

Phytochemical Examination of *Corchorus olitorius* Leaves

*D.Ramadevi

*Department of Pharmacognosy and Phytochemistry, College of Pharmaceutical Sciences,
Andhra University, Visakhapatnam, India.*

ABSTRACT

From the leaf extract of *Corchorus olitorius* L. a rare compound fusidic acid, betulinic acid and cannogenol were isolated and characterized by spectroscopy.

Key Words : fusidic acid, betulinic acid and cannogenol

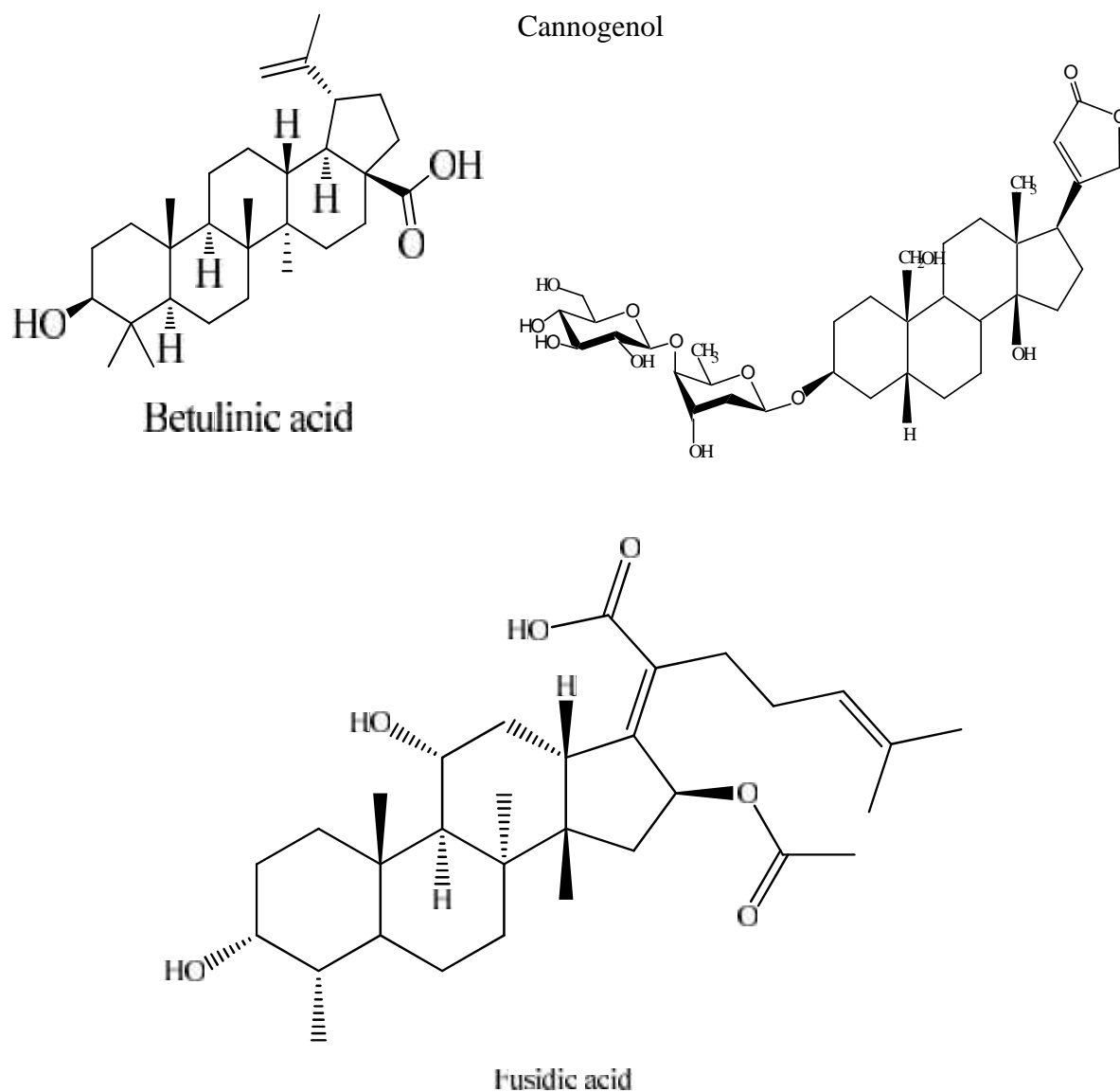
INTRODUCTION

The Mediterranean basin contains approximately 25,000 plant species, about half of which are endemic to the region, and is one of the world's major centres of plant diversity.^[1] *Corchorus olitorius* is a *Tiliaceae* member spread throughout India. Biologically *Corchorus* species are used as diuretic, chronic cystitis, antihistaminic, antimicrobial and cardiogenic,^[2-3]

Plant material: The leaves of *Corchorus olitorius*, were collected from Warangal in September 2007 (1.5kg) and was authenticated by Prof.V.S. Raju, Department of Botany, Kakatiya University, Warangal. A specimen was deposited in the Herbarium (Voucher specimen number (CO/07) leaves were collected from the plant and dried under shade.

Extraction: The leaves of *Corchorus olitorius* (1.5kg) were air dried and coarsely powdered in a Wiley mill and successively extracted with petroleum ether (3×3 l), chloroform (3×3 l) and methanol (3×3 l) and concentrated under reduced pressure. The petroleum ether, chloroform extracts of *C. olitorius* leaves shown similar spots on TLC (1:1 Benzene: Chloroform) and hence combined and column chromatographed over silica gel (Acme 100 mesh), which afforded one compound named as COL-1. The methanolic extract showed positive Liebermann-Burchard test for terpenoids and Kedde test for cardiac glycosides. On column chromatography the methanolic extract gave two compounds COL-2 and COL-3.

Characterization of Isolated Compounds : COL-1 (Betulinic acid, 10mg): It was crystallized from chloroform as white fluffy needles, m.p 276-278°C. It gave positive Liebermann-



Burchard test (pink colour) for terpenoids. This observation was supported by ms: m/z 456[M]⁺, 423, 411, 410, 342, 248, 220, 207, 203, 189, 143, 69 suggested the molecular formula C₃₀H₄₈O₃. IR (KBr, cm⁻¹): 3385 (OH), 3350 (COOH), 1715 cm⁻¹ (C=O); ¹H NMR (, CDCl₃) : 4.56 and 4.68 (=CH₂), 1.68 (s, =C-CH₃), 2.30 (m, H-19) 3.27 (dd, H-3), 0.76 (s, 3H), 0.78 (s, 3H), 0.82 (s, 3H), 0.96 (s, 3H), 1.03 (s, 3H) for five tertiary methyl groups; ¹³C NMR (, CDCl₃) : 38.7 (C-1), 27.4 (C-2), 78.9 (C-3), 38.8 (C-4), 55.3 (C-5), 18.3 (C-6), 34.3 (C-7), 40.7 (C-8), 50.5 (C-9), 37.2 (C-10), 20.8 (C-11), 25.5 (C-12), 38.4 (C-13), 42.4 (C-14), 30.5 (C-15), 32.1 (C-16), 56.3 (C-17), 46.8 (C-18), 49.2 (C-19), 150.3 (C-20), 29.7 (C-21), 37.0 (C-22), 27.9 (C-23), 15.3 (C-24), 16.0 (C-25), 16.1 (C-26), 14.7 (C-27), 180.5 (C-28), 09.6 (C-29), 19.4 (C-

30). The above mentioned spectral data were in close agreement with literature value of betulinic acid. Thus, compound COL-1 was characterized as betulinic acid [4-5]

COL-2 (Cannogenol , 8 mg): It was obtained as white amorphous powder in 30% methanol: chloroform. It showed positive kedde and legal reactions indicating the cardinolide nature of the compound. In the high resolution negative ion FAB mass spectrum , COL-2 showed a [M-H]⁻ ion peak at m/z 681.3436 .The fragment ion peaks of low resolution FABMS,m/z 519 for [M-H-162]⁻ and 389 for [aglycone -H]⁻, were observed. COL-2 had more mass units from digitoxigenin, and one extra hydroxyl group in the aglycone. The C-19 signal of COL -2 was observed at 66.0 shifted by +41.7 ppm. The signals of C-1 (24.8, -6.6 ppm), C-5 (30.2 7.7 ppm) and C-10 (40.4,-4.1 ppm) were significantly shifted. The ¹H NMR, H-H COSY and HMQC spectra, two protons at the 19-position were assigned at 3.41 and 3.81 .These data indicated that the aglycone was cannogenol which had one hydroxyl at C-19 [6-7]. The ¹H NMR showed signals as 0.88 (3H,s, H₃ -18),1.25(3H.d,J=6.5Hz, bio H₃ -6),2.82 (1H, m, H-17), 3.41, 3.81 (1H,d,J=11Hz, H₂-19), 3.45 (1H, m, boi H-4), 3.65 (1H, dd, J=5.5, 12.0 Hz , glc H-6b), 4.04 (1H, m, H-3), 4.15 (1H, br.q, boi H-3), 4.31 (1H, d, J=8.0Hz, glc H-1), 4.88 (1H, dd, J=1.5,18.5Hz, H₂-21), 5.89 (1H,s,H-22). Based on the data, the compound was identified as cannogenol.

COL-3 (Fusidic acid, 20mg): It was obtained as colourless substance in 40% methanol in chloroform, Molecular Formula is C₃₁H₄₈O₆ and its m.p.190-192⁰C . IR (KBr): (thin film) cm₋₁: 3369.62, 2924.39, 715.97, 1696.02, 1558.27, 1436.56, 1375.42, 1255.07, 1053.01, 934.01, 653.86. UV max: (log ε): 233 (3.96) nm. EI-MS: 475.3422 [M+H]. The ¹H NMR: 1.83, 1.80, 3.76, 1.58, 2.14, 1.40, 1.43, 1.58,4.35, .12, 3.06, 1.73, 5.90, 0.92, 0.98, 2.52, 2.14, 5.12, 1.60, 1.67, 0.91,1.39, acetyl 1.96. ¹³CNMR: 30.17 ,29.84 3, 71.53 , 36.38, 6.01,20.87, 32.14, 39.48, 49.32, 36.95,68.24, 35.58, 44.29, 48.72, 38.96, 74.47, 150.75, 17.78, 22.99, 129.64, 174.37, 28.77, 28.46, 123.10, 132.58, 17.84, 25.71, 15.92,23.94,CO170.70, COCH₃ 20.60. [8-26] Based on the a bove spectral data, the compound COL-3 was identified as fusidic acid.

RESULTS AND DISCUSSION

The chemical examination of the leaves of *C.olitorius* on conventional extraction and a sequence of chromatographic methods afforded three compounds. These are characterized as betulinic acid, cannogenol and fusidic acid. Out of these compounds, fusidic acids were reported for the first time from *C.olitorius* leaves.

ACKNOWLEDGEMENTS

The author D.Ramadevi is grate full to UGC New Delhi for the award of SRF (NO.U2/RGNF /(SC/ST)/2008-2009.

REFERENCES

- 1 Skoula M, Heywood V: achievements of the MEDUSA network and a preliminary presentation of the most used Mediterranean plant species: in pedulosis (ed) ; priority sitting for under utilized and neglected plant species of the mediterranean region. Report of the JPGRi conference, Feb, 9-11, 1998, ICARDA, Aleppo, Syria, IPGRi, 1999; PP 141-150.
- 2 Satyavati, G. V. Raina M K & Sharma M, Medicinal Plants of India, vol I (ICMR, New Delhi) 1976 : 278-281.
- 3 Khan, M. S. Y. Bano, S. Javed, K. Mueed, M. A ., *J. Sci. Ind. Res*, 2006: 65: 283–298.
- 4 Pallavi S, Yogesh, K. G. Sharma M .C ., and Dobhal M. P., *Indian Journal of Chemistry*, 2010 : 49 : 374-378.
- 5 De Silva L.B. and De Silva U. L. L. *J.Natn.Coun. Sri Lanka* 1979 :7 (1) : 1-3.
- 6 Rao E.V. Rao K.N and Rao D.V., *Current Sciences*, 1973: 42 ;731.
- 7 Schmersahl P, *Tetrahedron Letters* , 1969 : 10 : 789.
- 8 Okuyama E. Sato K. Yoshihira K. , *Phytochemistry*, 1990 : 29 : 3973–3974.
- 9 Koyama J, Ogura T. Tagahara K. Konoshima T, Kozuka M., *Phytochemistry* , 1992 : 31: 2907–2908.
- 10 Tai-Shun Lin Beverly A., Teicher, and Alan C Sartorelli., *Journal of Medicinal Chemistry*, 1980:23,(11) : 1239.
- 11 Chakraborty D. P. A, Islam S, *Phytochemistry*, 1978: 17,(11) : 2043.
- 12 Kenneth O. E, Gabriel, N. F. Victor K. , Veronique P. B., Karsten K., Hidayat H. Augustin E. N, Michael, S Salem. R. S, Achim, H. *Phytochemistry*, 2006: 67(6) : 605-609 .
- 13 Ivan Addae-Mensah, Reiner Waibel, Hans Achenbach, Gichuru Muriuki, Clive Pearce, Jeremy K.M. Sanders, *Phytochemistry*, 1989 : 28,(10) : 2759-2761.
- 14 Incent Castola, Ange Bighelli, Serge Rezzi, Giovanni Melloni, Serafino Gladiali, Jean-Marie Desjobert, Joseph Casanova , *Industrial Crops and Products*, 2002:15(1) : 15-22.
- 15 B. Hashi, P. Mahato, Asish, Kundu , *Phytochemistry*, 1994: 37(6) :1517-1575.
- 16 Y. H. Bang , C. Hee-Byung , B. S. K. Leonardus, R. Soedarsono , R. F. Norman, A. C. Geoffrey , M. P. John , A. D. Kinghorn, *Phytochemistry*, 2003: 62(2) : 197-201.
- 17 M. Rosane , Aguiar, Juceni, P. David, Jorge, M. David., *Phytochemistry*, 2005: 66 (19): 2388-2392.

- 18 A. Hymavathi, Suresh Babu, K. V. G .M. Naidu, Rama Krishna, S. Prakash, V. Diwan, J. Madhusudana Rao., *Bioorganic and Medicinal Chemistry Letters*, 2009: 19: 5727-5731.
- 19 W. Stöcklin, L .B. De Silva, T .A. Geissman, *Phytochemistry*, 1969: 8,(8): 1565-1569.
- 20 A. L .B.Soad , G. R. Michael, R. B. John, S. B. Ian , *Phytochemistry*, 2010: 71, 5-6, 598-604.
- 21 Mizuo Mizuno, Hiroyuki Kojima, Munekazu Iinuma, Toshiyuki Tanaka, Kiyoto Goto, *Phytochemistry*, 1992: 31(2): 717-719.
- 22 Emma Maldonado, Marisela Bello, José Luis Villaseñor, Alfredo Ortega., *Phytochemistry*, 1998 ; 49(4) : 1115-1118.
- 23 V. Derek, Banthorpe, Geoffrey, D. Brown., *Phytochemistry*, 1989 : 28(11) : 3003-3007.
- 24 Y. N. Shukla , Anil Srivastava, Sunil Kumar, Sushil Kumar., *Journal of Ethnopharmacology*, 1999 : 67(2) : 241-245.
- 25 L. Jorgen, P. C. Lars , T. Tove, *Phytochemistry*, 1992 : 31(8) : 2881-2882.
- 26 Tian-Shung Wu, Shiow-Chyn Huang, Jeng-Shiow Lai, Che-Ming Teng, Feng-Nien Ko, Chang-Sheng Kuoh., *Phytochemistry*, 1993 : 32 (2) : 449-451.