Strombom, *Strychnos angolensis*. *J. Nat. Prod.* 46 : 572-575.
169. Olaniyi, A., Rolfsen, W., and Verpoorte, R. 1981. Quaternary indole alkaloids of *Strychnos decussata*. *Planta Med.* 43 : 353-359.
170. Caron, C., et al. 1988. Antimicrobial and antifungal activities of quasi-dimeric and related alkaloids. *Planta Med.* 54 : 409-412.
171. Leclerq, J., Pauw-Gillet, M.-C. de, Bassleer, R., and Angenot, L. 1986. Screening of cytotoxic activities of *Strychnos* alkaloids (method and result). *J. Ethnopharmacol.* 15 : 305-316.
172. Leonard, B.E. 1968a. An investigation of the pharmacology of macusine B. *J. Pharm. Pharmac.* 17 : 566-576.
173. Hokanson, G.C. 1976. Potential antitumor agents from higher plants. Part I : *Strychnos henninsii*. Part II. *Centaurea solstitialis*. Part III : *Croton texensis*. *Dissertation Abstract International Section B* 37, no.3:1265-B
- Singh, H., and Kapoor, K.V. 1976. Investigation of *Strychnos spp.* IV. Pharmacological studies of alkaloids of *Strychnos potatorum*. *Planta Med.* 29 : 226-233.
175. Verpoorte, R., Beek, T.A. van, Thomassen, P.H.A.M., Anadewiel, J., and Svendsen, A.B. 1983. Screening of antimicrobial activity of some plants belonging to the Apocynaceae and Loganiaceae, *J. Ethnopharmacol.* 8 : 287-302.

176. Melo, M. de F.F., Santos, C.A. de M., Chiappeta, A. de A., Mello, J.F. de, and Mukherjee, R. 1987. Chemistry and pharmacology of a tertiary alkaloid from *Strychnos trinervis* root bark. **J. Ethnopharmacol.** 19 : 319-325.
177. Verpoorte, R., Kode, E.W., Doorne, H.van, and Baehem Svendsen, A. 1978. Antimicrobial effect of the alkaloids from *Strychnos afzelii* Gilg. **Planta Med.** 33 : 237-242.
178. Tits, M., Damas, J., Quetin-Leclercq, J., and Angenot, L. 1991. From ethnobotanical uses of *Strychnos henningsii* to antiinflammatories, analgesics and antispasmodics. **J. Ethnopharmacol.** 34 : 261-267.
179. Ayres, D.C. and Loike, J.D. 1990. **Lignans : Chemical, biological and clinical properties**, Cambridge University Press.
180. MacRae, W.D., and Towers, G.H.N. 1984. Biological Activities of Lignans. **Phytochemistry** 23 : 1207-1220.
181. El. Naggar, L.J., and Beal, J.L. 1980 Iridoids. A review. **J. Nat. Prod.** 43 : 649-705.
182. Boros, C.A., and Stermiz F.R. 1990. Iridoids, An update review part I. **J. Nat. Prod.** 53 : 1055-1147.
183. Boros, C. A., and Stermiz, F. R. 1991. Iridoids. An update review part II **J. Nat. Prod.** 54 : 1173-1246.
184. Rimpler, H. 1978. Strukturaufklarung von Iridoidglykosiden. **Planta Med.** 33-313.
185. Damtott, S., Jensen, S.R., and Nielsen, B.J. 1973. ¹³C and ¹H-NMR spectroscopy as a tool in the configurational analysis of iridoid glucosides. **Phytochemistry** 12 : 2717-2732.
186. Plouvier, V., and Favre-Bovin, J. 1971. Les Iridoides Et Seco-Iridoides : Repartition, Structure, Proprietes, Biosynthese. **Phytochemistry** 10 : 1697-1722.
187. Mitsunaga, K., Koike, K., Fukuda, H., Ishii, K., and Ohmoto, T. 1991. Ligustrinoside, A New Bisiridoid Glucoside from *Strychnos ligustrina*. **Chem. Pharm. Bull.** 30 : 2737-2738.
188. Asai, F. et al. 1987. 7-Ketologanin, an Iridoid Glucoside from Fruits of *Strychnos roborans*. **Shoyakugaku Zasshi** 41 : 349-351.
189. Michel, S., Tillequin, F., Koch, M. 1986. Brafoedine and Isobrafoedine : Novel Indole Alkaloids from *Strychnos dinklagei*. **J. Nat. Prod.** 49 : 452-455.

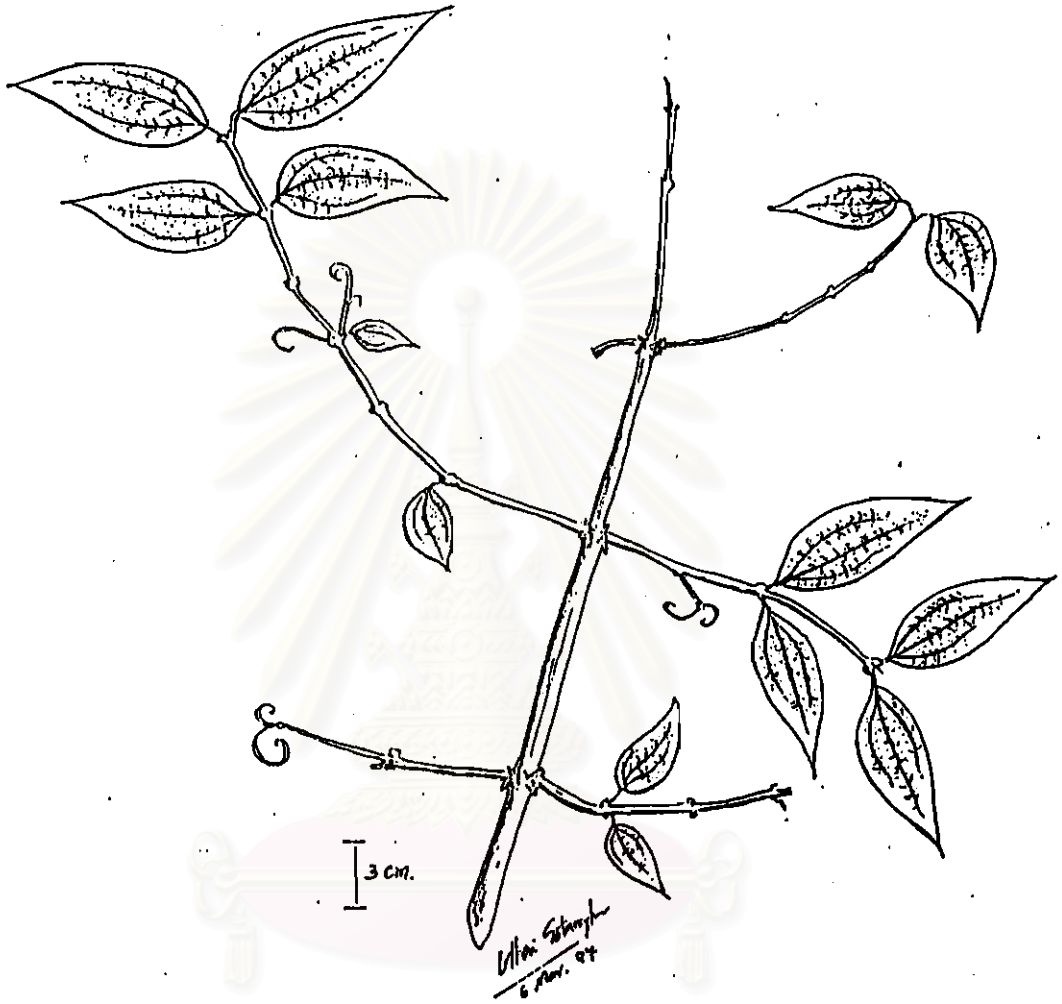
190. Msonthi, J.D., Galeffi, C., Nicoletti, M., Messana, I., and Marini-Bettolo, G.B.M.
191. Kingside Aglucone. A New Secoiridoid from Unripe Fruits of *Strychnos spinosa*. *Phytochemistry* 24 : 771-772.
191. Meyer, B.N., Ferringni, N.R., Putnam, J.E., Jacobsen, L.B., Nichols, D.E. and McLaughlin, J.L., 1982. Brine Shrimp : A convenient general bioassay for active plant constituents. *Planta Med.* 45 : 31-34.
192. Cleeland, R. and Gmberg, E. 1896. Laboratory evaluation of new antibiotics *in vitro* and in experimental animal infections. In V. Lorian (ed.), *Antibiotics in Laboratory medicine*, 2nd ed. pp 825-835. Baltimore : William & Wilkins, 1986.
193. Shier, T. W., and Abou-Karam, M. 1990. A simplified plaque reduction assay for antiviral agent from plants. Demonstration of frequent occurrence of antiviral activity in higher plants. *J. Nat. Prod.* 53 : 340-344.
194. University of Edinburgh, Department of Pharmacology. 1970. Pharmacological experiments on isolated preparations. 2nd ed. Edinburgh : E & S Livingstone.
195. Klyne, W., and Buckingham, J. 1974. Atlas of stereochemistry. Absolute configuration of organic molecules. London : Chapman and Hall.
196. Wenkert, E., Andrew Cheung, H.T., and Gottlieb, H.E. 1978. Carbon-13 nuclear magnetic resonance spectroscopy of naturally occurring substances. 56. *Strychnos* alkaloids, *J. Org. Chem.* 43 : 1099-1105.
197. Cordell, G.A., and Schun, Y. 1987. Revision of the Stereochemistry of koumidine. *Phytochemistry* 26 : 2875-2876.
198. Lounasmaa, M., Jokela, R., Tolvanen, A., and Kan, S. 1985. A 400 Mhz H-NMR study of seven sarpagin-type alkaloids. *Planta Med.* 51 : 519-521.
199. Ohashi, K., Watanabe, H., Okumura, Uji. t. and Kitagawa, J. 1994. Indonesian medicinal plants., XII. Four isameic lignan-glucosides from the bark of *Aegle marmelos* (Rutaceae). *Chem. Pharm. Bull.* 42 : 1924-1926.
200. Chandel, R.S., and Rastogi, R.P. 1980. Pygeoside, a new lignan xyloside from *Pygenum acuminatum* *Ind. J. Chem.* 19 B : 279-282.
201. Robinstein, J., Good, L.J., Clagne, A.D.H., and Mulheirn, L.J. 1976. The 220 Mhz NMR Spectra of phytosteroids, *Phytochemistry.* 15 : 195

202. Finney, D. J. 1971 **Probit analysis**, 3rd ed., Cambridge : Cambridge University Press.
203. Solis, P. N., Wright, C. W., Anderson, M. M., Gupta, M. P., and Phillipson, J. D.,
204. A microwell cytotoxicity assay using *Artemia Salina* (brine shrimp). **Planta Med.** 59 : 250-252.
204. Gisvold, O. and Thaker, E. 1974. Lignans from *Larrea divaricata*. **J. Pharm. Sci.** 63 : 1905-1907.
205. Stockigt, J., and Pfitzner, A. 1983. Characterization of polynneuridine aldehyde esterase, a key enzyme in the biosynthesis of sarpagine/ajmaline type alkaloids. **Planta Med.** 48 : 221-227.
206. Davis, B. D. 1958. On the importance of being ionised. **Arch. Biochem. Biophys.** 78 : 497-509.
207. Battersby, A. R., Brown, S. H., and Payne, T. G. 1970. Biosynthesis of loganin and the indole alkaloids from hydroxygeraniol-hydroxynerol. **J. C. S. Chem. Comm.** : 827-828.
208. Madyastha, K. M., Meehan, T. D., and Coscia. 1976. **Biochem. Biophys. Res. Commun.** 53 : 1043-1048.
209. Inouye, H. Ueda, S., Aoki, Y., and Takeda, Y. 1972. **Chem. Pharm. Bull. (Tokyo)** 20 : 1287-1296.
210. Battersby, A. R., Burnett, A. R., and Parsons, P. G. 1970. **J. C. S. Chem. Comm.** 826-827.
211. Guarnaccia, R., Botta, L., and Coscia, C. J. 1974. **J. Am. Chem. Soc.** 96 : 7079-7084.
212. Madyastha, K. M., Guarnaccia, R., and Coscia, C. J. 1971. **FEBS Letters** 14 : 175- 177.
213. Bombardelli, E., Bonati, A., Gabetta, B., and Mustich, G. 1974. A New Alkaloids from *Voacanga chalotina*. **Phytochemistry** 13 : 2857-2859.



APPENDIX

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย
Figure 1 *Strychnos nitida* G. Don

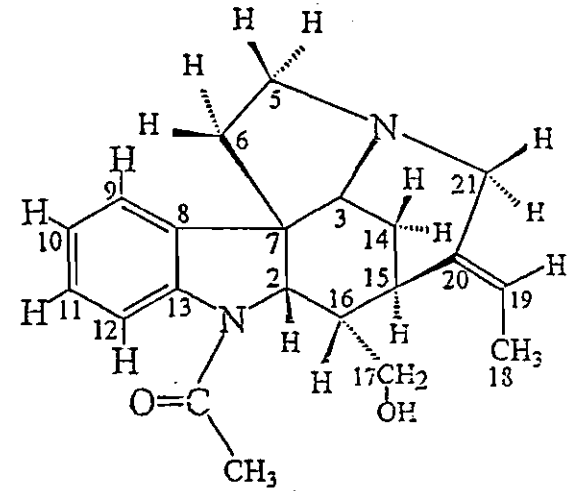
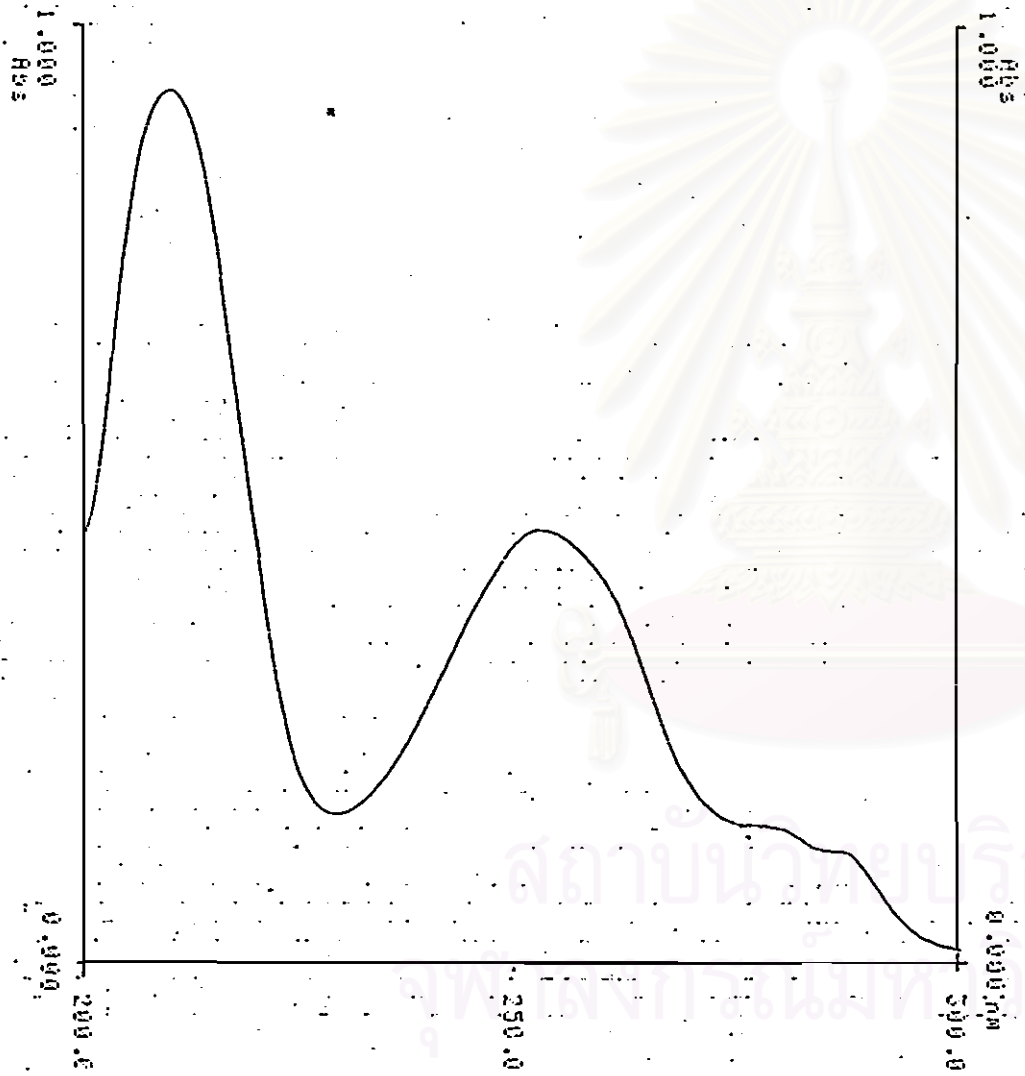


Figure 2 Ultraviolet absorption spectrum of SN-1

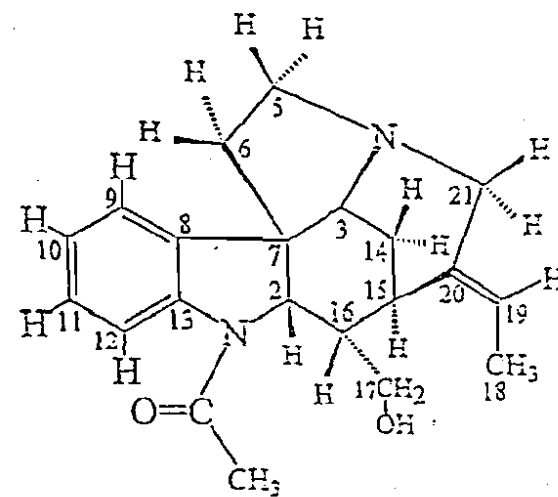
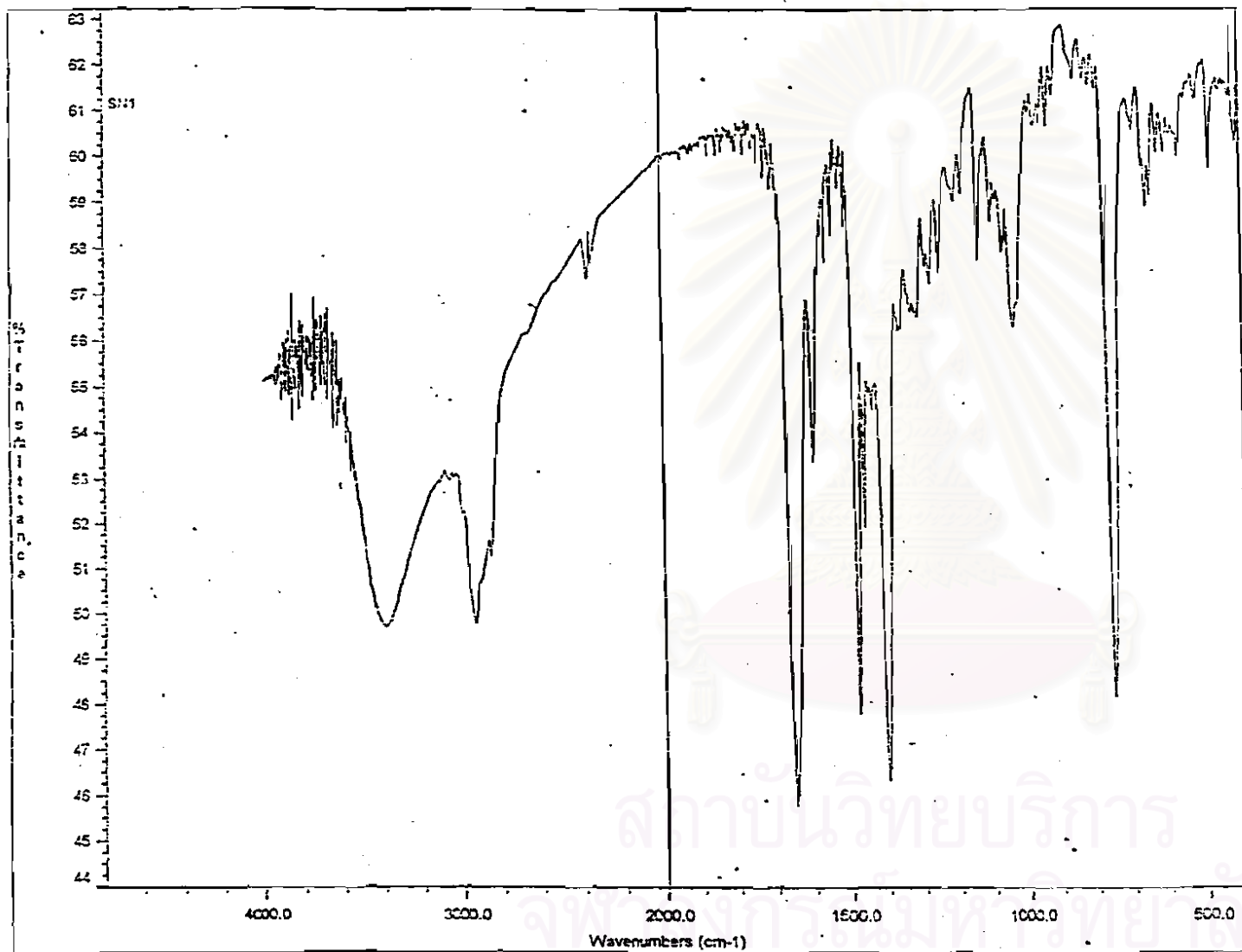


Figure 3 Infrared absorption spectrum of SN-1

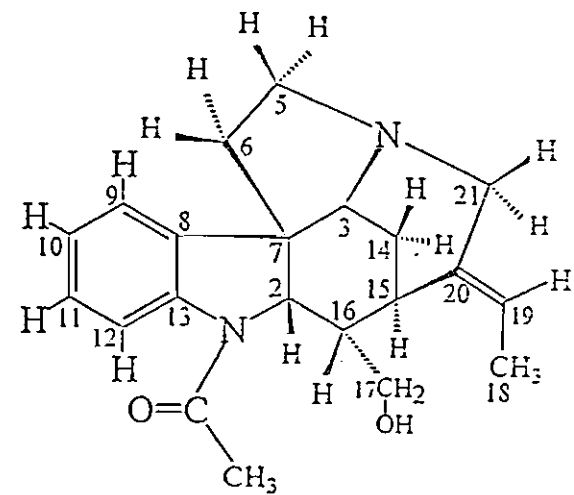
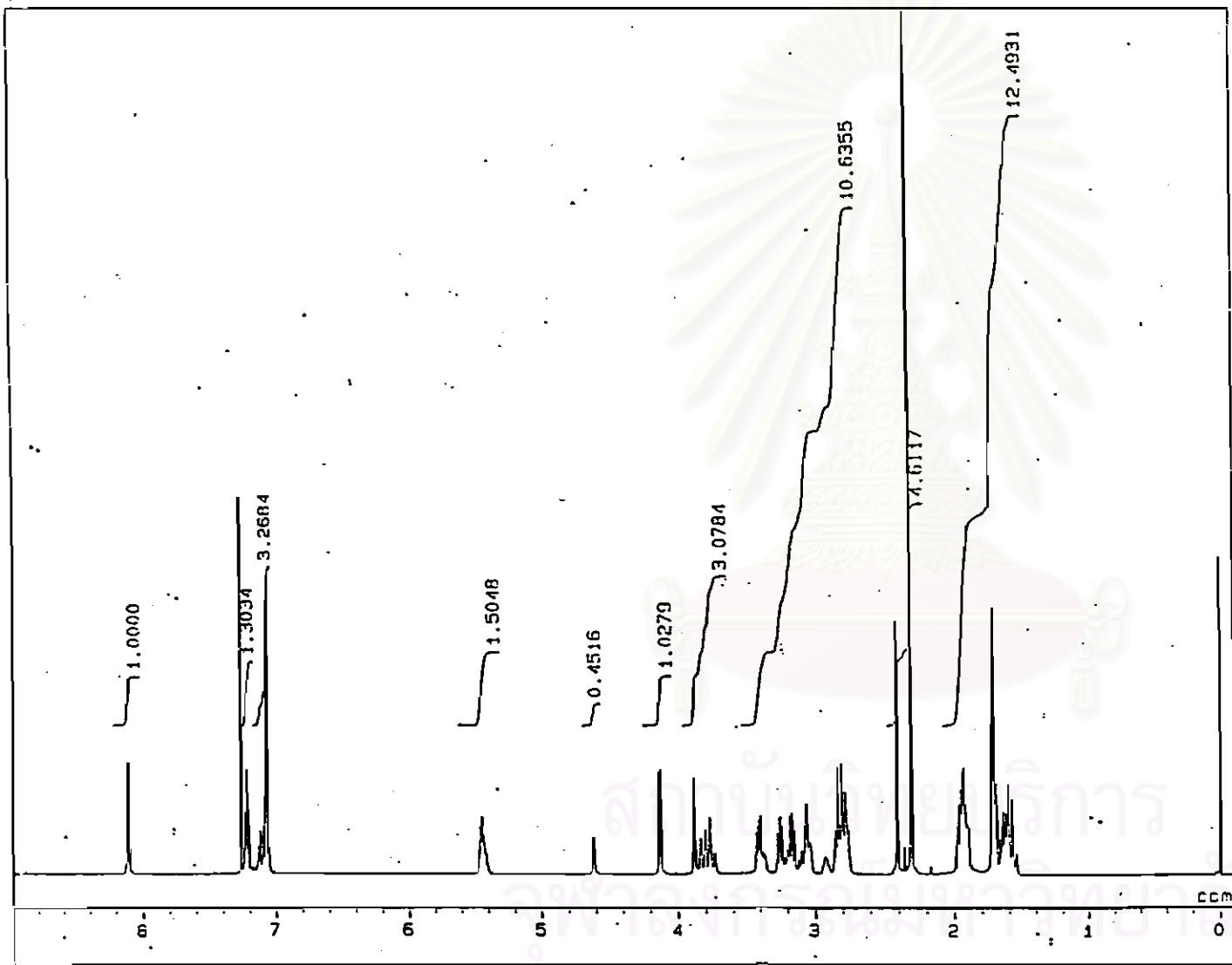


Figure 4.1 ¹H-NMR spectrum of SN-1 (500 MHz ; in CDCl₃)

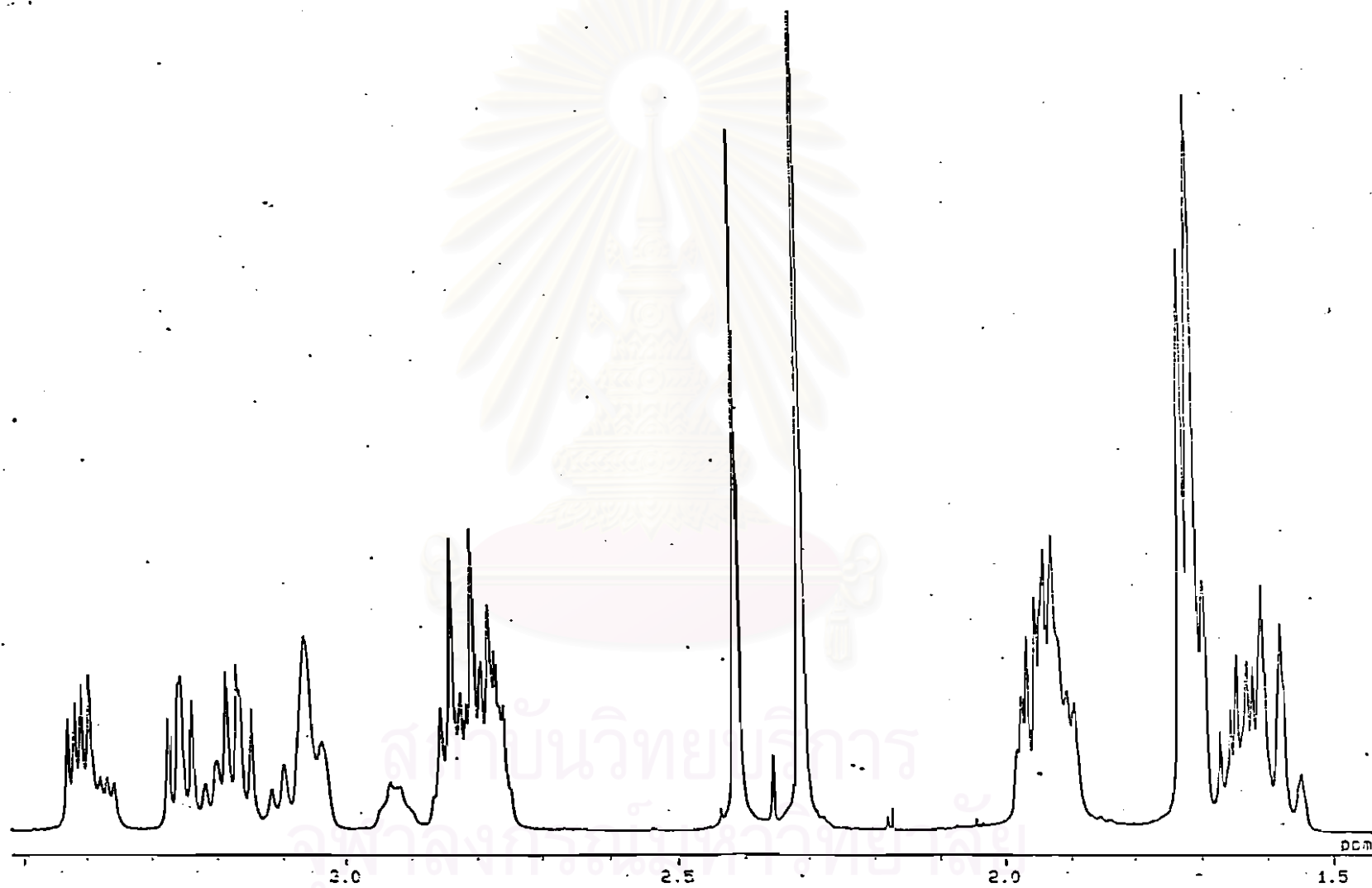


Figure 4.2 Expanded $^1\text{H-NMR}$ spectrum of SN-1

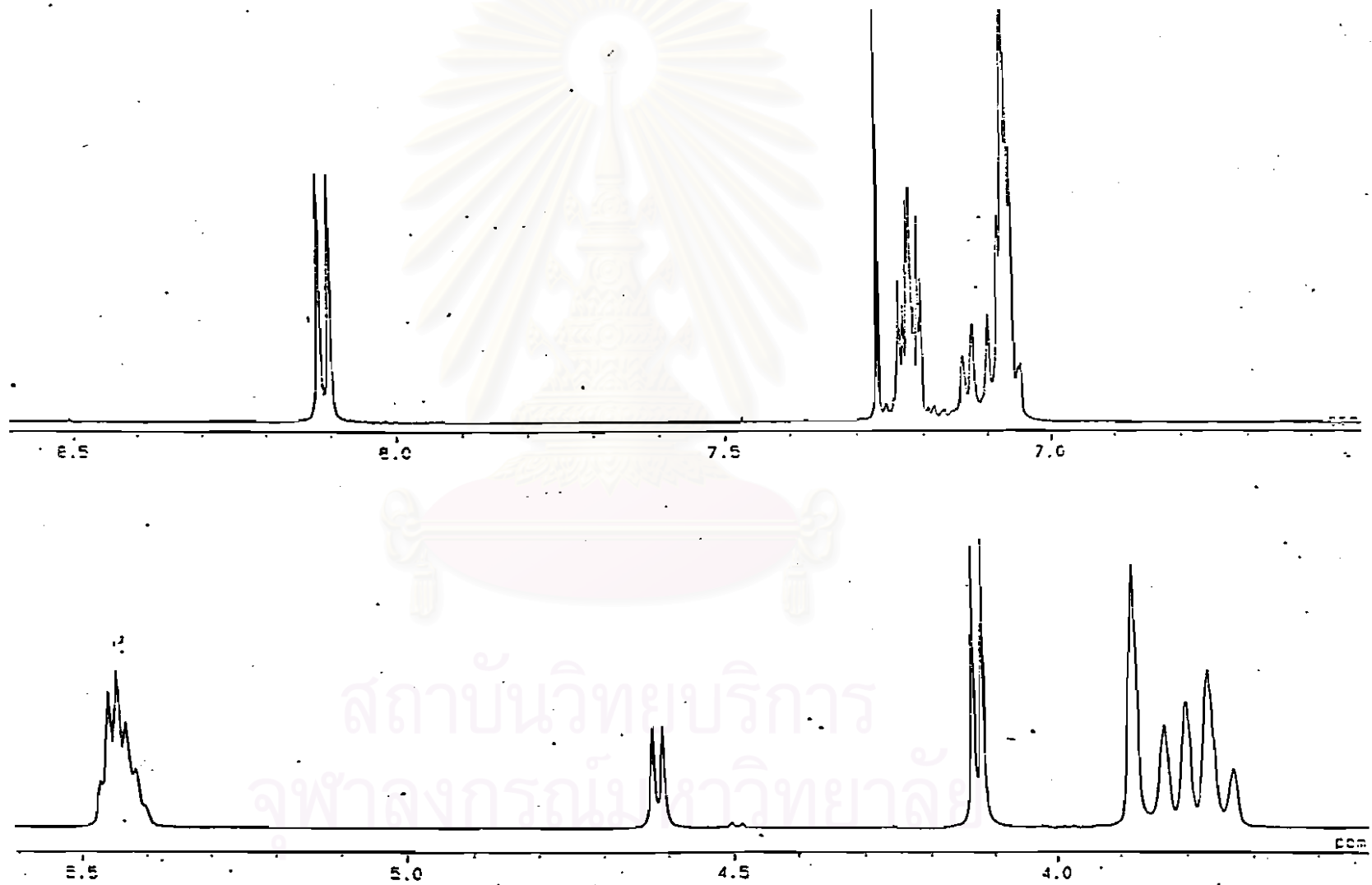


Figure 4.3 Expanded $^1\text{H-NMR}$ spectrum of SN-1

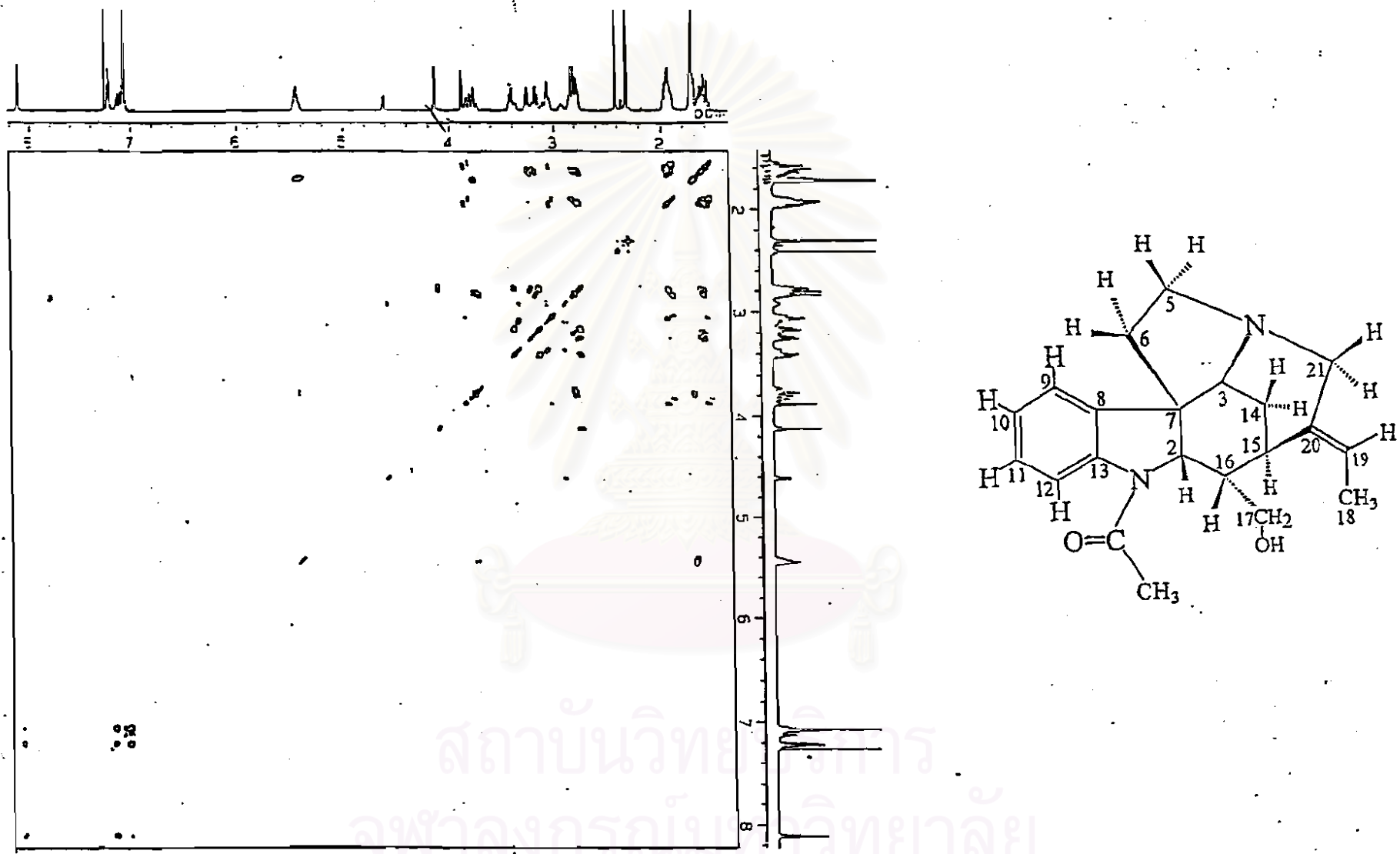


Figure 5 ^1H - ^1H COSY spectrum of SN-1 (500 MHz ; in CDCl_3)

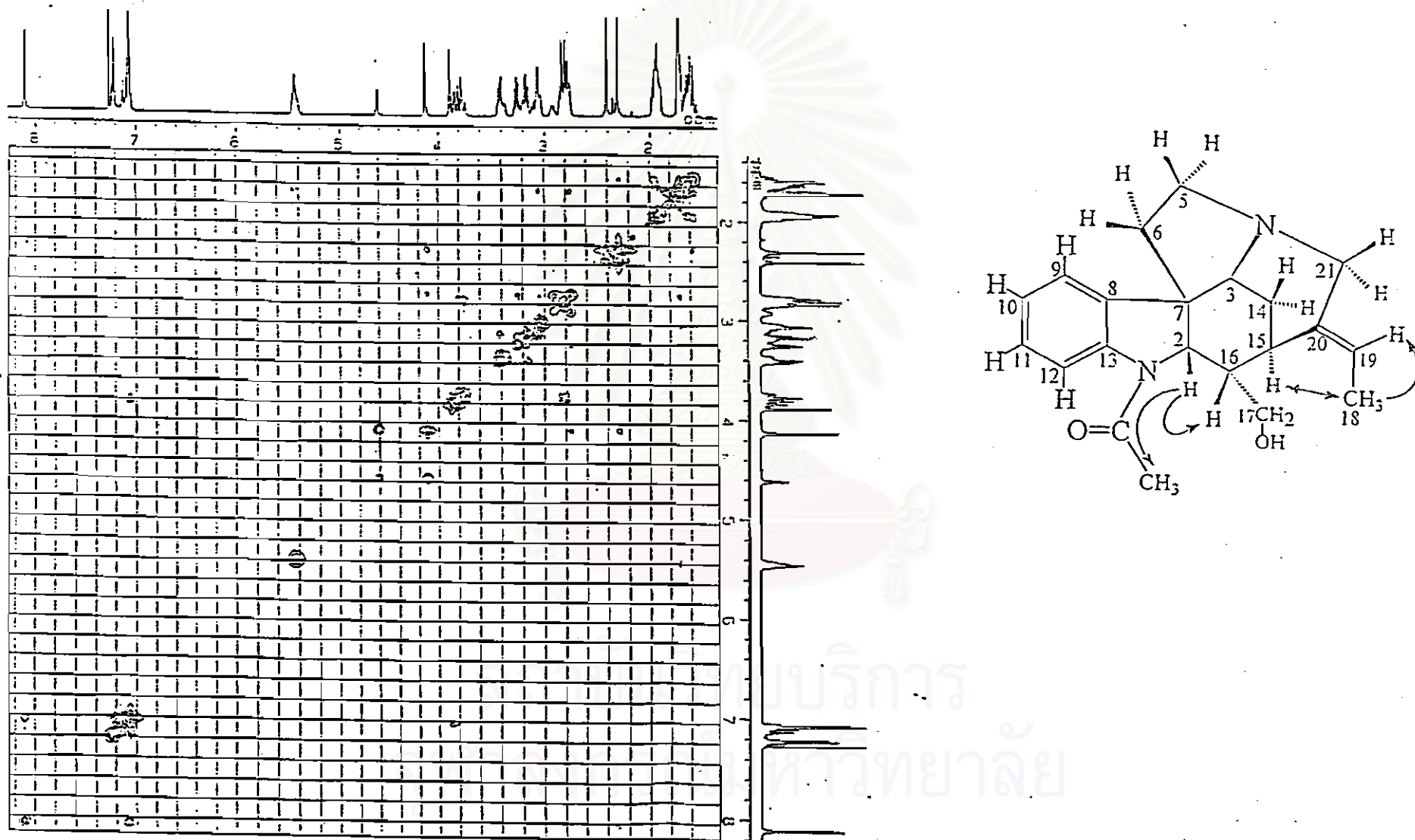


Figure 6 NOESY spectrum of SN-1 (500 MHz ; in CDCl₃)

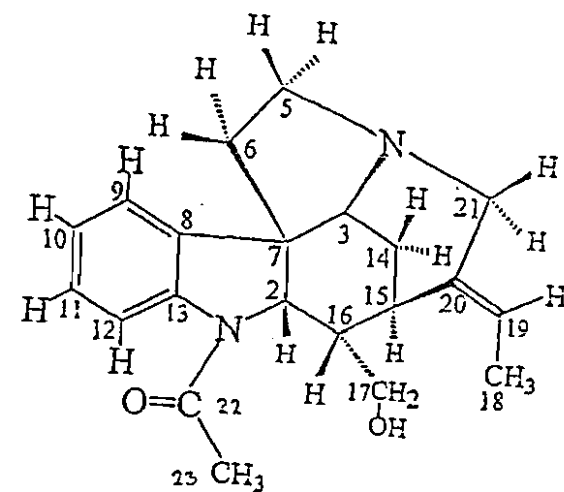
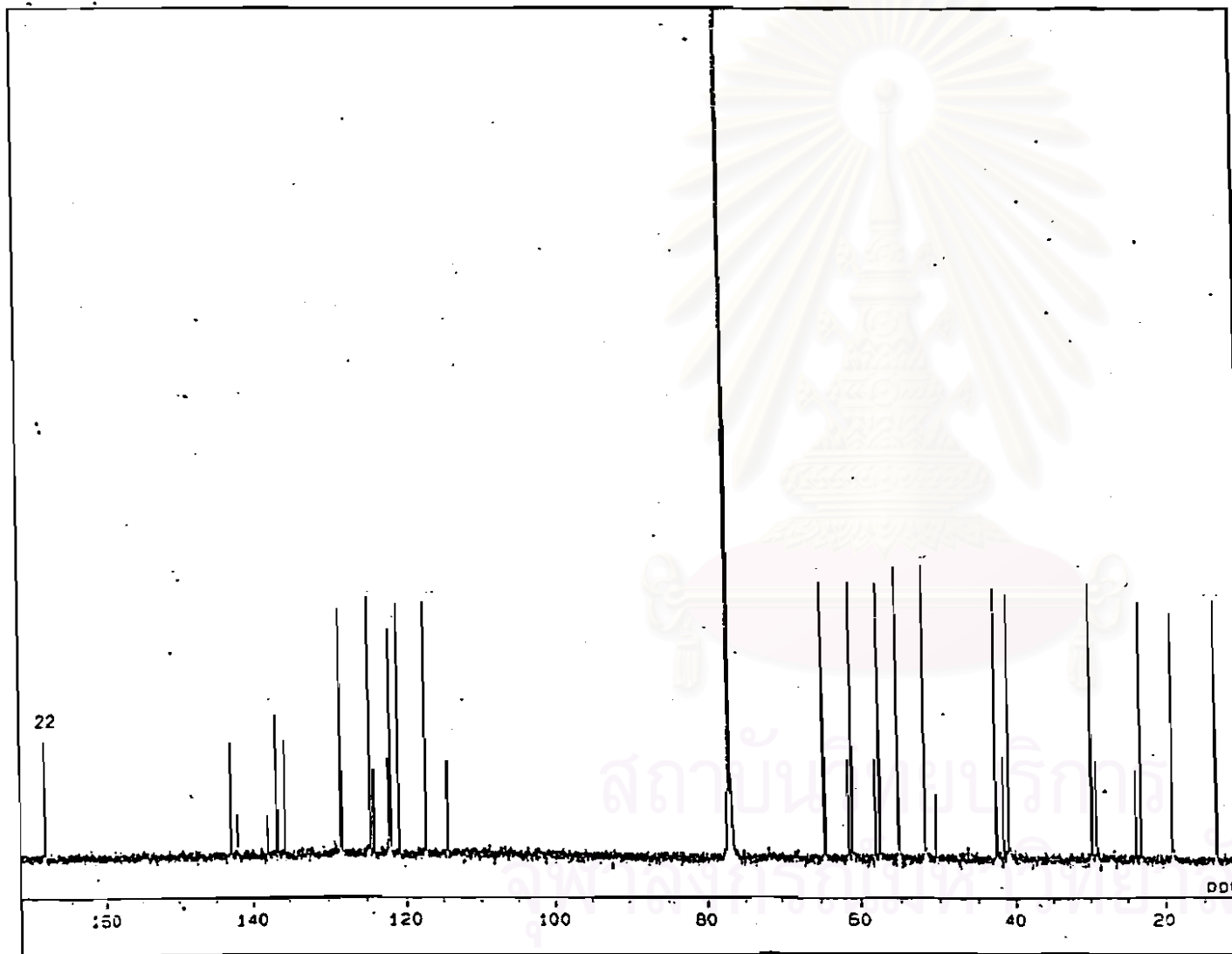


Figure 7.1 ^{13}C -NMR spectrum of SN-1 (125 MHz; in CDCl_3)

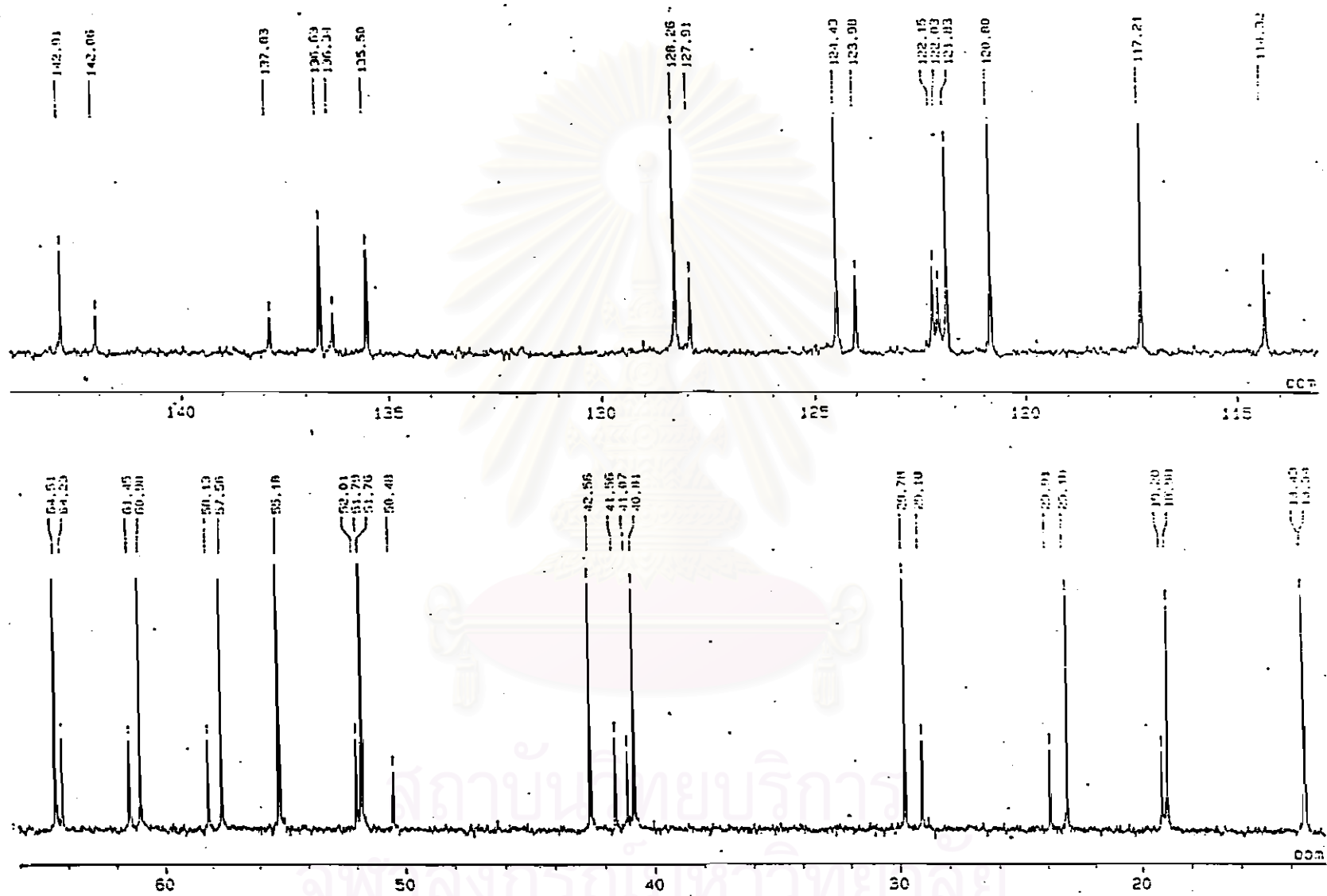


Figure 7.2 Expanded ^{13}C -NMR spectrum of SN-1

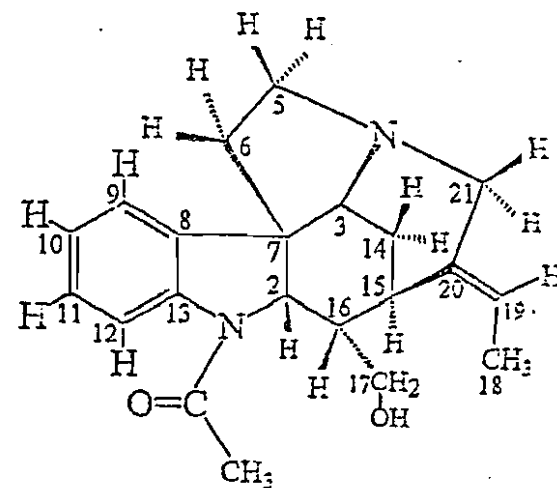
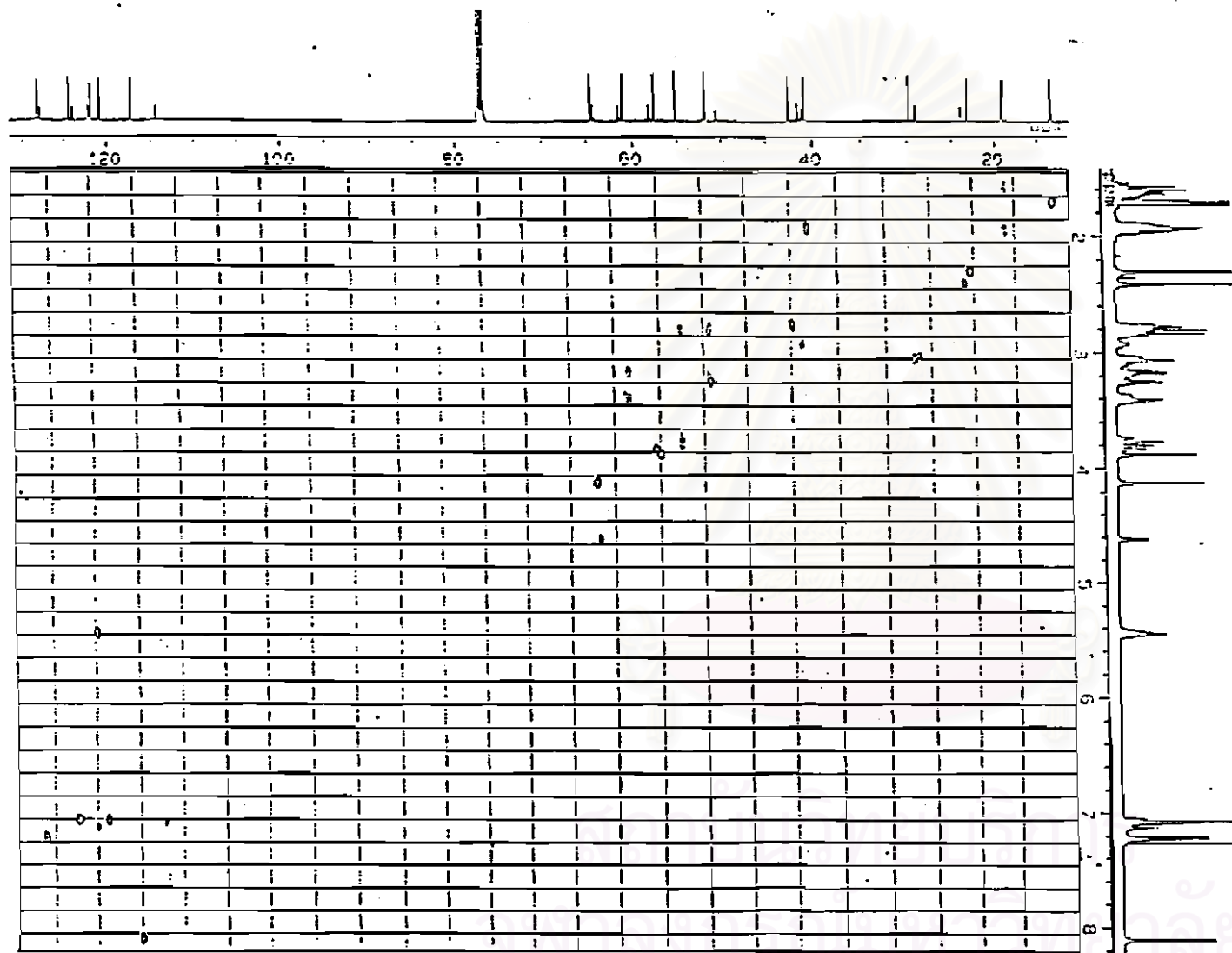


Figure 8.1 ^{13}C - ^1H COSY spectrum of SN-1 (500 MHz; in CDCl_3)

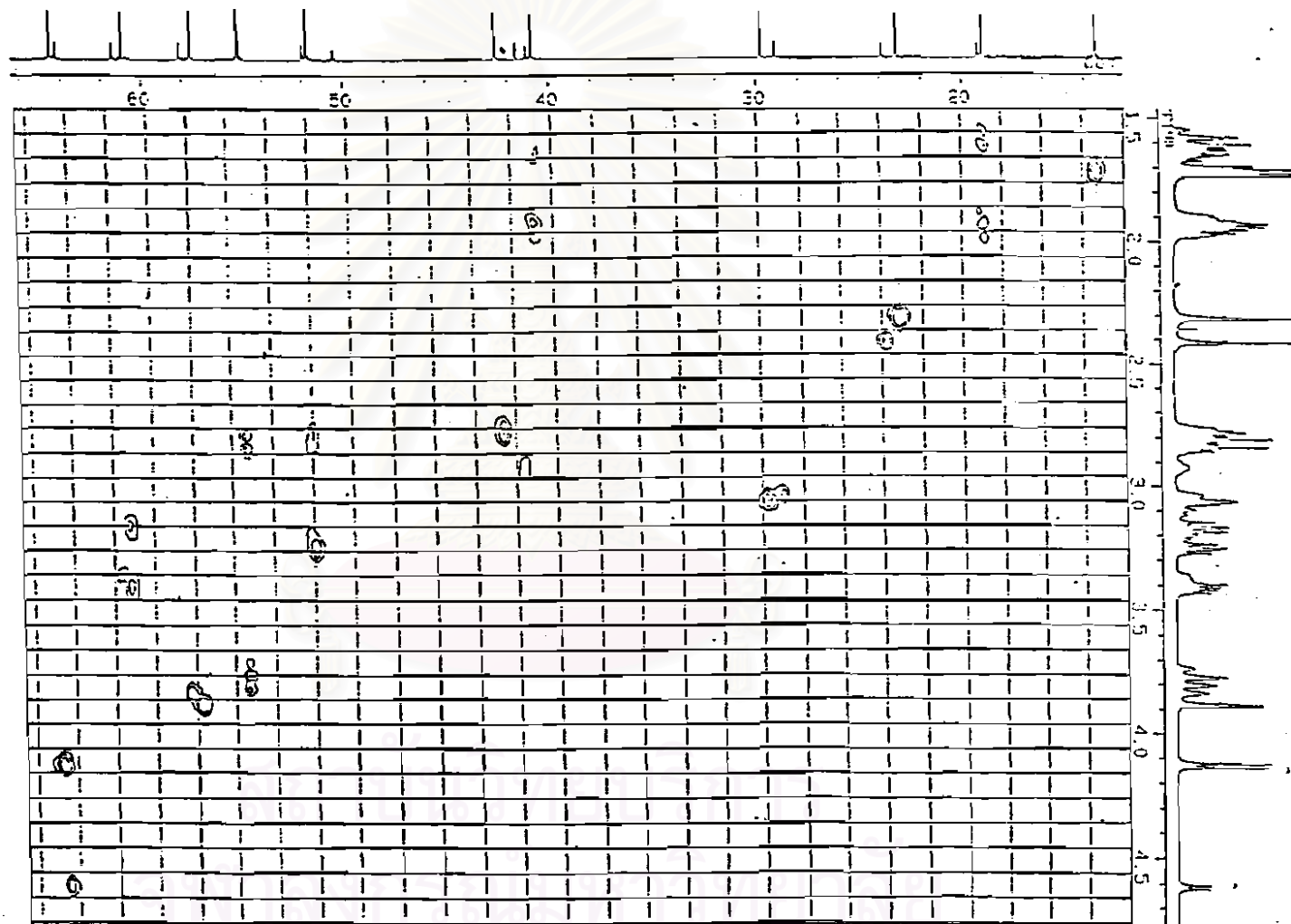


Figure 8.2 Expanded ^{13}C - ^1H COSY spectrum of SN-1

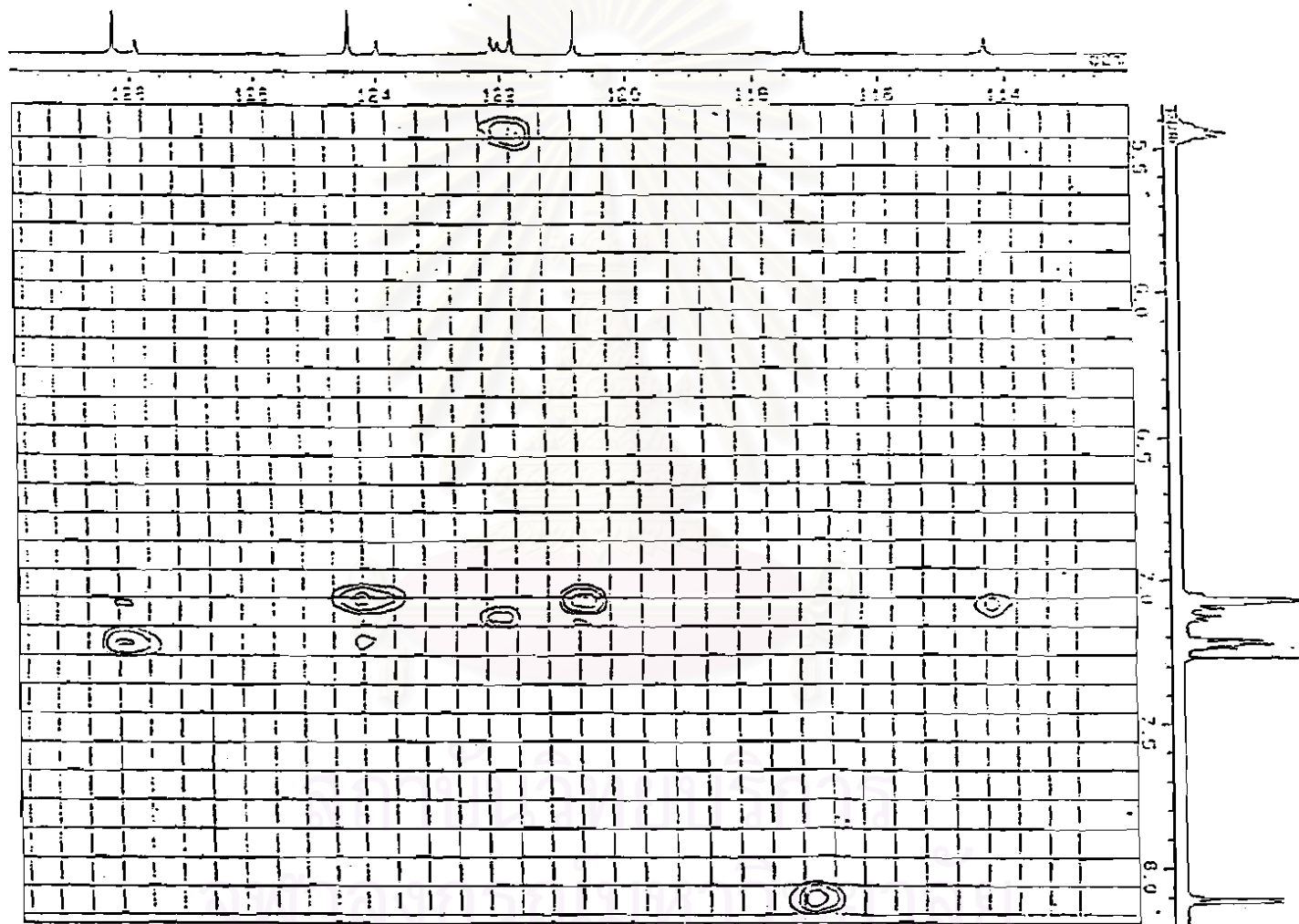


Figure 8.3 Expanded ^{13}C - ^1H COSY spectrum of SN-1

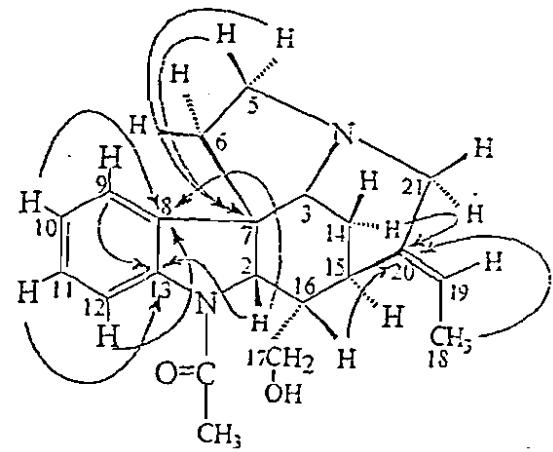
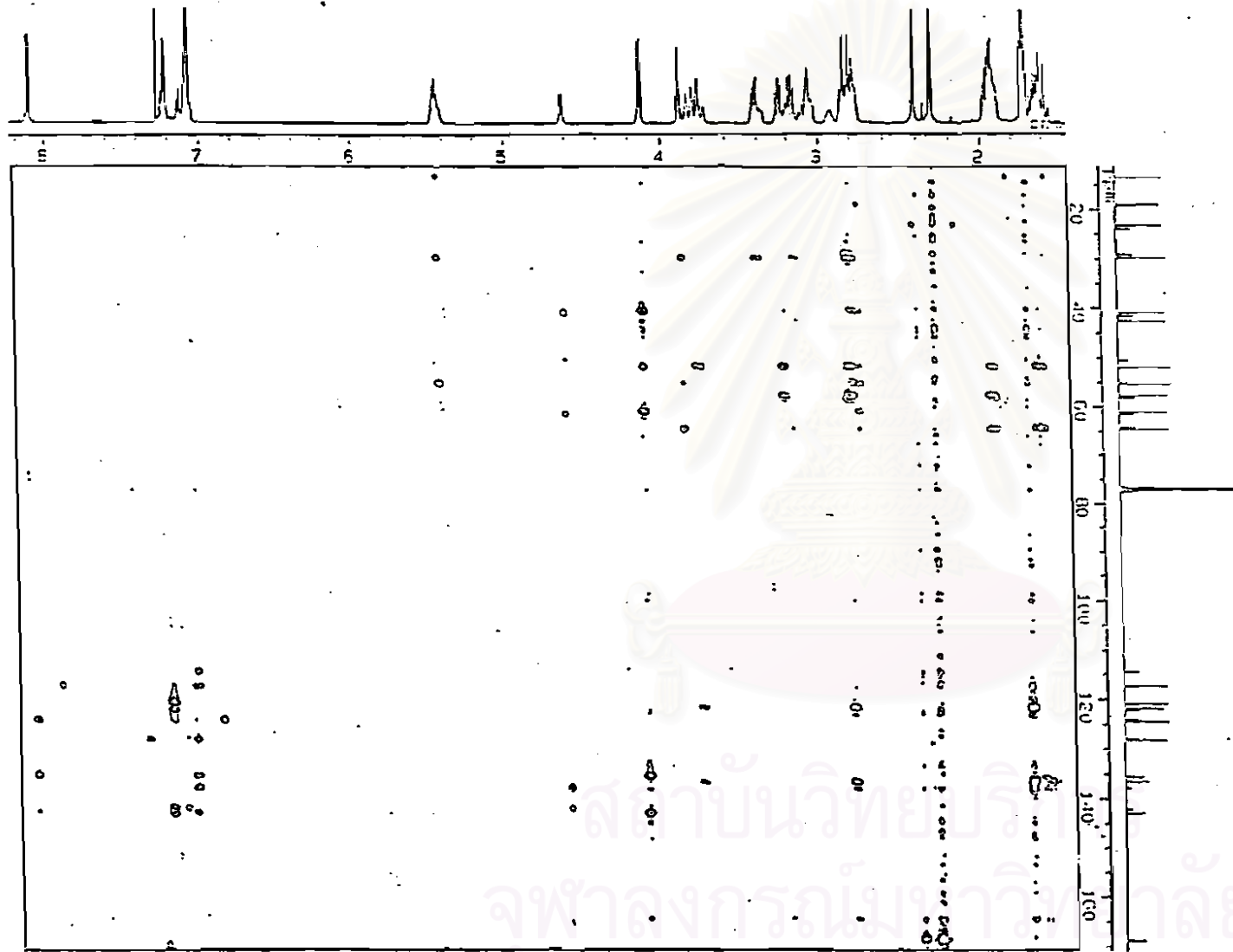


Figure 9 HMBc spectrum of SN-1 (500 MHz); in CDCl₃)

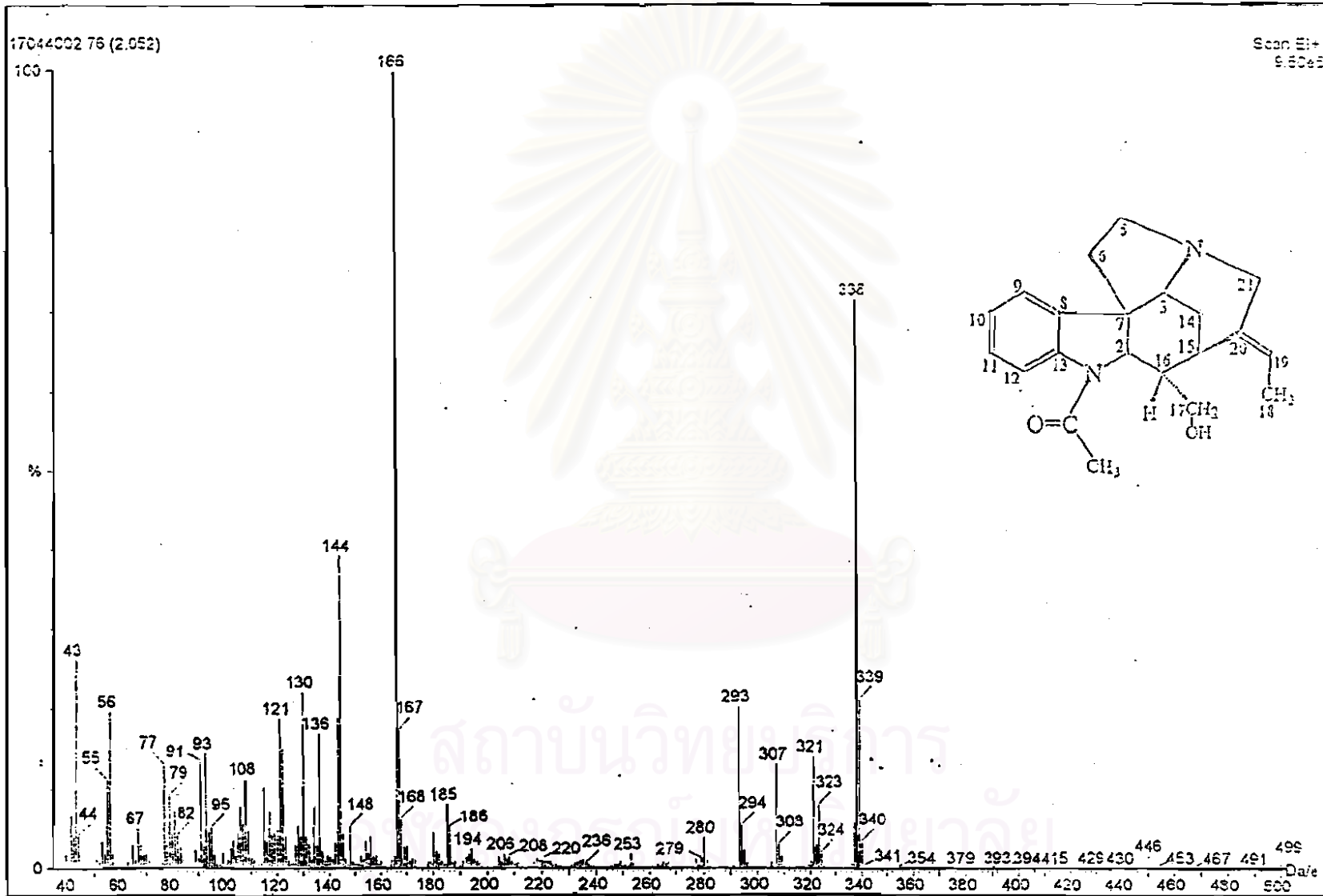


Figure 10 Mass spectrum of SN-1

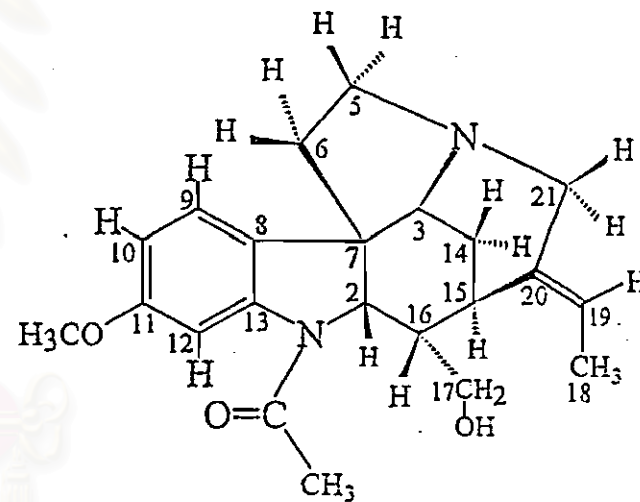
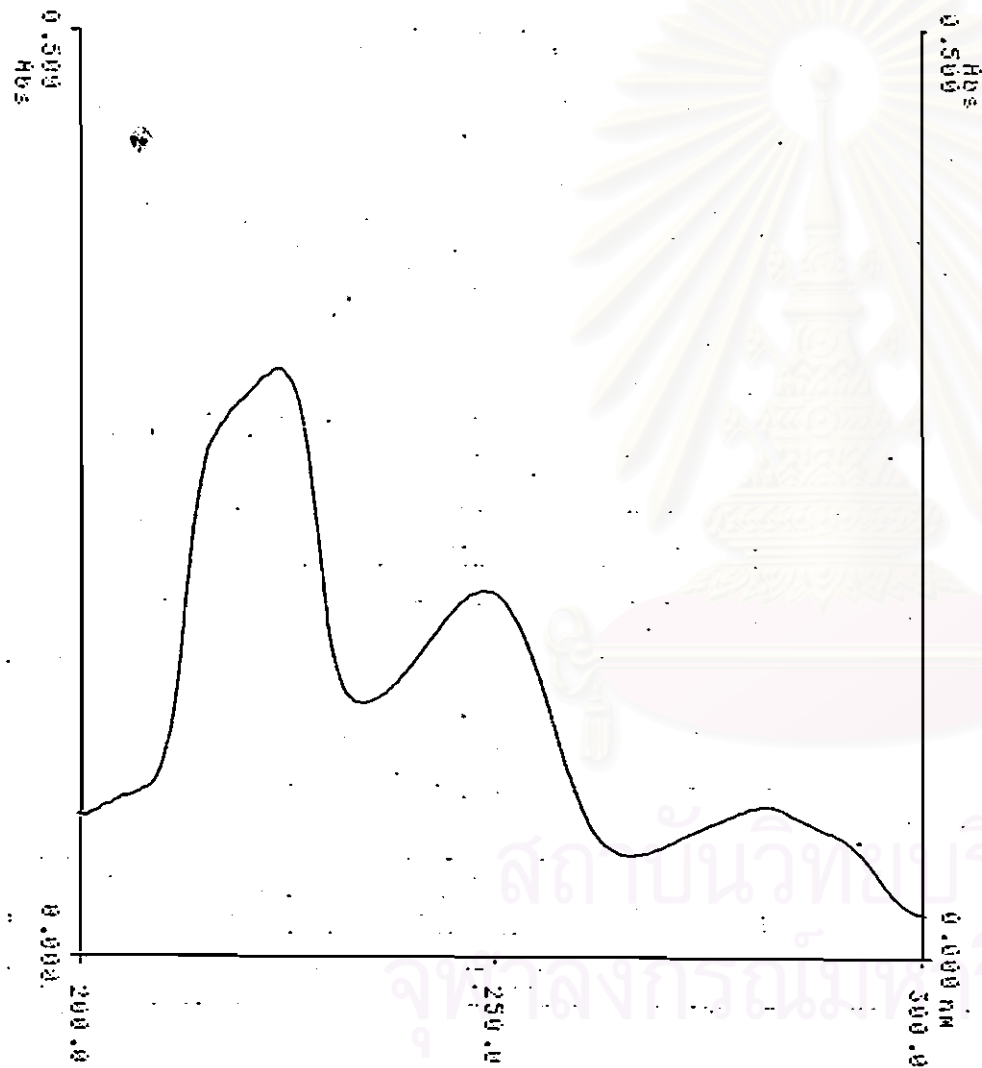


Figure 11 Ultraviolet absorption spectrum of SN-2

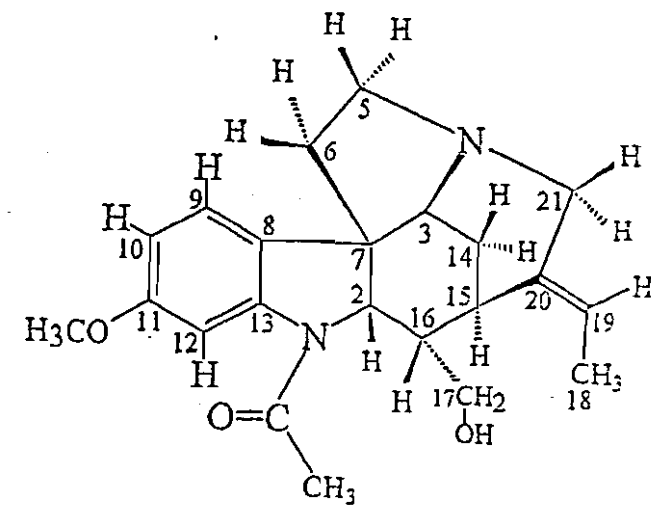
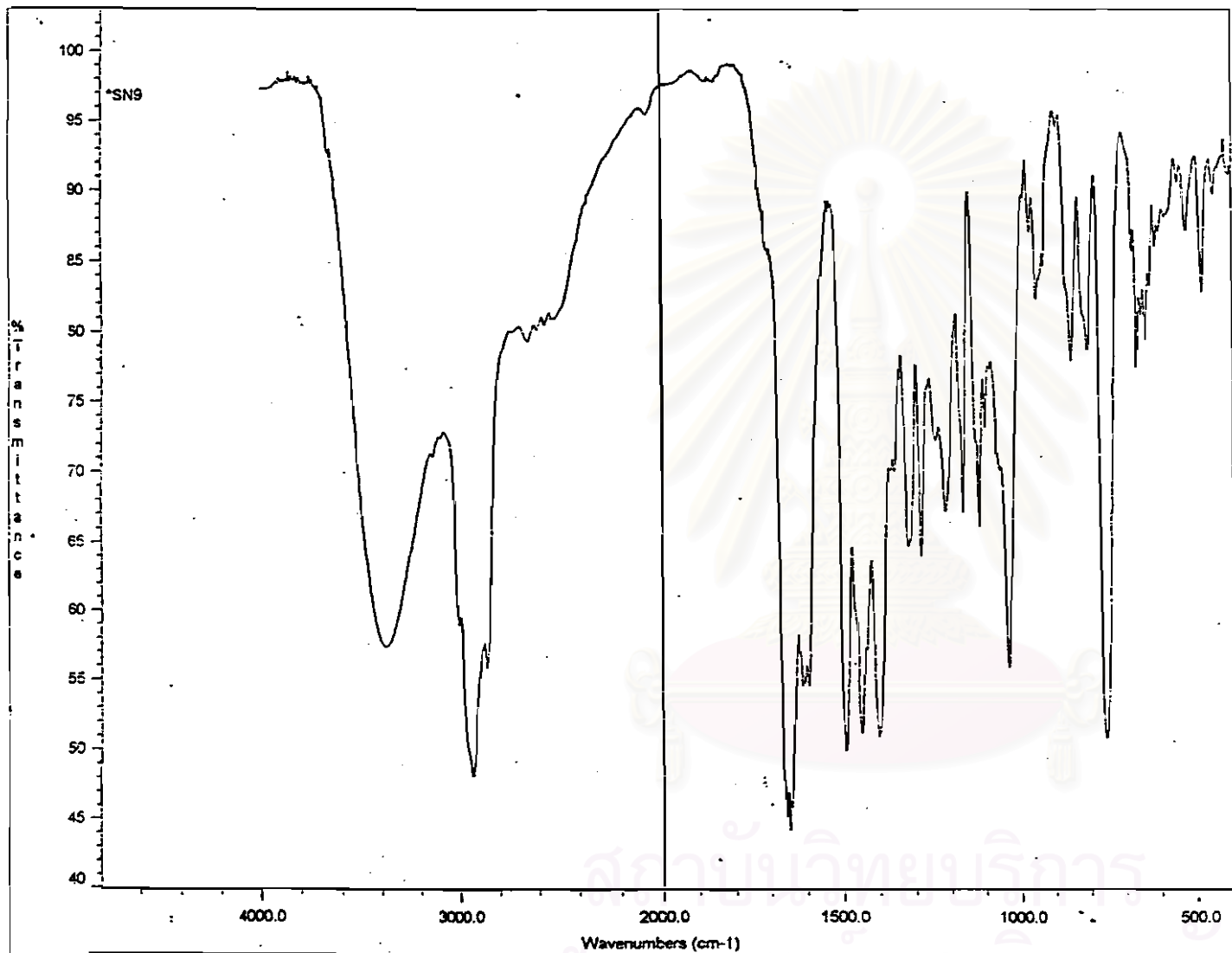


Figure 12 Infrared absorption spectrum of SN-2

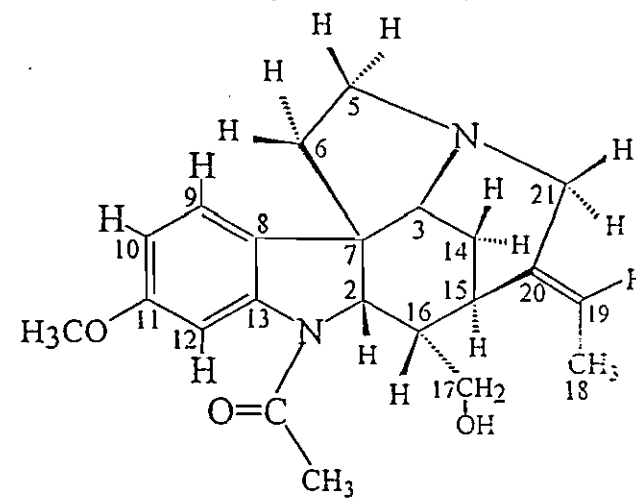
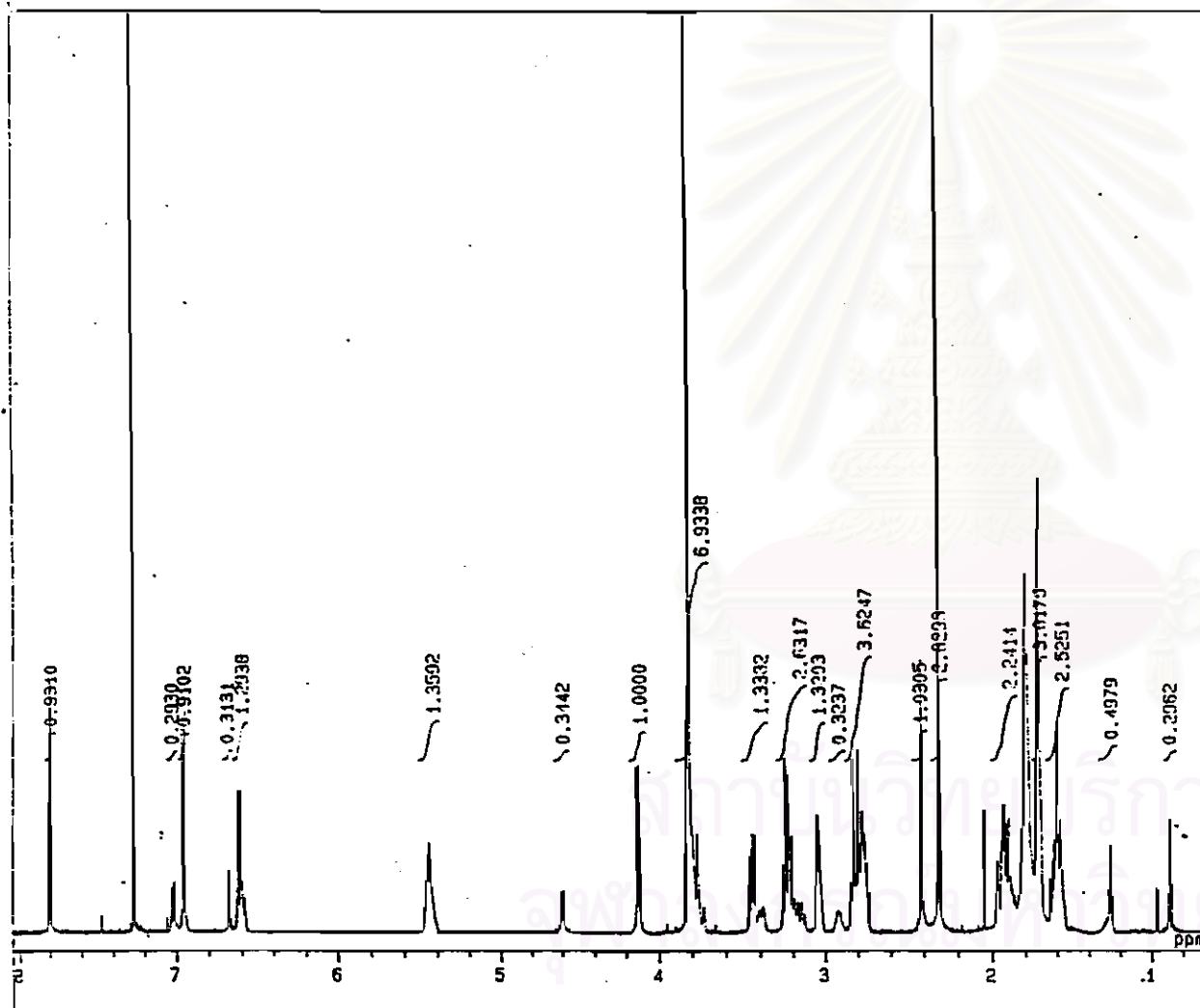


Figure 13.1 $^1\text{H-NMR}$ spectrum of SN-2 (500 MHz; in CDCl_3)

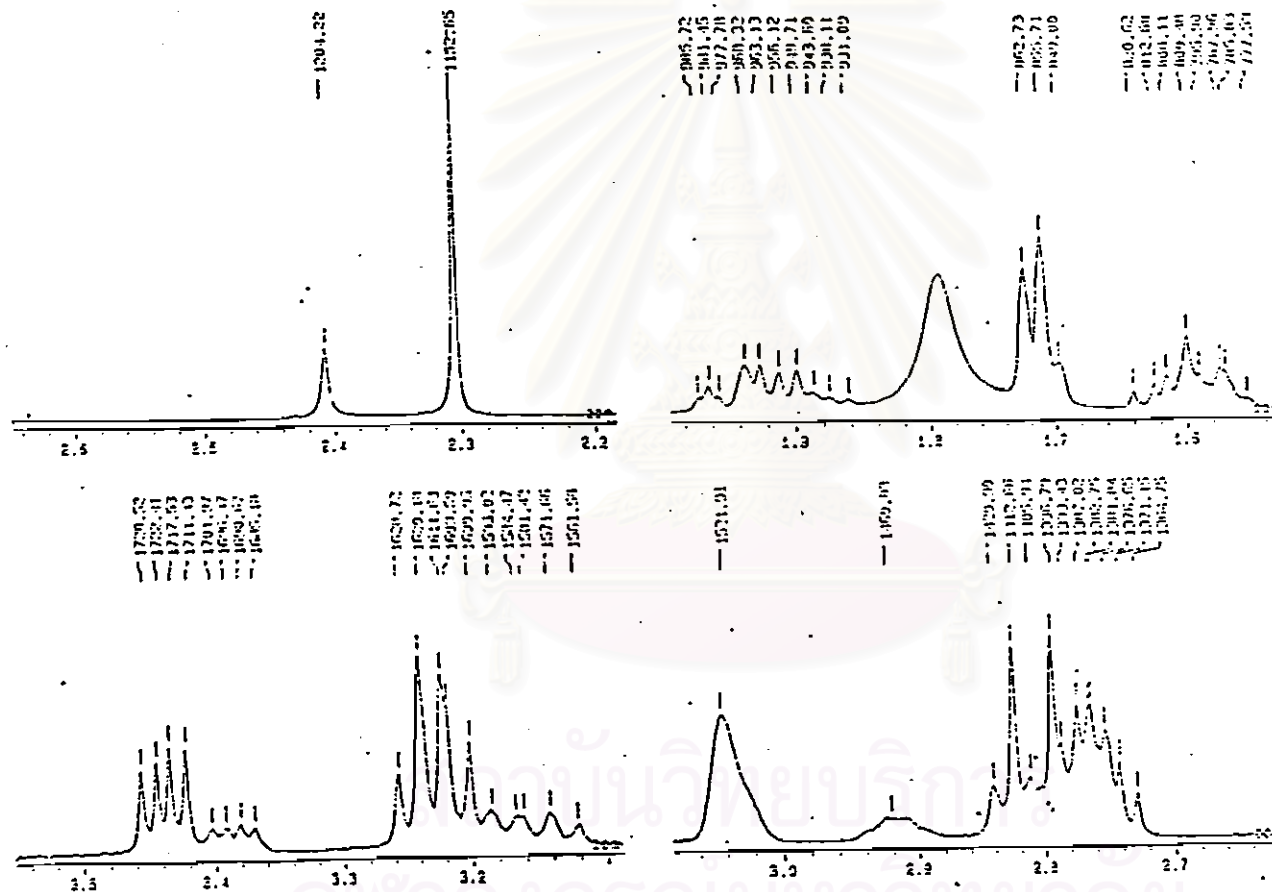


Figure 13.2 Expanded ¹H-NMR spectrum of SN-2

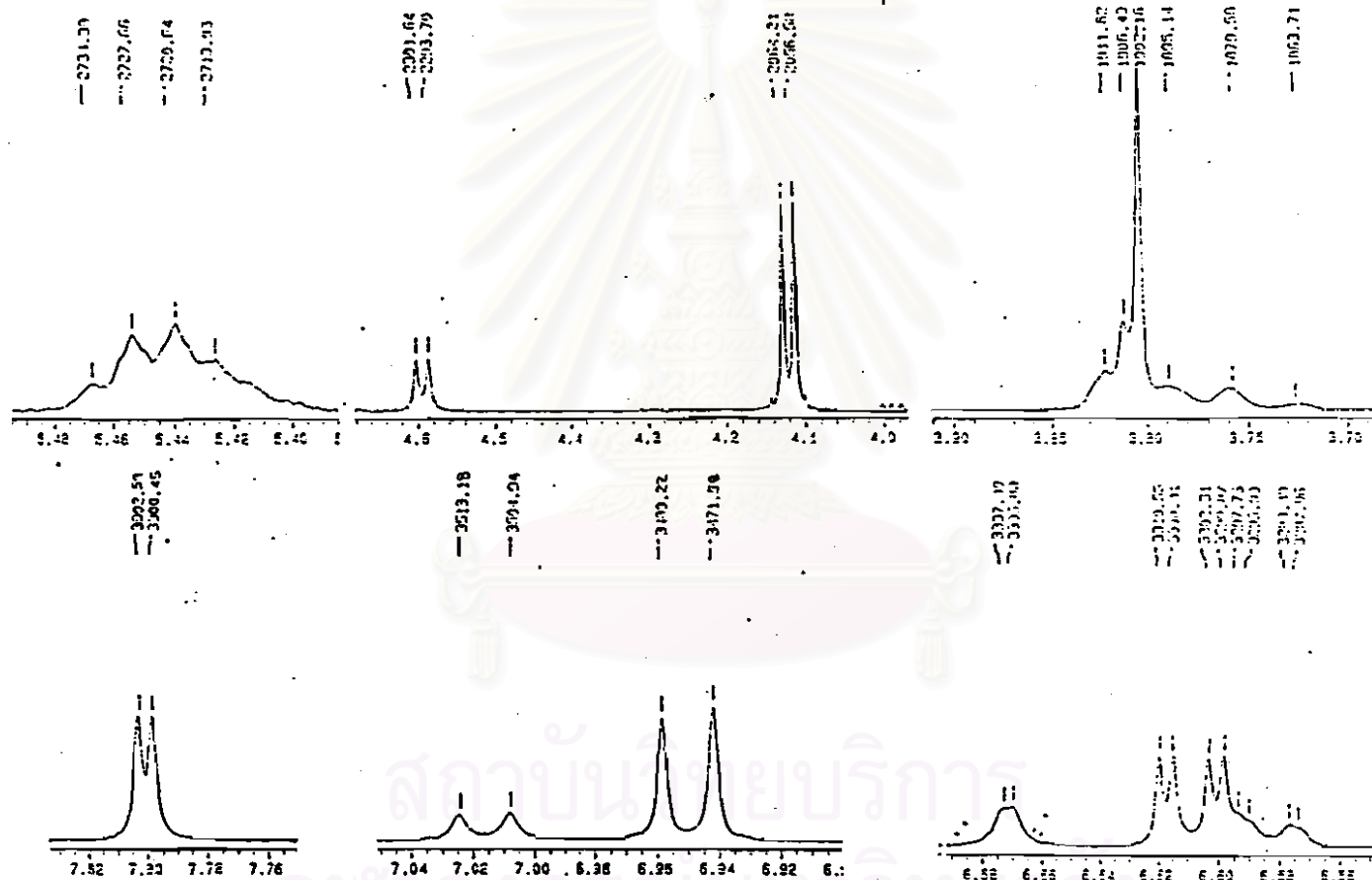


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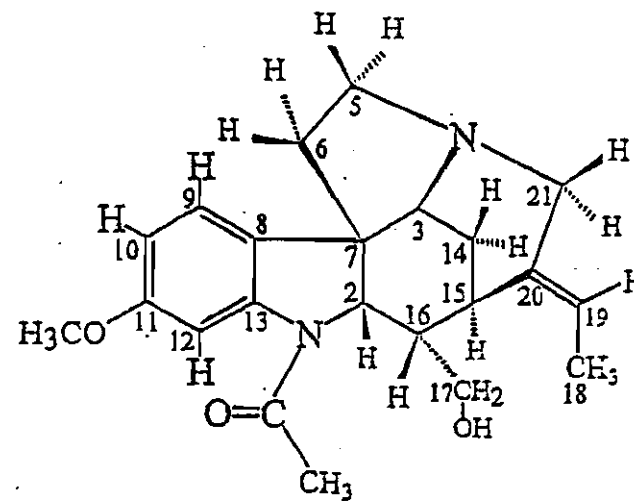
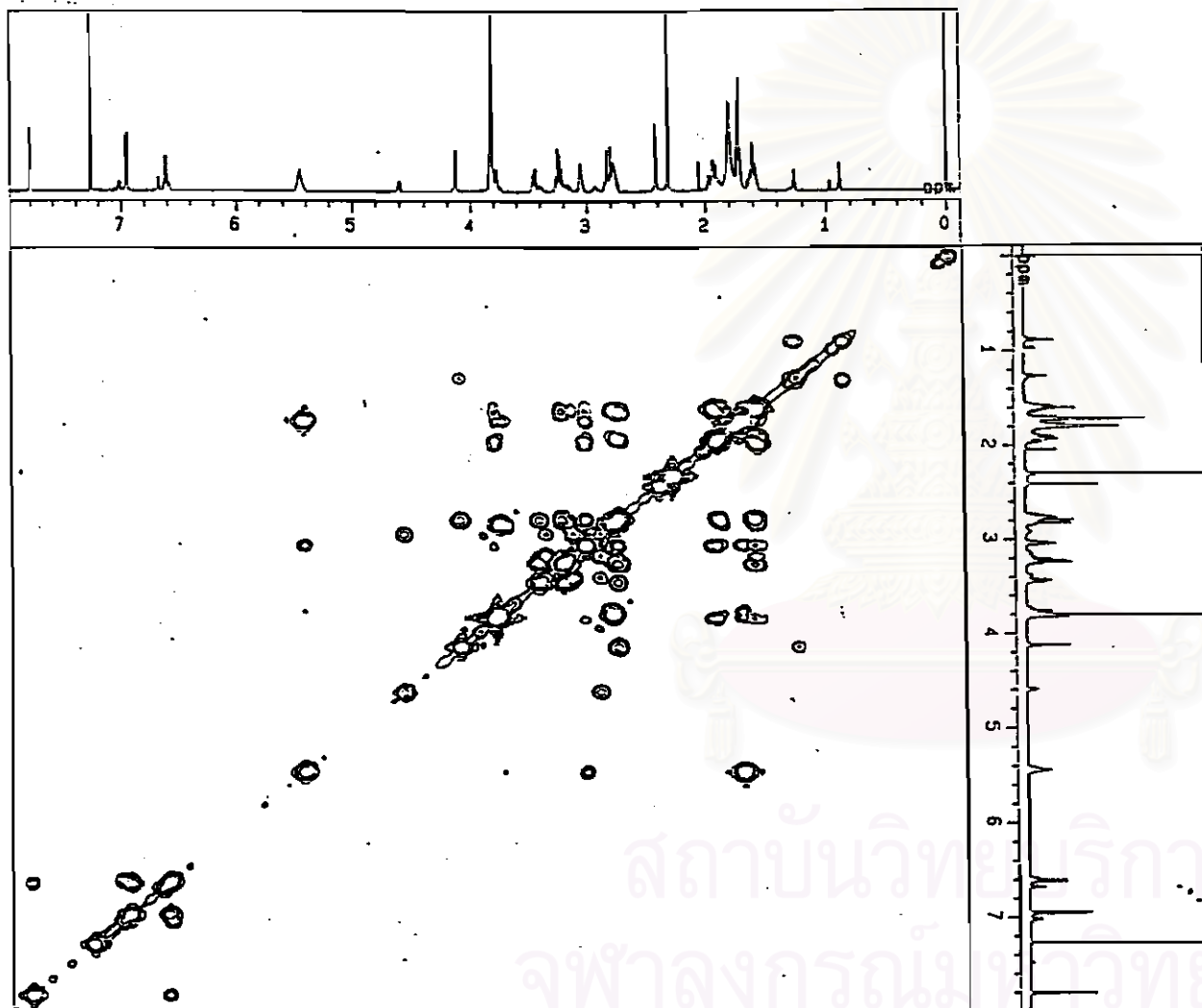


Figure 14. ^1H - ^1H COSY spectrum of SN-2 (500 MHz ; in CDCl_3)

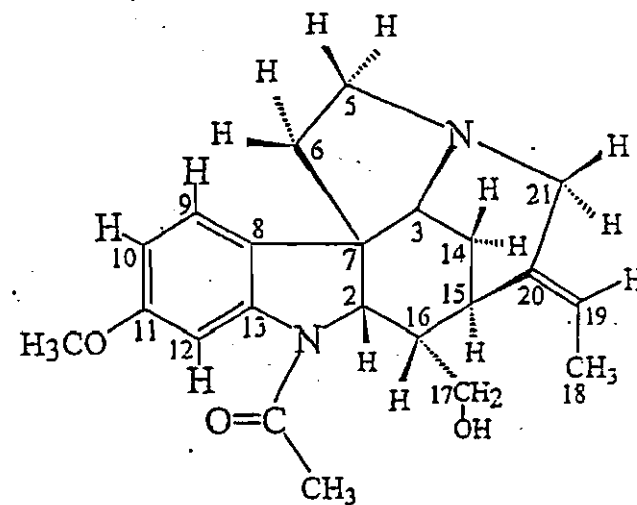
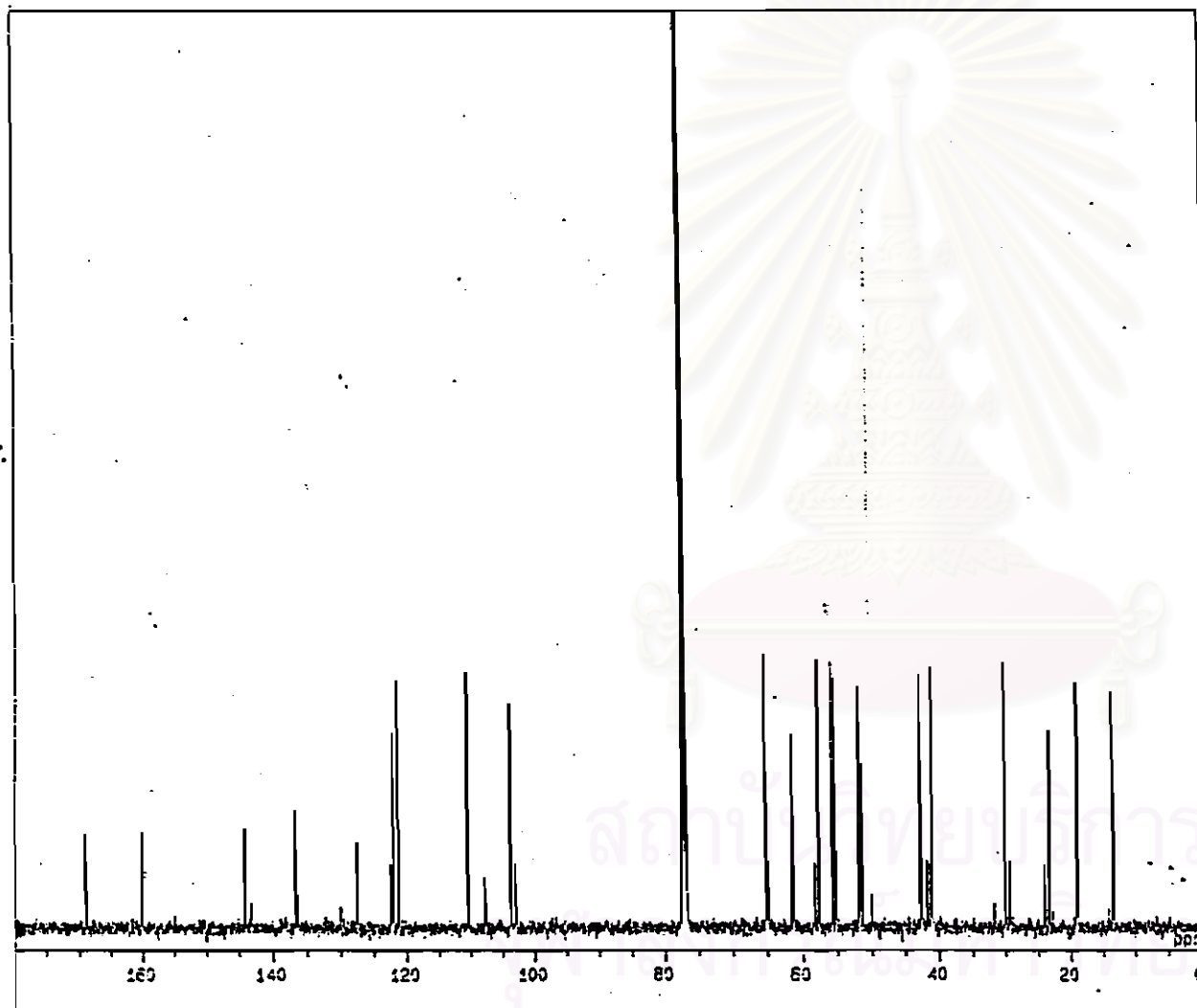


Figure 15.1. ^{13}C -NMR spectrum of SN-2 (125 MHz; in CDCl_3)

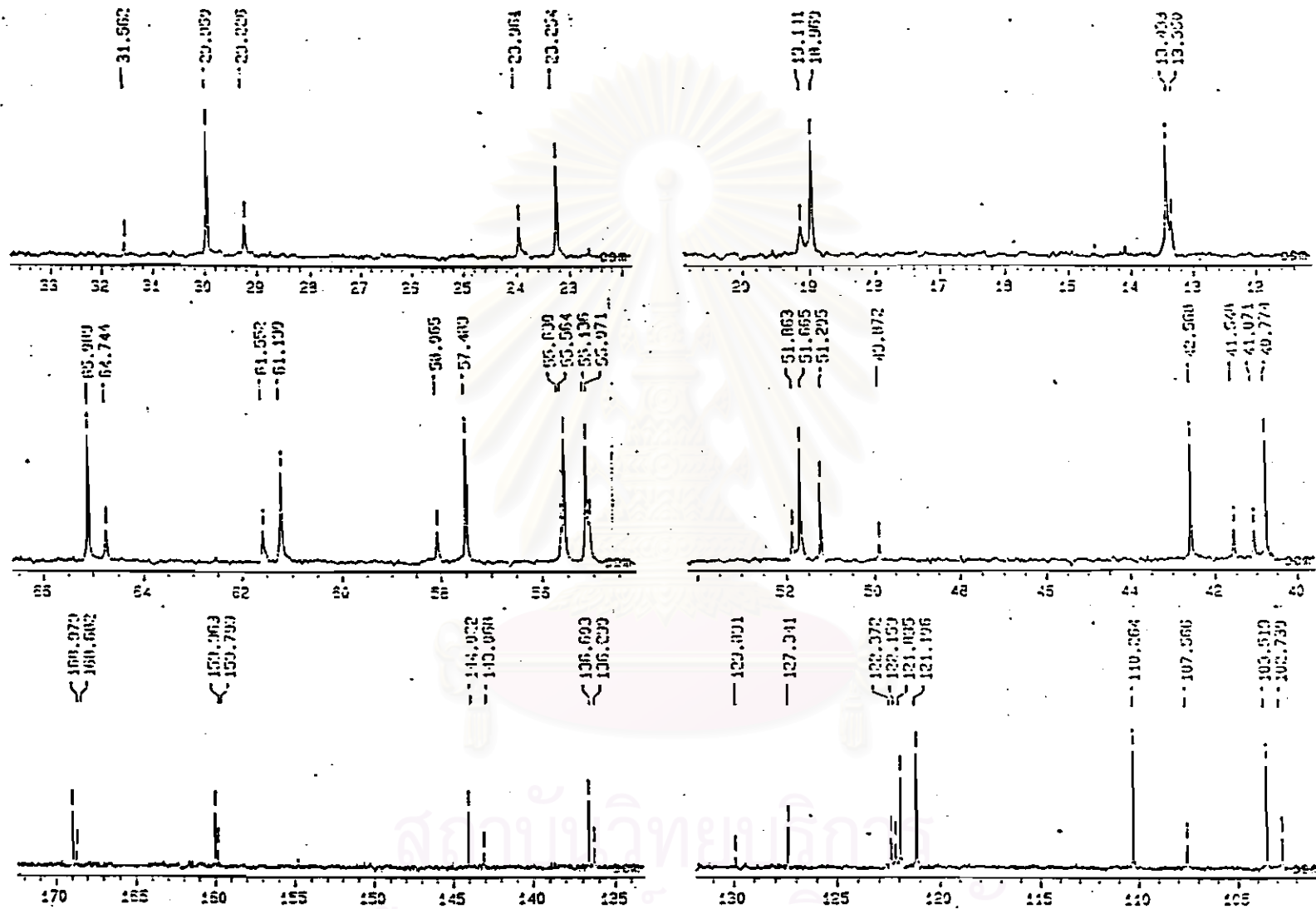


Figure 15.2 Expanded ^{13}C -NMR spectrum of SN-2

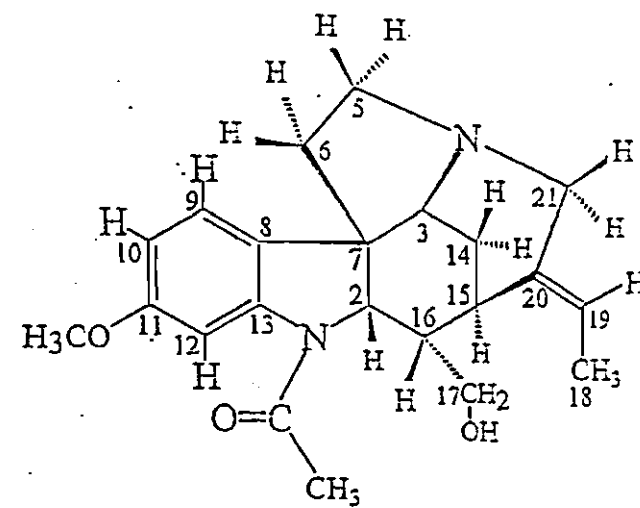
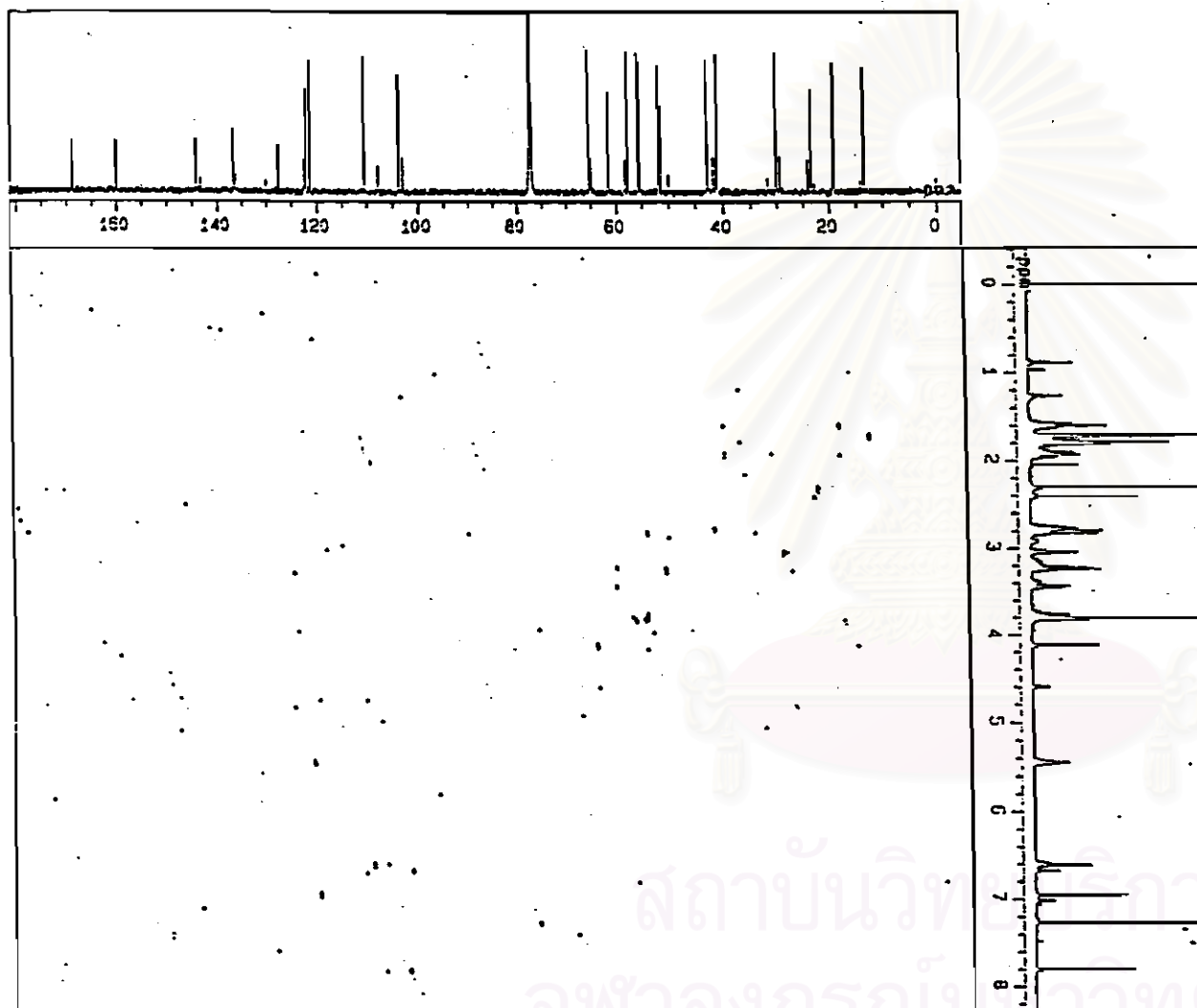


Figure 16.1 ^{13}C - ^1H COSY spectrum of SN-2 (500 MHz; in CDCl_3)

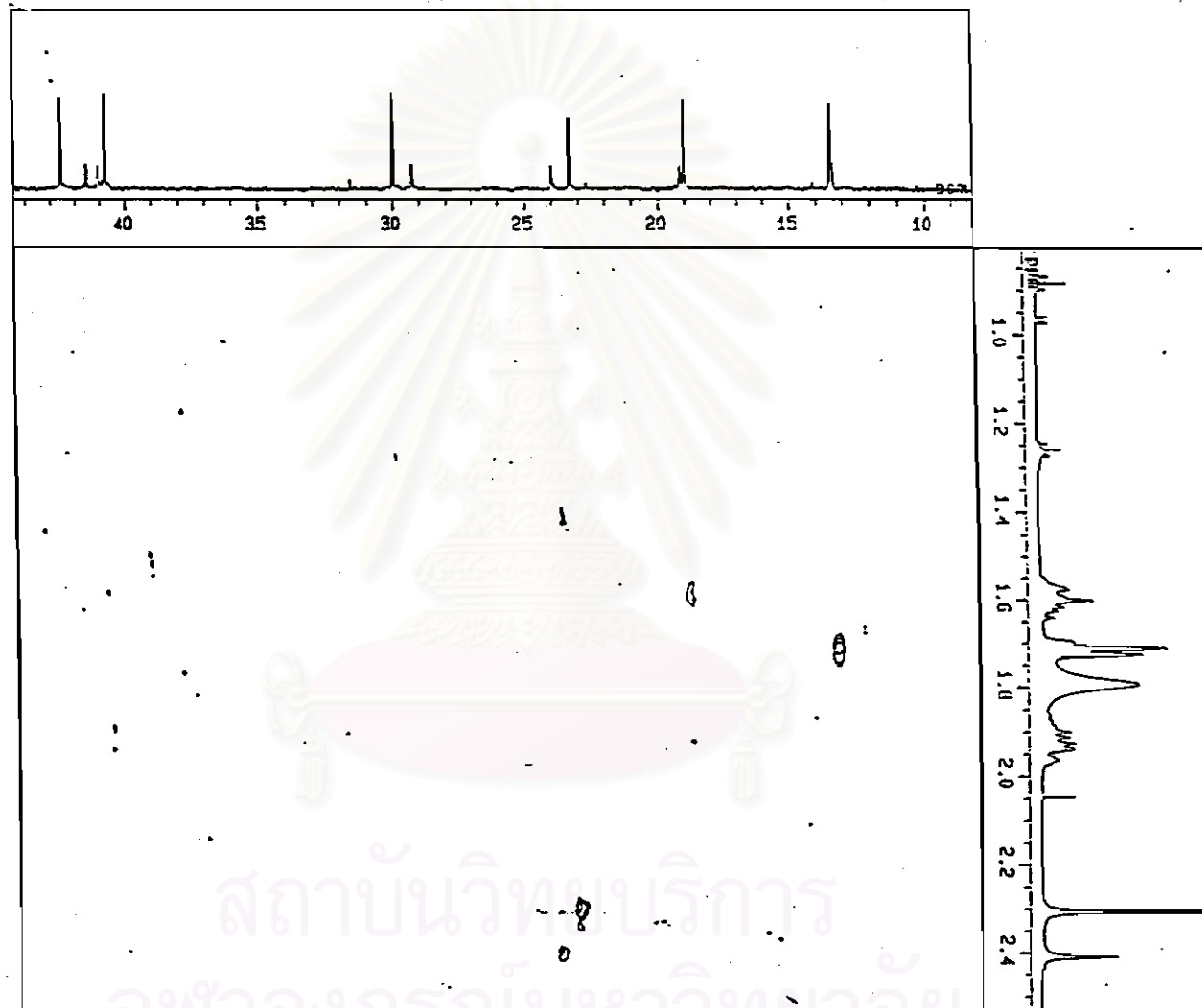


Figure 16.2 Expanded ^{13}C - ^1H COSY spectrum of SN-2

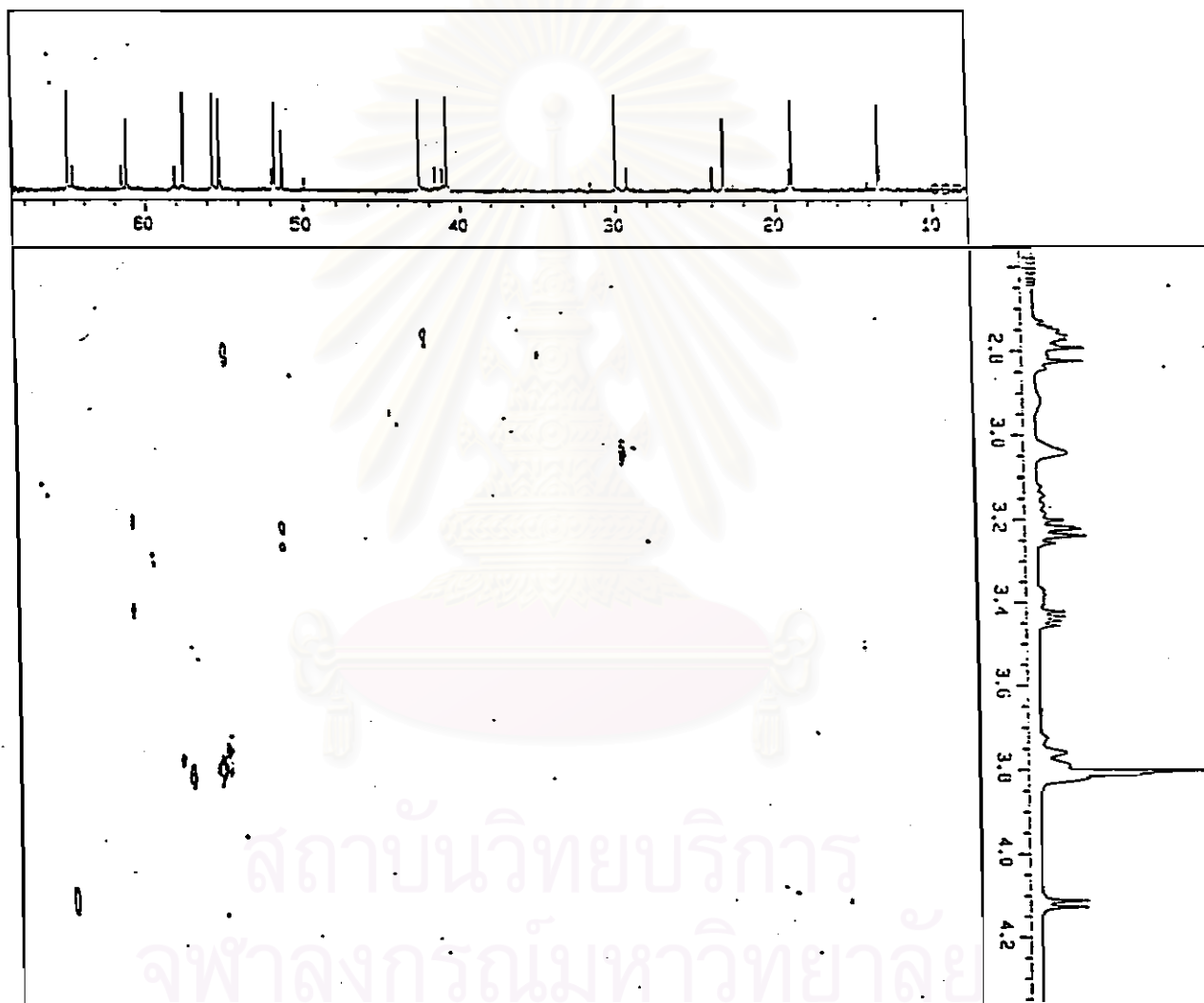


Figure 16.3 Expanded ^{13}C - ^1H COSY spectrum of SN-2

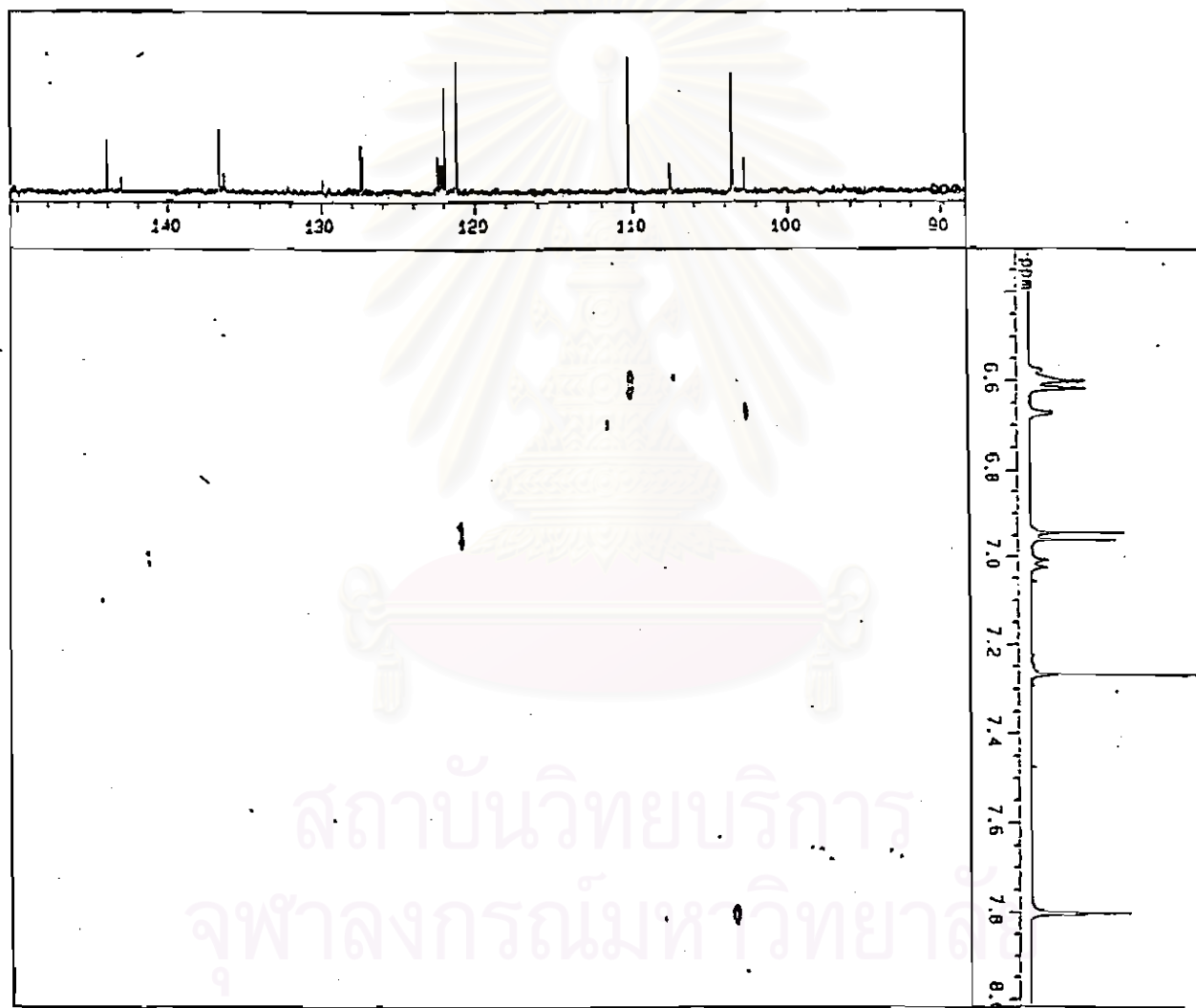


Figure 16.4 Expanded ^{13}C - ^1H COSY spectrum of SN-2

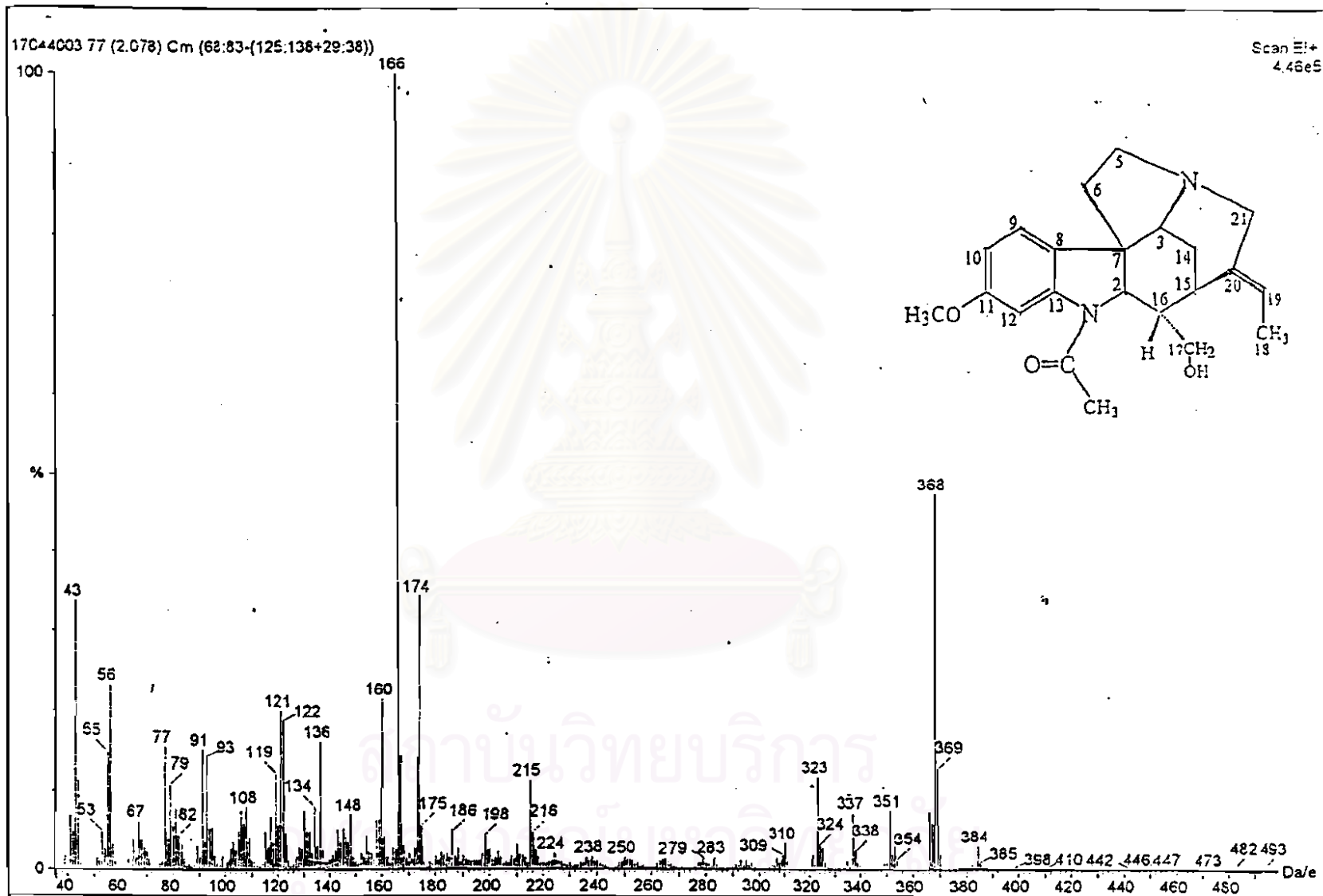


Figure 17 Mass spectrum of SN-2

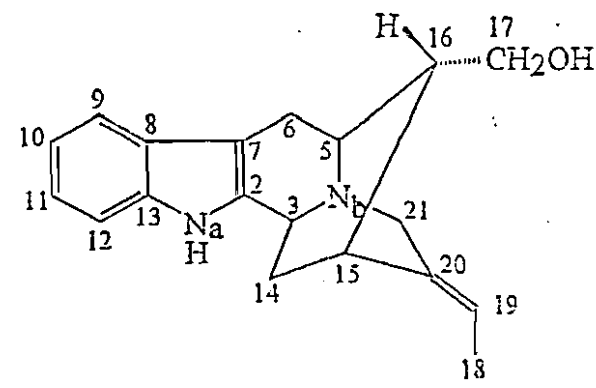
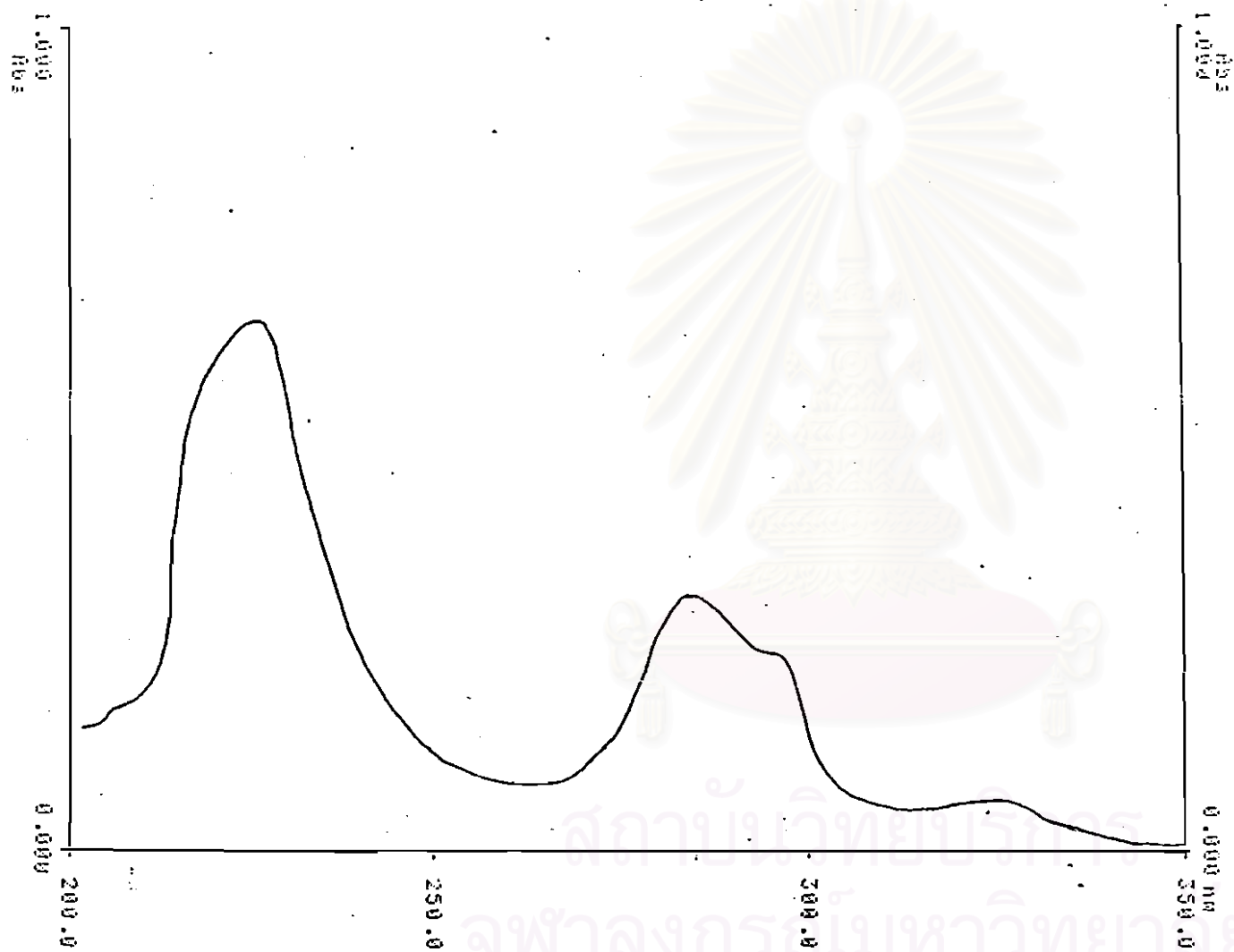


Figure 18 Ultraviolet absorption spectrum of SN-3

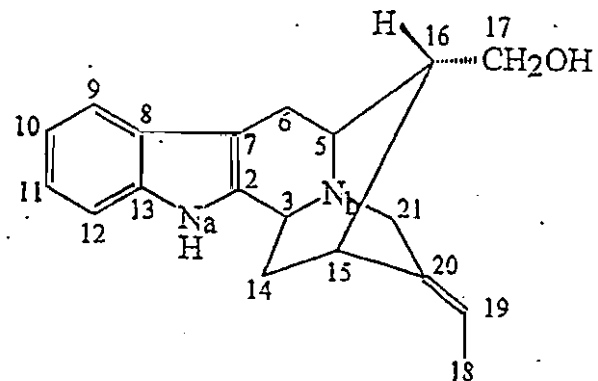
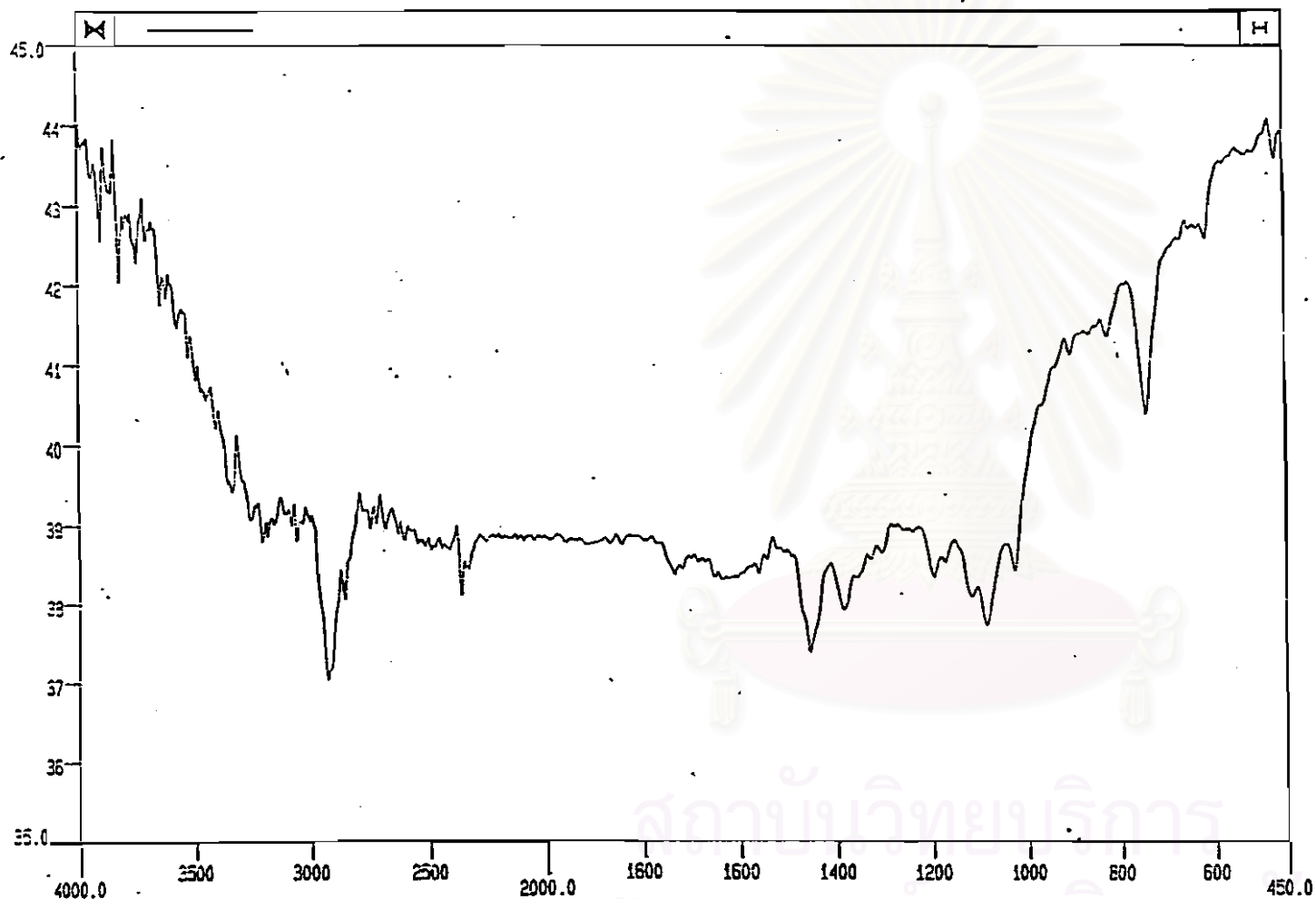


Figure 19 Infrared absorption spectrum of SN-3

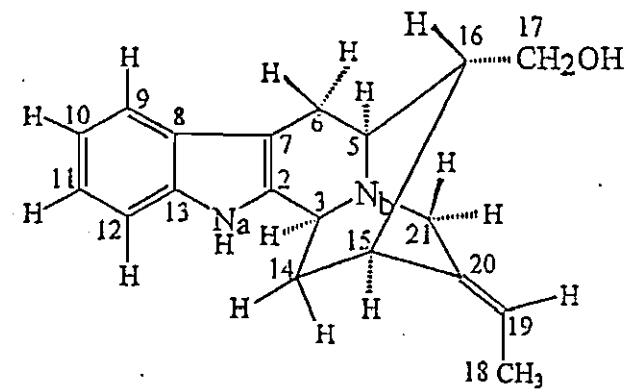
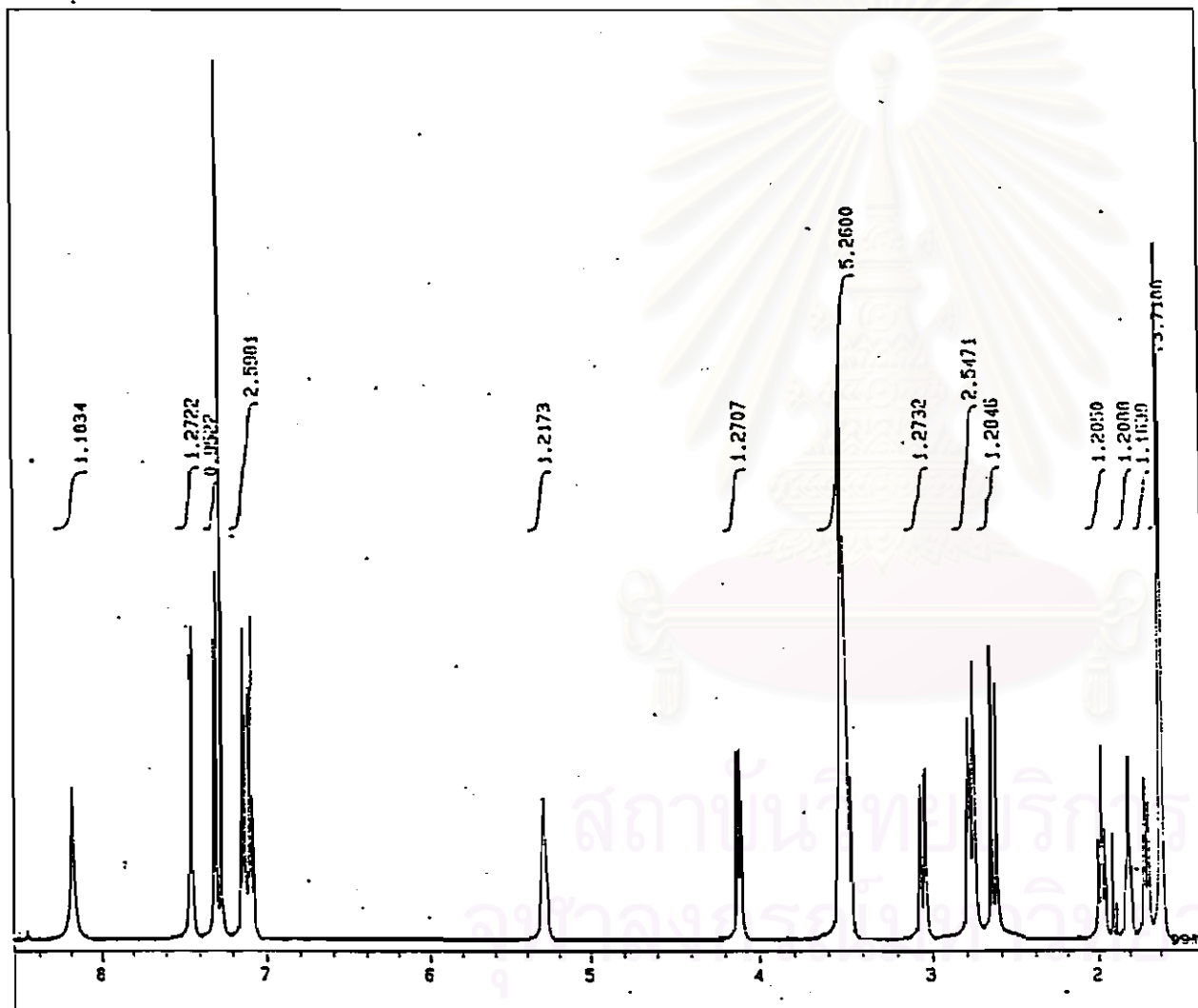


Figure 20.1 $^1\text{H-NMR}$ spectrum of SN-3 (500 MHz ; in CDCl_3)

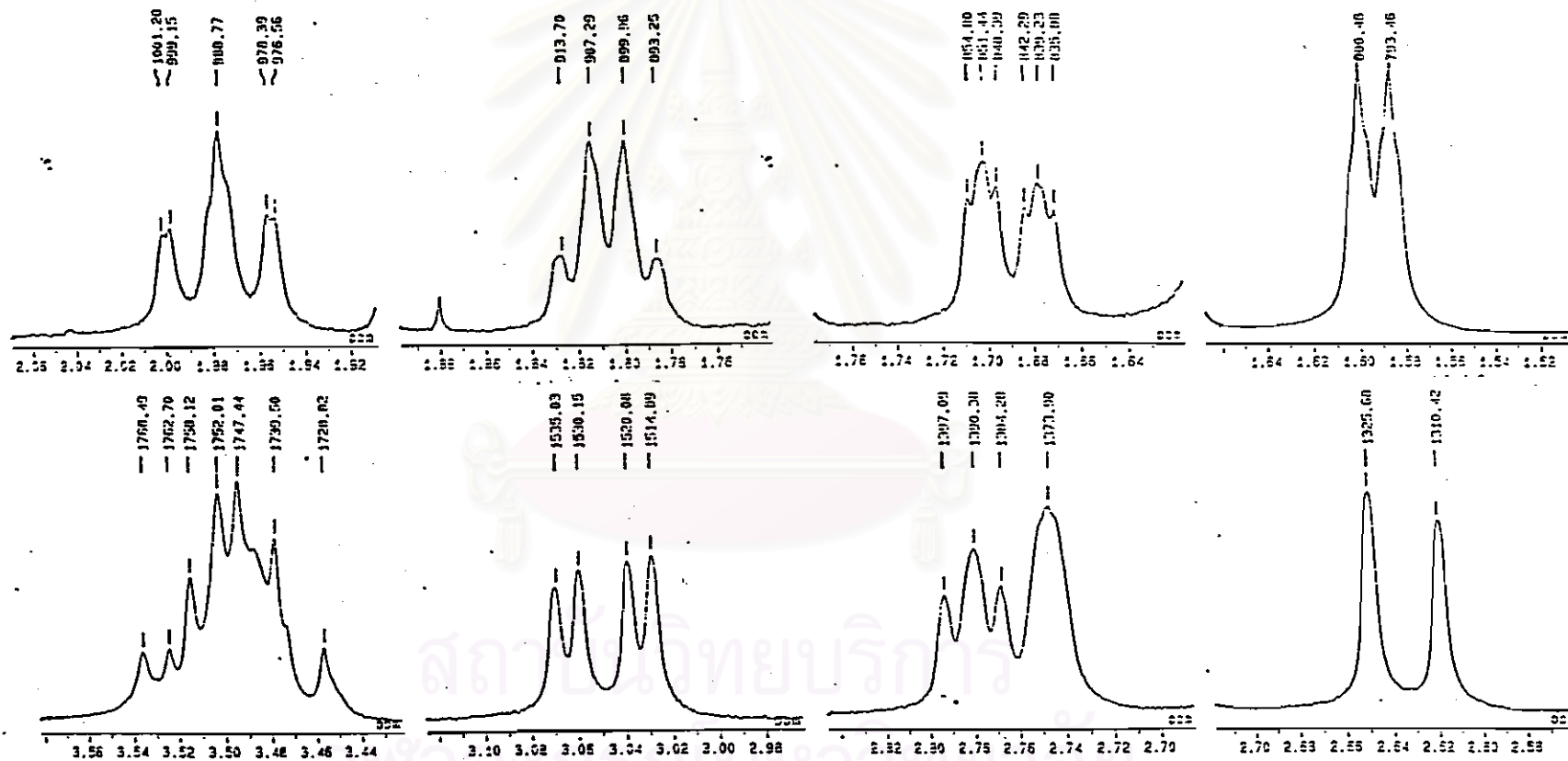


Figure 20.2 Expanded ¹H-NMR spectrum of SN-3

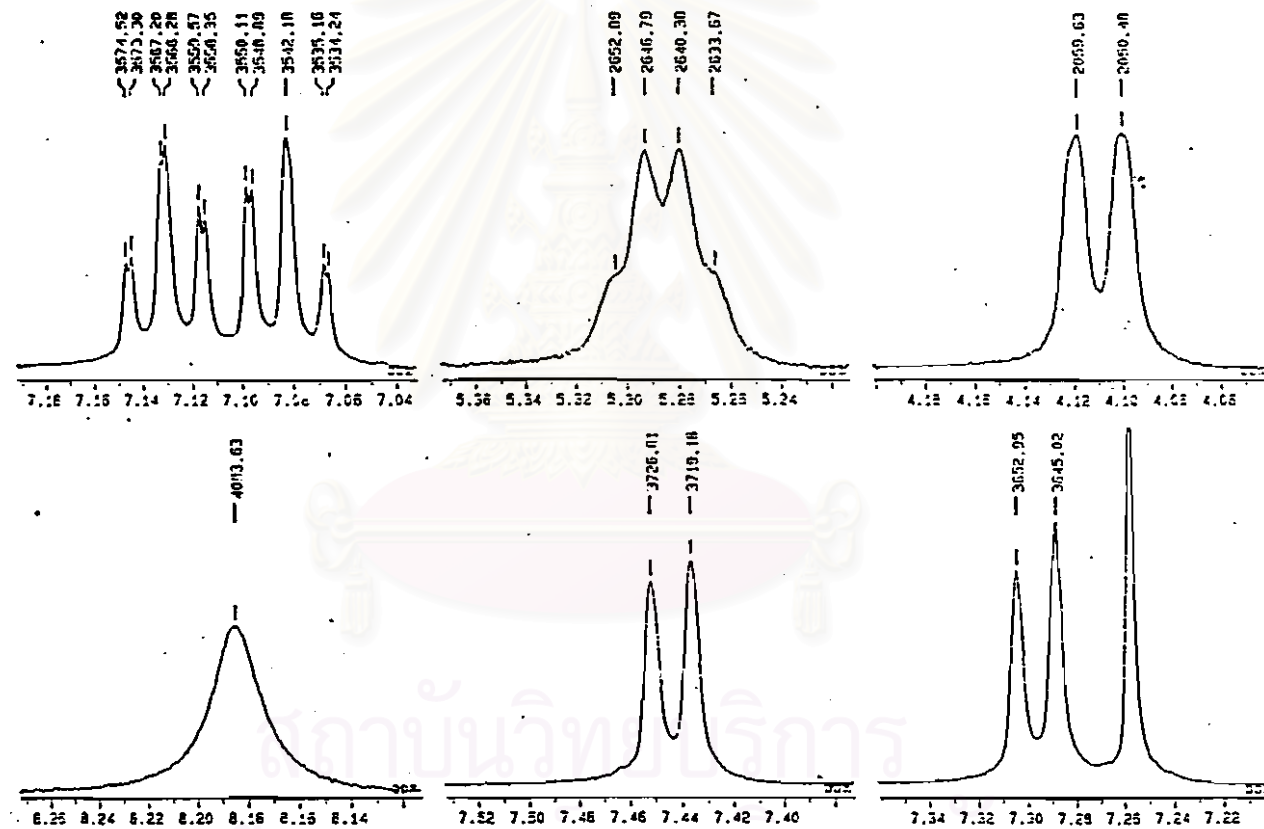


Figure 20.3 Expanded ^1H -NMR spectrum of SN-3

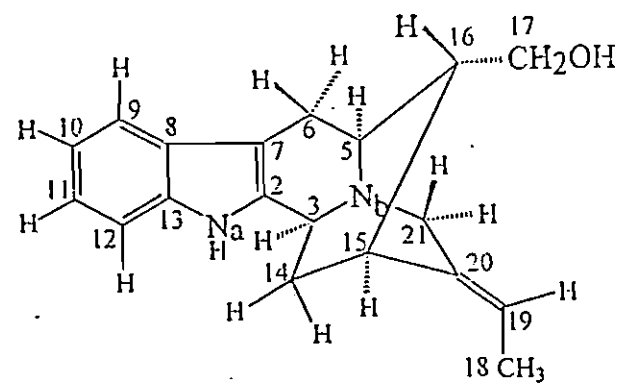
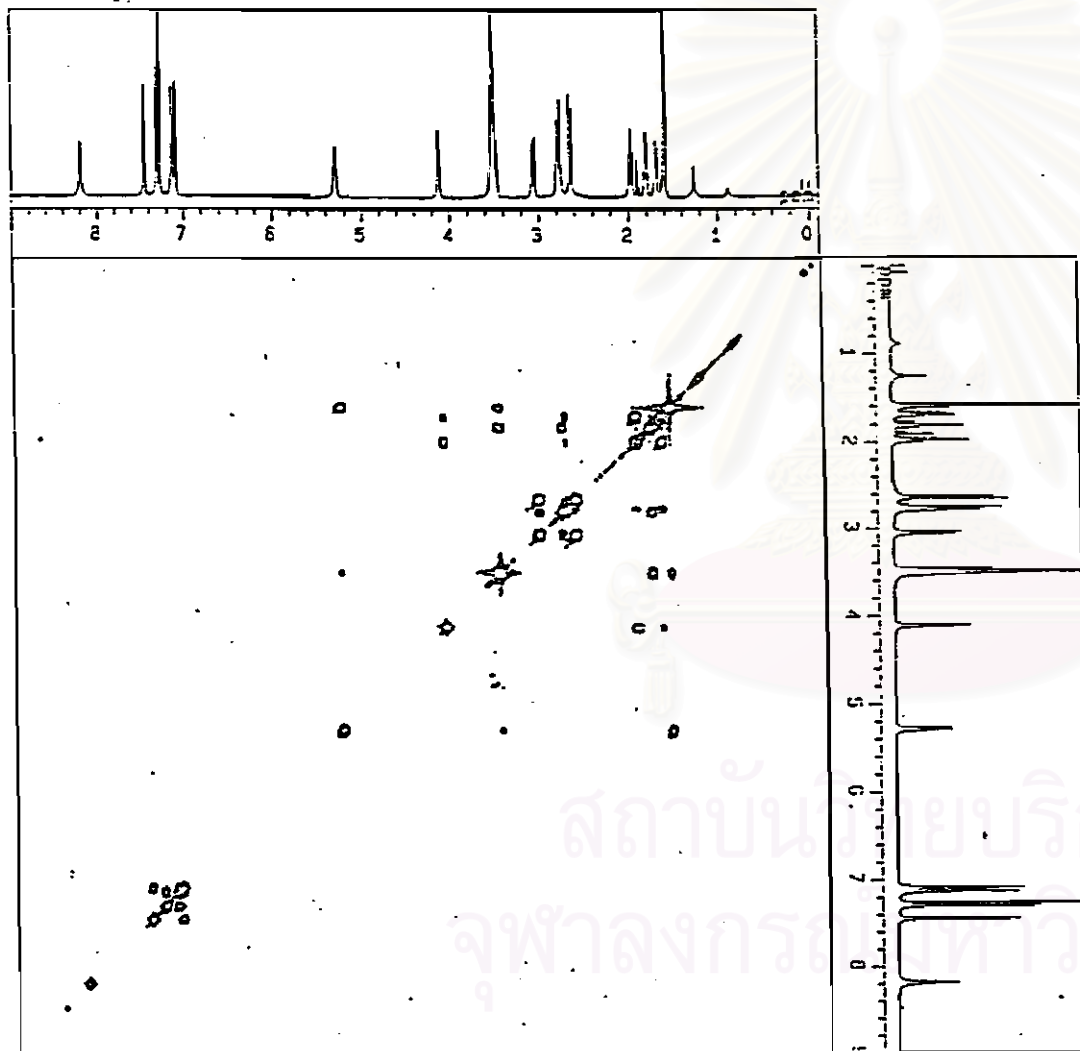


Figure 21 ^1H - ^1H COSY spectrum of SN-3 (500 MHz ; in CDCl_3)

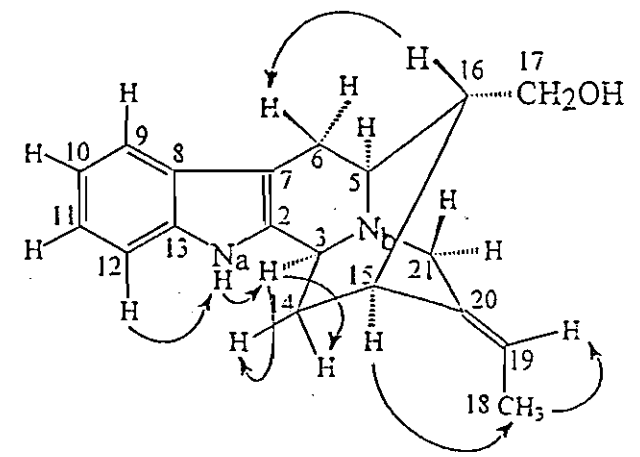
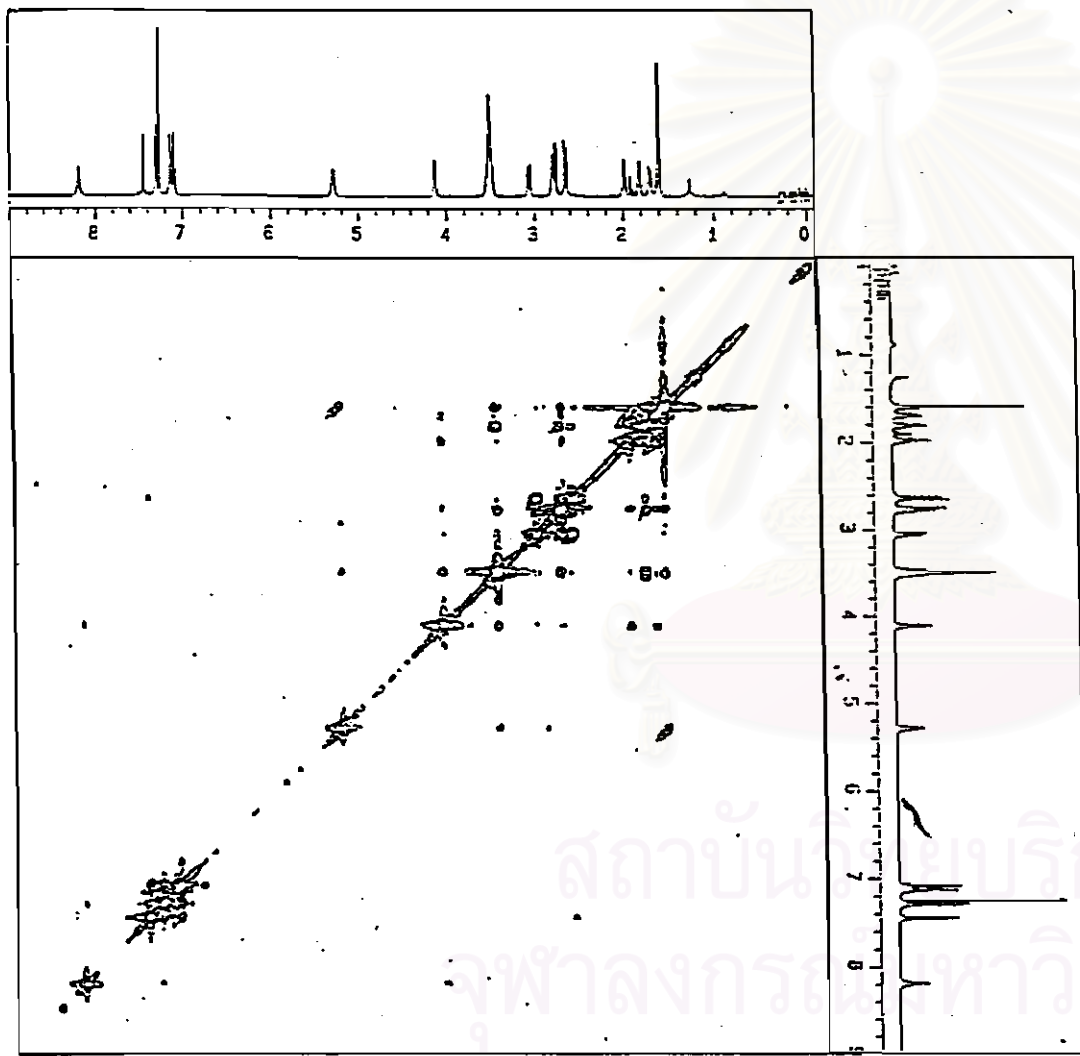


Figure 22 NOESY spectrum of SN-3 (500 MHz ; in CDCl₃)

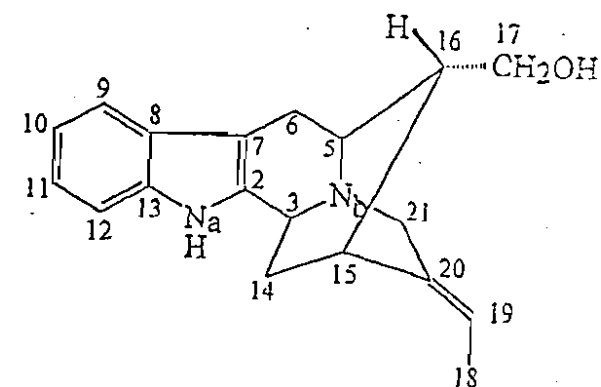
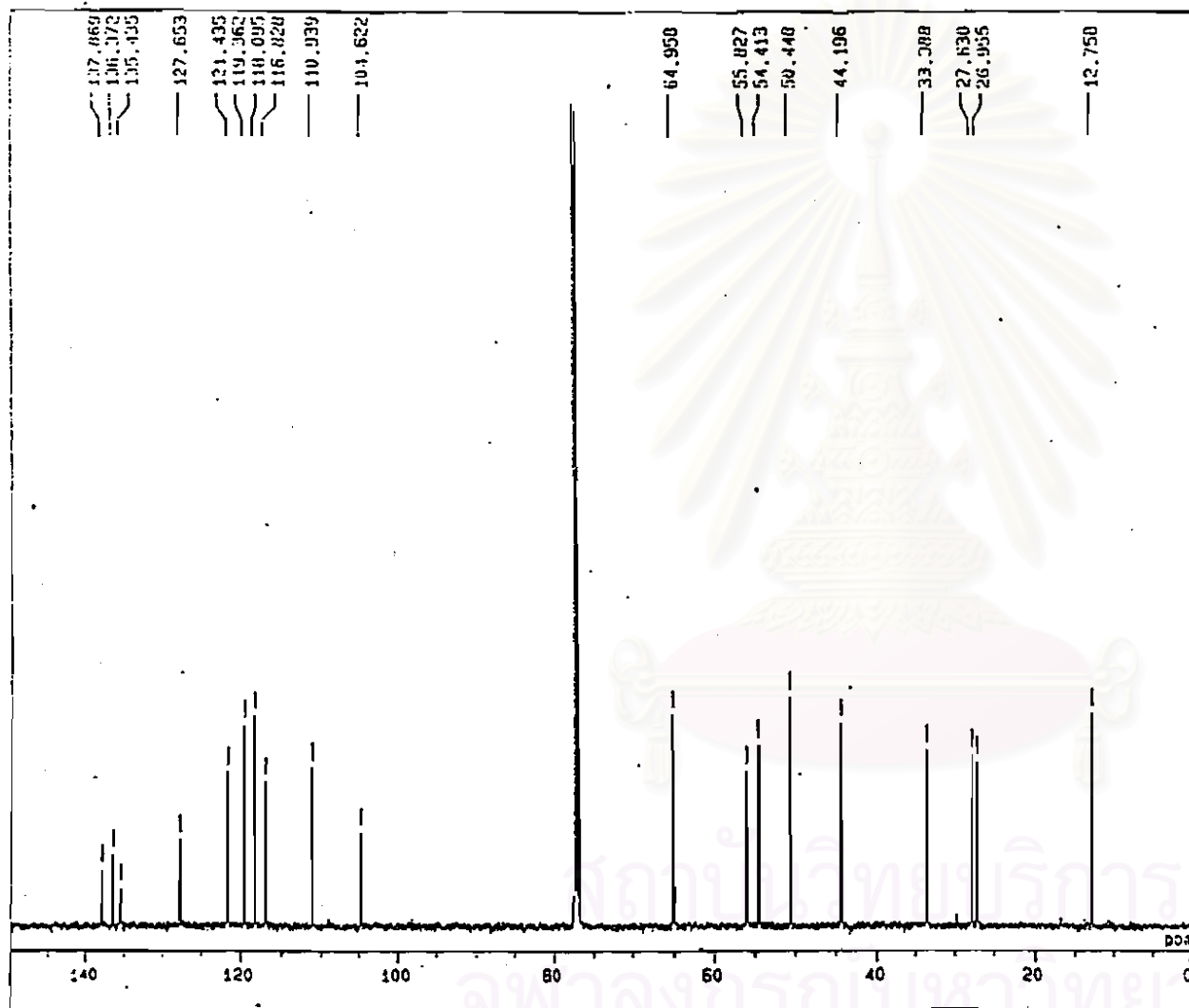


Figure 23 ¹³C-NMR spectrum of SN-3 (125 MHz; in CDCl₃)

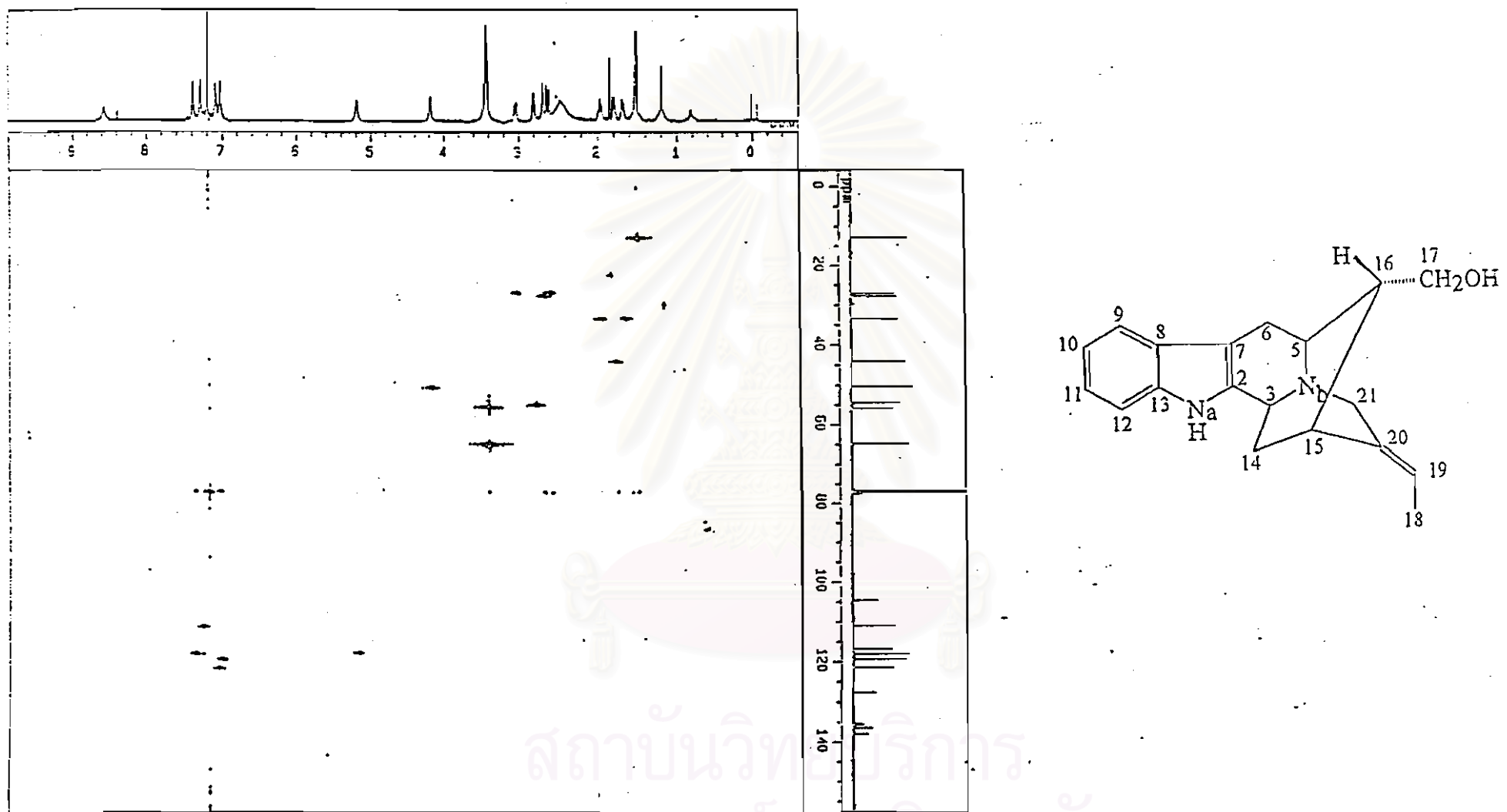


Figure 24 HMQC spectrum of SN-3 (500 MHz ; in CDCl_3)

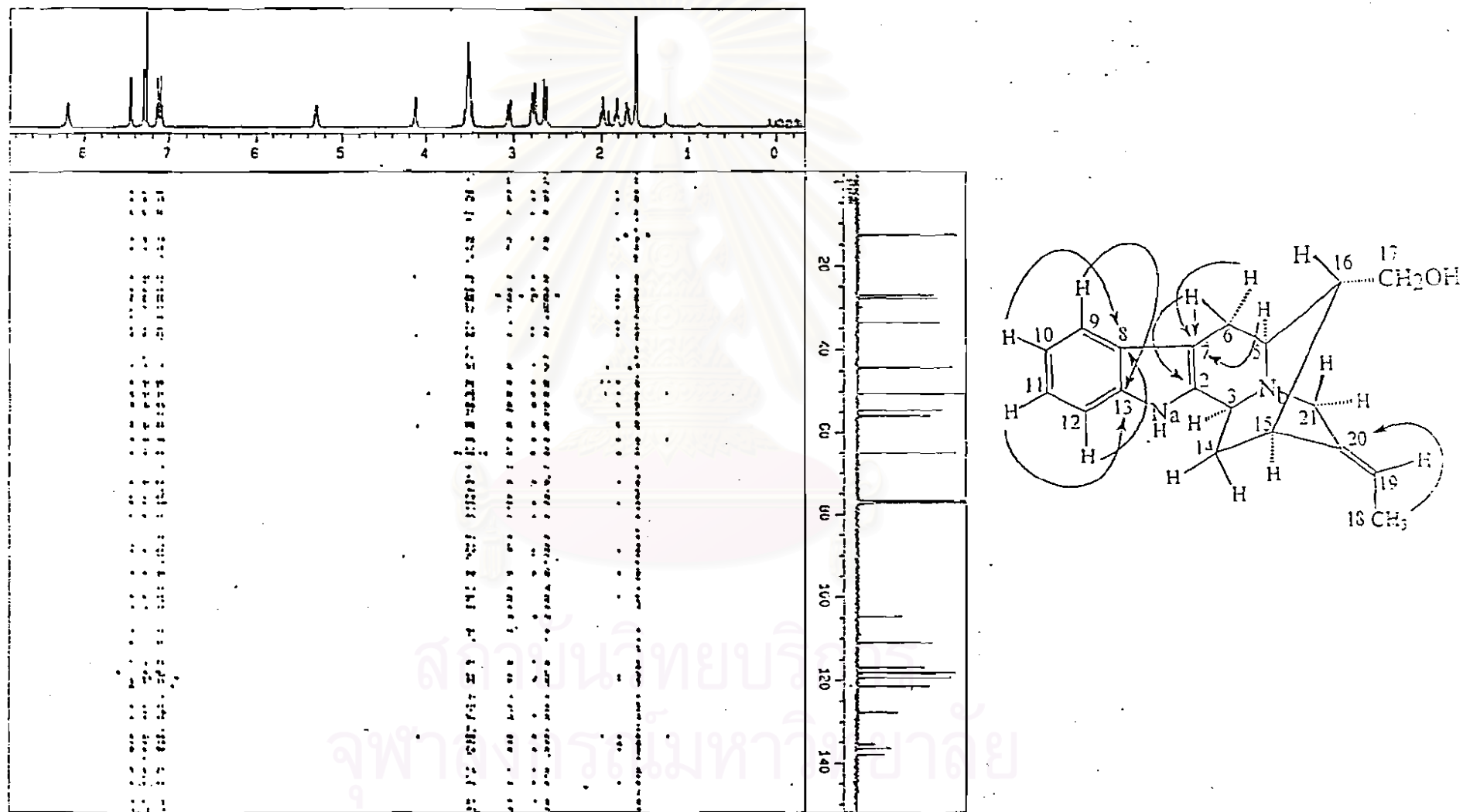


Figure 25.1 HMBC spectrum of SN-3 (500 MHz ; in CDCl_3)

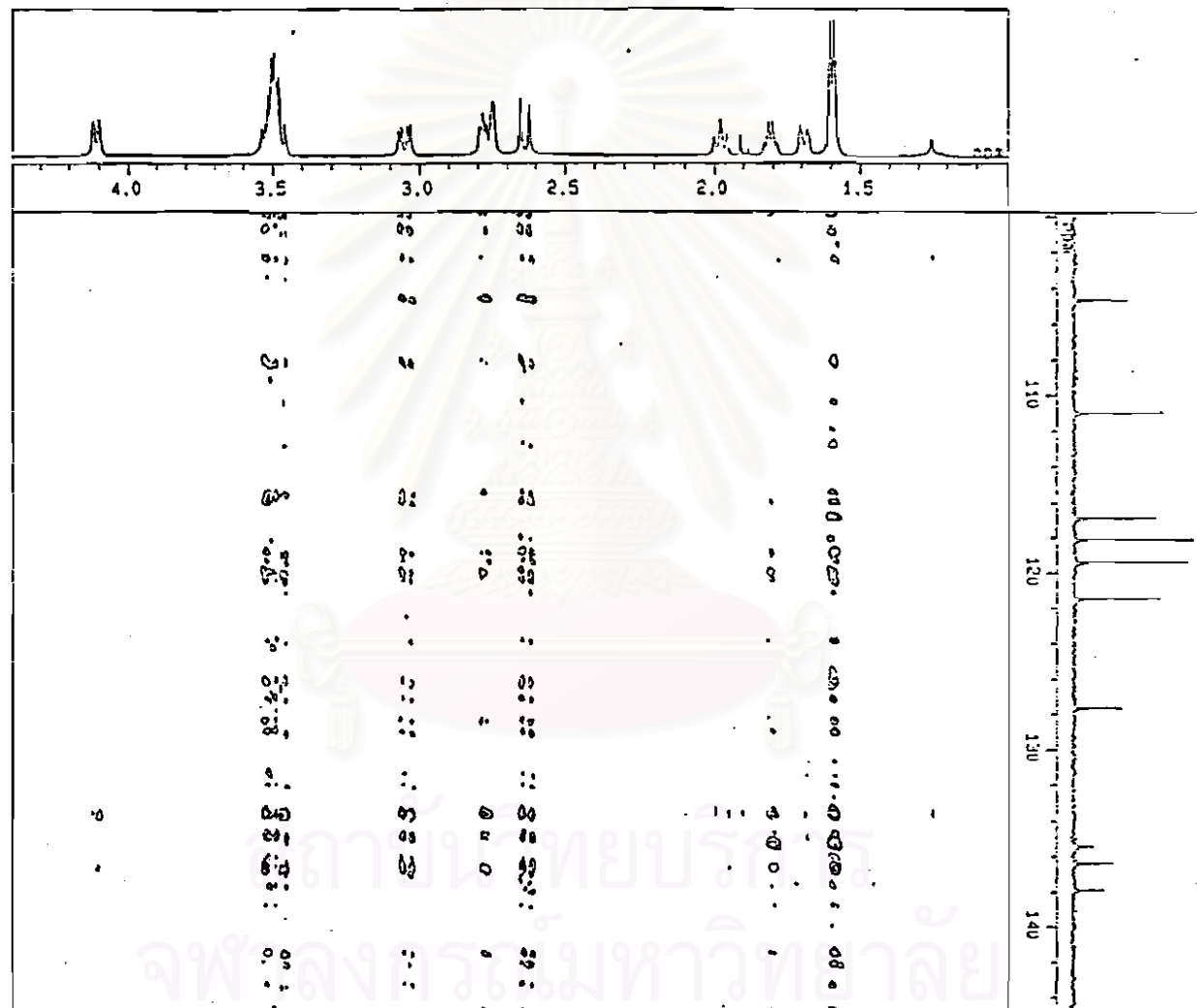


Figure 25.2 Expanded HMBC spectrum of SN-3

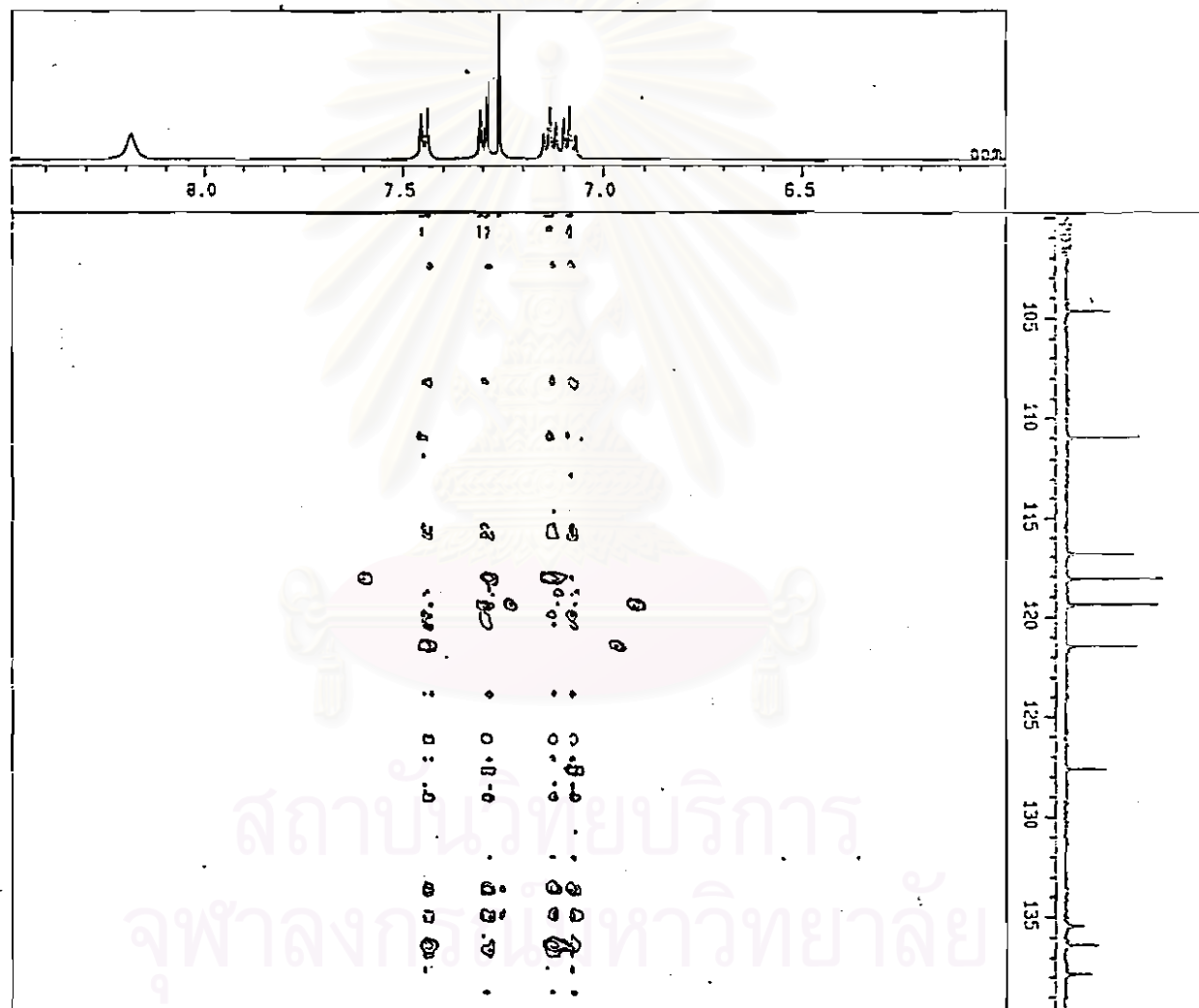


Figure 25.3 Expanded HMBC spectrum of SN-3

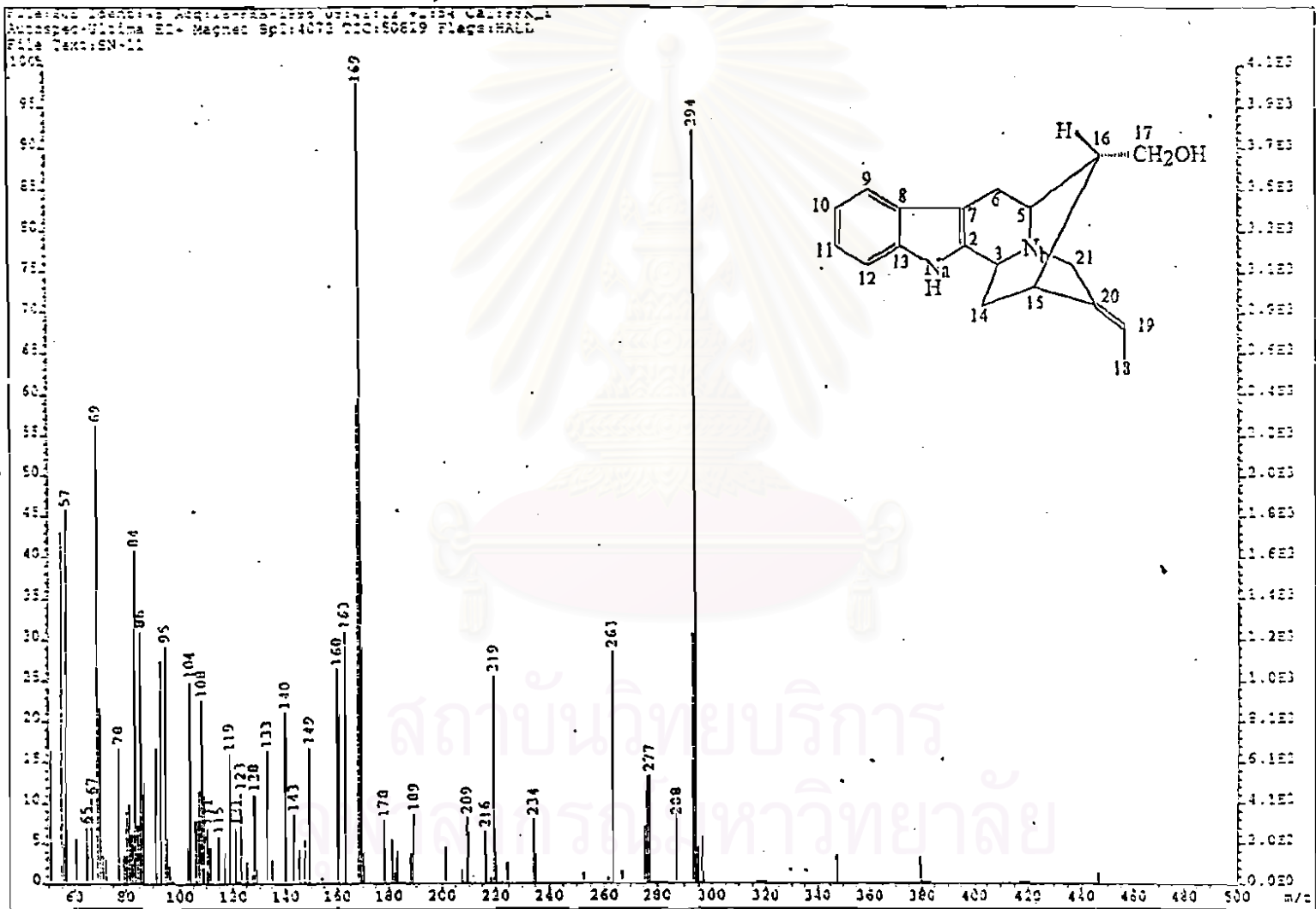


Figure 26 Mass spectrum of SN-3

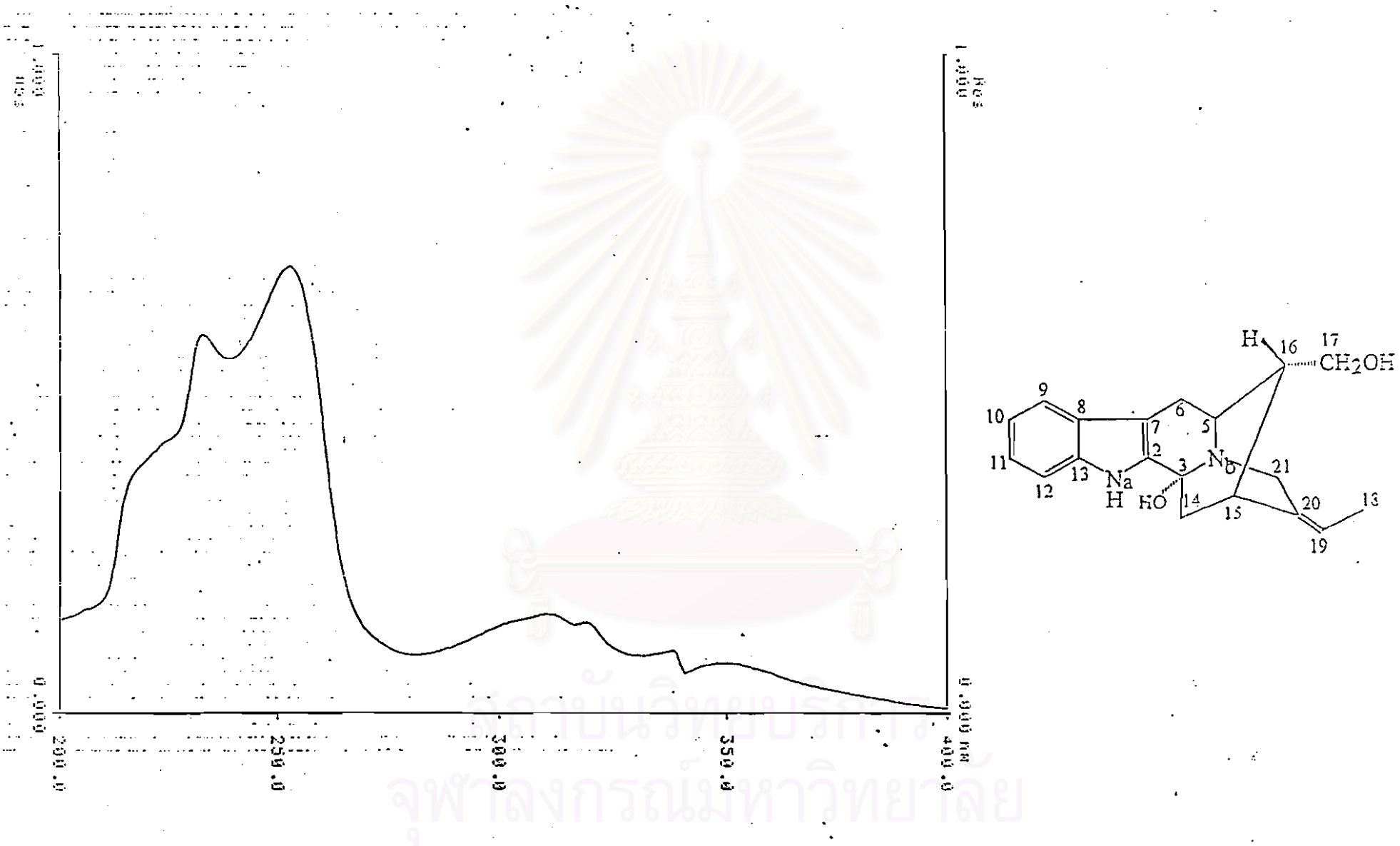


Figure 27 Ultraviolet absorption spectrum of SN-4

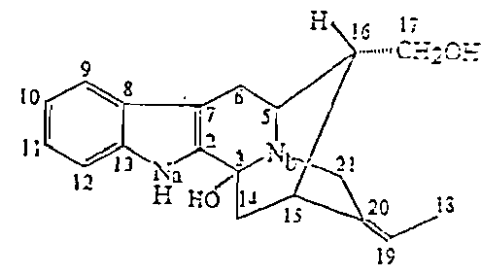
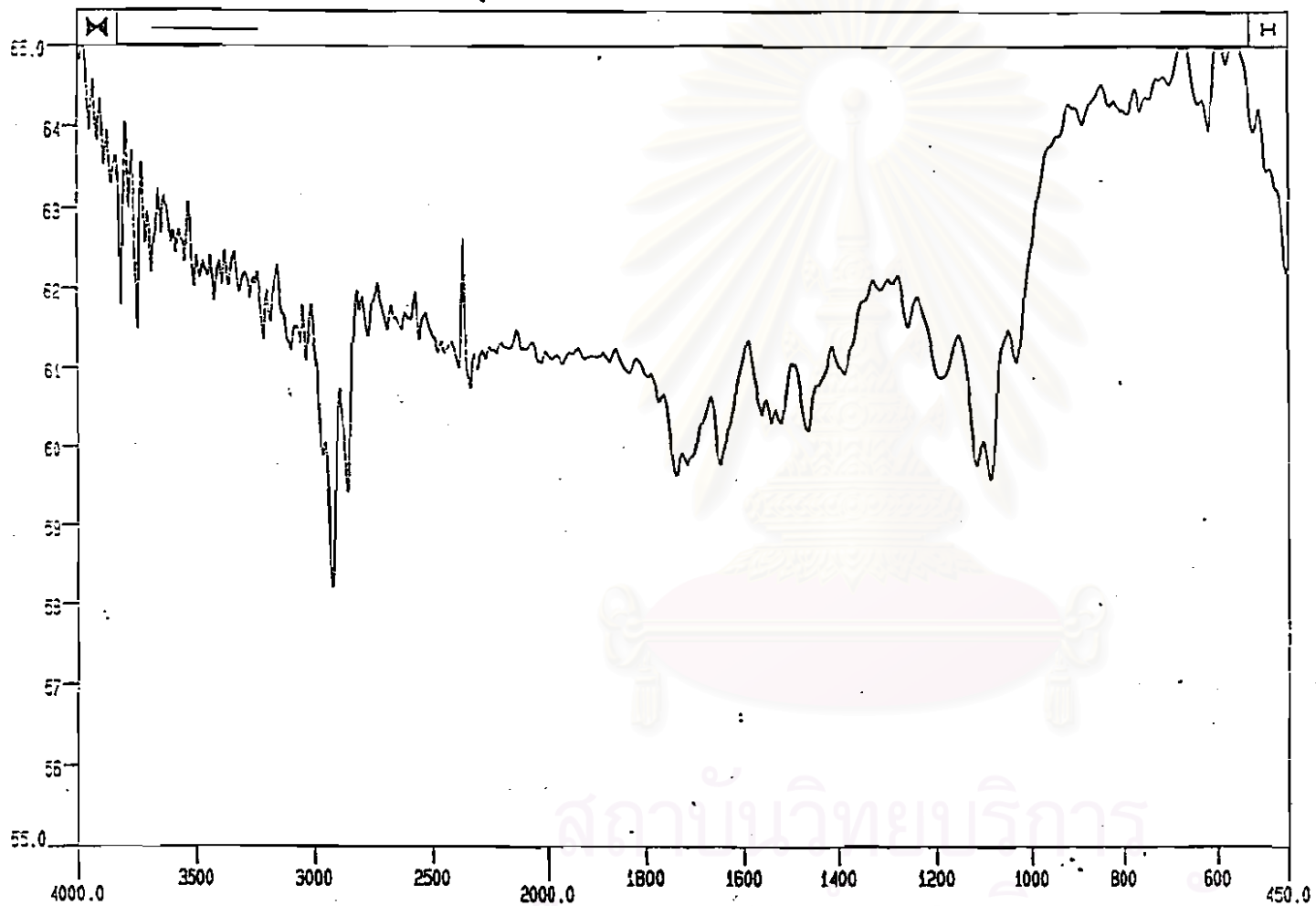


Figure 28 Infrared absorption spectrum of SN-4

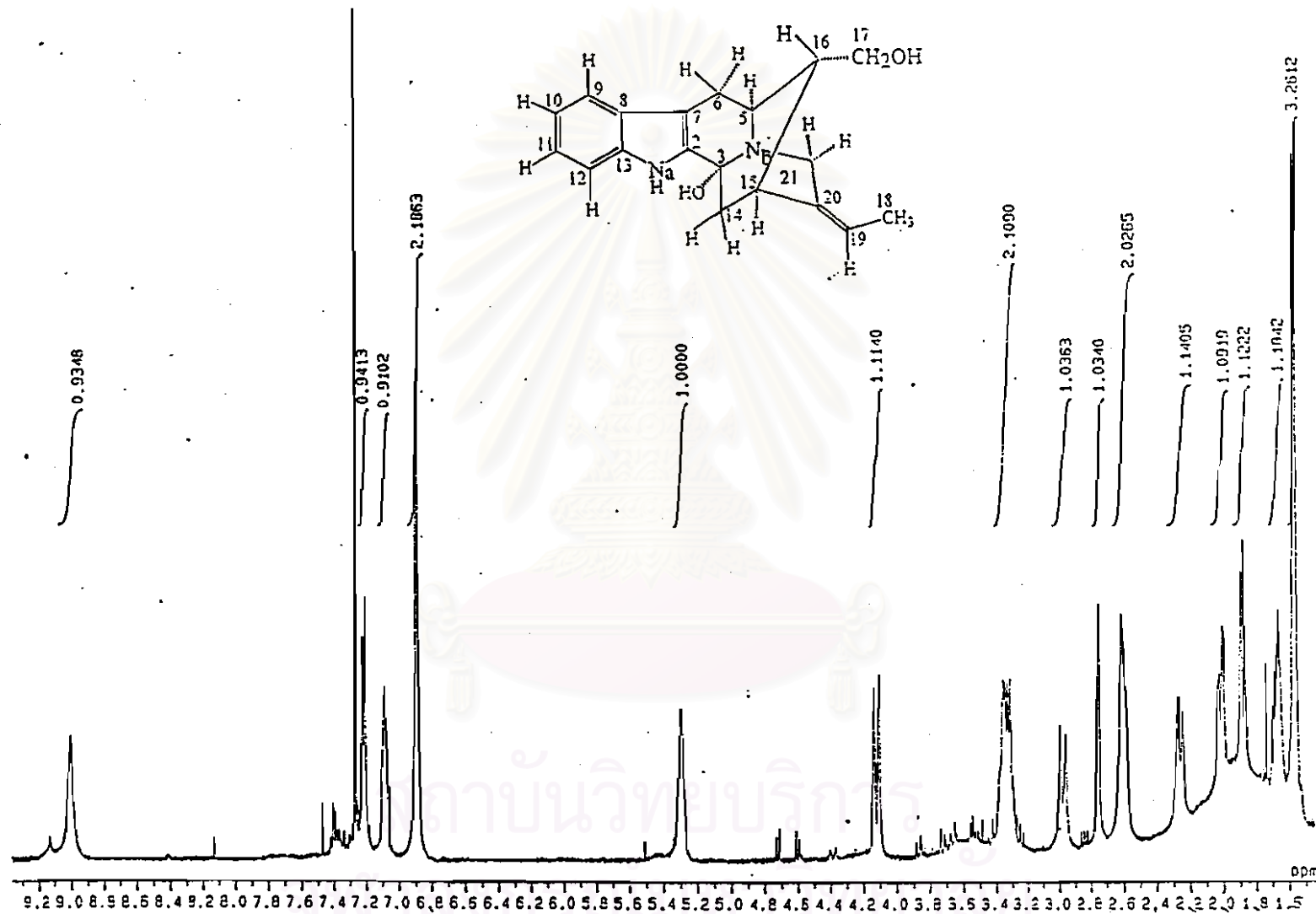


Figure 29.1 ¹H-NMR spectrum of SN-4 (500 MHz ; in CDCl₃)

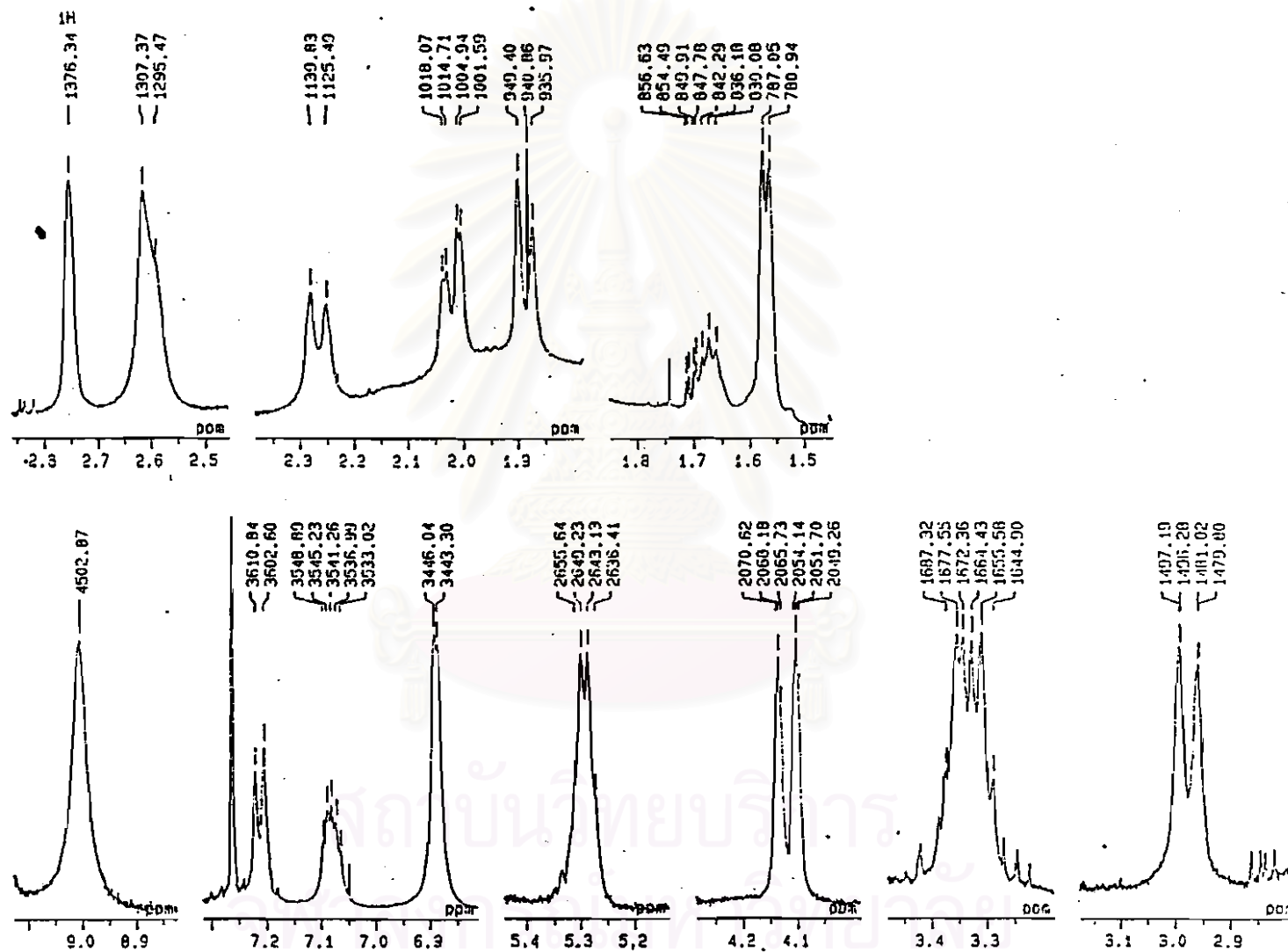


Figure 29.2 Expanded $^1\text{H-NMR}$ spectrum of SN-4

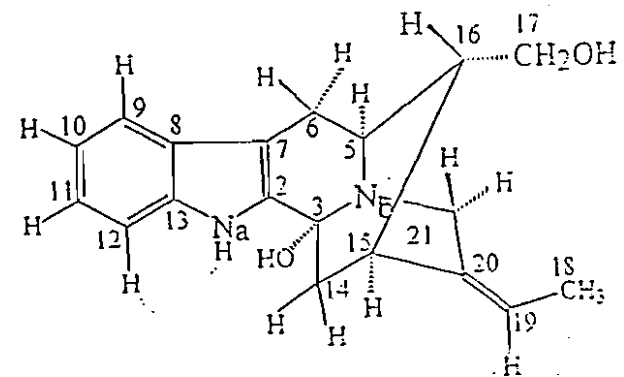
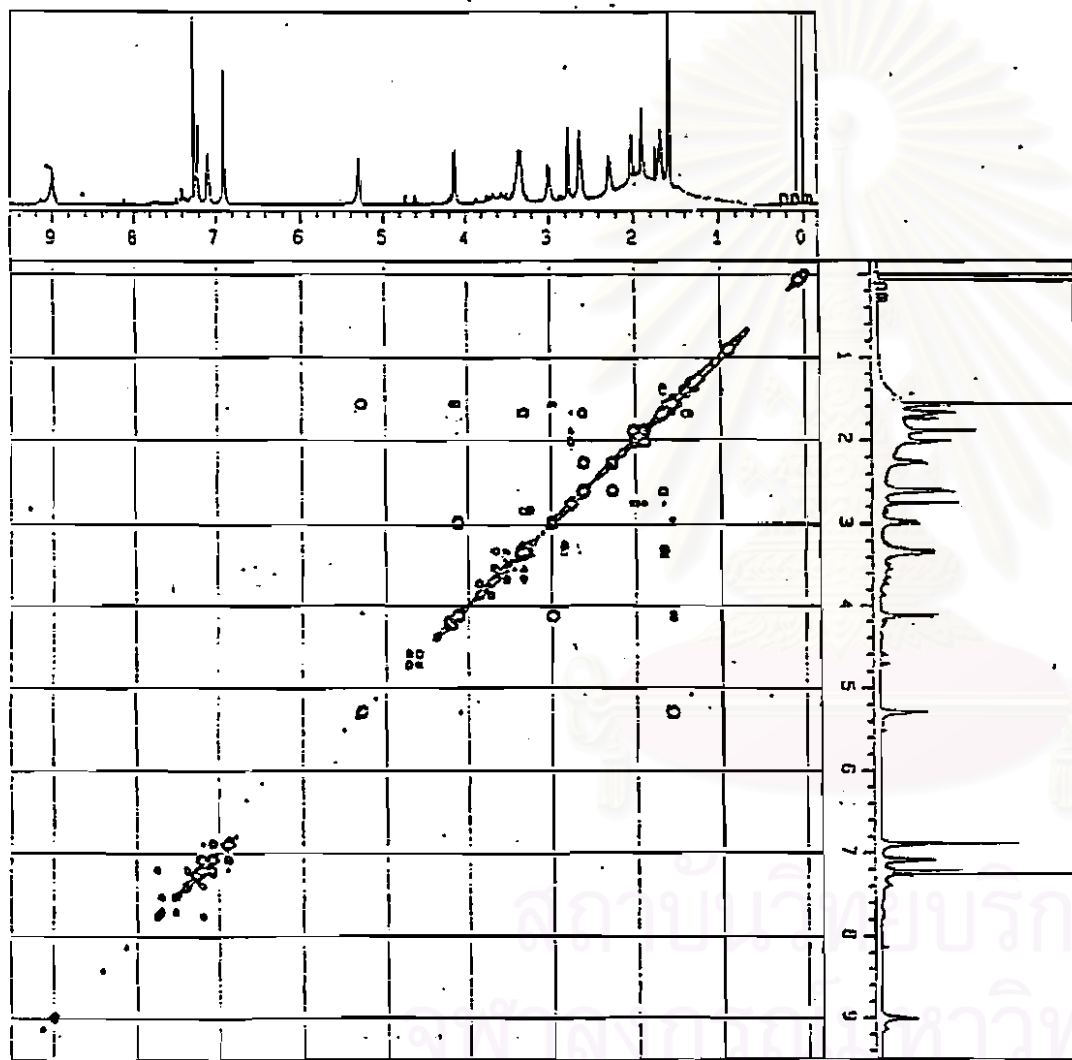


Figure 30 ^1H - ^1H COSY spectrum of SN-4 (500 MHz; in CDCl_3)

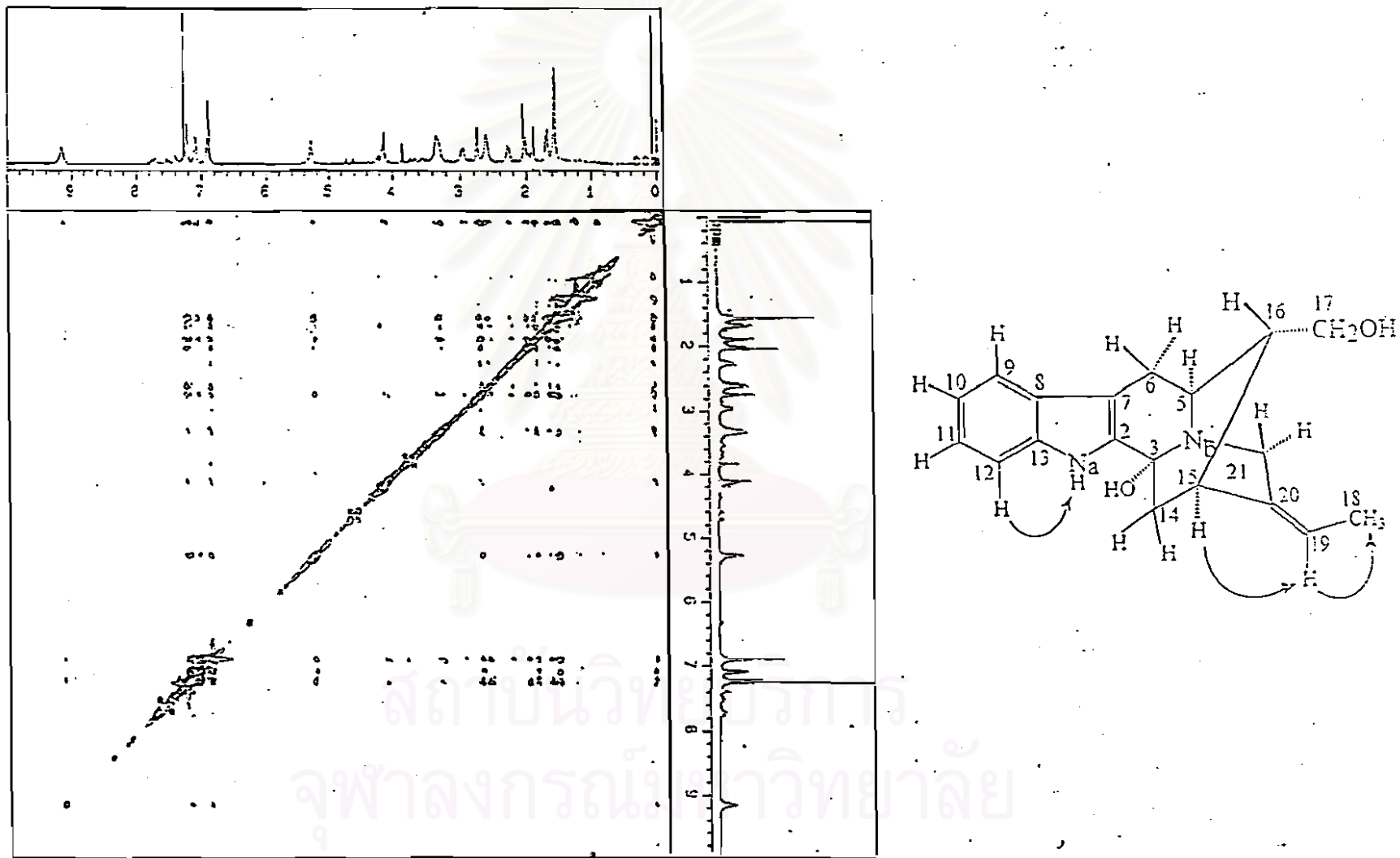


Figure 31 NOESY spectrum of SN-4 (500 MHz ; in CDCl₃)

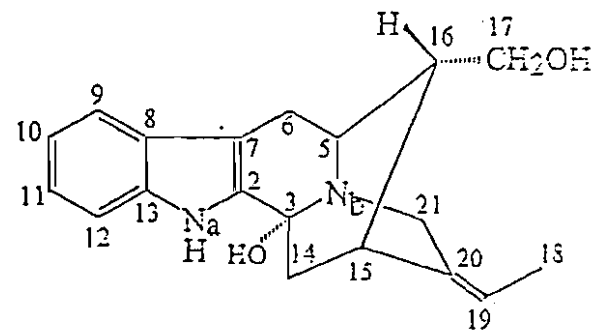
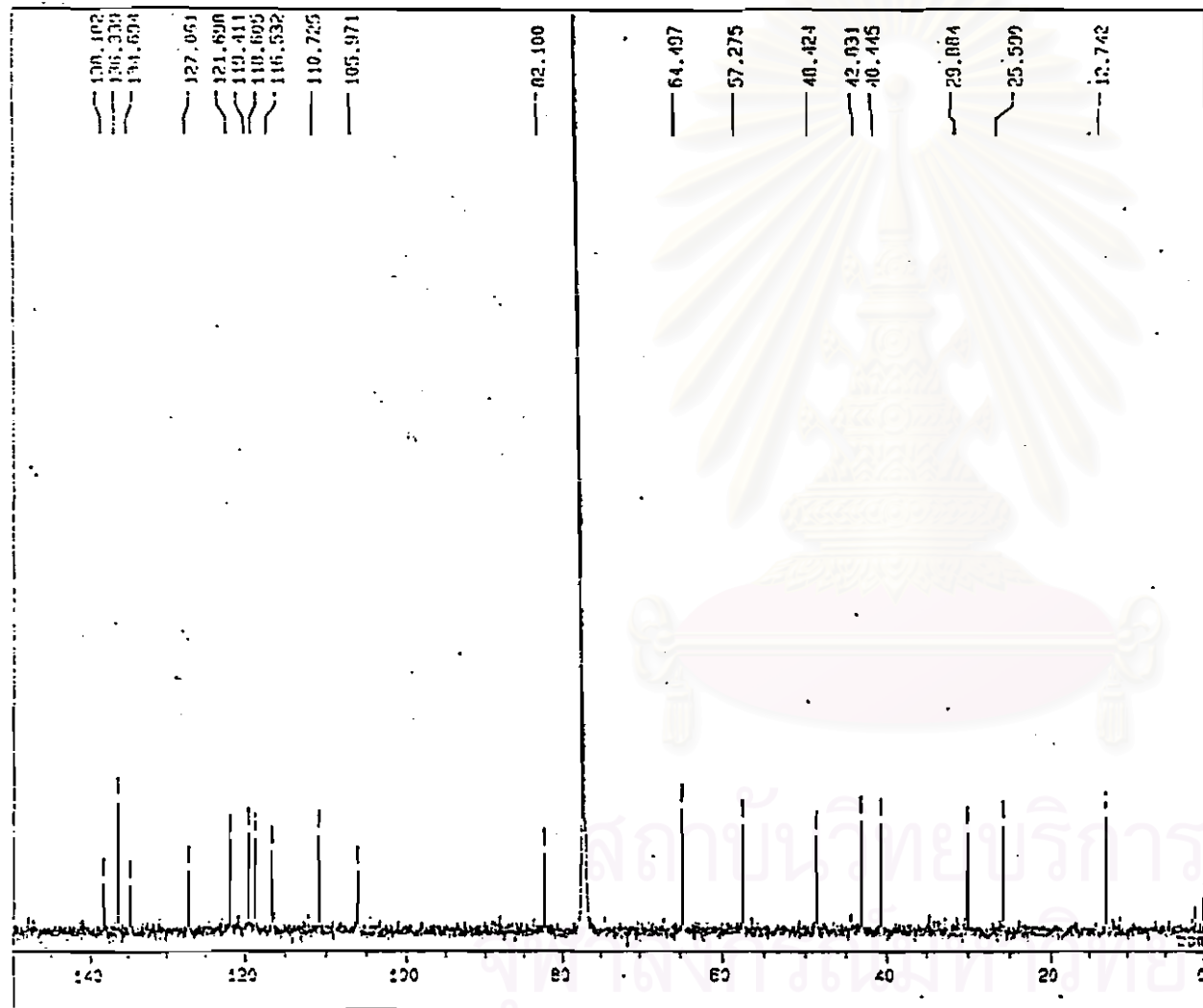


Figure 32 ¹³C-NMR spectrum of SN-4 (125 MHz; in CDCl₃)

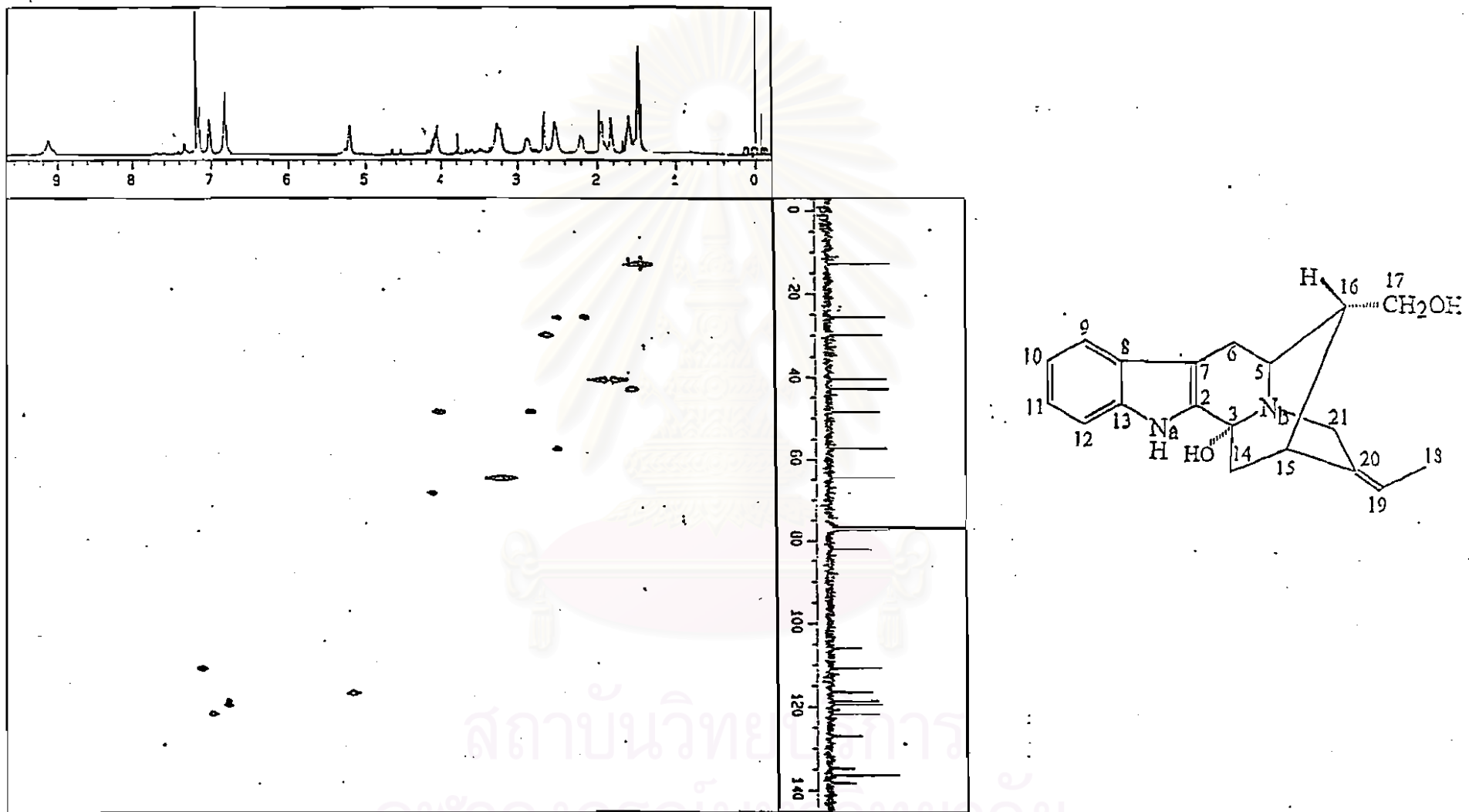


Figure 34 HMQC spectrum of SN-4 (500 MHz ; in CDCl₃)

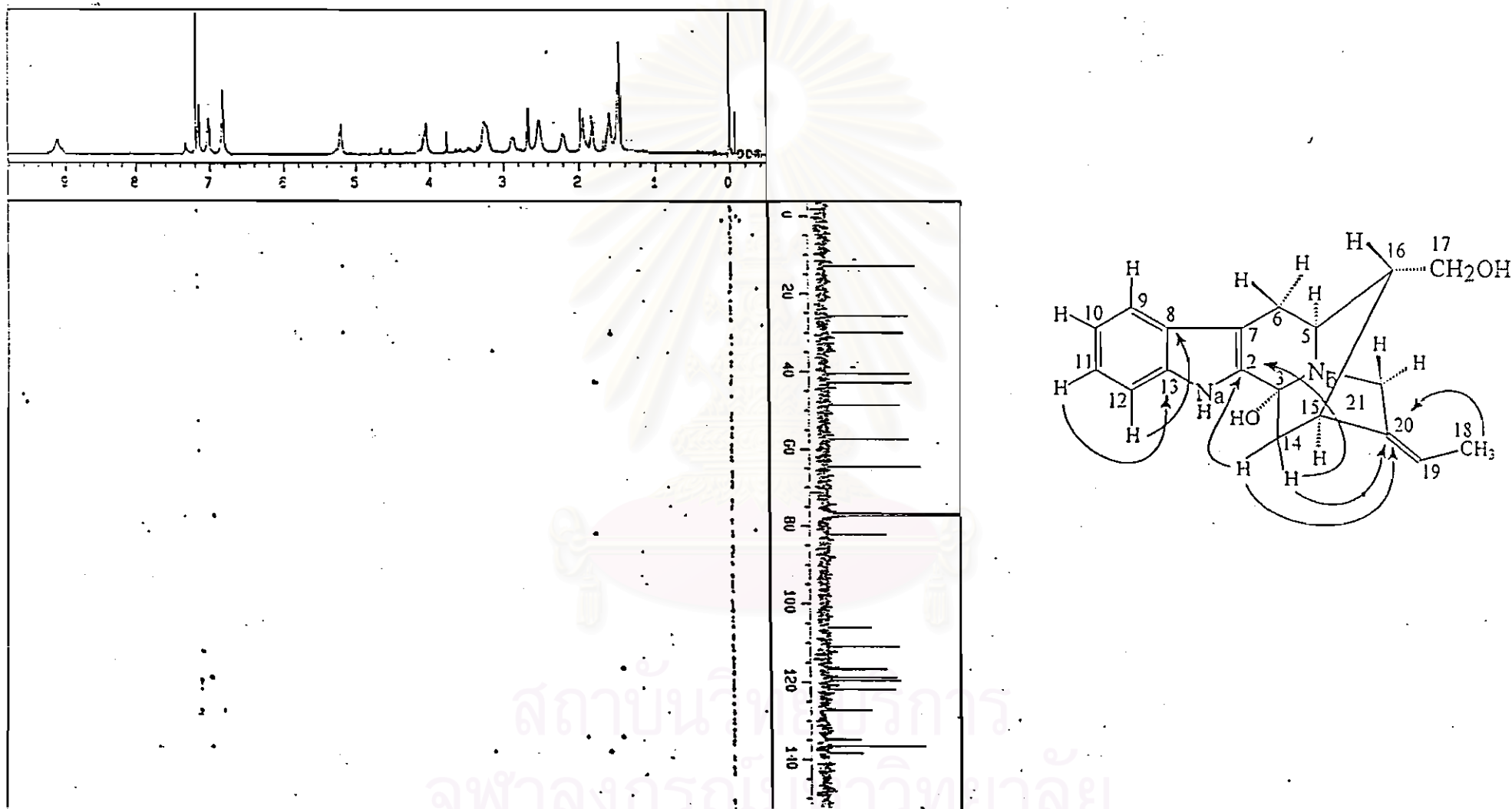


Figure 35.1 HMBC spectrum of SN-4 (500 MHz ; in CDCl₃)

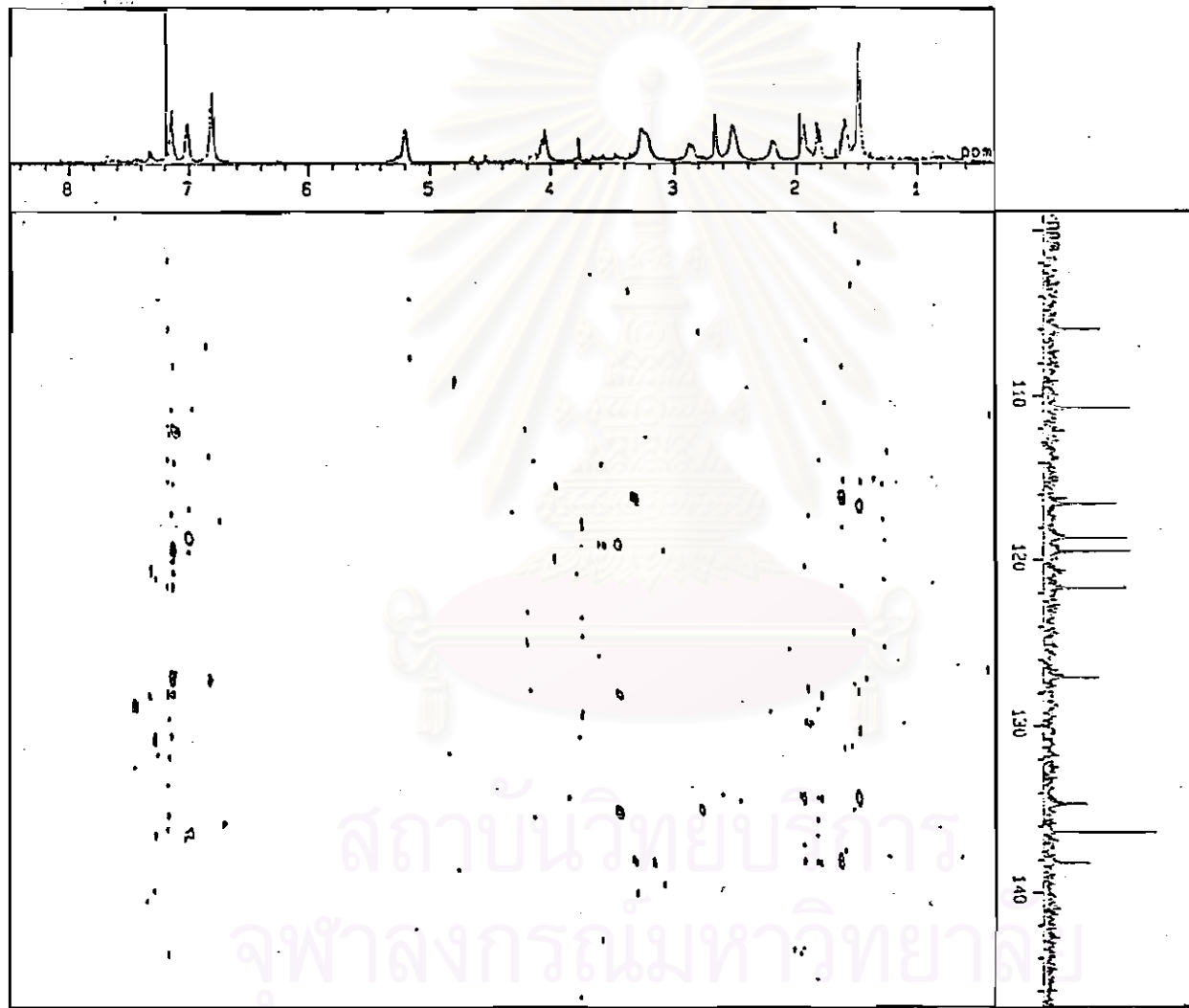


Figure 35.2 Expanded HMBC spectrum of SN-4

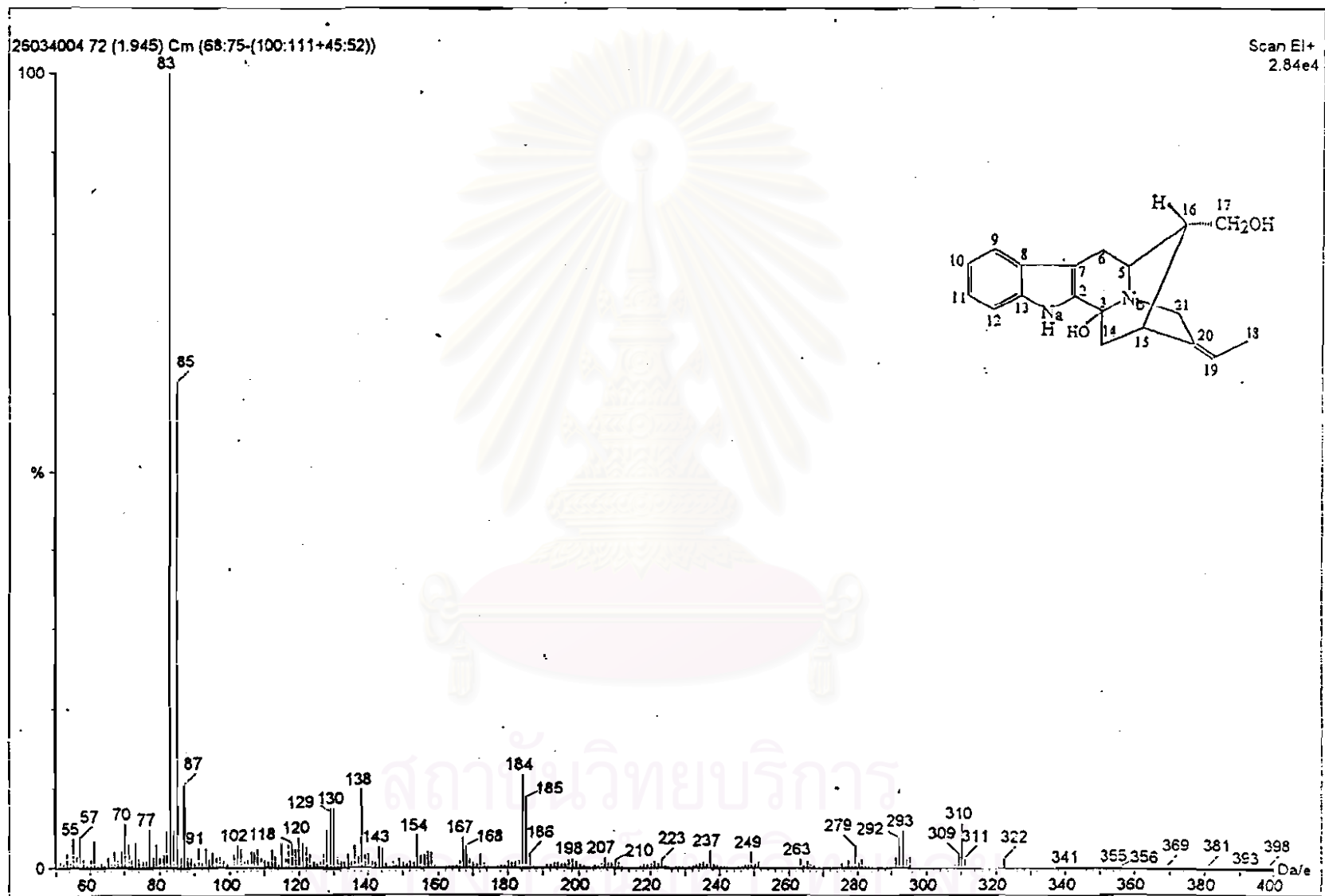


Figure 36 Mass spectrum of SN-4

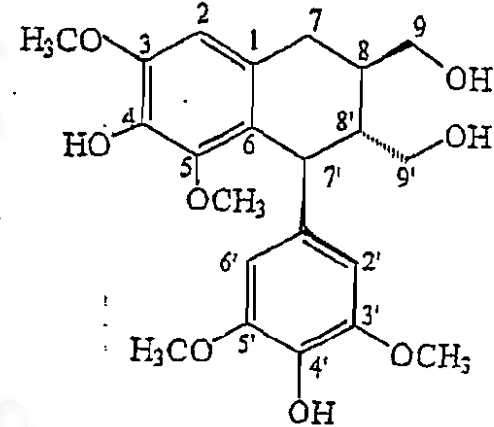
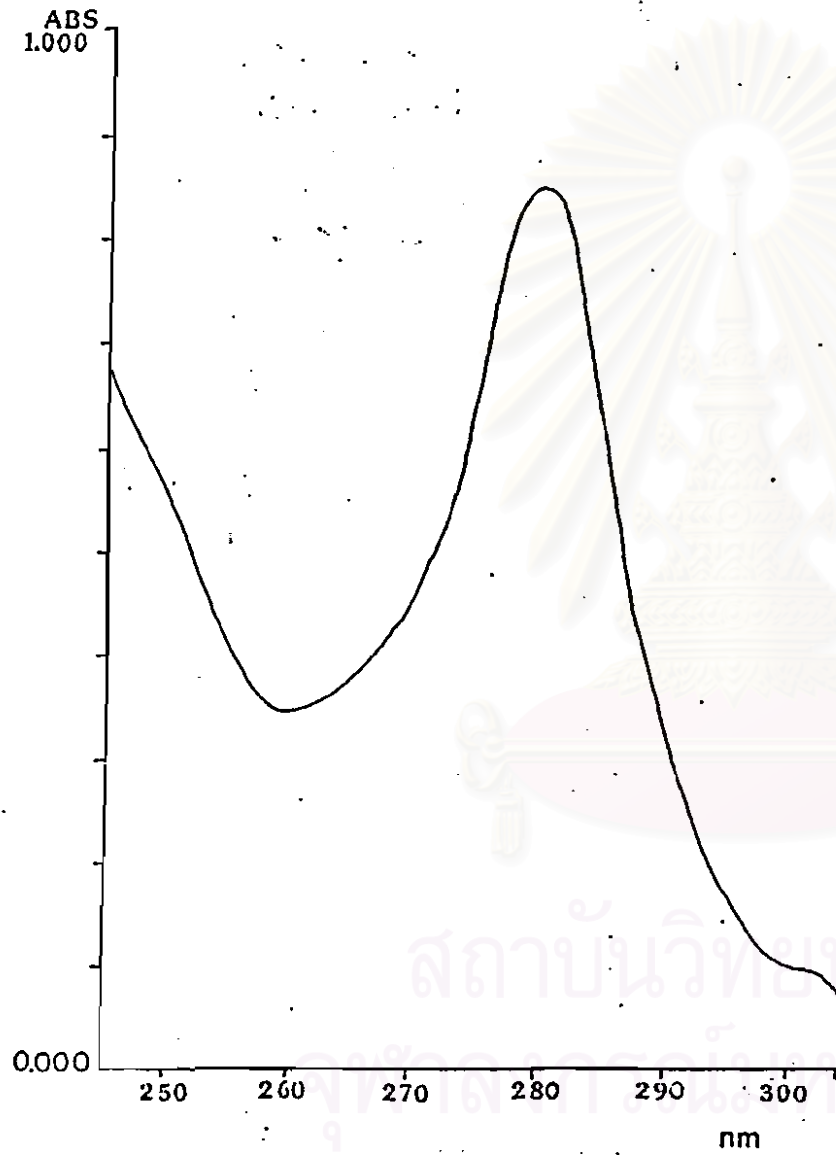


Figure 37 Ultraviolet absorption spectrum of SN-5

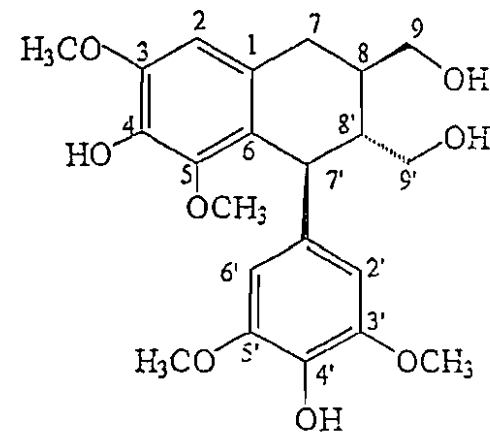
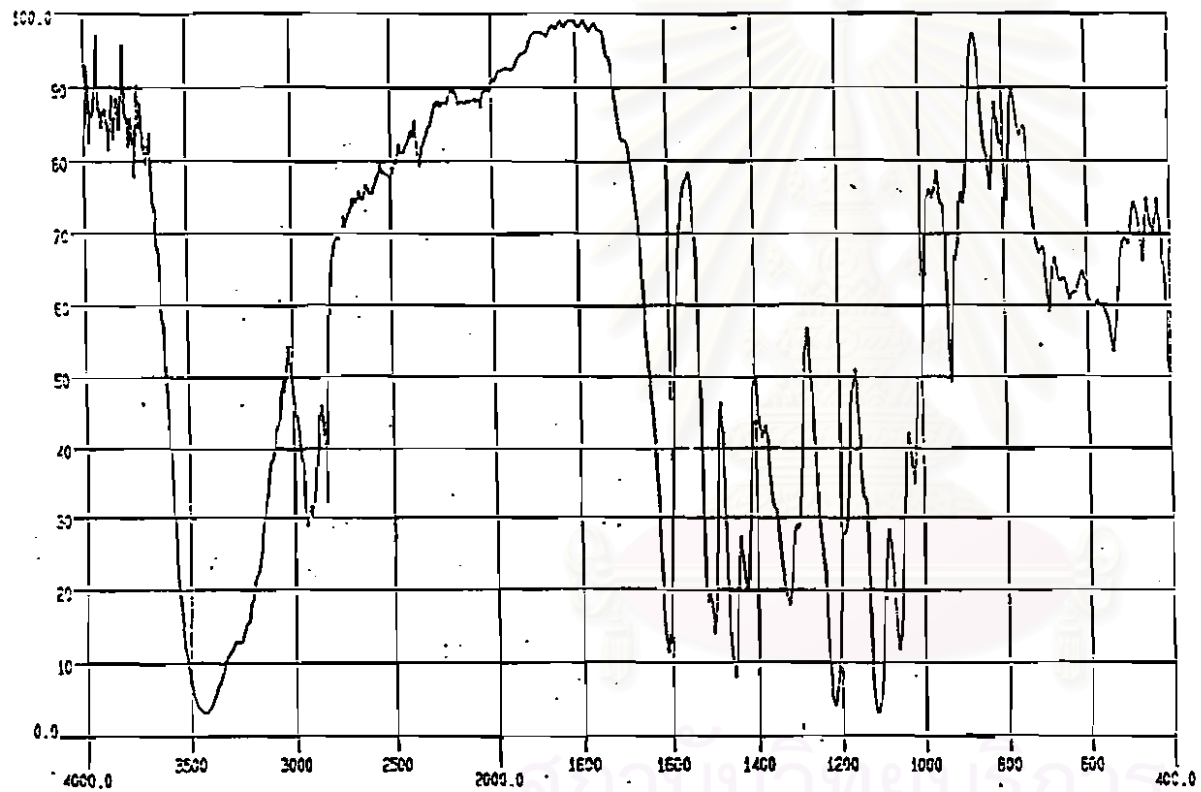


Figure 38 Infrared absorption spectrum of SN-5

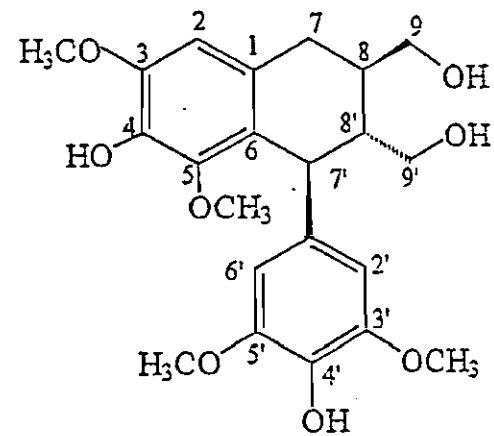
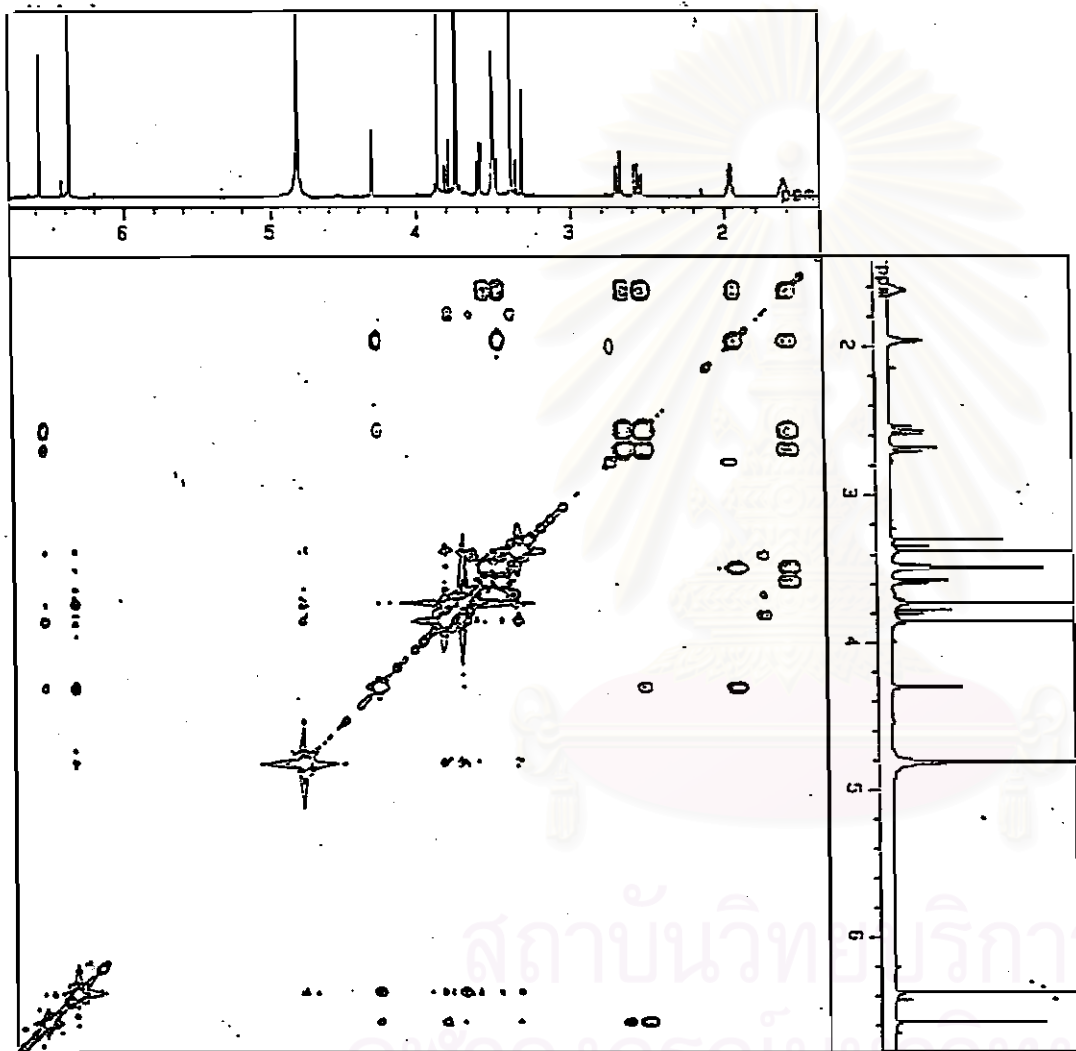


Figure 40 ^1H - ^1H COSY spectrum of SN-5 (500 MHz; in CD_3OD)

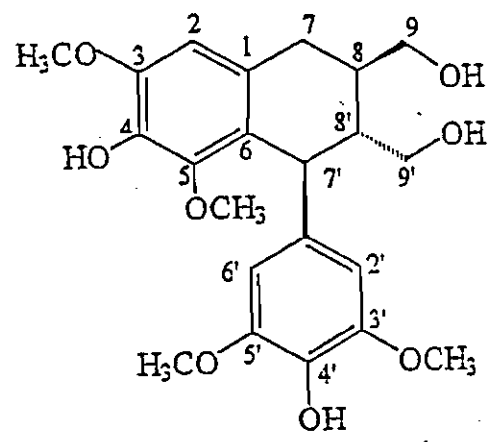
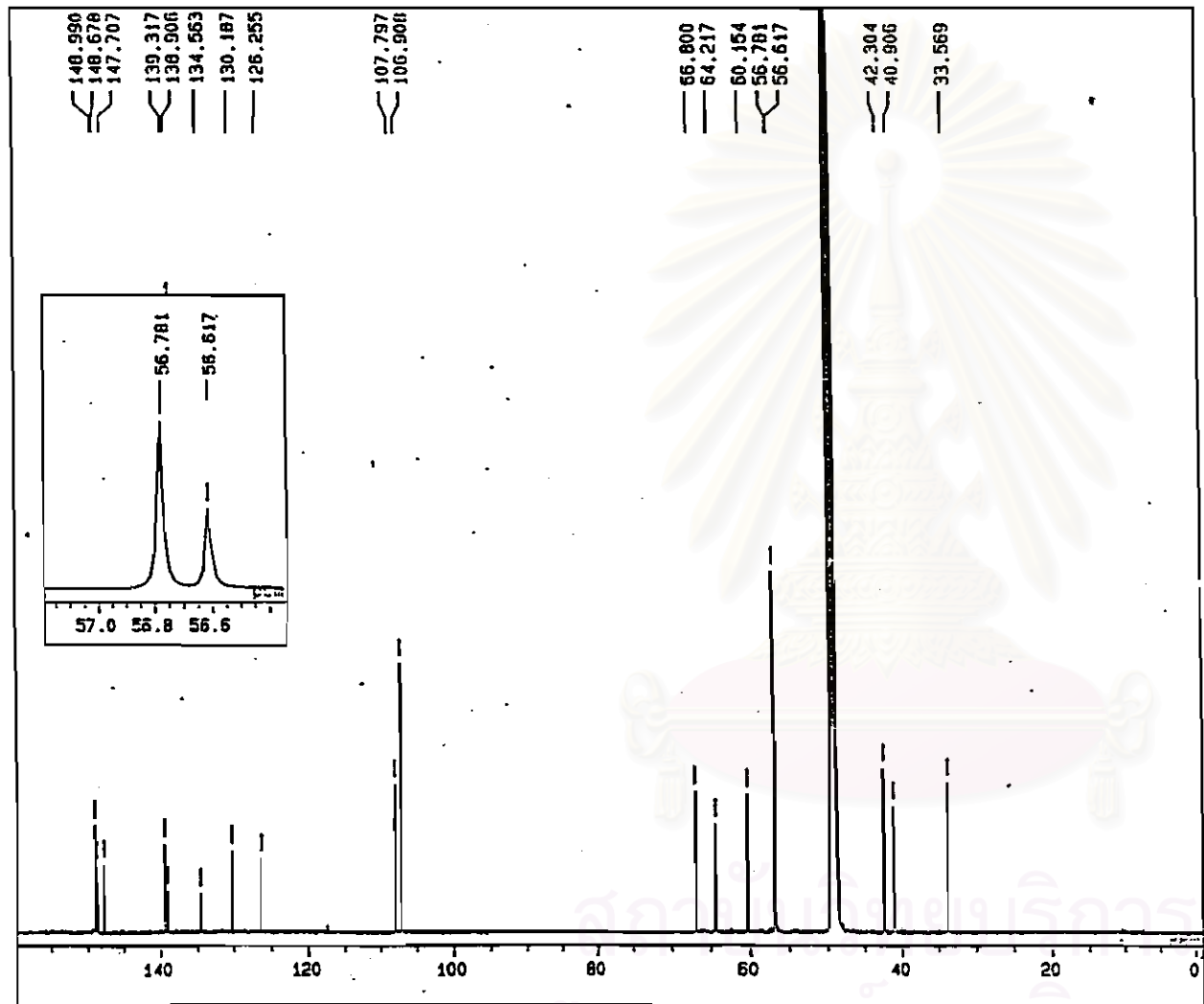


Figure 41 ¹³C-NMR spectrum of SN-5 (125 MHz; in CD₃OD)

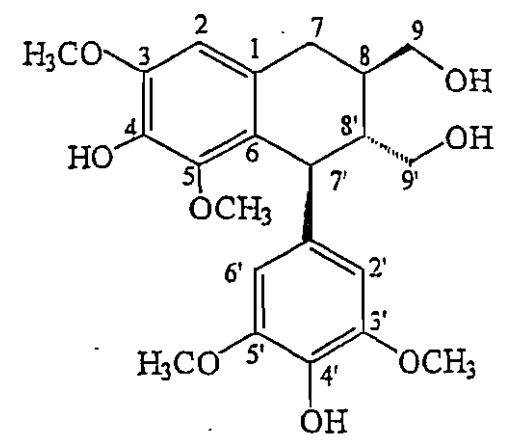
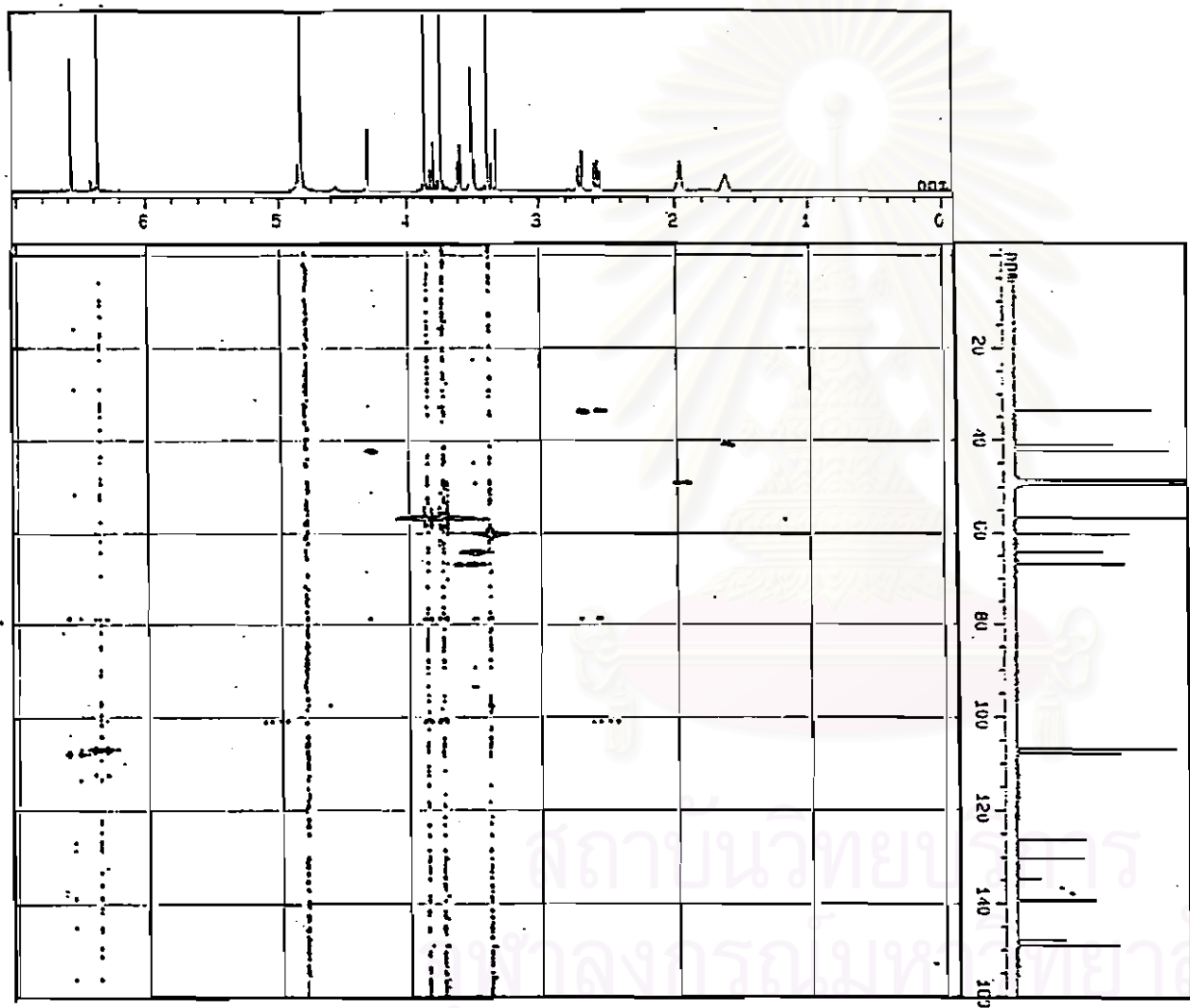


Figure 42.1 HMQC spectrum of SN-5 (500 MHz; in CD₃OD)

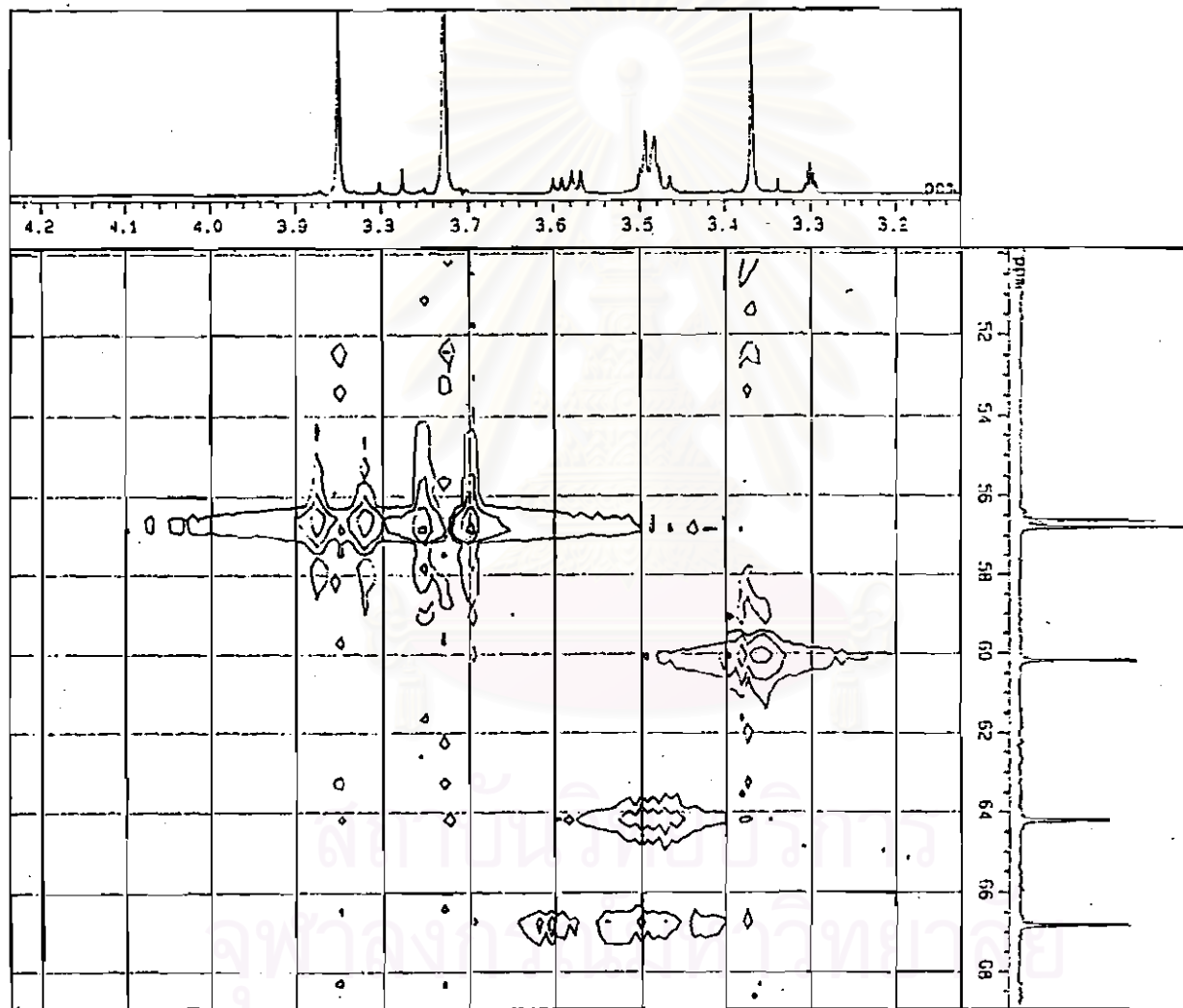


Figure 42.2 Expanded HMQC spectrum of SN-5

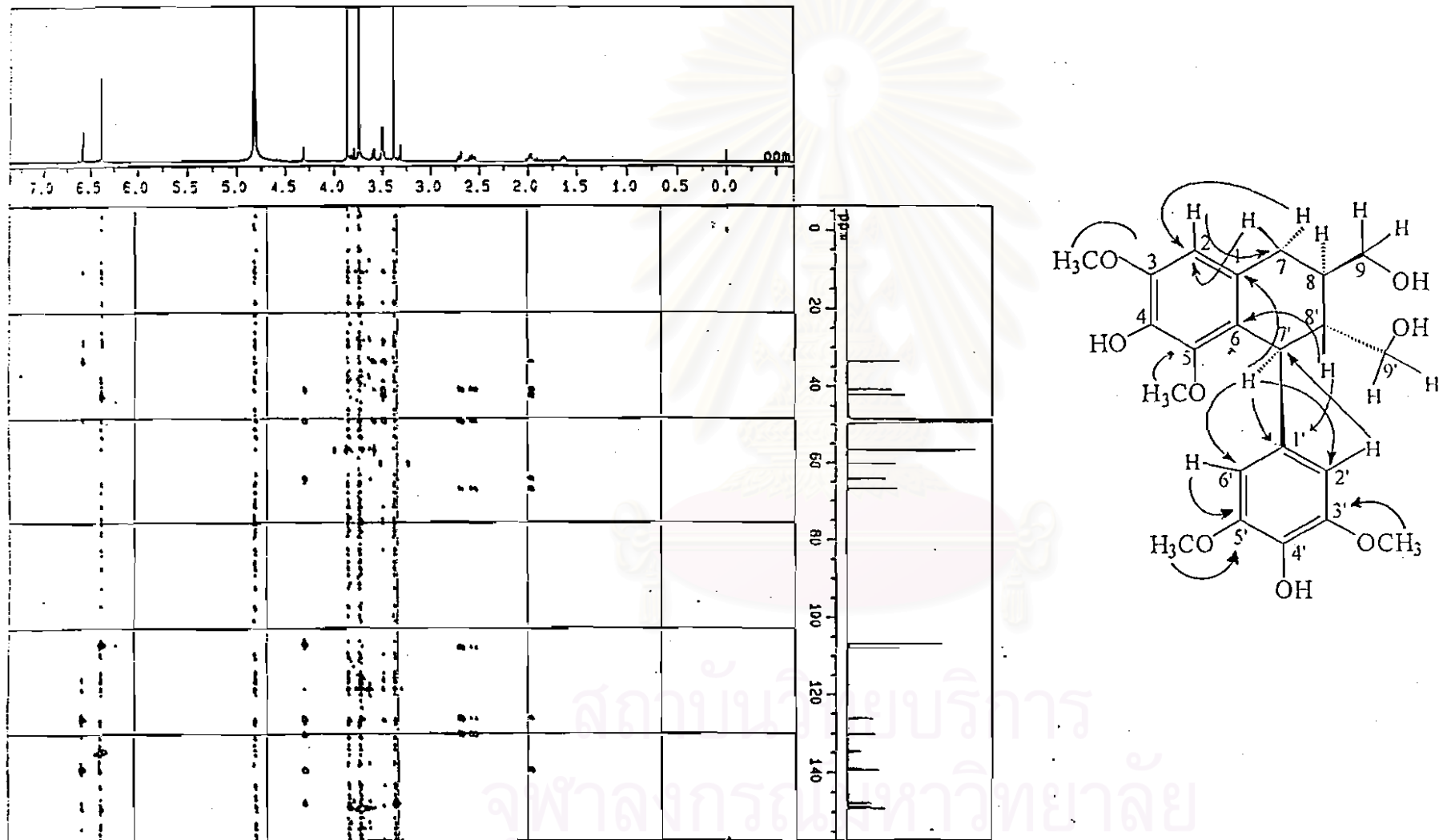


Figure 43 HMBC spectrum of SN-5 (500 MHz ; in CD₃OD)

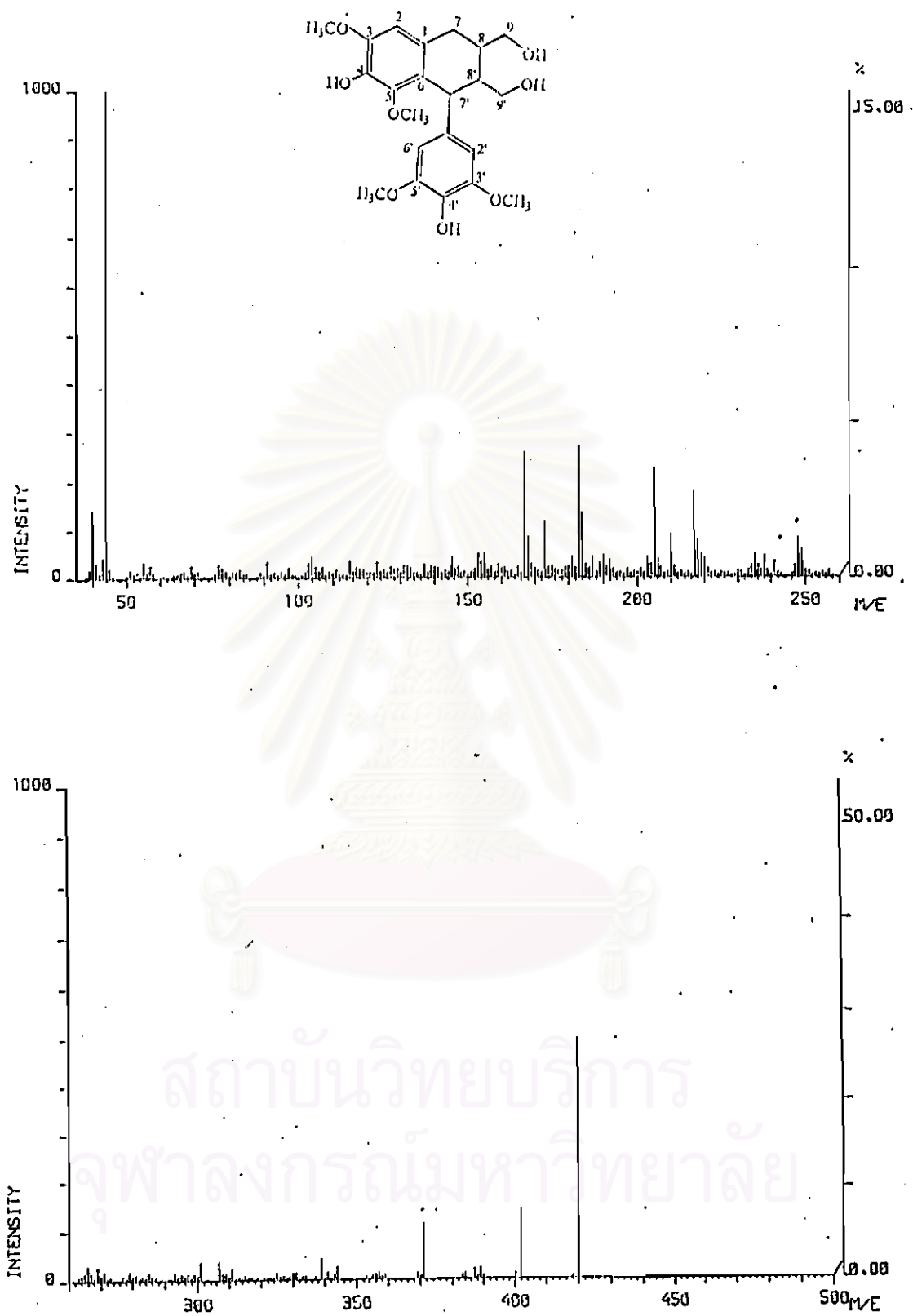


Figure 44 Mass spectrum of SN-5

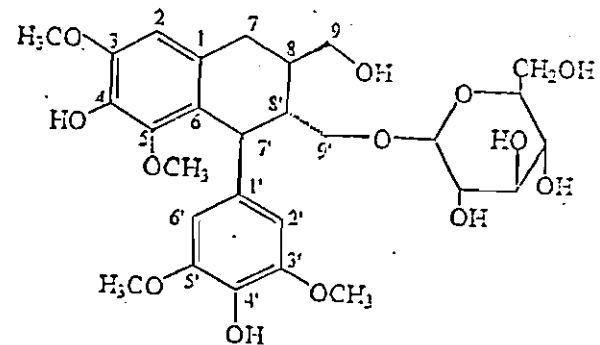
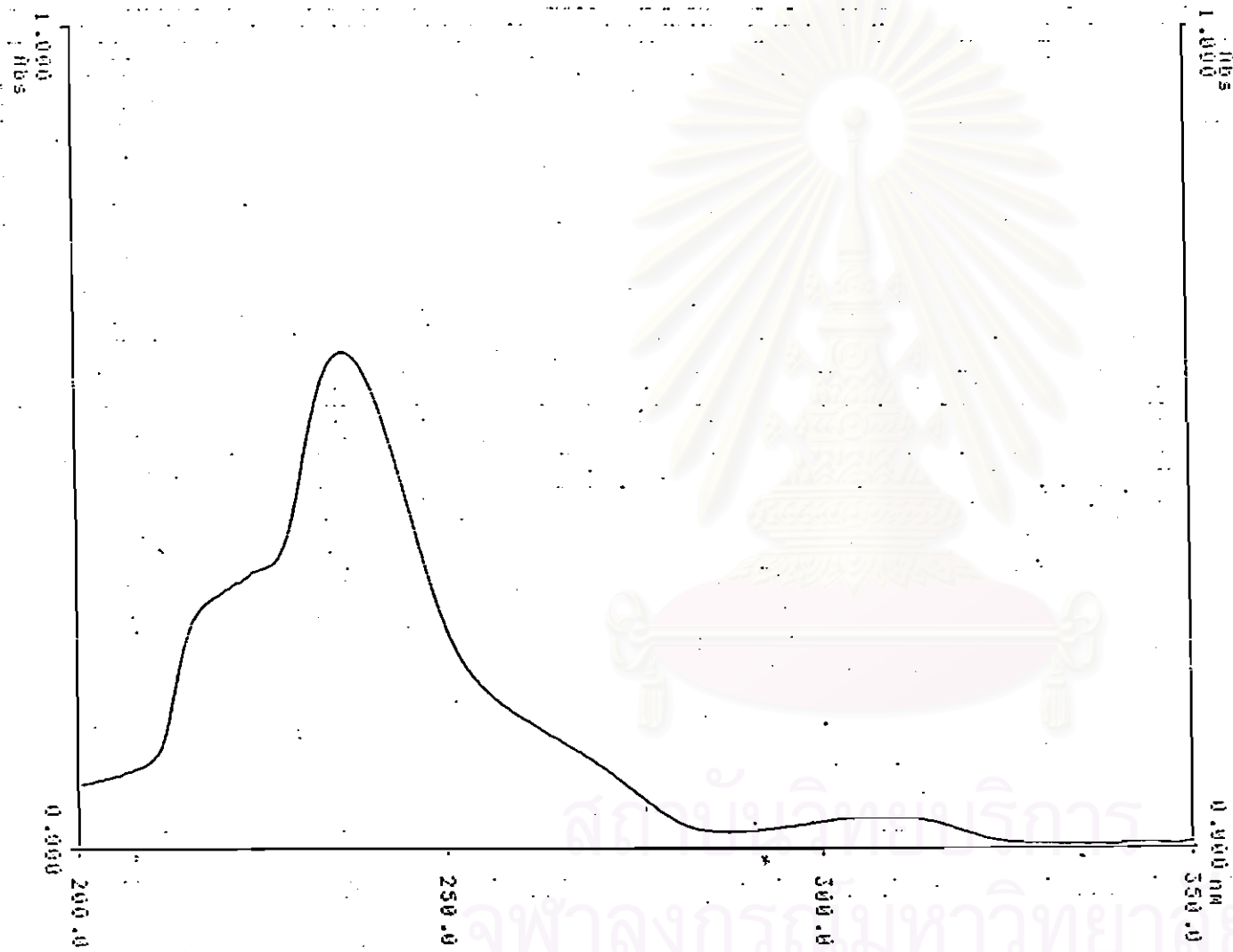


Figure 45 Ultraviolet absorption spectrum of SN-6

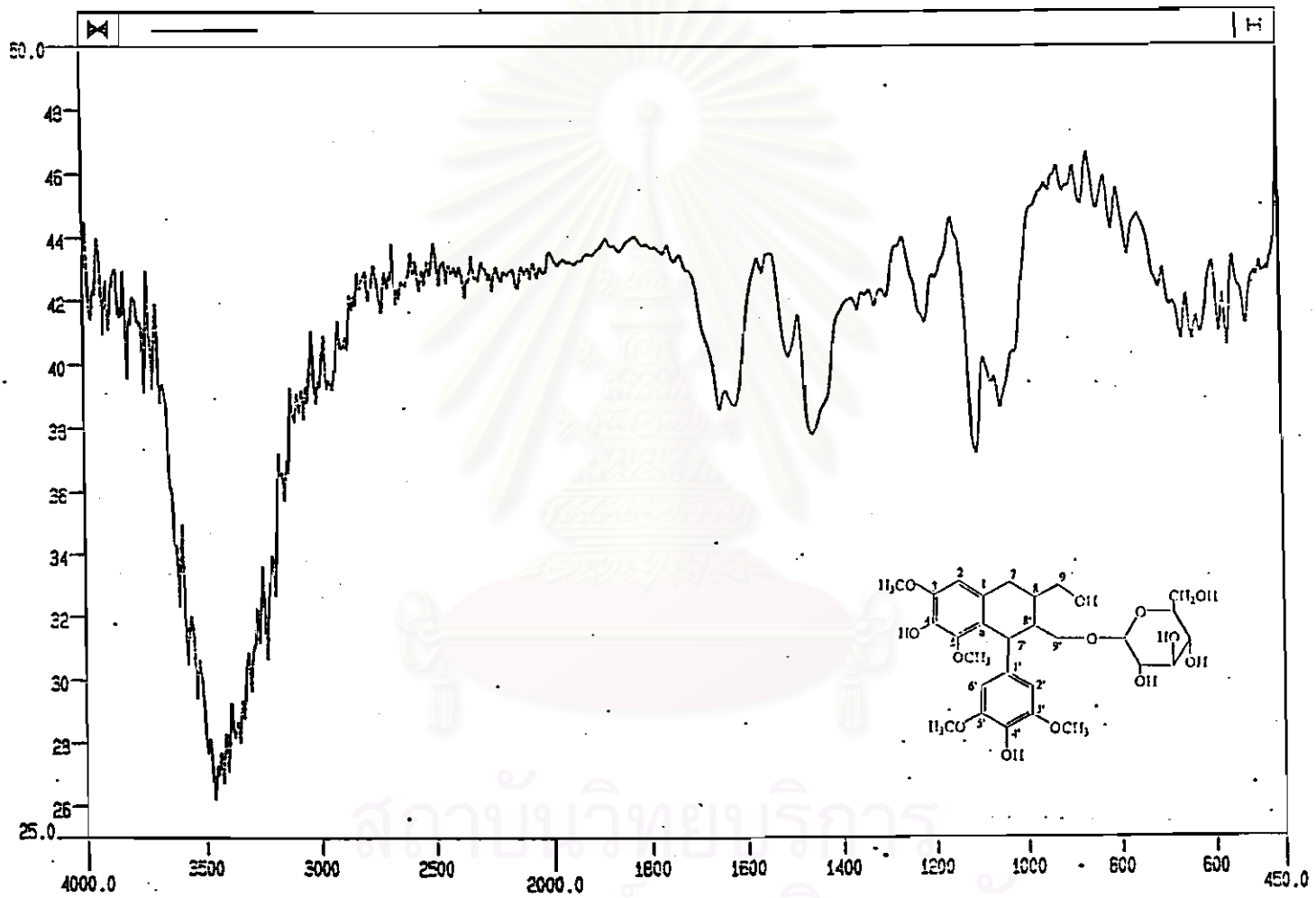


Figure 46 Infrared absorption spectrum of SN-6

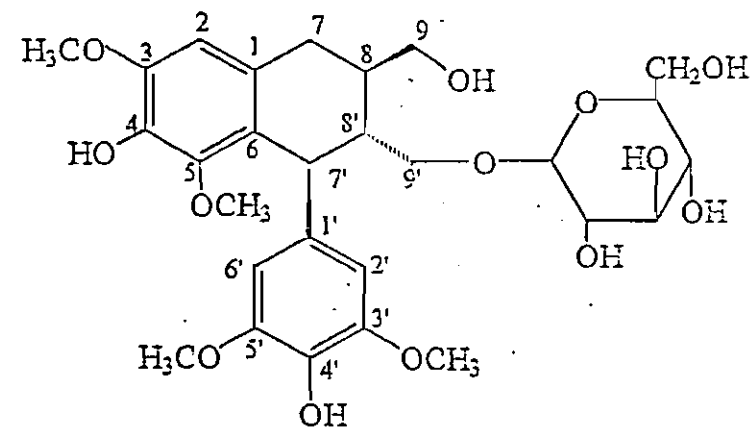
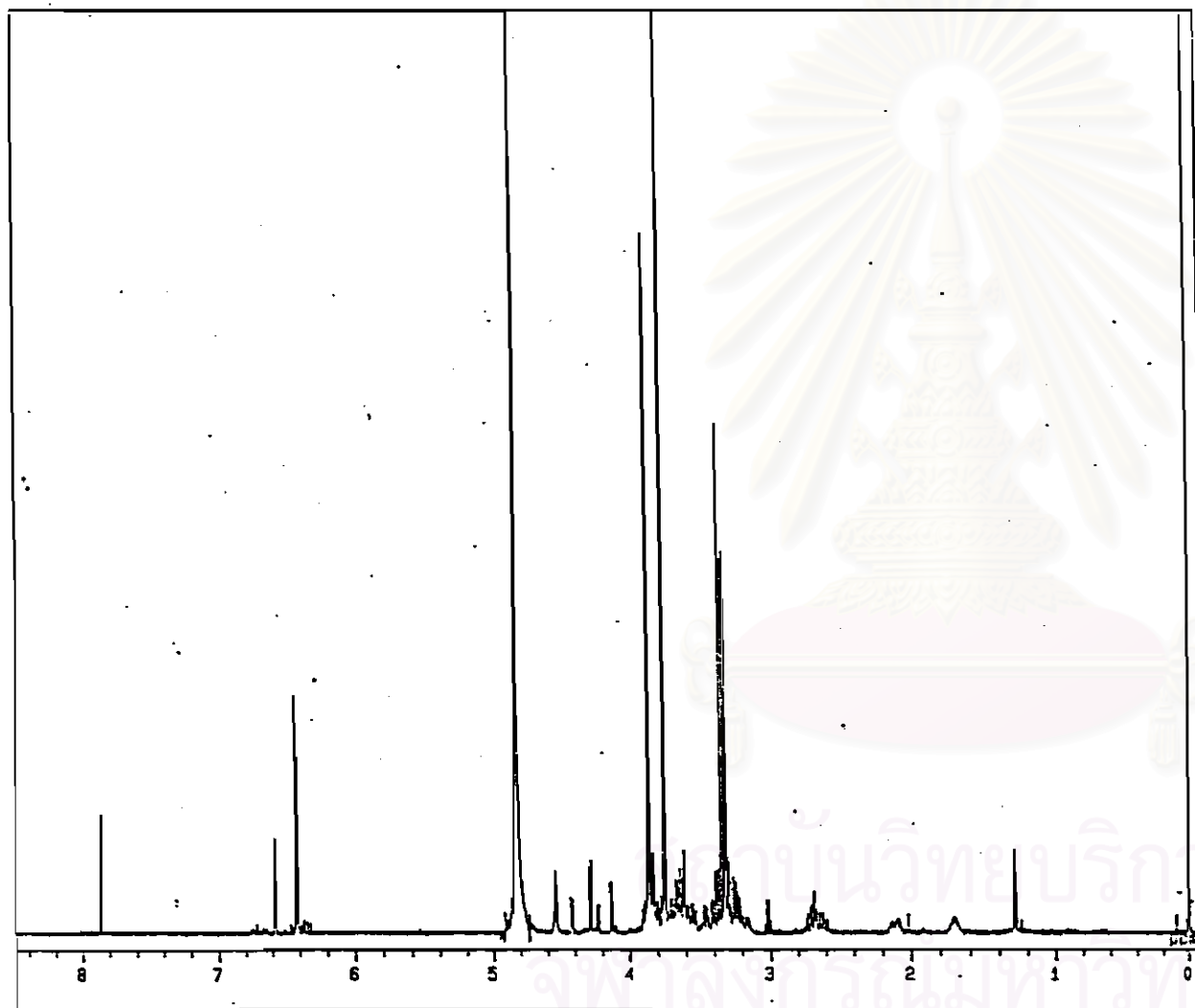


Figure 47.1. $^1\text{H-NMR}$ spectrum of SN-6 (500 MHz ; in CD_3OD)

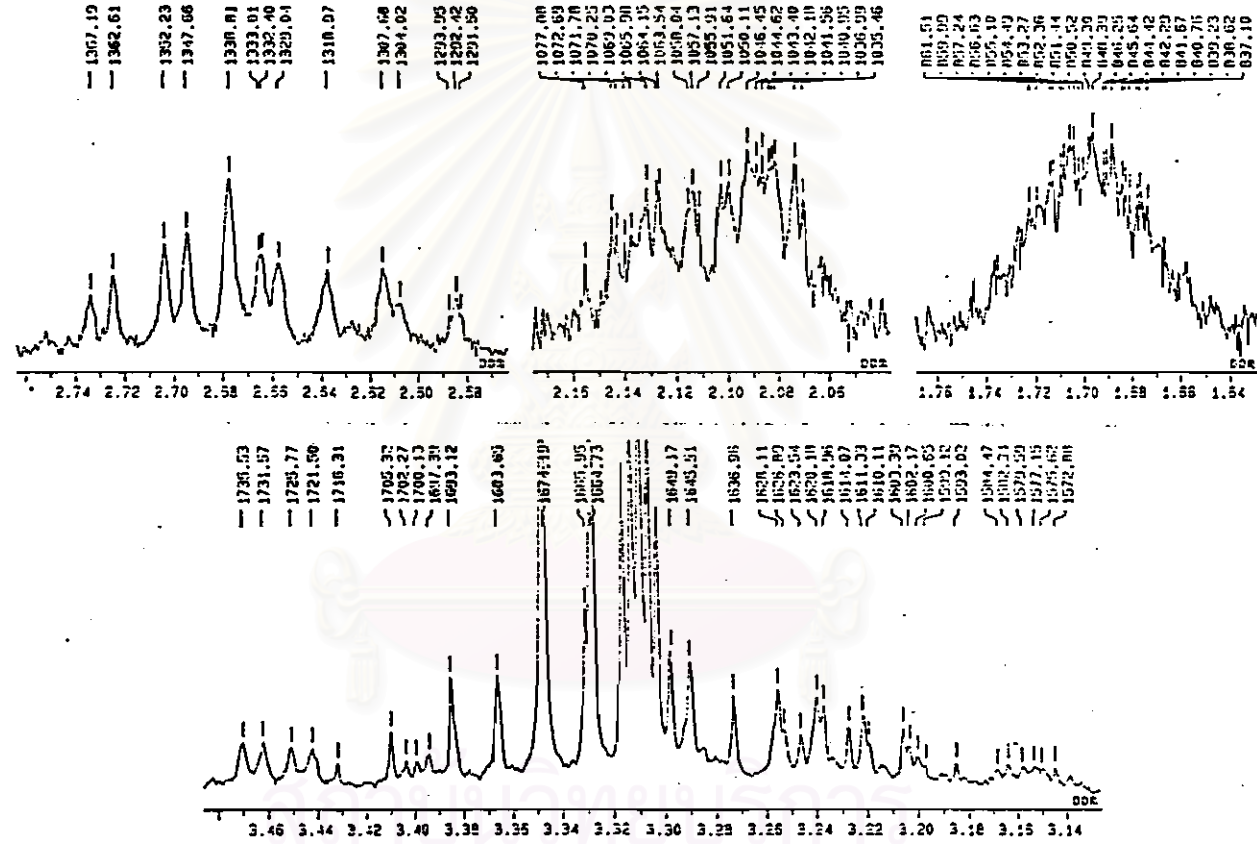


Figure 47.2 Expanded $^1\text{H-NMR}$ spectrum of SN-6

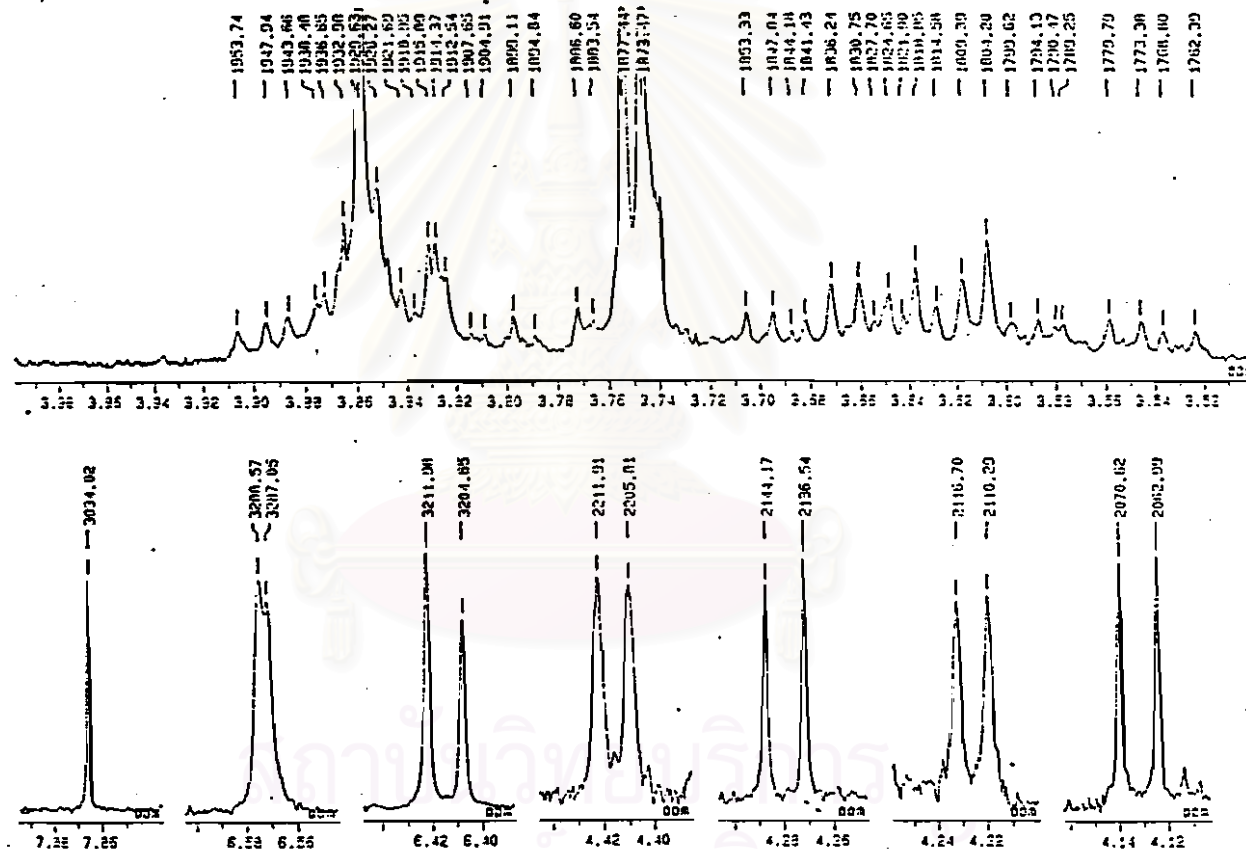


Figure 47.3 Expanded $^1\text{H-NMR}$ absorption spectrum of SN-6

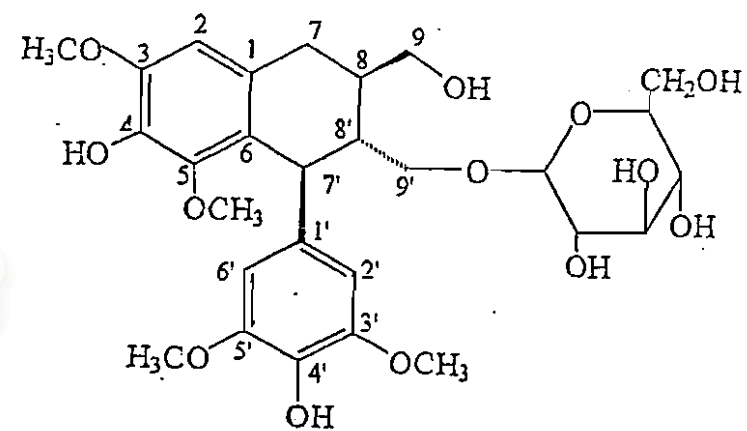
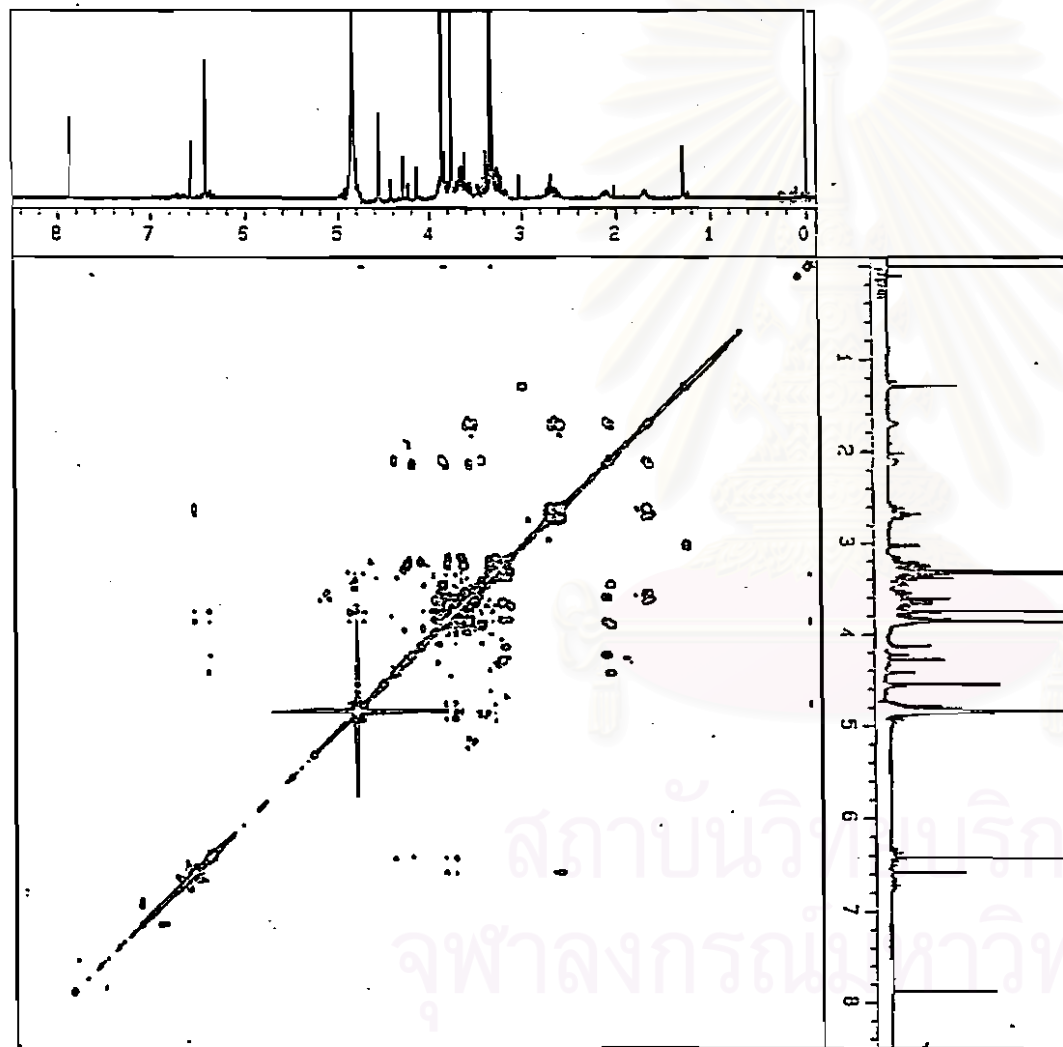


Figure 48.1 ^1H - ^1H COSY spectrum of SN-6 (500 MHz ; in CD_3OD)

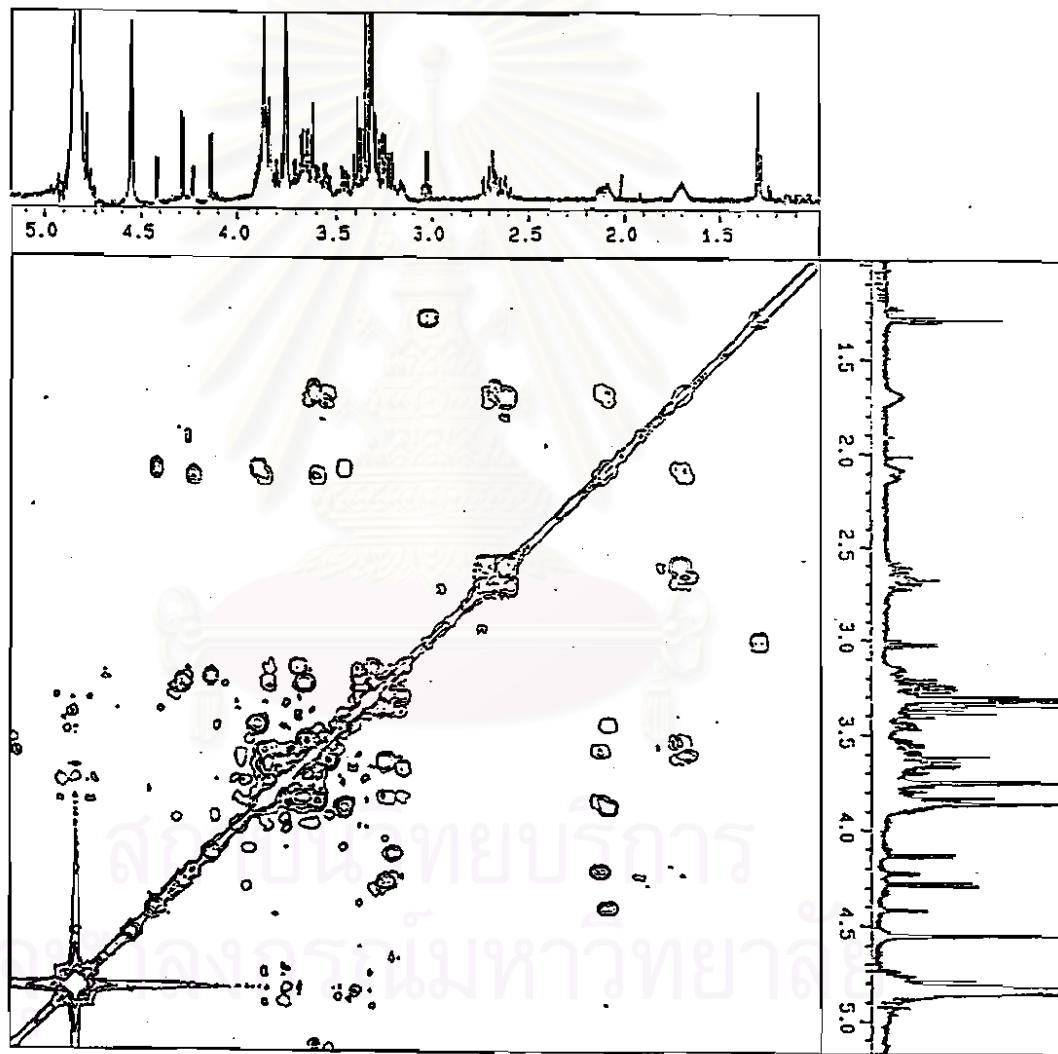


Figure 48.2 Expanded ^1H - ^1H COSY spectrum of SN-6

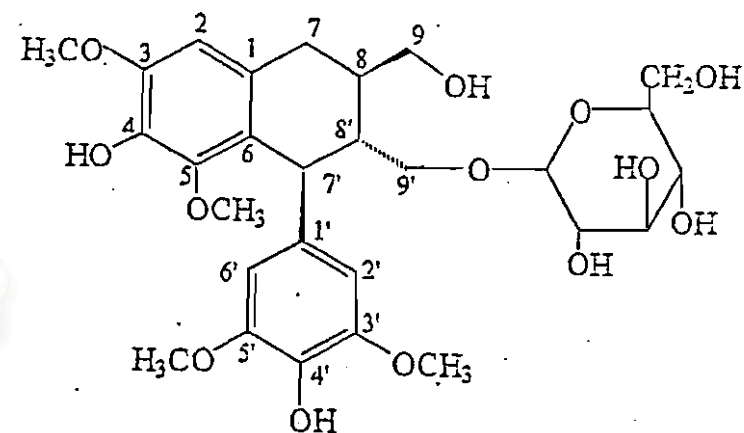
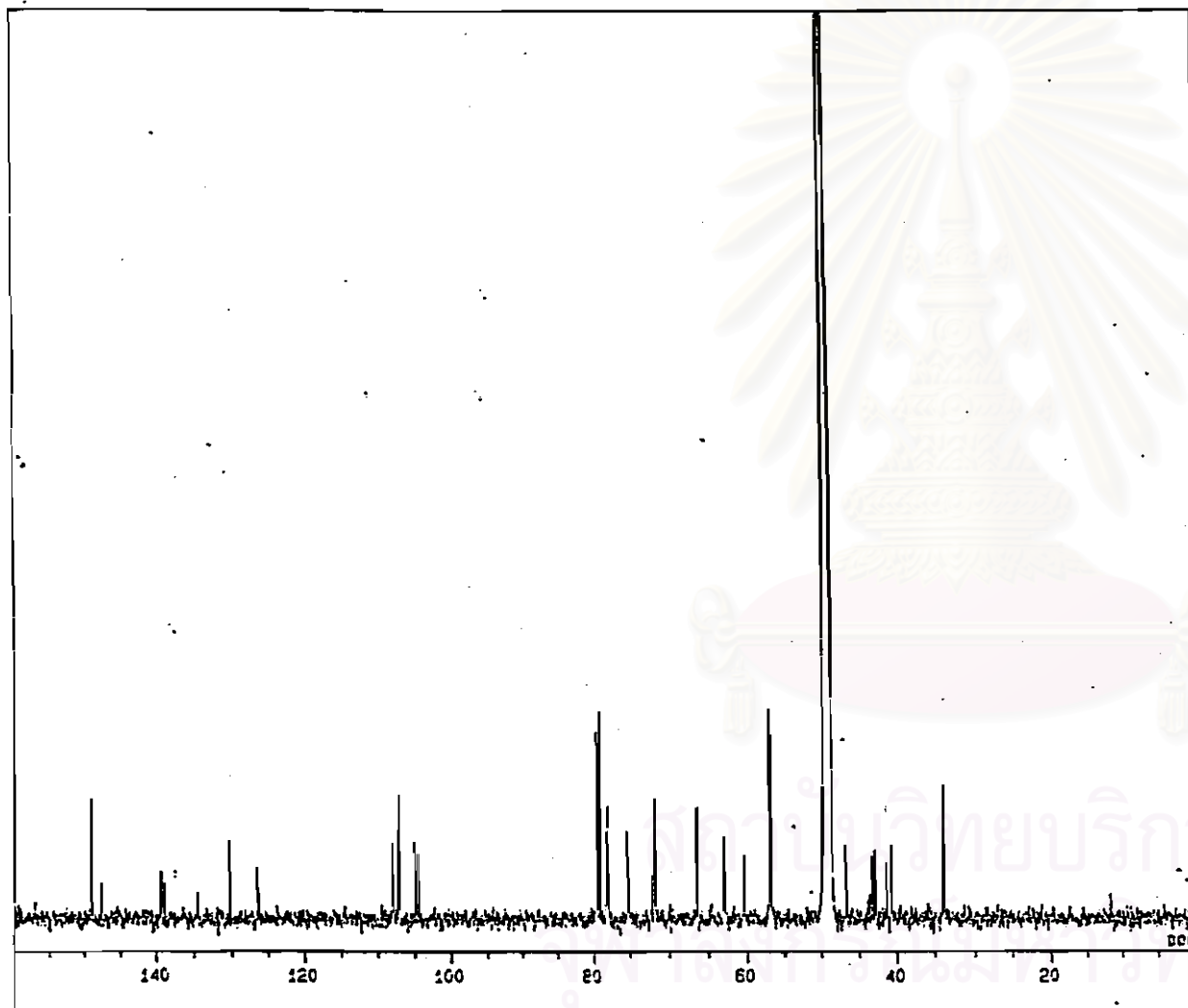


Figure 49.1 $^{13}\text{C-NMR}$ spectrum of SN-6. (125 MHz; in CD_3OD)

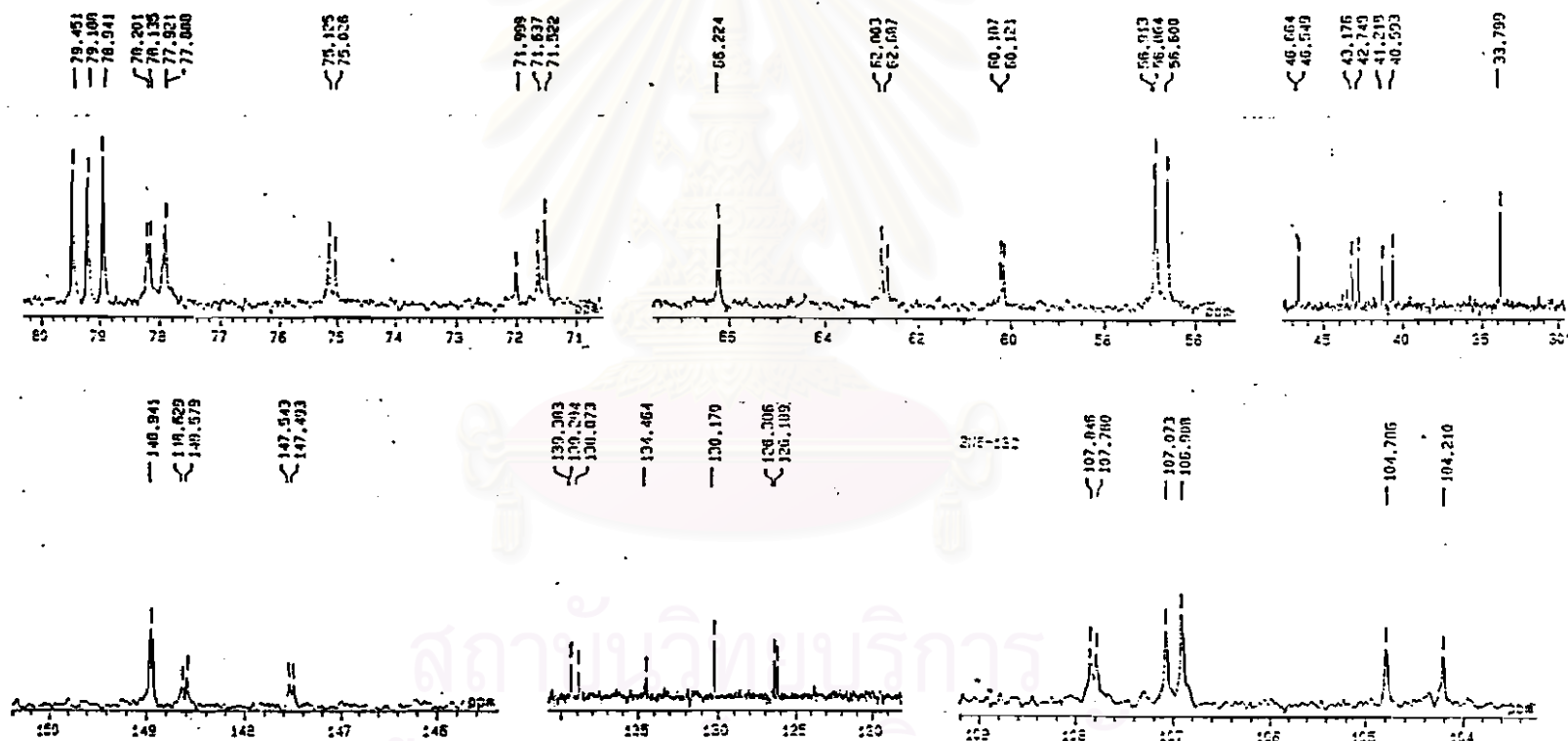


Figure 49.2 Expanded ^{13}C -NMR spectrum of SN-6

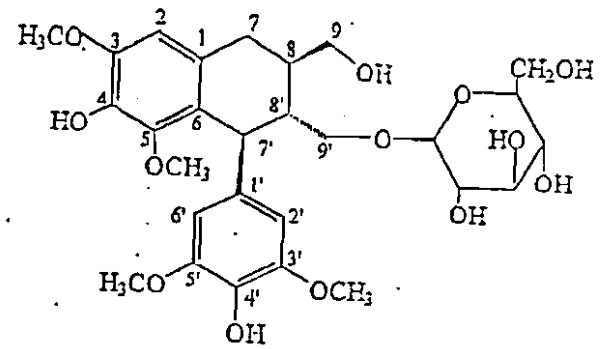
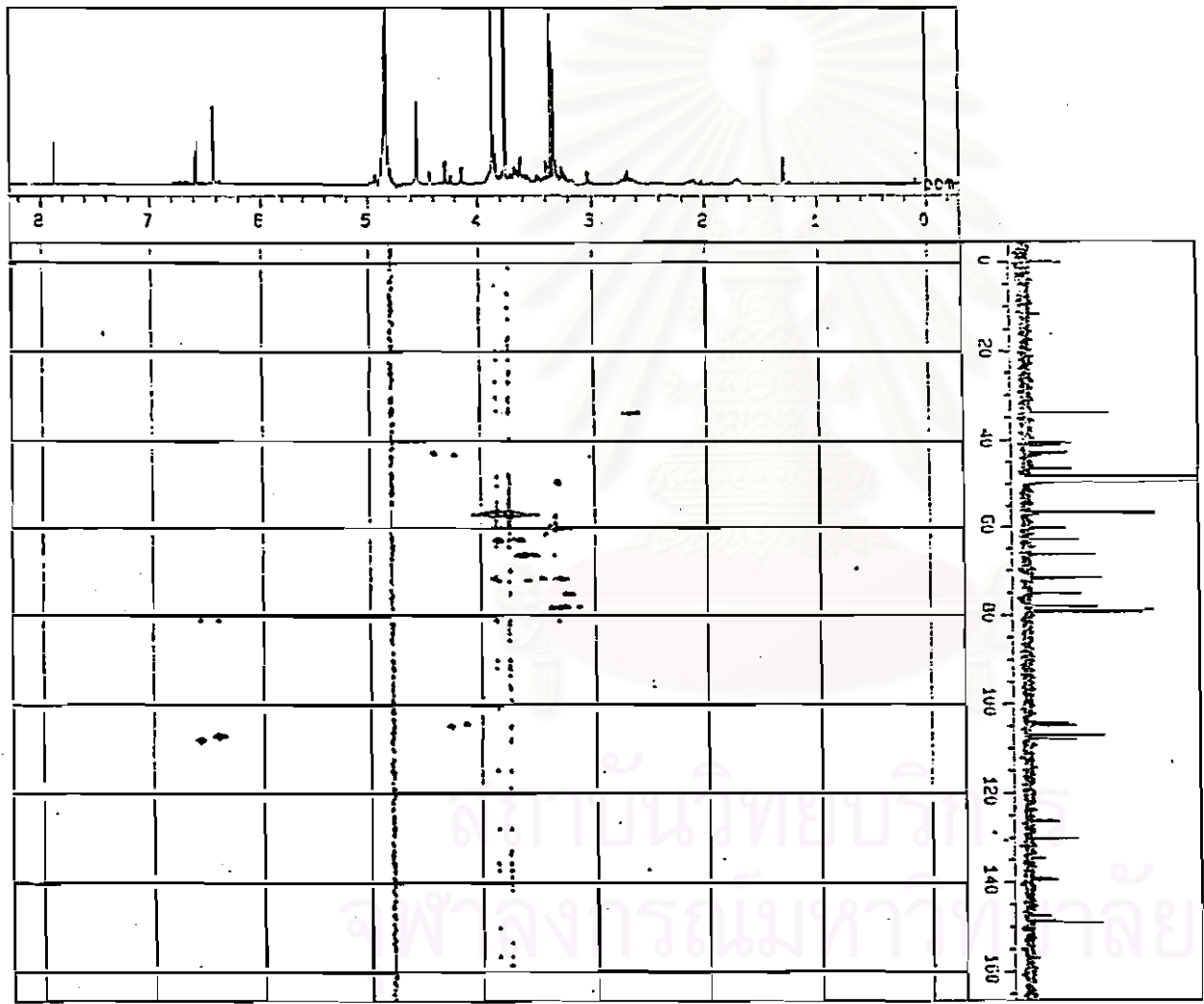


Figure 50.1 HMQC spectrum of SN-6 (500 MHz ; in CD₃OD)

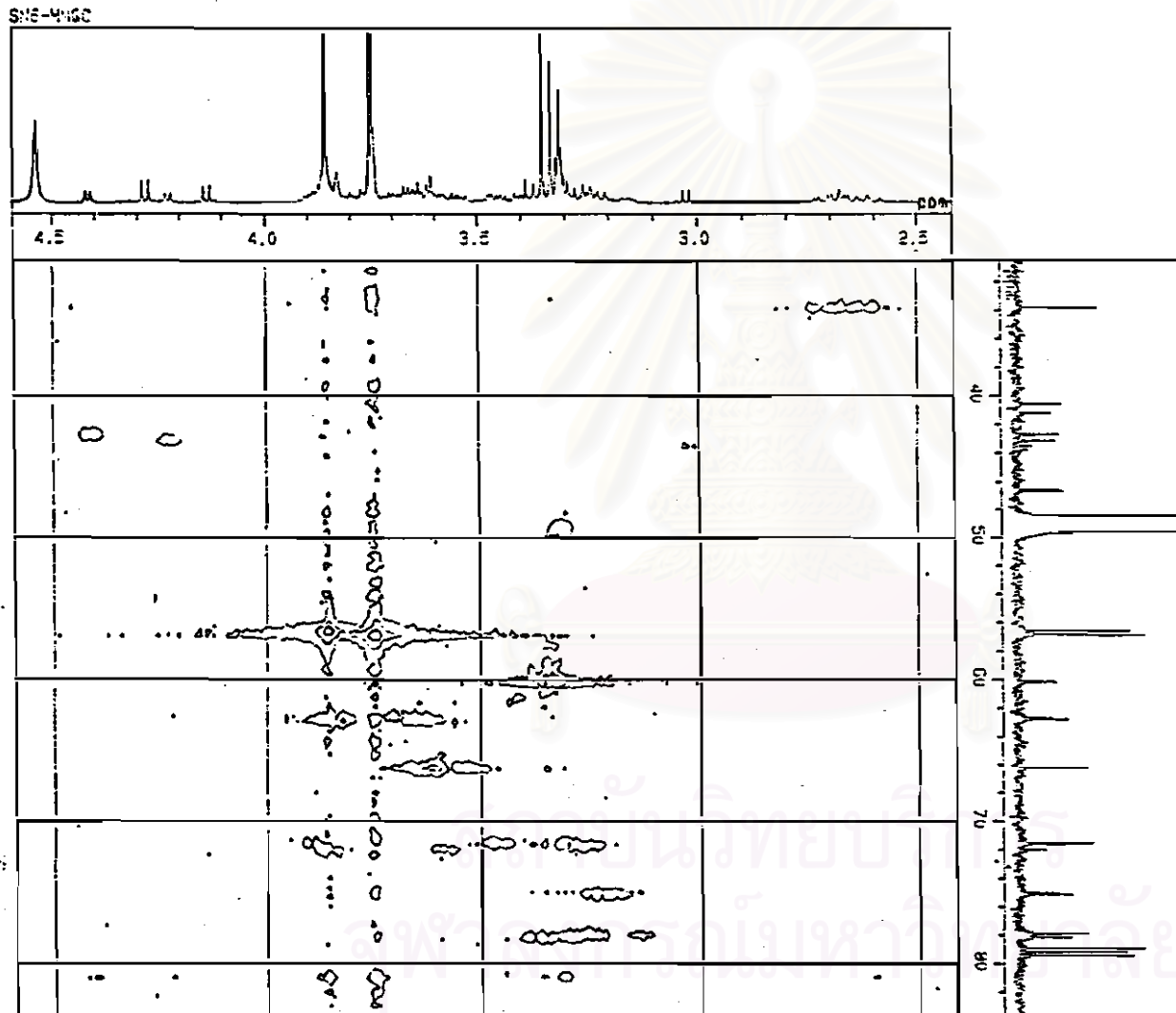


Figure 50.2 Expanded HMQC spectrum of SN-6

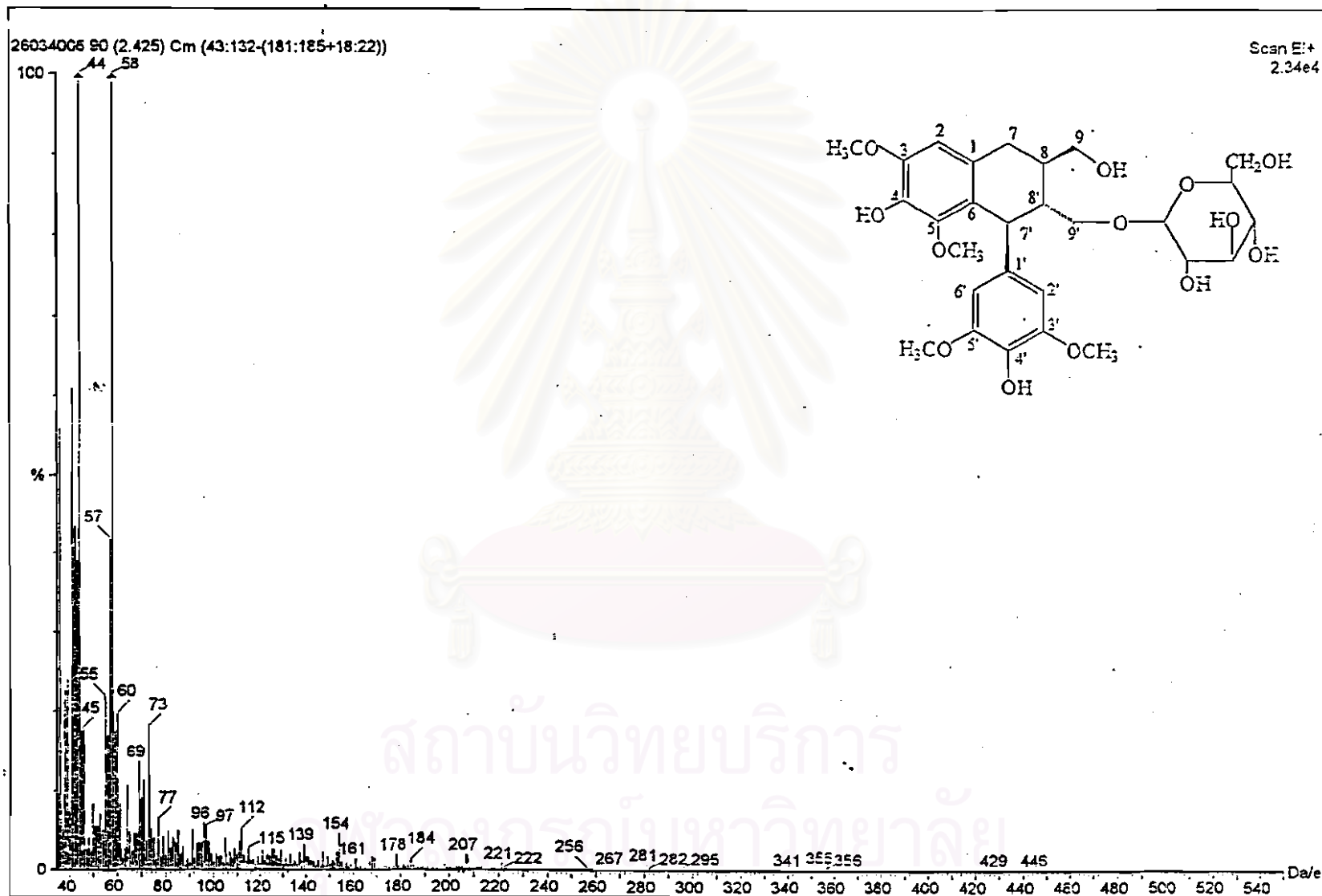


Figure 51 Mass spectrum of SN-6

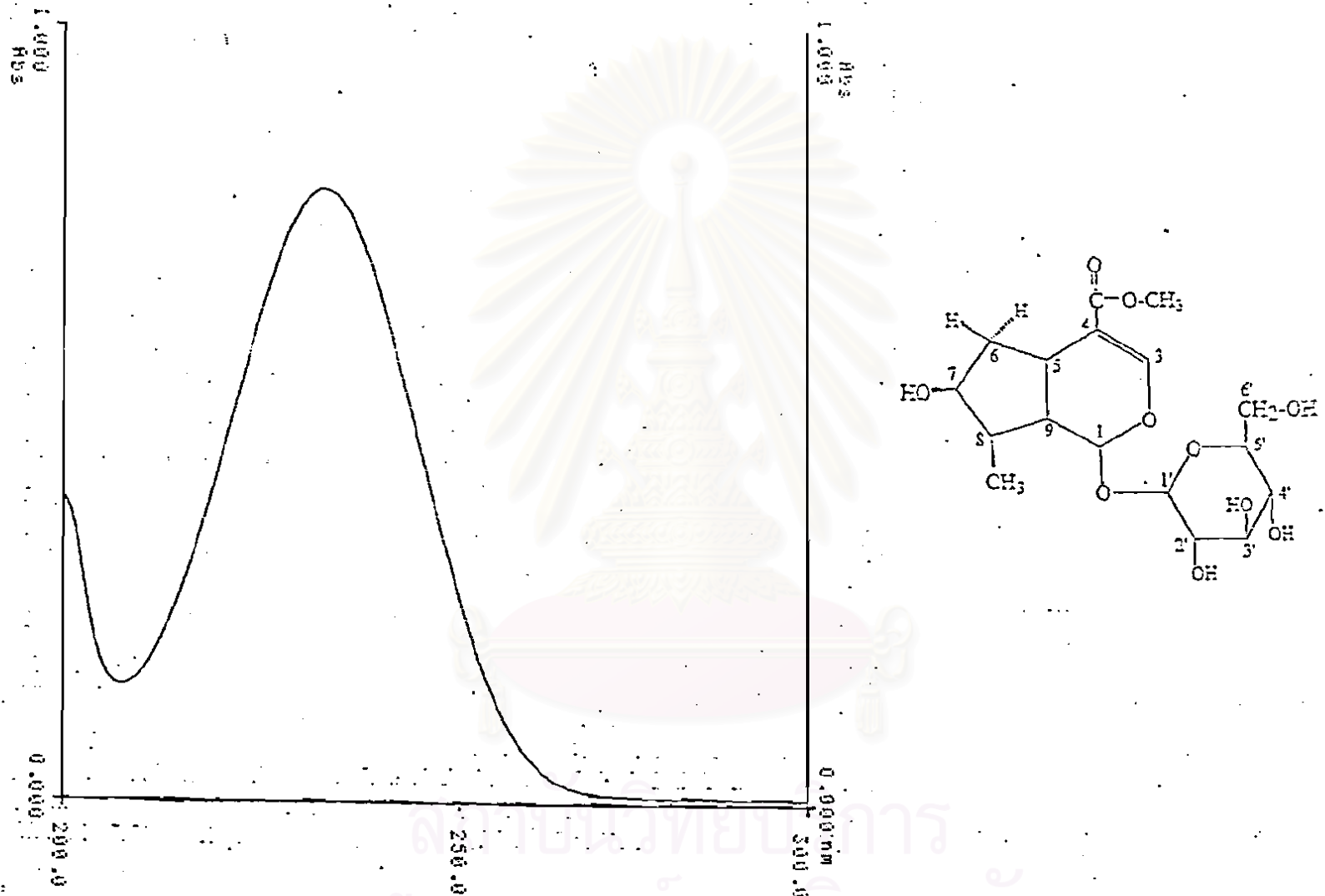


Figure 52 Ultraviolet absorption spectrum of SN-7

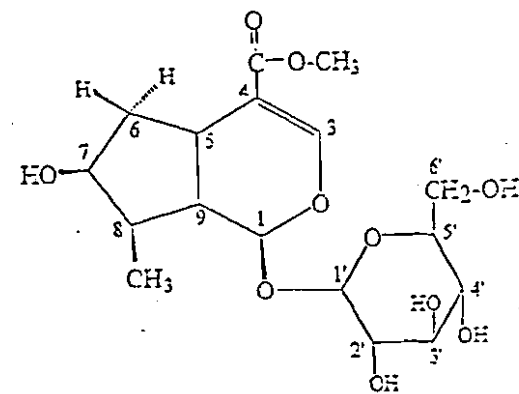
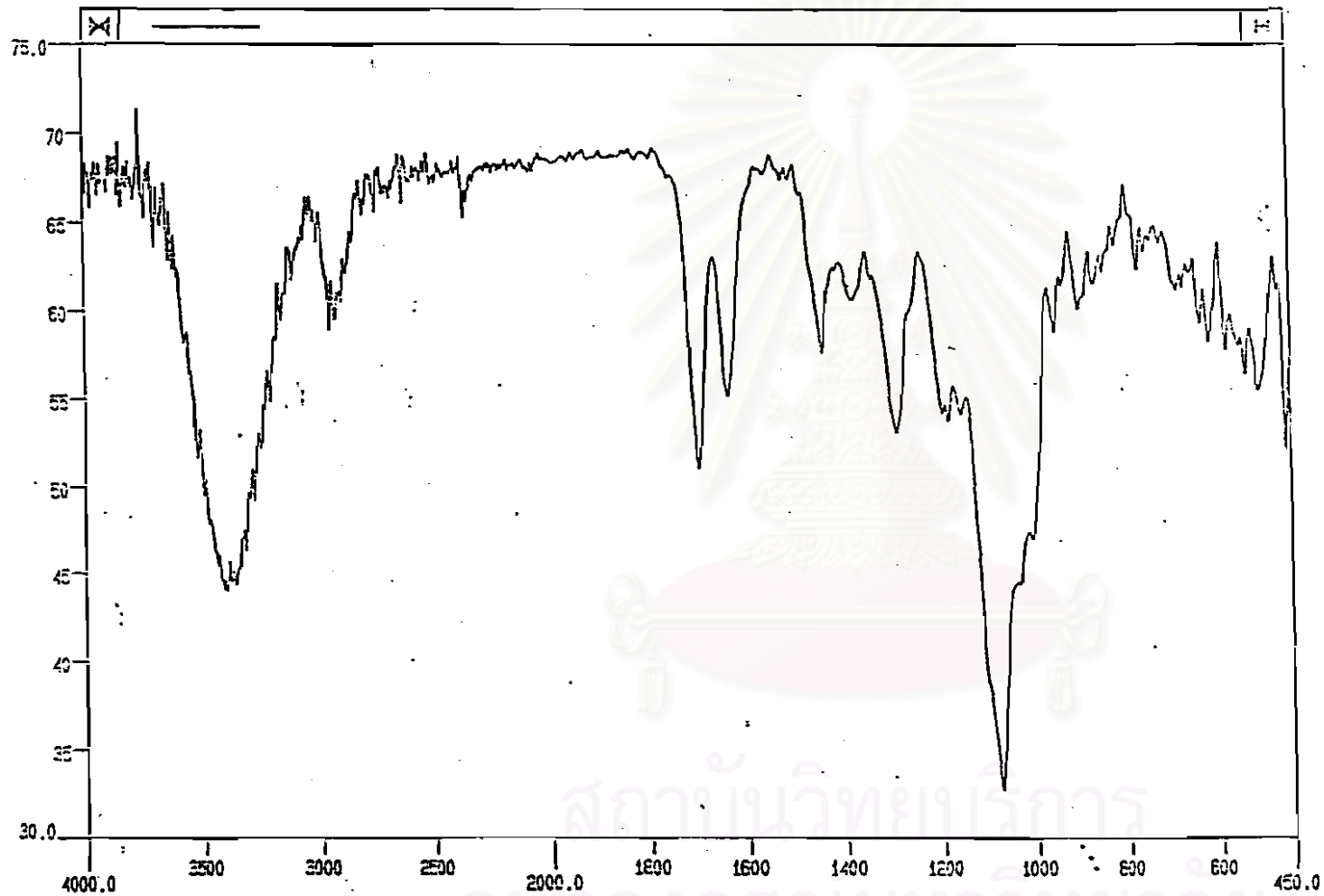


Figure 53 Infrared absorption spectrum of SN-7

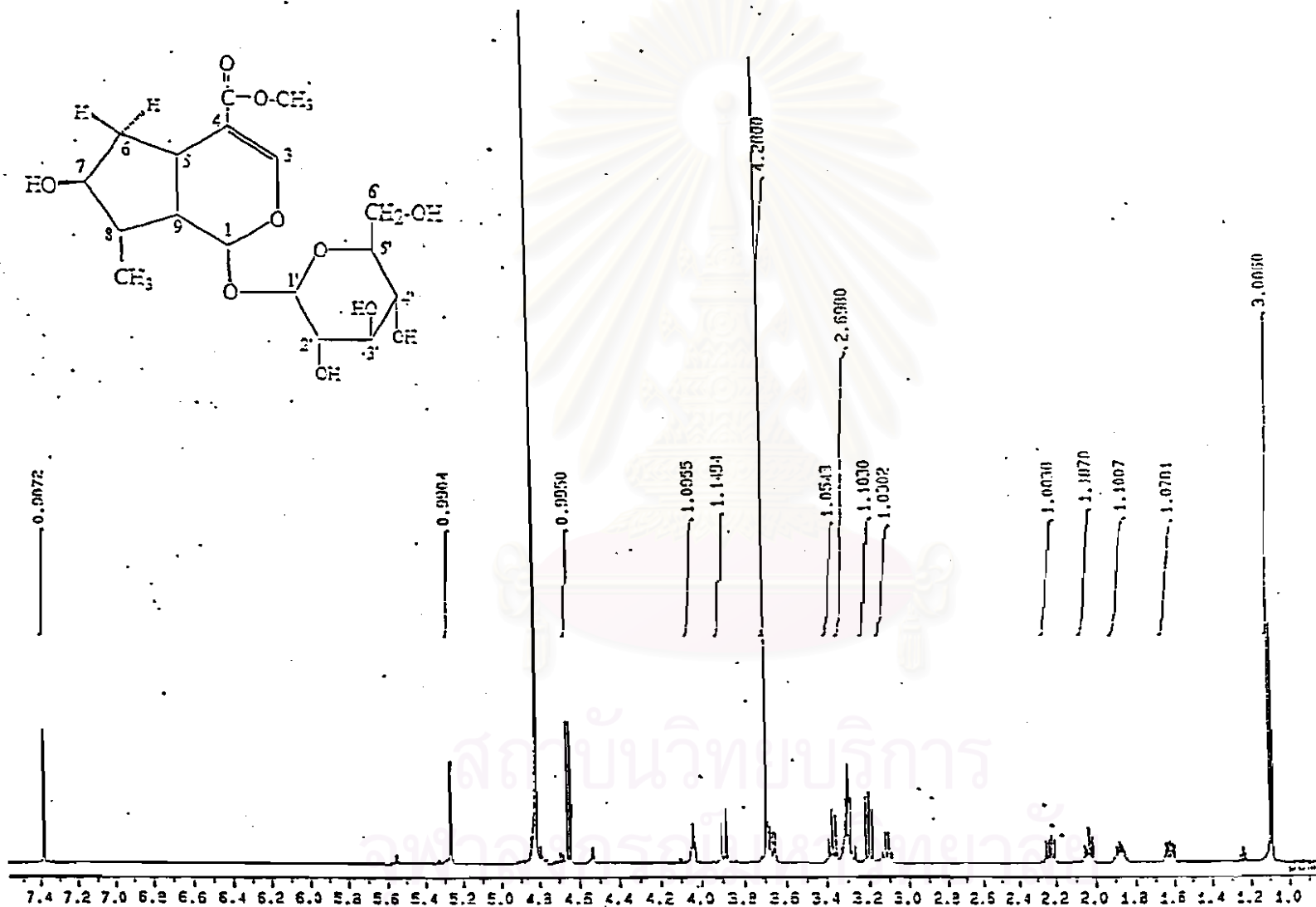


Figure S4.1 ¹H-NMR spectrum of SN-7 (500 MHz ; in CD₃OD)

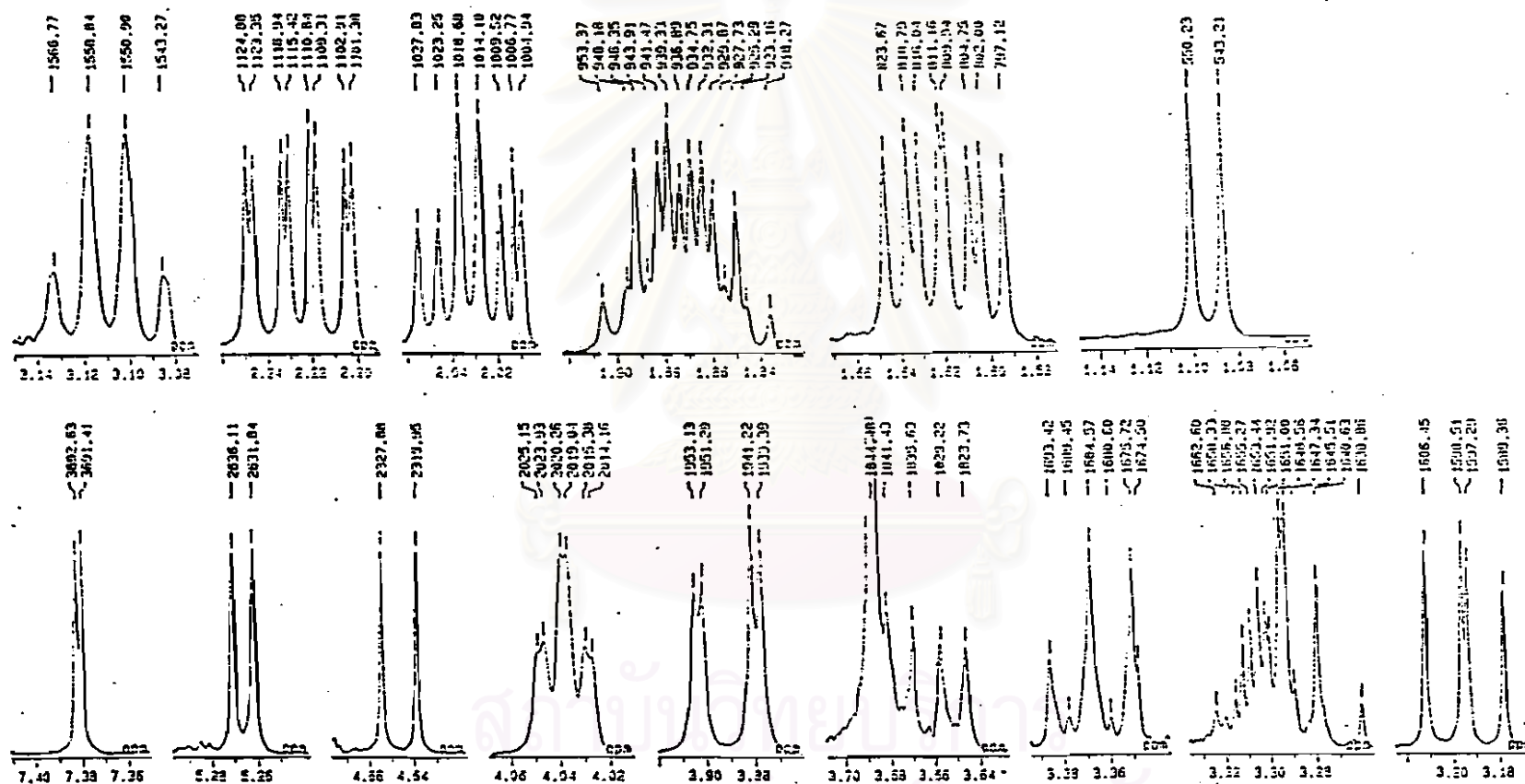


Figure 54.2 Expanded ¹H-NMR spectrum of SN-7

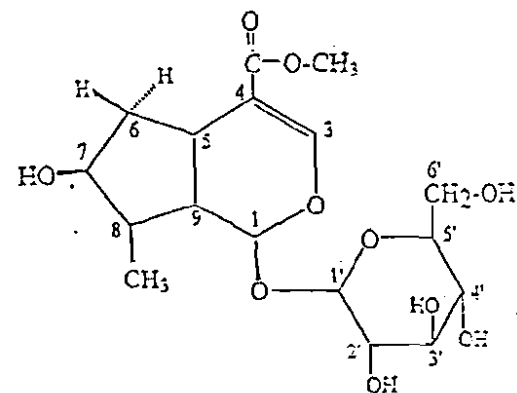
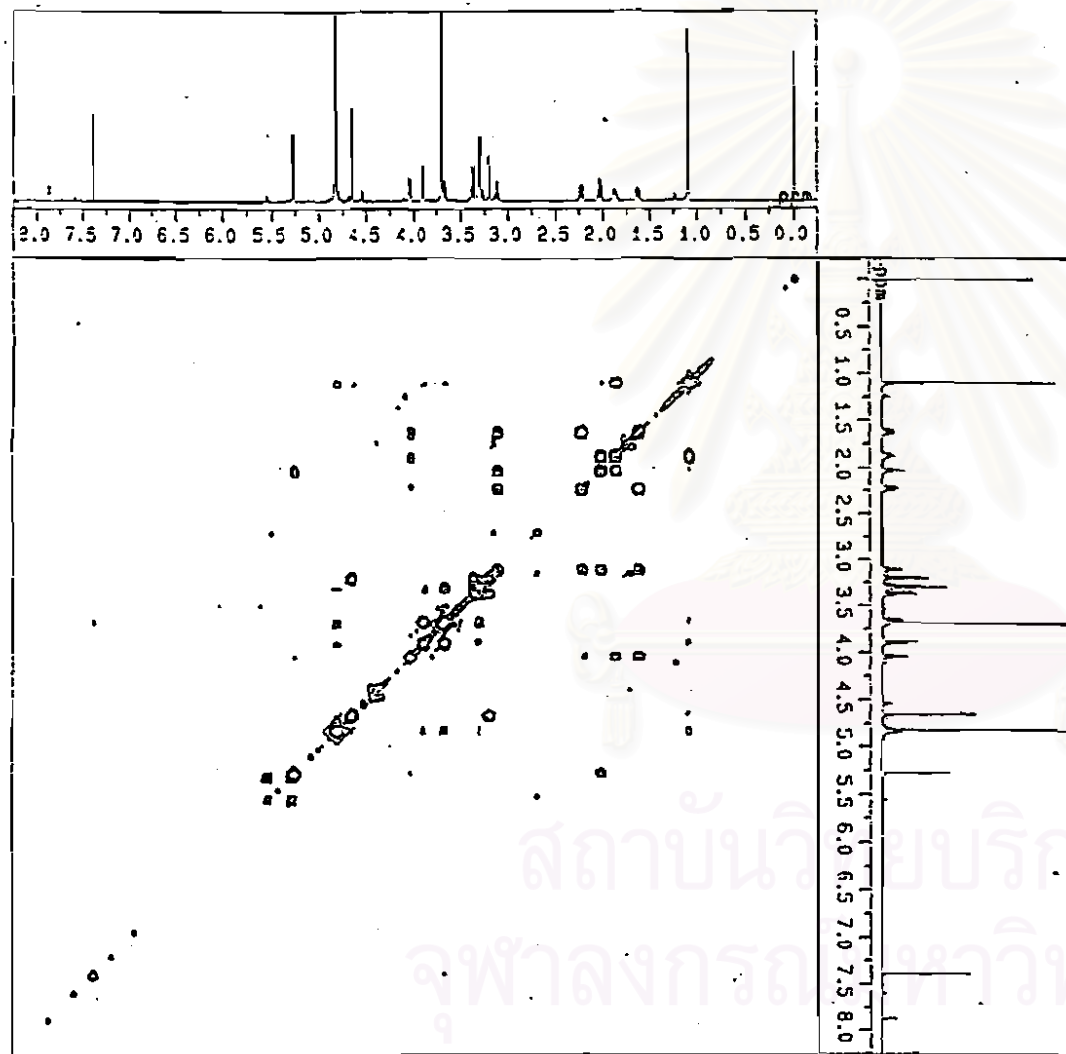


Figure 55 ^1H - ^1H COSY spectrum of SN-7 (500 MHz; in CD_3OD)

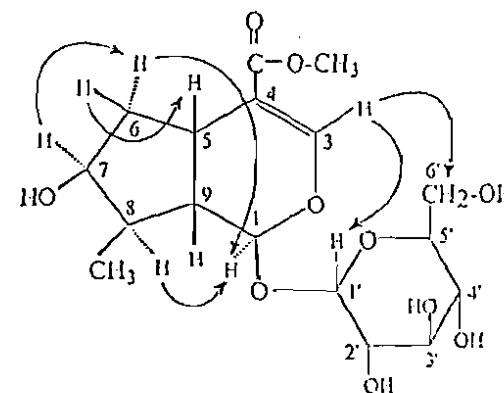
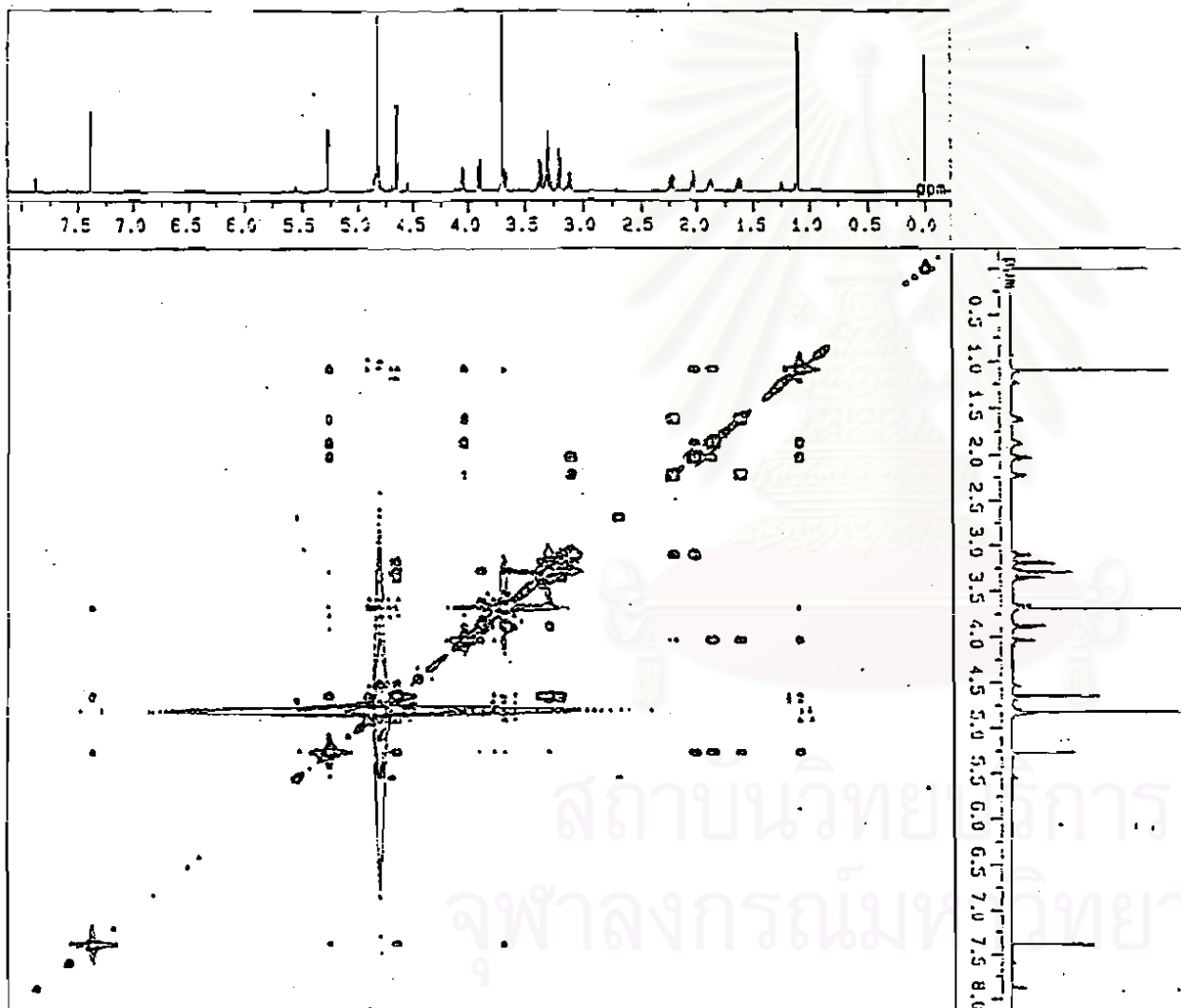


Figure 56 NOESY spectrum of SN-7

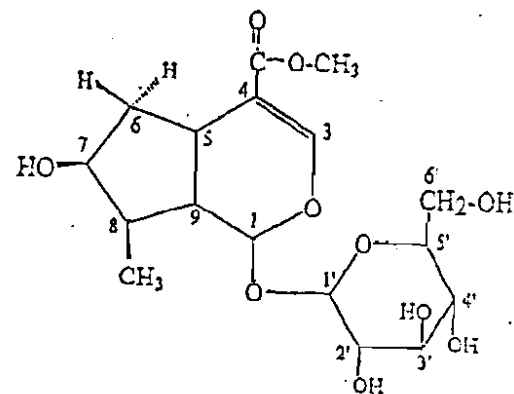
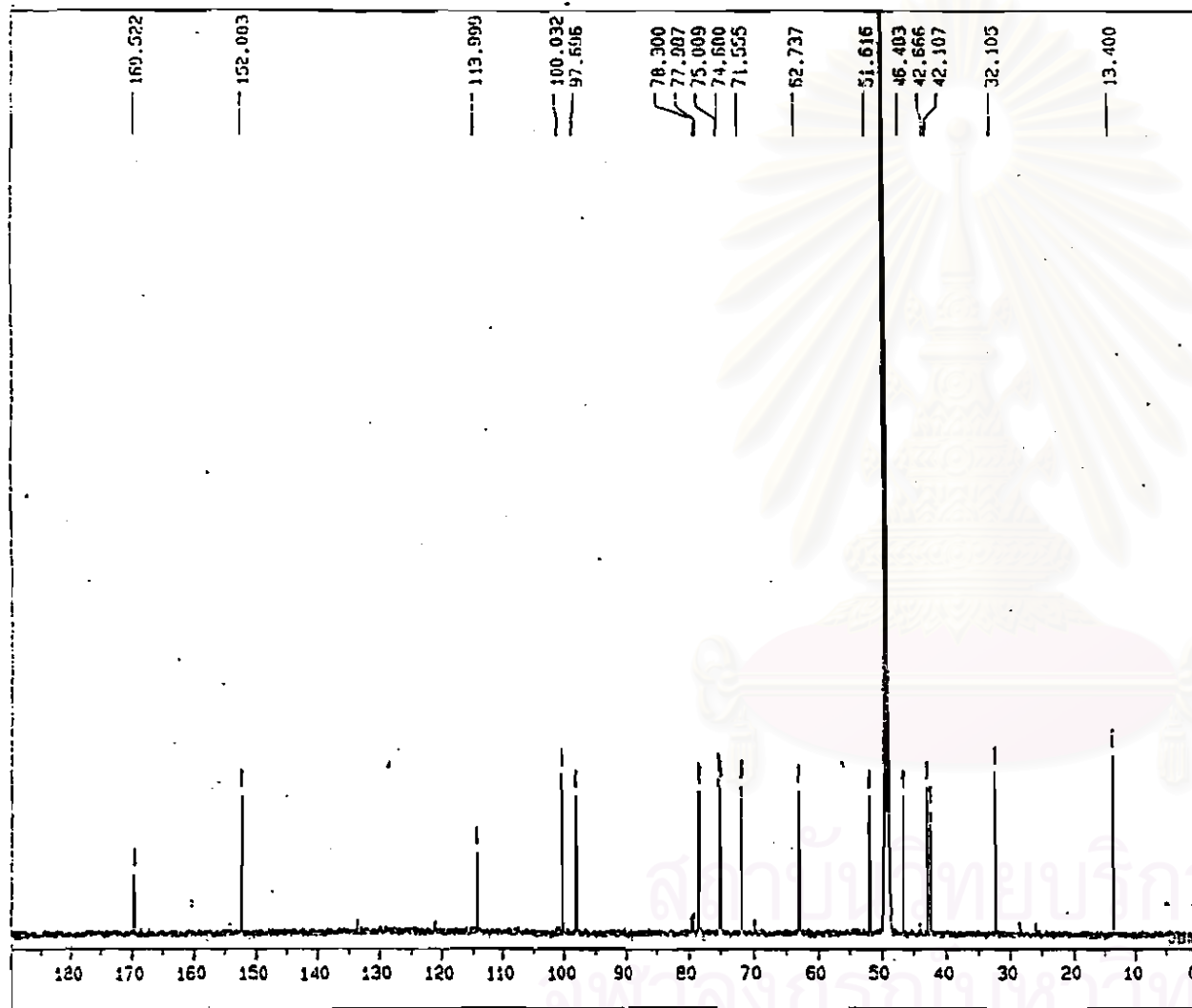


Figure 57 ¹³C-NMR spectrum of SN-7 (125 MHz; in CD₃OD)

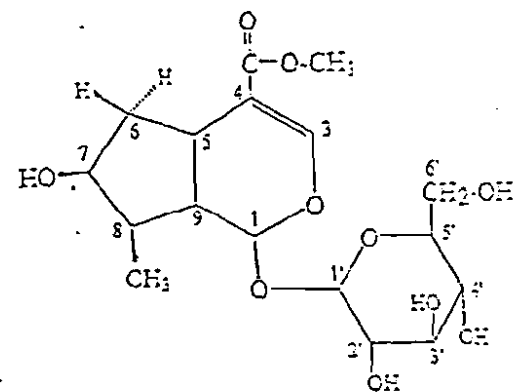
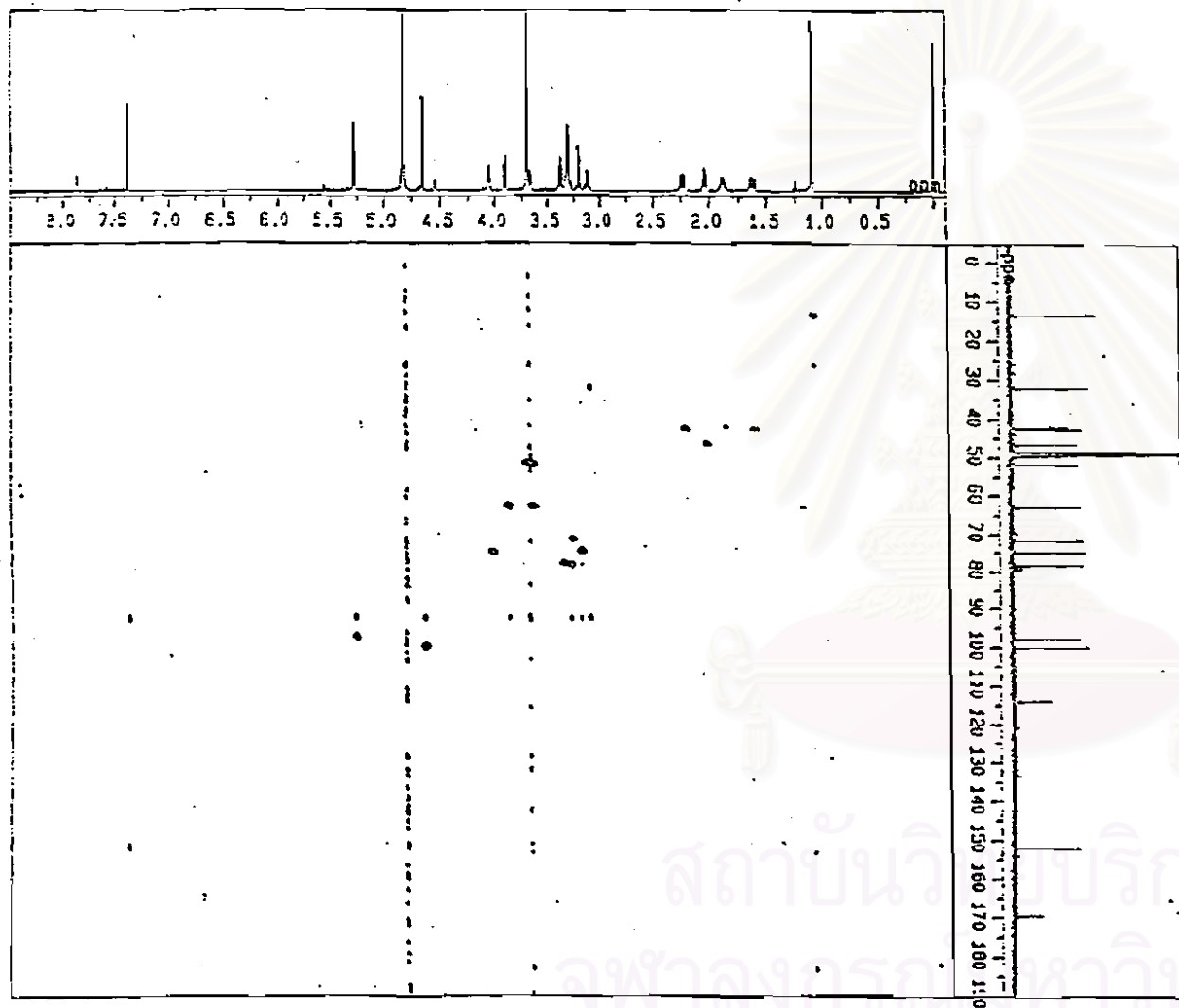


Figure 58.1 HMOC spectrum of SN-7 (500 MHz ; in CD_3OD)

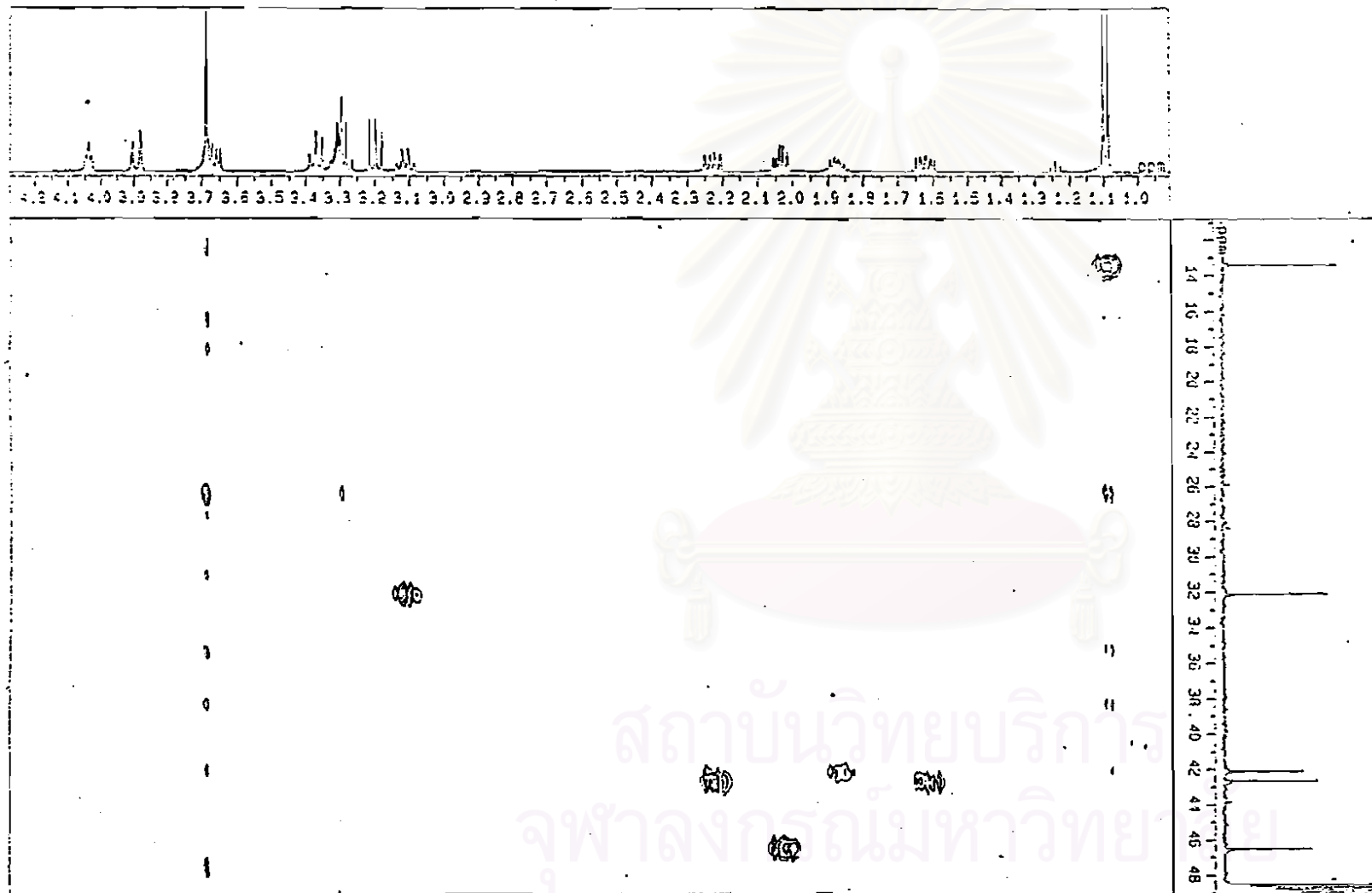


Figure 58.2 Expanded HMQC spectrum of SN-7

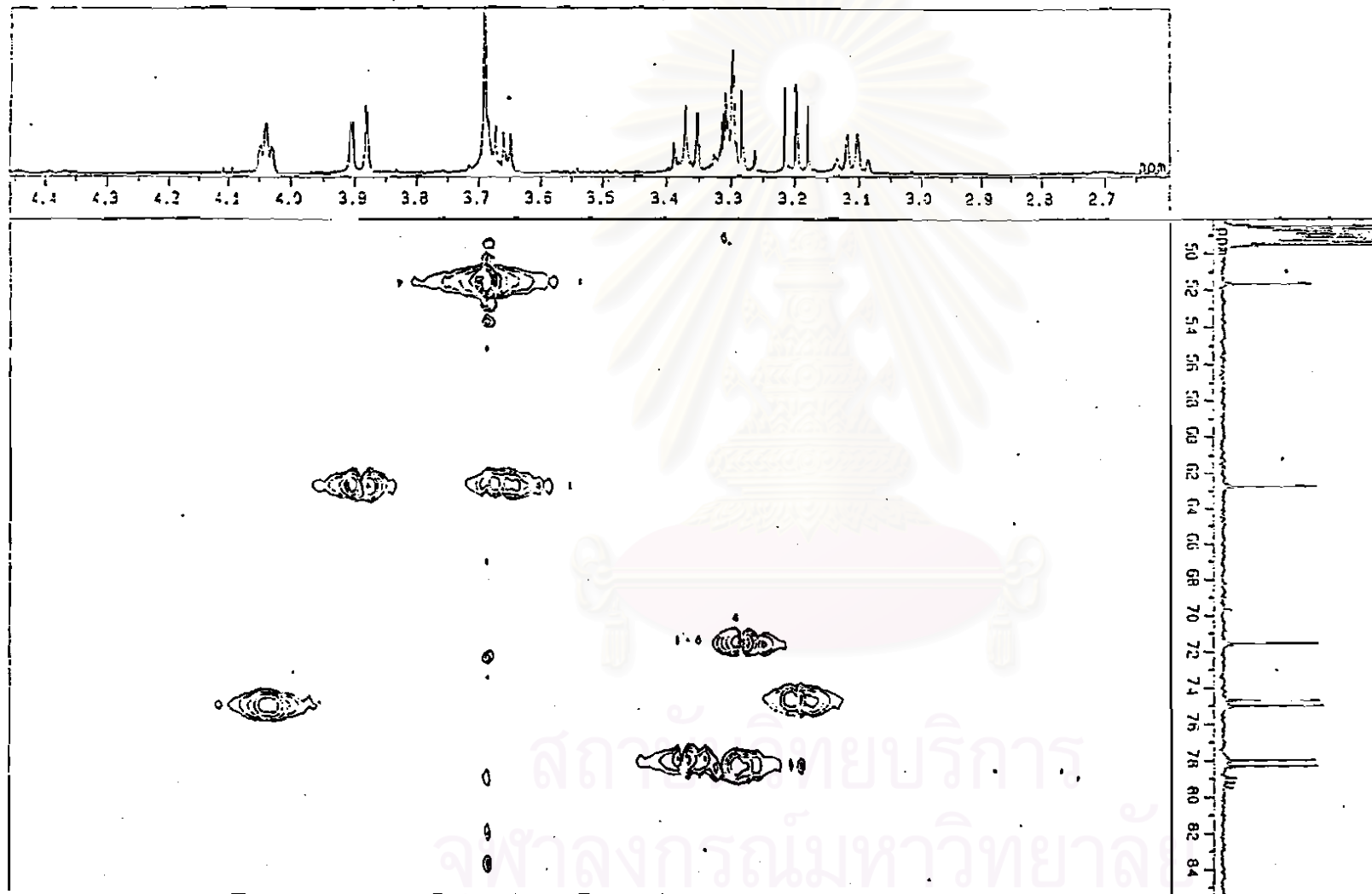


Figure 58.3 Expanded HMQC spectrum of SN-7

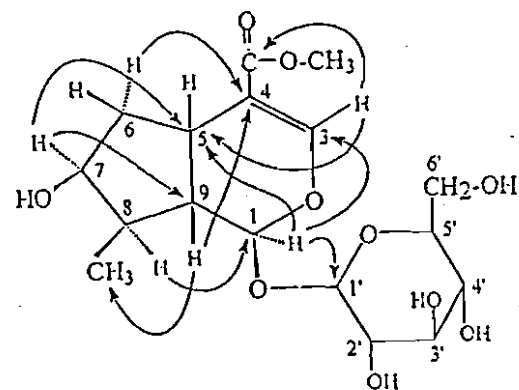
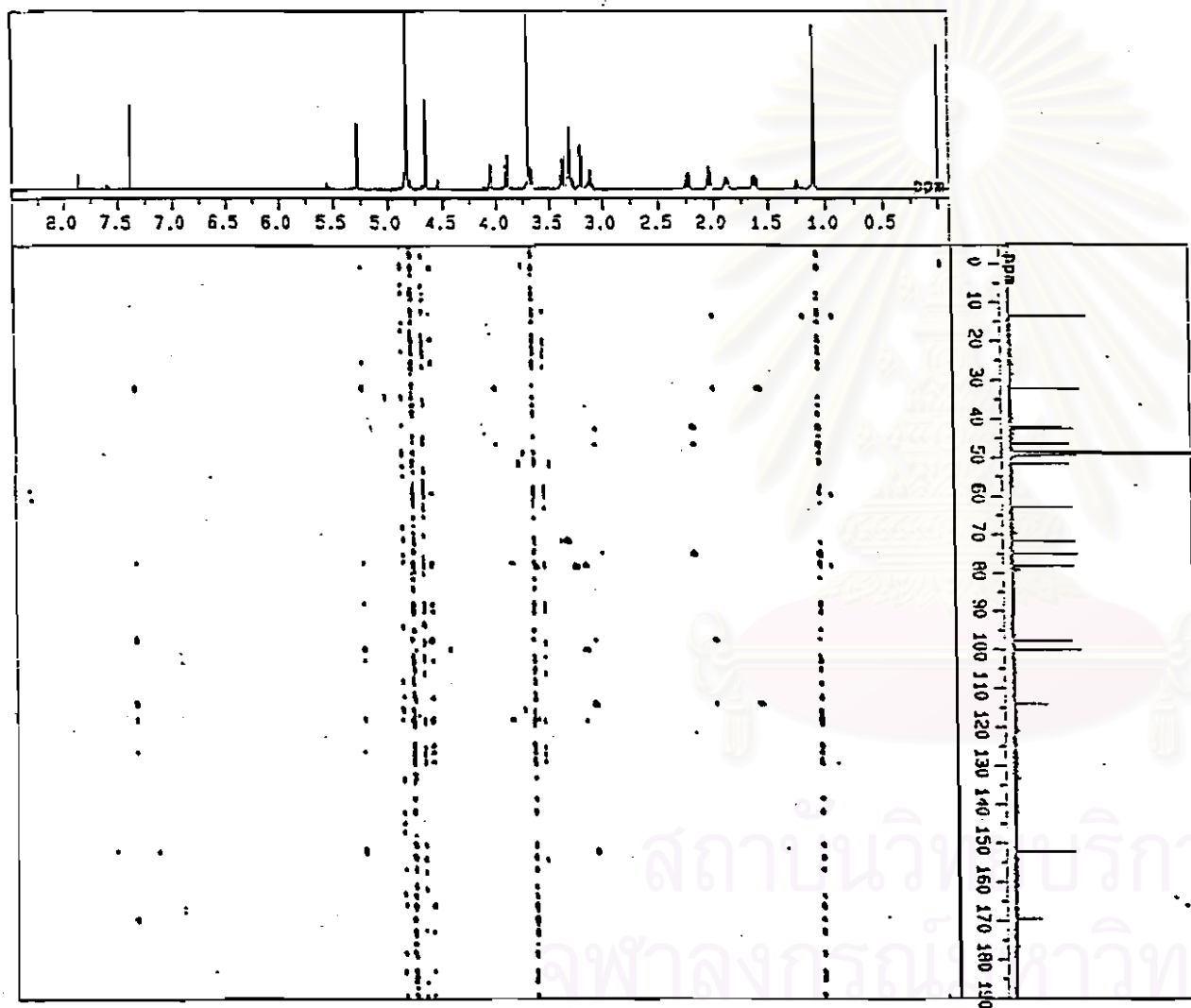


Figure 59 HMBC spectrum of SN-7 (500 MHz ; in CD_3OD)

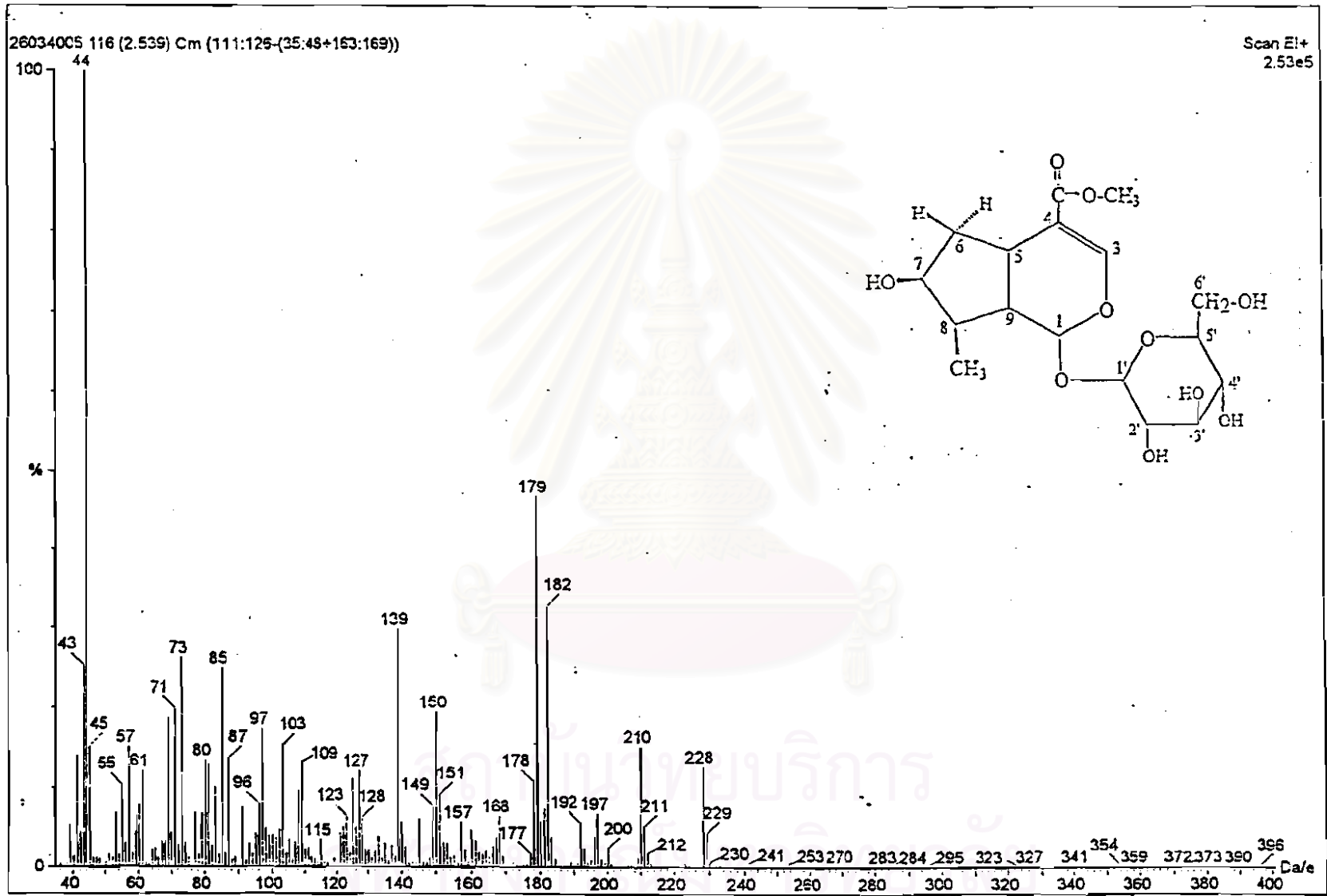


Figure 60 Mass spectrum of SN-7

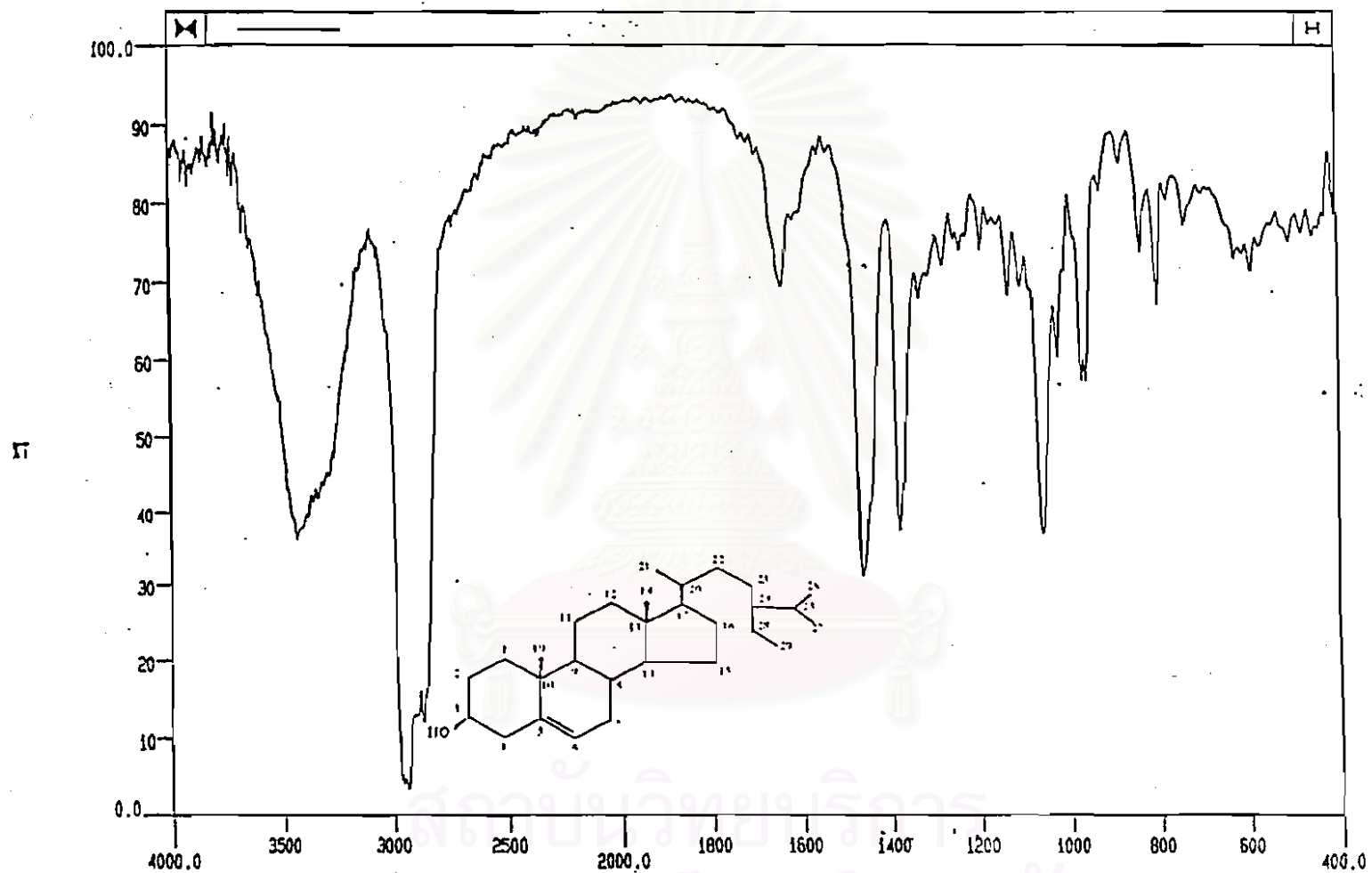


Figure 61 Infrared absorption spectrum of SN-8

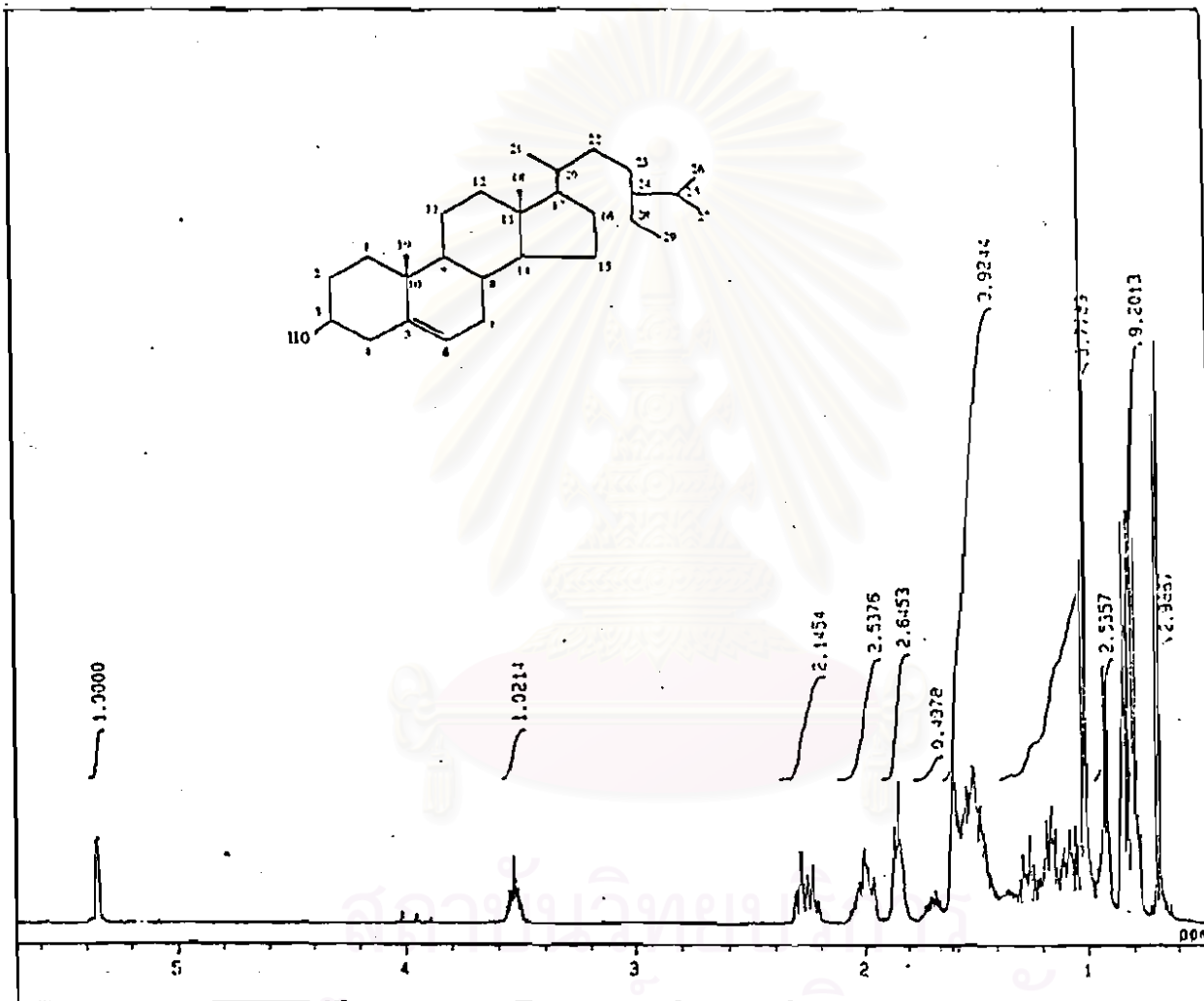


Figure 62 ¹H-NMR spectrum of SN-8 (500 MHz; in CDCl₃)

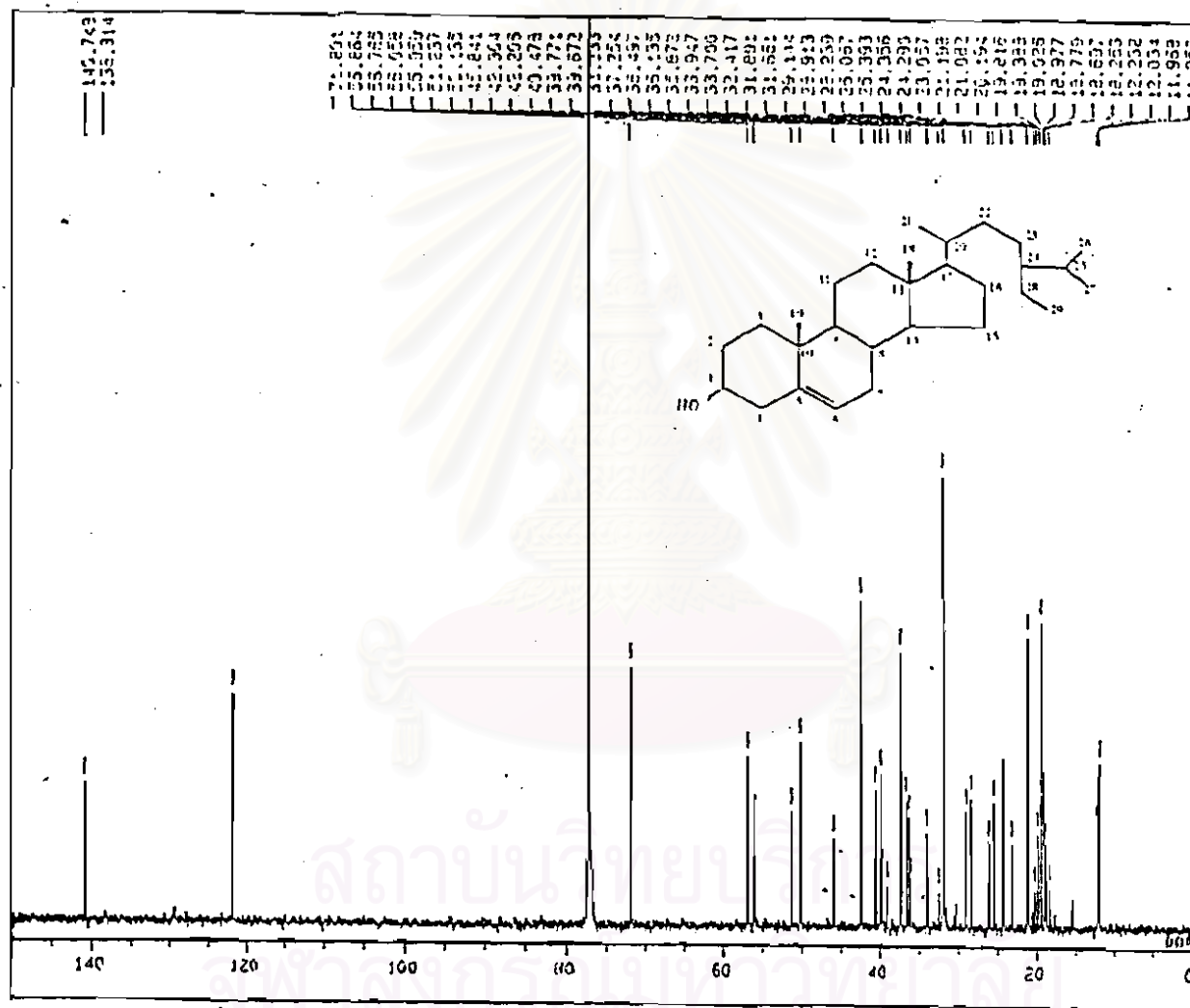


Figure 63 ¹³C-NMR spectrum of SN-8 (125 MHz; in CDCl₃)

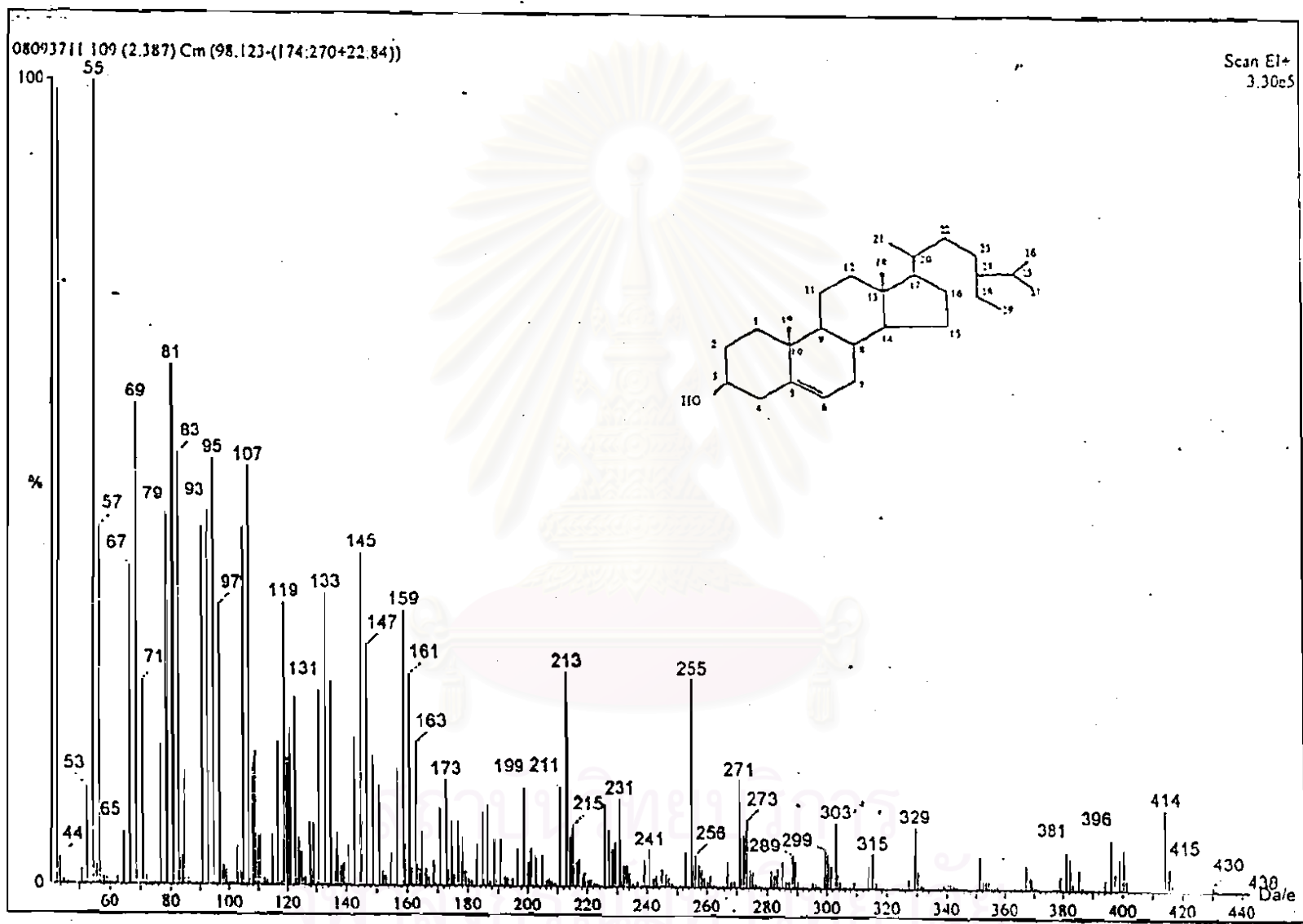
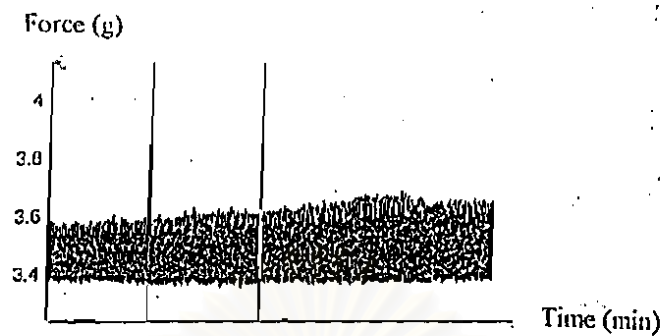


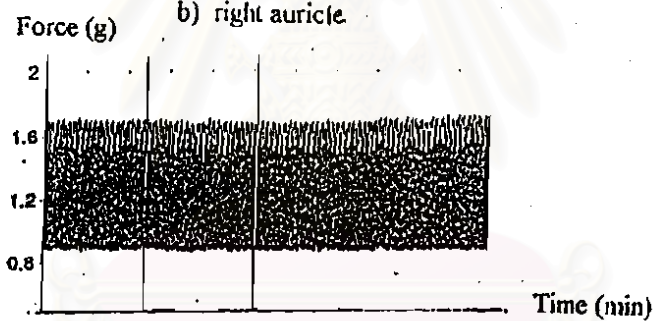
Figure 64 Mass spectrum of SN-8



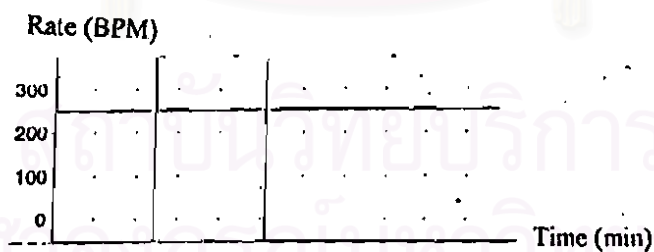
a) right auricle



b) right auricle

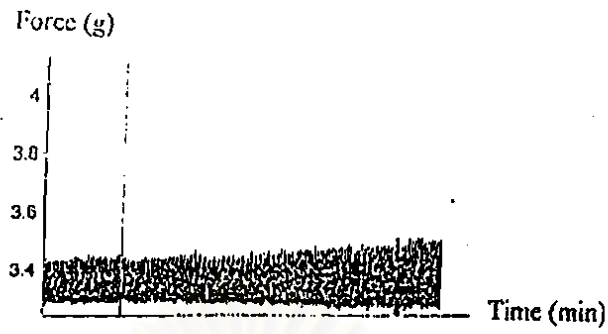


c) left auricle

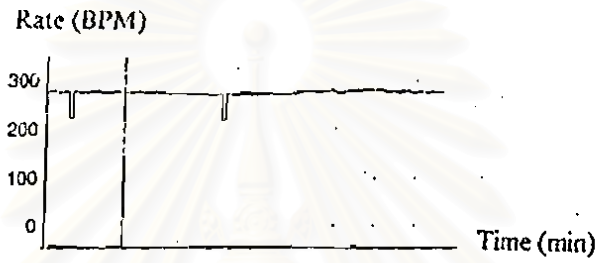


d) left auricle

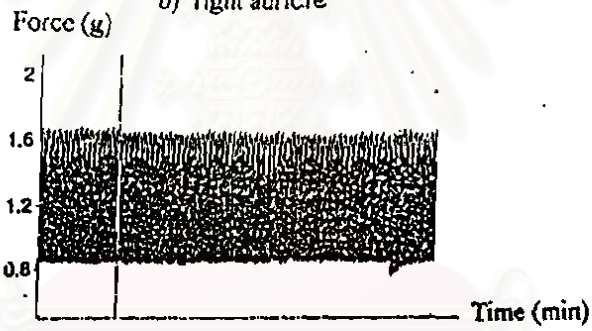
Figure 65 Effects of SN-1 on the isolated auricle



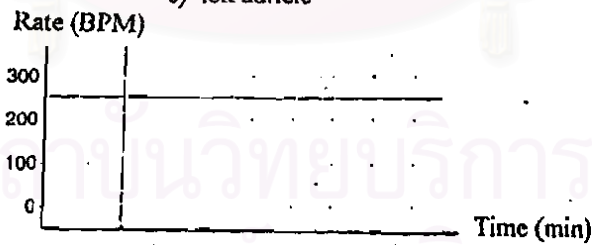
a) right auricle



b) right auricle

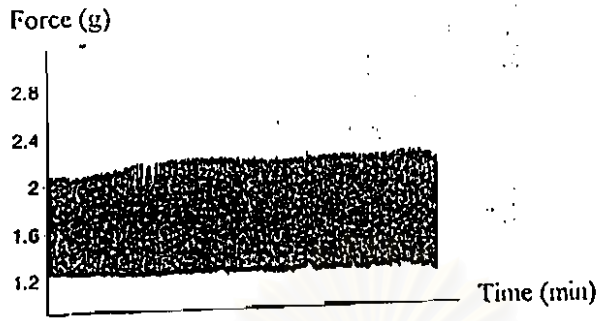


c) left auricle



d) left auricle

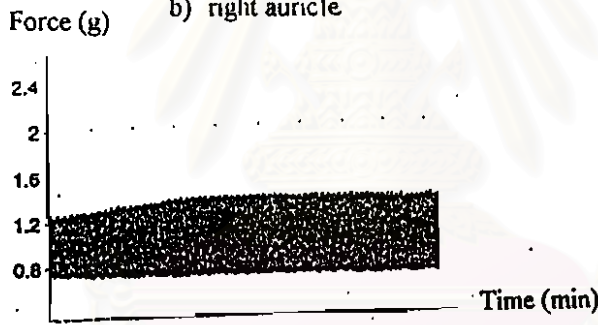
Figure 66 Effects of SN-2 on the isolated auricle



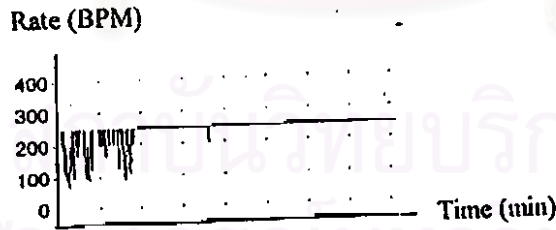
a) right auricle



b) right auricle

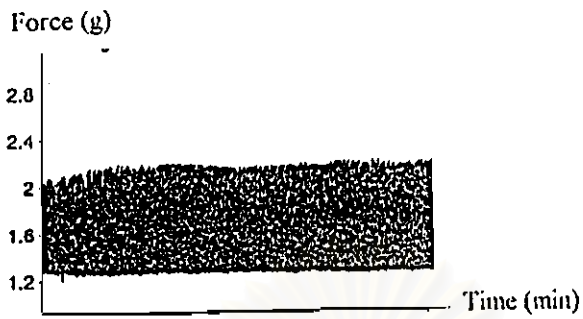


c) left auricle

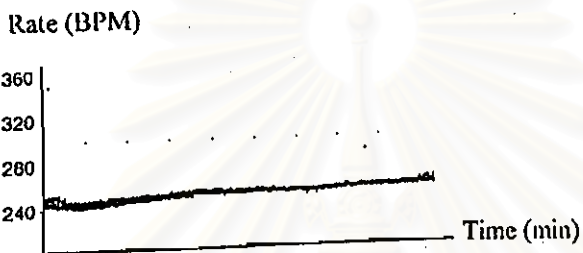


d) left auricle

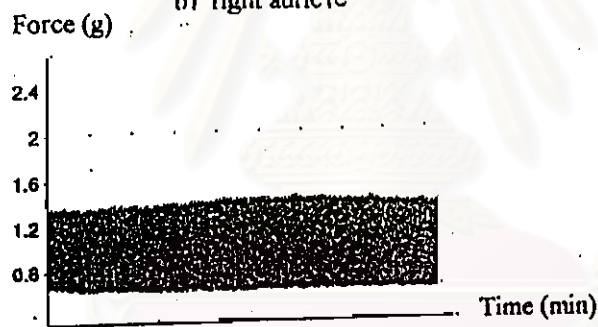
Figure 67 Effects of SN-6 on the isolated auricle



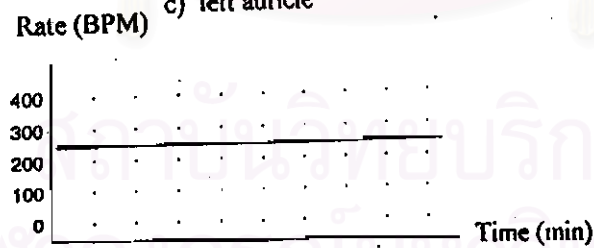
a) right auricle



b) right auricle



c) left auricle



d) left auricle

Figure 68 Effects of SN-7 on the isolated auricle



VITA

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