REFERENCES

1. Kokpol, U., "Investigation of Constituents and Antitumor Activity of Sarracenia flava," Ph.D. Dissertation, Mississippi State Unversity, 1974.
2. Farnsworth, N.R., "Biological and Phytochemical Screening of Plants," J. Pharm. Sci., 55(3), 225-276, 1966.
3. Richards, J.H., D.J. Cram and G.S. Hammond, Element of Organic Chemistry, pp. 417-424, Mc. Graw-Hill, Inc., USA, 1st ed., 1967.
4. Metcaff, R.L., "The Chemistry and Biology of Pesticides", Pesticides in the Environment (Stevens, R.W., eds.), Vol.1, pt. 1, pp. 1-44, Marcel dekker, Inc., New York, 1971.
5. Ware, G.W., The Pesticide Book, pp. 75-116, W.H. Freeman and Company, San Francisco, 1978.
6. Green, M.B., G.S. Hartley and T.F. West, Chemicals for Crop Protection and Pest Control, pp. 69-78, Pengaman Press Ltd., London, 1st ed., 1977.
7. ปรีกมาศ สุวรรณสิงห์และอานนท์ ทรงศิริกุล, "ป่าชายเลน," วารสารการธรณี, (2), 27-36, 2522.
8. สนิท อักษรแก้ว, "การใช้ทรัพยากรป่าชายเลนกับปัญหาสิ่งแวดล้อม," จุลสารสภาวะแวดล้อม, 3(1), 1-6, 2527.
9. พิพัฒน์ พัฒนผลไพบูลย์, โครงสร้างของป่าชายเลนที่อำเภอเขาสมิง จังหวัดตราด," วิทยานิพนธ์ปริญญามหาบัณฑิต, ภาควิชาพฤกษศาสตร์, บัณฑิตวิทยาลัย, จุฬาลงกรณ์มหาวิทยาลัย, 2522.

10. Krishnamurthy, K., "Socio-economic Aspects of Indian Mangrove," In. Proc. Symp. Biol. Mangmt. Mangroves. (Walsh, G.,S. Snedaker and H. Leas, eds.), pp. 279-731, Resource Mangement System program Univ. of Florida, Goinesville Fla., 1975.

11. Loder, J.W. and J.B. Russel, "Tumor inhibitory Plants: The Alkaloids of Bruguiera sexangula and Bruguiera exaristata (Rhizophoraceae)," Aust. J. Chem., 22, 1271-1275, 1969.

12. Okorie, D.A. and D.A.H. Taylor, "Limonoids from Xylocarpus granatum Koenig," J. Chem. Soc., (2), 211-213, 1970.

13. Sundarasivarao, B.N., J. Madhudhanarao, "Antifungal Activity of Gedunin," Curr. Sci., 46(20), 714-716, 1977. through C.A. 88:33007c.

14. Chou, F.Y., K. Hostettmann, I. Kubo and K. Nakanishi, "Isolation of an Insect Antifeedant N-methylflindersine and Several Benz[C]phenanthridine Alkaloids from East African Plants; A comment on Chelerythrine," Heterocycle, 7(2), 969-977, 1977.

15. Connolly, J.D., M. MacLellan, D.A. Okorie and D.A.H. Taylor, "Limonoids from Xylocarpus moluccensis (Lam.) M. Roem.", J. Chem. Soc. Perkin Trans I, (19), 1993-1996, 1976.

16. Kubo, I., J. Miura and K. Nakanishi, " The Structure of Xylomollin, a Secoiridoid Hemiacetal Acetal," J. Am. Chem. Soc., 98(21), 6704-6705, 1976.

17. Miana, G.A., R. Schmidt, E. Hecker, M. Shamma, J.L. Moniot and M. Kiamuddin, "4-Alpha-sapinine: A Novel Diterpene Ester from Sapium indicum," Z. Naturforsch, 32B(6), 727-728, 1972. through C.A. 87:152415y.

18. Taylor, S.E., M.A. Gafur, A.K. Choudhury and F.J. Evans, "Sapintoxin A: A New Biologically Active Nitrogen Containing Phorbol Ester," Experentia, 37(7), 681-682, 1981.

19. Ali, S., P. Singh and R.H. Thomson," Naturally Occuring Quinone Part 28. Sesquiterpenoid Quinones and Related Compounds from Hibicus tilliaceus," J. Chem. Soc. Perkin Trans 1, 257-259, (1), 1980.

20. Mukhopadhyay, S., G.A. Cordell, N. Ruangrugsi, S. Rodird, P. Tantivatana and P.J. Hylands, "Traditional Medicinal Plants of Thailand IV. 3-(2',3'-diacetoxy-2'-methyl butyryl)-cuauhtemone from Pluchea indica," J. Nat. Prod., 46(5), 671-674, 1983.

21. Minocha, P.K. and K.P. Tiwari, "A Triterpenoidal Saponin from Roots of Acanthus illicifolius," Phytochemistry, 20, 135-137, 1981.

22. Tiwai, K.P., "Chemical Constituents of Acanthus illicifolius Linn.," Pol. J. Chem., 54, 2089-2090, 1980.

23. Kokpol, U., V. Chittawong and D.H. Miles, "Chemical Constituents of the Roots of Acanthus illicifolius," J. Nat. Prod., 49(2), 355-356, 1986.

24. Hou, D., "Rhizophoraceae," Flora of Java, (Backer, C.A. and R.C. Bakhuizer van Den Brick, eds.), Vol. 1, pp. 378-

381, NVP Noordhoff-gromingen, the Netherlands, 1963.

25. Hou, D., "Rhizophoraceae," Flora of Thailand, (Smithinand, T. and K. Larsen, eds.), Vol 2, pt. 2, pp. 5-15, Applied Scientific Research Cooperation of Thailand, Bangkok, 1972.

26. ธวัชชัย สันติสุข, "วงศ์ไม้โกงกาง Rhizophoraceae," ไม้ที่มีค่าทางเศรษฐกิจของไทย (เต็ม สมิตินันทน์ บรรณาธิการ), เล่มที่ 2, หน้า 21-30, กองพรรณไม้, กรมป่าไม้, กรุงเทพมหานคร, ครั้งที่ 1, 2518.

27. เสงี่ยม พงษ์บุญรอด, ไม้เทศเมืองไทย สรรพคุณยาเทศและยาไทย, หน้า 64-65, เกษมบรรณกิจ, กรุงเทพมหานคร, ครั้งที่ 1, 2502.

28. ประมูล รักษาแก้ว, "ไม้โกงกาง," วนสาร, 32(4), 320-324, 2517.

29. Ghosh and Debabrata, "Tannin Material from Mangrove Bark and Wood," Indian patent 99,768, 16 Sep 1967, Appl 99,768,22 May 1965, 11 pages.

30. พงษ์ศักดิ์ ชนาธิป, "อุตสาหกรรมการกลั่นไม้," จุลสารสภาวะแวดล้อม, 3(1), 7-14, 2527.

31. สนิท อักษรแก้ว, "ป่าชายเลน," สารสิ่งแวดล้อม, 3(4), 17-24, 2520.

32. Majumdar, S.G. and G. Patra, "Chemical Investigation of Some Mangrove Species, part III: Rhizophoraceae, A Mangrove Family," J. Indian Chem. Soc., 53(12), 1241-1242, 1976.

33. Mirsa, S., A. Choudhury, A.K. Dutta and A. Ghosh, "Steroids and Fatty Acids from Three Species of Mangrove," Phytochemistry, 23(12), 2823-2827, 1984.

34. Ghosh, A., S. Misra, A.K. Dutta and A. Choudhury, "Pentacyclic Triterpenoids and Sterols from Seven Species of Mangrove," Phytochemistry, 24(8), 1725-1727, 1985.

35. Sarkar, A. and S.N. Ganguly, "Gymnorhizol, a New Triterpene Alcohol from Bruguiera gymnorhiza," Indian J. Chem., Sect. B, 16B(8), 742, 1978. through C.A. 90:55134k.

36. Ohsawa, K. and I. Yamamoto, "Chemistry of Mangrove," Proceedings of a Seminar on Southeast Asain Mangrove, pp. 93-103, Nodai Research Institute (NRI), Japan, 1980.

37. Kato, A. and J. Takahashi, " A New Occuring 1,2-dithiolane from Bruguiera cylindrica," Phytochemistry, 15, 220-221, 1976.

38. Kato, A. "Brugine from Bruguiera cylindrica," Phytochemistry, 14, 1458, 1975.

39. Loder, J.W. and G.B. Russell, "Tropine 1,2-dithiolane-3-carboxylate, A New Alkaloid from Bruguiera sexangula," Tet Lett., (51), 6327-6329, 1966.

40. Fitzgerald, J.S., "(+)-Hygroline, The Major Alkaloid of Carallia brachiata (Rhizophoraceae)," Aust. J. Chem., 18, 589-590, 1965.

41. Wright, W.G. and F.L. Warren, "Rhizophoraceae Alkaloid Part I., Four Sulphur-containing Bases from Cassipourea spp.," J. Chem. Soc. (C), 283-284. 1967.

42. Cooks, R.G., F.L. Warren and D.H. Williams, "Rhizophoraceae Alkaloids Part III. Cassiporine," J. Chem. Soc. (C), 286-288, 1967.

43. Wright, W.G. and F.L. Warren, "Rhizophoraceae Alkaloids Part II, Garrardine," J. Chem. Soc. (C), 284-285, 1967.

44. Johns, S.R., J.A. Lamberton and A.A. Siournis, "The occurance of (+)-Hygroline in Gymnotroches axillaris Bl. (Rhizophoraceae)," Aust. J. Chem., 20, 1303-1304, 1967.

45. Saha. P.K., T. Ganguly, S.N. Ganguly and S.M. Sirger, "Rhizophorine, A New Indole Acid Plant Growth from Rhizophora mucronata," The Plant Biochemical Journal, 5(1), 65-68, 1978.

46. Kato, A. and M. Numato, "Brugierol and Isobrugierol, Trans- and Cis-1,2-dithiolane-1-oxide, from Bruguiera conjugata," Tet Lett., (3), 203-206, 1978.

47. Seshadri, T.R. and B. Venkataramani, "Leucocyanidin from Mangroves," J. Sci. and Research (India), 180, 261-2, 1959. through C.A. 54:17389a.

48. Ganguly, S.N. and S.M. Sirger, "Gibberellins from Mangrove Plants," Phytochemistry, 13(9), 1911-1913, 1974.

49. McPherson, D.D, G.A. Cordell and D.D. Soejarto, "Phytochemical Reports, Phytochemistry, (15), 2132-2134, 1977.

50. Kato, A. and J. Takahashi, "Phytochemical Reports," Phytochemistry, (15), 2025-2028, 1976.

51. Sokoloff, B.T., J.B. Redd and R. Dutcher, "Nutritive Value of Mangrove Leaves," Quart. J. Florida Acad. Sci., 12, 191-194, 1949. through C.A. 45:8164f.

52. Bhosale, N.B., V.K. Dutcher, S.G.P. Matondker and S.S. Bukhari, "Biochemical Composition of Mangrove Leaves from Goa," J. Mar. Sci., 5(2), 239-241, 1976. through C.A. 87:180709r.

53. Bhosale, L.J., "Distribution of Trace Elements in the Leaves of Mangroves," Indian J. Mar. Sci., 8(1), 55-59, 1979. through C.A. 87:180709r.

54. Untawale, A.G., S. Wafar and N.B. Bhosale, "Seasonal Variation in Heavy Concentration in Mangrove Foliage," Mahasagar, 13(3), 215-233, 1980. through C.A. 94:80286b.

55. Furniss, B.S., A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, Vogel's Textbook of Practical Organic Chemistry, 4th ed., 1984.

56. John, C., Quick Column Chromatography, pp. 10-74, James Cook University of North Queenland, 1 st. ed., 1979.

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

58. Randerath, K., Thin-layer Chromatography, 2nd rev., Academic Press, U.S.A., 1966.

59. Pasto, D.J. and C.R. Johnson, Laboratory Text for Organic Chemistry, 56-83, Prentice-Hall, Inc., New Jersey, 1 st. ed., 1979.

60. Ruzicka, L., M.W. Goldberg and H. Wirz, "Sexualhormone III Zurstitutionsaufklarung des Androsterones," Helv. Chim. Acta, 18, 61-68, 1935.

61. Brieskorn, C.H. and L. Capuano, "Der Chemismus der Farbreaktionen nach Libermann und Salkowski bei Triterpenen und Sterrinen," Chem. Ber., 86, 866-873, 1953.

62. รายงานสัมมนาเชิงปฏิบัติการเรื่อง Phytochemical Screening Techniques, มหาวิทยาลัยมหิดล, วันที่ 2-6 ตุลาคม 2521.

63. Shriner, R.L., R.C. Fuson, D.Y. Curtin and T.C. Morrill, The Systematic Identification of Organic Compounds, John-Willey & Sons, U.S.A., 6 th ed., 1980.

64. Beaton, J.M., F.S. Spring, R. Stevenson and J.L. Stewart, "Triterpenoids. Part XXXVII. The Constitution of Taraxerol," J. Chem. Soc., 2131-2137, 1955.

65. Matsumoto, M. and H. Kobayashi, "Hexacyanoferrate-Catalyzed Oxidation of Trimethoxybenzenes to Dimethoxy-p-benzoquinones with Hydrogen Peroxide, J. Org. Chem., 50, 1766-1768, 1985.

66. Dyke, S.F., A.J. Floyd, M. Sainbury and R.S. Theobald, Organic Spectroscopy: An Introduction, pp. 48-100, Penguin Books Ltd., 1st ed., 1971.

67. William, D.H. and I. Fleming, Spectroscopic Methods in Organic Chemistry, pp. 35-73, Mc. Graw Hill, 2 nd ed., 1973.

68. McLafferty, F.W., Interpretation of Mass Spectra, pp. 97-188, W.A. Benjamin, Inc., USA, 2nd ed., 1973.

69. Mc Nair, H.M. and E.J. Bonelli, Basic Gas Chromatography, pp. 123-135. Varian Instrument Division Offices, USA, 5 th ed., 1968.

70. Cooper, J.W., Spectroscopic Techniques for Organic Chemists, pp. 227-248, John-Wiley & Sons, U.S.A., 1st ed., 1980.

71. Silverstein, R.M., G.C. Bassler and T.C. Morrill, Spectrometric Identification of Organic Compounds, pp. 181-304, John-Wiley & Sons, USA, 4th ed.,1981.

72. Levy, G.C. and G.L. Nelson, Carbon-13 Nuclear Magnetic Resonance for Organic Chemists, pp. 38-135, Willy-Interscience, USA, 1st ed., 1972.

73. Budzikiewicz, H., J.M. Wilson and C. Djerassi, "Mass Spectrometry in Structural and Stereochemical Problem XXXII. Pentacyclic Triterpenes," J. Am. Chem. Soc., 85, 3688-3699, 1963.

74. Buckingham, J., Dictionary of Organic Compounds, Chapman and Hall, 5th ed., Great Britain, 1984.

75. Doddrell, D.M., P.W. Khong and K.G. Lewis, "The Stereochemical Dependence of ^{13}C Chemical Shifts in Olean-12-enes and Urs-12-enes as an Aid to Structural Assignments," Tet Lett., (27), 2381-2384, 1974.

76. Seo, S., Y. Tomita and K. Tori, "Carbon-13 NMR Spectra of Urs-12-enes and Application to Structural Assignments of Components of Isoden japonicus Hara. Tissue Cultures," Tet Lett., (1), 7-10, 1975.

77. Macdonald, C.G., J.S. Shannon and G. Suzavdz, "Studyies in Mass Spectrometry Stereochemistry and Elimination Reactions of Hydroxy and Acetoxy Compounds," Tet Lett., (13), 807-814, 1963.

78. Pouchert, C.J., The Aldrich Library of Infrared Spectra, Aldrich Chemical Company, U.S.A., 3 nd ed., 1981.

79. The Sadtler Standard ^{13}C NMR Spectra.

80. Walberg, I., K. Karlson and C.R. Fenzell, "Non Volatile Constituents of Deertongue Leaf," Acta Chem. Scand., 26, 1383-1388, 1972.

81. Bandaranayake, W.M., "Triterpenoids of Canarium zeylanicum," Phytochemistry, 19, 255-257, 1980.

82. Walberg, I., K. Karlson and C.R. Fenzell, "A mass Spectral Fragmentation Reaction Characteristic of 11-Oxo-α-amyrin and 11-Oxo-β-amyrin Derivatives," Acta Chem. Scand., 25(8), 3192-3193, 1971.

83. Abramovitch, R.A. and R.G. Micetich, "Extractives from Populus temuloides Heartwood: The Triterpene Alcohols," Can. J. Chem., 41, 2362-2367, 1963.

84. Finucane, B.W. and J.B. Thomson, "Triterpenoids Part VIII, Allylic Oxidation by N-bromosuccinimide," J. Chem. Soc. Perkin Trans I, 1856-1861, 1972.

85. Hinge, V.K., A.D. Wagh, S.K. Pakrikar and S.C. Bhattacharyya, "Triterpenoids LXXI. Constituents of Indian Black Damman Resin," Tetrahedron, 21, 3197-3203, 1965.

86. Hui, W.H., M.M. Li and K. Lux, "Triterpenoids and Steroids from Rhodonyrtus tomentosa," Phytochemistry, 14, 833-834, 1975.

87. Nakanishi, K. and P.H. Solomon, Infrared Absorption Spectroscopy, pp. 10-57, Holden-Day, Inc., USA, 2 nd ed., 1977.

88. Jackman, L.M. and S. Sternhell, Application of Nuclear Magnetic Resonance Spectroscopy in Organic Chemistry, pp. 288, Pregammon Press, USA, 2 nd ed., 1969.

89. Nakanishi, K., T. Goto, S. Ito, S. Natori and S. Nozoe, Natural Products Chemistry, Vol 2, pp. 165-166, Kodansha Scientific Ltd. U.S.A., 1975.

90. Nozaki, H., H. Suzuki, T. Hirayama, R. Kasai, R.Y. Wu and K. Hsiung, "Antitumor Triterpenes of Maytenus diversifolia," Phytochemistry, 25(2), 479-485, 1986.

91. Suga, T. and T. Shishibori, "The Stereospecific of Biosynthesis of Squlene and β-Amyrin in Pisum sativum," Phytochemistry, 14, 2411-2417, 1975.

92. Buddeley, G.V., A.J. Bealing, P.R. Jefferies and R.W. Retallack, "The Chemistry of the Euphorbiaceae," Aust. J. Chem., 17, 908-914, 1964.

93. Despande, S.M. and R.R. Upadhyay, "Chemical Investigation of Jasminum auriculatum (Vahl) Leaves VII Structure of Jasminol a New Triterpene," Experientia, 26,10, 1970.

94. Galbraith, M.N., C.J. Miller, J.W.L. Rawson, E. Ritchie, J.S. Shannon and W.C. Taylor, "Moretenol and Other Triterpenes from Ficus macrophylla Desf.," Aust. J. Chem., 18, 226-239, 1965.

95. Khastgir, H.N., B.P. Pradhan, A.M. Duffield and L.J. Durham, "Identification of a New Triterpene, 3-Epimoretenol from the Bark of Sapium sabferum Roxb.," Chem. Comm., 1217-1218, 1967.

96. Ganguly, A.G., T.R. Govindachari, P.A. Mohamed, A.D. Rahimtulla and N. Viswanathan, "Chemical Constituents of Glochidion hohenackeri," Tetrahedron, 22, 1513-1519, 1966.

97. Wenkert, E., G.V. Baddeley, I.R. Rurfitt and L.N. Moreno, "Carbon-13 Nuclear Magnetic Resonance Spectroscopy of Naturally Occuring Substances LVII. Triterpenes

Related to Lupane and Hopane," Org. Mag. Res., 11(7), 337-343, 1978.

98. Scolichin, M., K. Yamasaki, R. Kasai and O. Tanaka, "^{13}C Nuclear Magnetic Resonance of Lupane-Type Triterpenes, Lupeol, Betulin and Betulinic Acid," Chem. Pharm. Bull., 28(3), 1006-1008, 1980.

99. Allsop, I.L., A.R.H. Cole, D.E. White and R.L.S. Willix, "Infrared Spectra of Natural Products Part VI. The Characterization of Equatorial and Axial 3-Hydroxyl Groups in Triterpenoids," J. Chem. Soc., 4868-4873, 1956.

100. Corbett, R.E. and E.V. Whitehead, "Lichen and Fungi. Part X 14-Taraxerane," J. Chem. Soc. Perkin Trans 1, 2827-2829, 1972.

101. Carpenter, R.C., S. Sotheeswaran, M.S.U. Sulthanbawa and B. Terni, "^{13}C NMR Studies of Some Lupane and Taraxerane Triterpenes," Org. Mag. Res., 14(6), 462-465, 1980.

102. Katai, M. and H. Meguri, "^{13}C Nuclear Magnetic Resonance Spectral of Several Triterpenoids of Taraxerane and Ursane Series," Yukugaku, 32(6), 311-314, 1983.

103. Anjaneyulu, A.S.R., L.R. Raw, C. Subrahmanyam and K.S. Murty, "Crystalline Constituents of Euphobiaceae," Curr. Sci., 43(1), 10-11, 1974.

104. Beaton, J.M., F.S. Spring, R. Stevenson and J.L. Stewart, "Triterpenoids Part XXXVII. The Constituents of Taraxerol," J. Chem. Soc., 2131-2137, 1955.

105. Jones, R.N. and G. Roberts, "The Infrared Spectra of Hydroxysteroids below 1350 cm^{-1}," J. Am. Chem. Soc., 80, 6121-6130, 1958.

106. Hirschmann, H., "The Characterization of Δ^5-unsaturated Steroids by Infrared Spectroscopy," J. Am. Chem. Soc., 74, 5357, 1952.

107. Tikarn, C.J., "22-Dihydrostigmasterol from Saussurea lappa Clarke," Can. J. Chem., 46, 2325-2327, 1968.

108. Harborne, J.B., Phytochemical Methods, pp. 120-128, Chapman and Hill, USA, 2nd ed., 1984.

109. ขวัญใจ ตันสุวรรณ, "การศึกษาองค์ประกอบทางเคมีของใบรางจืด," วิทยานิพนธ์ปริญญามหาบัณฑิต, ภาควิชาเคมี, บัณฑิตวิทยาลัย, จุฬาลงกรณ์มหาวิทยาลัย, 2526.

110. Rubinstein, I., L.J. Gold, A.D.H. Clague and L.J. Mulheun, "The 220 Hz NMR Spectra of Phytosterols," Phytochemistry, 15, 195-200, 1976.

111. Stephen, S.F., H.L. George and R.T. Longman, "Mass Spectra of Steroids," Anal. Chem., 31, 169-174, 1959.

112. Naqui, S.H.M., "Chemical Synthesis and Mass Spectrometric Characterization of Some C-27 Steroids," Steroids, 22(2), 285-292, 1973.

113. Nishioka. I., N. Ikekawa, A. Yazi, T. Kawasaki and T. Tsukamoto, "Studies on the Plant Sterols and Triterpenes II. Separation of Stigmasterol, β-Sitosterol and Campesterol, and about So-called " γ-Sitosterol," Chem. Pharm. Bull., 13(3), 379-384, 1965.

114. John, W.R., "Two Steroids of Pine Bark," Phytochemistry, 4, 1-10, 1965.

115. Holland, L., R.P. Diakow and J. Taylor, "^{13}C Nuclear Magnetic Resonance Spectra of Some C-19 Hydroxy, C-5, 6-epoxy, C-24 Ethyl and C-19 Norsteroid," Can. J. Chem., 56, 3121-3127, 1978.

116. Budzikiewicz, H., C. Djerassi and D.H. Williams, Mass Spectrometry of Organic Compounds, Holden-Day, Inc., USA, 1st ed.,1967.

117. Yagi, A., N. Okamura, Y. Haraguchi, K. Noda abd I. Nishioka, "Studies on the Constituents of Zizyphi Fructus I Structure of Three New p-Coumaroylates of Alphitolic Acid," Chem. Pharm. Bull., 1798-1802, 26, 1978.

118. Banerji, R., G. Misra and S.K. Nigam, "Chemical Constituents of the leaves of Mimosops littorlis," Indian J. Chem. Sect. B, 18B(3), 293-294, 1979.

119. Talapatra, B. A. Basak and S.K. Talapatra, "Triterpenoids and Related Compounds Part XX, Careaborin, a New Triterpene Ester from the Leaves of Careya arborea," J. Indian Chem. Soc., 58(8), 814-815. 1981.

120. Betancor, C., R. Freire, A.G. Gonzalez, J.A. Salazar, C. Pascard and T. Prange, "Three Triterpenes and Other Triterpenoids from Catha cassinoides," Phytochemistry, 19, 1989-1993, 1980.

121. Ahmad, V.U. and S.B. Hej, "Chemical Examination of Nepeta hindostana (Roth) Haines. The Structure of Nepeticin," Tet Lett., 22(18), 1715-1718, 1981.

122. Hui, W.H. and W.K. Lee, "An Examination of the Euphobiaceae of Hong Kong Part VIII. Lup-20(29)-ene-3β,23-diol, a New Triterpene from Glochidion macrophyllum Benth.," J. Chem. Soc. (C), 1004-1006, 1971.

123. Jolad, S.D. and C. Steelink, "Thurberin, a New Pentacyclic Triterpene from Organ Pipe Catus," J. Org. Chem., 34(5), 1367-1369, 1969.

124. Kulshreshtha, D.K., "29-Hydroxylupeol from Gymnosporia wallichiana," Phytochemistry, 18, 1239-1240, 1979.

125. Hui, W.H. and M.M. li, "Six New Triterpenoids and Other Triterpenoids and Steroids from Three Quercus Species of Hong Kong," J. Chem. Soc. Perkin Trans I, 897-904, 1977.

126. Kikuchi, T. M. Takayama and T. toyoda, "Studies on the Neutral Constituents of Pachysandra terminalis, " Chem. Pharm. Bull. (Japan), 21(10), 2243-2251, 1973.

127. Chang, I.M., H.S. Yun and K. Yamasaki, "Revision of ^{13}C NMR Assignments of β-Sitosterol and β-Sitosteryl-3-O-β-D-glucopyranoside, Isolated from Plantago osiatica Seed., "Soul Tahye Saengyak Yonguso Opjukjin, 20, 35-37, 1981.

128. Peral, A., "Mass Spectrometry as an Aid for Determining Structure of Natural Glycoside," Phytochemistry, 7, 831-837, 1968.

129. Nigam, S.K., G. Mirsa and C.R. Mitra, "Stigmasterol Glucose: a Constituent of Ademanthera pavonina Seed and Leaf," Planta Med., 23-24, 145-148, 1973.

130. วัลลภา ชิตทะวงศ์, "องค์ประกอบทางเคมีในรากของต้นเหงือกปลาหมอ," วิทยานิพนธ์ปริญญามหาบัณฑิต, ภาควิชาเคมี, บัณฑิตวิทยาลัย, จุฬาลงกรณ์มหาวิทยาลัย, 2526.

131. Osman, A.M., M.E.G. Younes and A. Mokhtar, "Chemical Examination of the Structure of a New Glycoside from the Leaves of Egyptian Hibiscus sabdariffa," Aust. J. Chem., 28, 217-220, 1975.

132. Dzizenko, A.K., V.V. Isakov, N.J. Uvarova, G.I. Oshitok and G.B. Elyakov, "PMR Spectra of Acetylated Steroid and Triterpenoid Glycoside," Carbohydrate Res., 27, 249-253, 1973.

133. Angyall, S.J., "The Composition and Conformation of Sugar in Solution," Angew. Chem., 8, 157-226, 1969.

134. Lemieu, R.U., R.K. Kullmig and W.G. Schneider, "Configuration Effects on Proton Magnetic Resonance Spectra of Six-membered," J. Am. Chem. Soc., 80, 6098-6105, 1958.

135. Griffiths, J., Colour and Constitution of Organic Molecule, Academic Press, New York, pp. 121-125, 1976.

136. Rao, C.N.R., Ultra-violet and Visible Spectroscopy: Chemical Application, pp. 48-50, Butterworth & Co. Ltd., 3 rd ed., 1975.

137. Fitzgerald, M.A., P.J.M. Gunning and D.M.X. Donnelly, "Phytochemical Examination of Pericopsis Species," J. Chem. Soc. Perkin Trans I, 186-190, 1976.

138. Karrer, P. and A. Helfenstein, "The Constituents of Phlroglucinol, Monomethyl Ether Aldehyde VIII. Hydroxycarbonyl Compounds," Helv. Chim. Acta, 10, 789-

794, 1927.

139. Meou-Chan F. and L. Choo-Loh, "N-alkanes of the Leaves of Some Mangrove Plants," Proceeding of UNESCO Regional Seminar on the Chemistry of Mangrove Plants, pp. 51-60, January 12-16, 1987, Bangkok,

140. Hogg, R.W. and F.T. Gillan, "Fatty Acids, Sterols and Hydrocarbons in the Leaves from Eleven Species of Mangrove," Phytochemistry, 23, 93, 1984.

141. Wannigama, G.P., J.K. Volkman, F.T. Gillan, R.D. Nichols and R.B. Johns, "A Comparision of Lipid Components of the Fresh and Dead Leaves and Preumatophores of Mangrove Avicenia marina, Phytochemistry, 20, 659, 1981.

142. Yadagiri, B., K. Raj and G.S.R. Subba Rao, "Triterpenoids from Balanophora abbreviata and Balanophora indica," J. Nat. Prod., 47(1), 182-191, 1984.

143. Ling, H.C., M.L. King, C.F. Chen, K.P. Hsu, M.H. Su and M.H. Lin, "Anticancer Effects of Nine Triterpenol Derivatives on Human Cancer Cell," Chung-hua I Hsueh Tsa Chih (Taipei), 29(4), 308-315, 1982. through C.A. 97:120120p.

144. Gogrej, N.B., M.S. Thakur, "Plant Growth Promotor," Brit. UK. Pat. Appl. GB. 2,144,728, March, 13, 1985.

145. Ries, S.K., "Regulation of Plant Growth with Triacontanol," Neurotoxicology, 6(3), 63-85, 1985. through C.A. 103:66636p.

146. Zakharkin, T.N, N.P. Aksenova, V.V. Guseva, T. Bavrina, V. Kenstiantinova and T.N. Chailakhyan, "Synthesis of 1-

Triacontanol from Dodecanedioic Acid," Khim. Prir. Soedin., (3), 369-370, 1984.

147. Templeton, W., An Introduction to the Chemistry of the Triterpenoids and Steroids, pp. 141, Pitman Press, Great Britain, 1 st ed., 1969.

148. Segal, R., J. Milo-Goldzweig and M. Seiffe, "The Hemolytic Properties of Non-ionic Hemolysins," Life Science, 11, pt. 2, 61-70, 1972.

149. Chatterjee, A., S.K. Srimary, "Isolation of Lupeol from Asteracantha longifolia Nees.," J. Indian Chem Soc., 34(12), 822-884, 1958. through Biological Abstract 32:38551

150. Sheth, K., E. Bianchi, R. Wiedhopf and J.R. Cole, "Antitumor Agents from Alnus oregona (Betulaceae)," J. Pharm. Sci., 62(1), 139-140, 1973.

151. Grzelinska, A., "Isolation and Identification of Tomata Phytoalexins. II Isolation of Lupeol" Bull. Acad. Pol. Sci., Ser Sci Biol., 28(5), 293-298, 1980. through C.A. 94:162088y.

152. Gupta, M.B., R. Nath, G.P. Gupta and K.P. Bhargava, "Antiulcer Activity of Some Plant Triterpenoids," Indian J. Med. Res., 73, 649-652, 1981. through C.A. 95:162088y.

153. Burrows, S. and J.C.E. Simpson, "The Triterpene Group Part IV, the Triterpene Alcohols of Taraxacum Root," J. Chem. Soc., 2042-2047, 1938.

154. Herr, M.E. and F.W. Heyl, ""Enamine", Derivatives of Steroidal Carbonyl Compounds I," J. Am. Chem. Soc., 74, 3627-

3630 ,1952.

155. Chandler, R.F., S.N. Hooper and H.A. Ismail, "Antihyper-Chlolesterolemic Studies with Stersols," J. Pharm. Sci., 68, 245-247, 1979.

156. Jones, E.R.H. and R.J. Meakins, "The Constitution of Lupeol," J. Chem. Soc., 757-761, 1941.

157. Seki, J., A. Okita, M. Watanabe, T. Nakagawa, K. Honda, N. Tatewaki and M. Sugiyama, "Plasma Lipoproteins as Drug Carriers: Pharmacological Activity and Desposition of the Complex of β-Sitosteryl- β-D-glucopyranoside with Plasma Lipoproteins, J. Pharm. Sci, 74(12), 1259-1264, 1985.

158. Miles, D.H., D.D. Stagg and E.J. Parish, "Investigation of Constituents and Antitumor Activity of Spartima cynosuroides," J. Nat. Prod., 42(6), 700, 1979.

159. King, M.L., H.C. Ling., C.T. Wang and M.H. Lu, "Sterols and Triterpenoids of Gymnosporia trilocularis Hay.," J. Nat. Prod., 42(6), 701, 1979.

160. Gisvold, O. and C.H. Rogers, The Chemistry of Plant Constituents, pp. 53-55, Burgress Publishing Company, USA, 1st ed., 1938.

161. Gierer, J., F. Imsgard and I. Noren, "Studies on the Degradation of Phenolic Lignin Units of the -Aryl Ether Type with Oxygen in Alkaline Media, Acta Chem. Scand., B(31), 561-572, 1977.

162. Karrer, W., "Uber das Vorkommen von 2,6-Dimethoxy-chinon in Adonis vernalis L.," Helv. Chim. Acta, 13, 1424-1428,

1930.

163. L.V. Thoi and N.N. Suong, "Constituents of Eurycoma longifolia Jack.," J. Org. Chem., 35(4), 1104-1109, 1970.

164. Kodaira, H., M. Ishikawa, Y. Komoda and T. Nakajama, "Antiplatlet Aggregration Principles from the Bark of Fraxinus japonicad Blume," Chem. Pharm. Bull., 29(8), 2391-2393, 1981.

165. Bu'Lock J.D., "Constituents of the Higher Fungi. Part IV. A Quinone from Polyporus fumosus," J. Chem. Soc., 575-576, 1955.

166. Inoshiri, S., M. Sasaki, Y. Kohda, H. Otsuka and K. Yamasaki, "Inhibition of Mast Cell Histamine Release by 2,6-Dimethoxy-p-benzoquinone, Isolated from Berchemica racemosa," Chem. Pharm. Bull., 34(3), 1333-1336, 1986.

167. Handa, S.S., A.D. Kinghorn, G.A. Cordell and N.R. Farnsworth, "Plant Anticancer Agents XXVI Constituents of Peddiea fischeri," J. Nat. Prod., 46(2), 248-250, 1983.

168. Fujimota, J., K. Katsukawa and M. Mori, Chem. Pharm. Bull., 11, 948, 1963.

169. Le Quesne, P.W., J.E. Larrahonds and R.F. Raffauf, "Antitumer Plants X Constituents of Nectandra ridiga," J. Nat. Prod., 43(3), 353-359, 1980.

170. Jones, E., O. Ekundaya and D.G.I. Kingston, "Plant Anticancer Agents XI, 2,6-Dimethoxybenzoquinone as a Cytotoxic Constituent of Tibouchina pulchra," J. Nat. Prod., 44(4), 493-494, 1981.

171. Bolker, H.J. and F.L. Kung, "Formation of 2,6-Dimethoxy-1,4-benzoquinone by the Action of Nitrous Acid on 1,2,3-Trimethoxybenzene," J. Chem. Soc. (C), 2298-2304, 1969.

172. Chugai Pharmaceutical Co. Ltd, "Plant Growth Regulating Composition Containing Benzaldehydes," JP. 57,212,103, June 23, 1981. through C.A. 98:121374g.

173. Rehn, D., H. Nolte and W. Zerling, "Antimicrobial Activity of Substituted Aromatic Aldehydes," Zentralbl Bakteriol, 172(6), 508-519, 1981. through C.A. 96:177786u.

174. Zemek, J., B. Kosikova, J. Augustin and D. Joniak, "Antibiotic Properties of Lignin Components," Folia Microbial, 24(6), 483-486, 1979. through C.A. 93:62323m.

175. Puri, S.C., S.M. Anand and C.K. Atal, "Regiospecific Alkoxylation of Phenolic Aldehydes," Indian Journal of Chemistry, 24B, 294-195, 1985.

176. Calixto, J.B., M. Nicolau and G.A. Rae, "Pharmacological Actions of Tannic Acid I. Effects on Isolated Smooth and Cardiac Muscles and Blood Pressure," Planta Medica, 32-35, 1986.

177. Ezaki, N., M. Kato, N. Takizawa, S. Morimoto, G. Nonaka and I. Nishioka, "Pharmacological Studies on Linderae umbellatae Ramus, IV. Effects of Condensed Tannin Related Compounds on Peptic Activity and Stress-Induced Gastric Lesions in Mice," Planta Medica, 34-38, 1985.

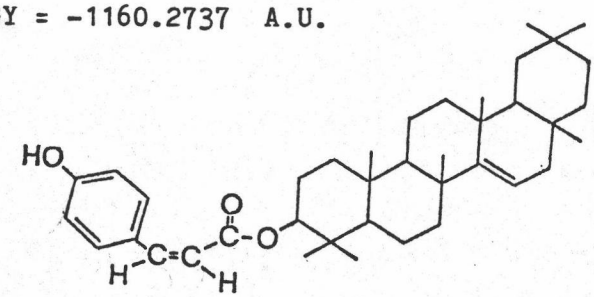
178. Leung, A.Y., Encyclopedia of Common Natural Ingredients, pp. 305-306, John-Wiley & Sons, Inc., 1980.

APPENDIX I

The semiempirical MO SCF were computed by CNDO/2 PROGRAMME at the IBM 3031/08 Computer Center of Chulalongkorn University.

I. For Taraxeryl-cis-p-hydroxy-cinnamate (Compound 11)

NUCLEAR REPULSION ENERGY = 963.2312 A.U.
TOTAL ENERGY = -197.0423 A.U.
BINDING ENERGY = -16.4969 A.U.
ELECTRONIC ENERGY = -1160.2737 A.U.



VALENCE ELECTRON DENSITY

1	C	3.8399
2	C	4.0160
3	C	4.0065
4	C	3.9462
5	C	3.9176
6	C	4.0308
7	O	6.2283
8	H	0.9648
9	H	0.6156
10	H	0.9821
11	H	0.9854
12	H	0.8619
13	C	4.1392
14	H	1.0076
15	C	4.2613
16	H	0.6306
17	C	4.1819
18	O	6.2549
19	O	6.2216
20	C	3.8049
21	H	1.0479
22	C	4.0519
23	C	3.9687
24	C	4.0472
25	C	4.0089
26	C	3.9867
27	H	1.0142
28	C	3.9601
29	C	4.0537
30	C	3.9889
31	H	0.9980
32	H	0.9607
33	H	1.0000
34	H	1.0042
35	H	0.9937
36	H	1.0040
37	H	1.0094
38	H	0.9992
39	H	0.9463
40	H	1.0202
41	H	1.0128
42	H	1.0010
43	H	0.9701
44	H	1.0104
45	H	1.0207

DIPOLE MOMENTS

COMPONENTS	X	Y	Z
DENSITIES	-0.51933	5.23556	0.16725
S.P	-0.63539	3.89430	-0.16232
P.D	0.00000	0.00000	0.00000
TOTAL	-1.15471	9.12986	0.00494

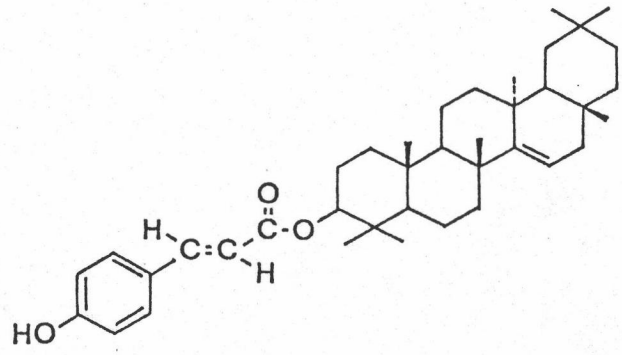
DIPOLE MOMENT= 9.20259 DEBYES

COORDINATES

	X	*Y*	*Z*
C	3.7360897	6.4709797	0.0000100
C	2.5262403	5.7725000	0.0000100
C	2.5262203	4.3754997	0.0000100
C	3.7360497	3.6769800	0.0000100
C	4.9459000	4.3754702	0.0000100
C	4.9459105	5.7724705	0.0000100
O	3.7361002	7.8309803	0.0000100
H	5.8812199	6.3124599	0.0000100
H	5.8811998	3.8354597	0.0000100
H	1.5909004	3.8355198	0.0000100
H	1.5909405	6.3125200	0.0000100
H	2.7278404	8.2180300	0.0000100
C	3.7360401	2.1569796	0.0000100
H	2.8007202	1.6169901	0.0000100
C	4.8939104	1.4884701	0.0000100
H	5.8292198	2.0284700	0.0000100
C	6.2016096	2.2434597	0.0000100
O	6.2016201	3.4764605	0.0000100
O	7.3776703	1.5644503	0.0000100
C	8.4291496	2.4159098	0.0000200
H	8.7093201	2.6427898	-1.0180397
C	8.0374899	3.7164402	0.7258500
C	9.6198196	1.7623997	0.7258500
C	9.2222900	1.4399204	2.1782904
C	10.0125999	0.4616400	0.0010500
C	10.8169098	2.7311897	0.7250800
H	11.0968800	2.9575005	-0.2931500
C	10.4258099	4.0321798	1.4504004
C	10.0271597	3.7110901	2.9028397
C	9.2343102	4.6855803	0.7258500
H	8.3831596	0.7600200	2.1799097
H	8.9472198	2.3516598	2.6876802
H	10.0572996	0.9816100	2.6873198
H	10.2921801	0.6868200	-1.0175400
H	9.1738701	-0.2187500	0.0015900
H	10.8476105	0.0033300	0.5100800
H	9.7522898	4.6233902	3.4113197
H	10.8615799	3.2526999	3.4127703
H	9.1876402	3.0316801	2.9044600
H	8.9588404	5.5973997	1.2348804
H	9.5122099	4.9124298	-0.2928300
H	7.7579098	3.4888401	1.7439003
H	7.2021904	4.1751099	0.2176300
H	11.6519203	2.2728901	1.2341099
H	11.2653303	4.7115898	1.4498596

II. For Taraxeryl-trans-p-hydroxycinnamate (Compound 12)

NUCLEAR REPULSION ENERGY = 886.9883 A.U.
TOTAL ENERGY = -199.1539 A.U.
BINDING ENERGY = -18.6086 A.U.
ELECTRONIC ENERGY = -1086.1423 A.U.



VALENCE ELECTRON DENSITY

1	C	3.8152
2	C	4.0593
3	C	3.9818
4	C	3.9896
5	C	3.9757
6	C	4.0501
7	O	6.2333
8	H	0.9923
9	H	0.9941
10	H	1.0051
11	H	0.9982
12	H	0.8753
13	C	3.9242
14	H	1.0369
15	C	4.4224
16	H	0.6789
17	C	3.6266
18	O	6.2923
19	O	6.2292
20	C	3.8165
21	H	1.0298
22	C	4.0859
23	C	3.9639
24	C	4.0513
25	C	4.0119
26	C	3.9855
27	H	1.0121
28	C	3.9626
29	C	4.0519
30	C	3.9850
31	H	1.0028
32	H	0.9524
33	H	0.9942
34	H	1.0016
35	H	0.9962
36	H	0.9982
37	H	1.0046
38	H	0.9992
39	H	0.9512
40	H	1.0113
41	H	1.0120
42	H	0.9998
43	H	0.8910
44	H	1.0071
45	H	1.0177

DIPOLE MOMENTS

COMPONENTS	X	Y	Z
DENSITIES	0.63009	-1.55317	-0.28227
S.P	-2.95125	-1.68784	0.03230
P.D	0.00000	0.00000	0.00000
TOTAL	-2.32115	-3.24101	-0.24997

DIPOLE MOMENT= 3.99429 DEBYES

COORDINATES

	X	*Y*	*Z*
C	3.7360897	6.4709797	0.0000100
C	2.5262403	5.7725000	0.0000100
C	2.5262203	4.3754997	0.0000100
C	3.7360497	3.6769800	0.0000100
C	4.9459000	4.3754702	0.0000100
C	4.9459105	5.7724705	0.0000100
O	3.7361002	7.8309803	0.0000100
H	5.8812199	6.3124599	0.0000100
H	5.8811998	3.8354597	0.0000100
H	1.5909004	3.8355198	0.0000100
H	1.5909405	6.3125200	0.0000100
H	2.7278404	8.2180300	0.0000100
C	3.7360401	2.1569796	0.0000100
H	2.8907202	1.6169901	0.0000100
C	4.8939104	1.4884701	0.0000100
H	4.8938899	0.4084700	0.0000100
C	4.8938999	-0.0215200	0.0000100
O	3.8260803	-0.6380100	0.0000100
O	6.0699501	-0.7005300	0.0000100
C	5.8582897	-2.0368700	0.0000100
H	5.8018904	-2.3929396	1.0180597
C	4.5361700	-2.3479309	-0.7258200
C	7.0195704	-2.7412796	-0.7258200
C	7.1000900	-2.2357702	-2.1782598
O	8.3424597	-2.4310799	-0.0010200
C	6.7790899	-4.2623796	-0.7250500
H	6.7230797	-4.6189000	0.2931800
C	5.4568501	-4.5741596	-1.4503698
C	5.5356102	-4.0683699	-2.9028101
C	4.2952499	-3.8689699	-0.7258200
H	7.2693501	-1.1691198	-2.1798897
H	6.1729603	-2.4534101	-2.6876497
H	7.9144897	-2.7297697	-2.6872902
H	8.2372200	-2.7857904	1.0175695
H	8.5123396	-1.3645296	-0.0015600
H	9.1568604	-2.9250803	-0.5100500
H	4.6080999	-4.2864704	-3.4112902
H	6.3497801	-4.5618200	-3.4127398
H	5.7042503	-3.0016203	-2.9044304
H	3.3676503	-4.0862999	-1.2348499
H	4.2377396	-4.2230501	0.2928600
H	4.5934896	-1.9919996	-1.7438698
H	3.7213001	-1.8538504	-0.2176100
H	7.5934896	-4.7563801	-1.2348903
H	5.2552099	-5.6409101	-1.4498301

VITA

Mr. Warinthorn Chavasiri was born on October 20, 1963 in Songkla province, Thailand. He received Bachelor Degree of Science of Chemistry at Chulalongkorn University in 1985. Since 1985, he has been a graduate student studying Organic Chemistry in Chulalongkorn University. During the study towards the Master's degree, he was awarded as a research assistance by Faculty of Science during 1985-1987 and supported a research grant for his Master degree's thesis from the Graduate School, Chulalongkorn University.