Research Article

Phytochemical Examination of *Corchorus aestuans* (Tiliaceae) Capsule

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ABSTRACT

From the capsule extract of *Corchorus aestuans* L, β-sitosterol, lupeol, betulin, 2-methyl anthraquinone, scopoletin and corchoroside-A were isolated and characterized by spectroscopy and also the hexane, chloroform and methanolic extracts of *Corchorus aestuans* were tested for antimicrobial activity.

Key words: *Corchorus aestuans*, β-sitosterol, lupeol, betulin, 2-methyl anthraquinone, scopoletin and corchoroside-A, antimicrobial activity.

INTRODUCTION

*Corchorus aestuans* is a Tiliaceae member is an erect to procurement of annuval herb grow up to 20 cm long. Capsules are 1.5-2.7 cm long. several important bioactive molecules were reported which includes cardiac glycosides, their aglycones and polysaccharides, triterpenoids, phenolics, sterols and fatty acids [1-96]. Biologically *Corchorus* species are used as diuretic, chronic cystitis, gonorrhoea and dysuria antihistaminic, anti-inflammatory, antimicrobial, cardiotonic, and also to increase the viscosity of the seminal fluid [97-98].

MATERIALS AND METHODS

Plant material collection: The plant material, *Corchorus aestuans* capsules was collected from Warangal in September 2007(2kg). The plant was authenticated by Prof. V.S. Raju , Department of Botany, KaKatiya University, Warangal. A specimen was deposited in the herbarium (Voucher specimen number (CA/07) roots were collected from the plant and dried under shade.

Extraction and Isolation of the compounds: The capsules (2kg) of *Corchorus aestuans* 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 *Corchorus aestuans* capsules shown similar spots on TLC (1:1 Benzene : Chloroform) and hence combined and column chromatographed over silica gel (Acme 100 mesh), which afforded three compounds designated as CAC-1, CAC-2, and CAC-3. The methanolic extracts showed positive tests for terpenoids and cardiac glycosides. On column chromatography the methanolic extract gave three compounds CAC-4, CAC-5, and CAC-6.

Characterization Of The Compounds

CAC-1(β-sitosterol 200 mg): The compound was crystallized from petroleum ether as a colorless needles, m.p 136-138°C. It showed color reaction for sterols with Liebermann-Burchard test. The UV (MeOH) λmax 205 nm; EIMS m/z 414 [M]+(calc. for C30H50O). 1H NMR (CDCl3, 400 MHz): δH 3.52 (1H, m, H -3), 5.35 (1H, m, H-6), 0.68 (3H, s, Me-18), 0.98 (3H, s, Me-19), 0.91 (3H, d, J = 6.4 Hz, Me-21), 0.83 (3H, d, J = 6.8 Hz, Me-26), 0.81 (3H, d, J = 6.9 Hz, Me-27), 0.85 (3H, t, J = 7.8 Hz, Me-29). 13C NMR (CDCl3, 100 MHz): δC 37.4 (C-1), 31.8 (C-2), 72.0 (C-3), 42.5 (C-4), 140.9 (C-5), 121.9 (C-6), 32.1 (C-7), 29.9 (C-8), 50.3 (C-9), 36.7 (C-10), 21.3 (C-11), 40.0 (C-12), 42.5 (C-13), 56.9 (C-14), 24.5 (C-15), 28.4 (C-16), 56.2 (C-17), 12.0 (C-18), 19.6 (C-19), 36.3 (C-20), 19.0 (C-21), 34.1 (C-22), 26.3 (C-23), 46.0 (C-24), 29.3 (C-25), 20.0 (C-26), 19.2 (C-27), 23.2 (C-28), 12.2 (C-29). Based on the spectral data the compound was identified as β-sitosterol and the identity was further confirmed by comparison with authentic sample (m.m.p. and Co-TLC.)

The compound was obtained as colorless needles, m.p. 212-214°C, [α]D0 + 38° (C, 1.12 in chloroform) and analyzed for the formula C30H50O. It gave pink colour with L.B. reaction indicating that the compound was a triterpenoid. The IR spectrum showed bands at 3540 cm⁻¹ – OH absorption, 1380 and 1390 cm⁻¹ (gem- methyls) and at 890 cm⁻¹ (vinyl methylene). 1H NMR spectrum (CDCl3, 90 MHz, δ) showed peaks at 0.76 (d, 3H); 0.78, 0.80, 0.90, 1.02 (s,15H); 1.63 (s, 3H); 0.91 (s, 6H) and δ 3.18 (m, 1H). From the above properties CAC-2 was identified as lupeol and the identity was confirmed by comparison with authentic sample (m.m.p. and co-TLC).[95]

The compound was obtained as colorless needles, m.p. 253-255° and showed single spot on TLC. It developed pale-yellow coloration with trinitro methane in chloroform indicating unsaturation. It responded positively to Liebermann-Burchard tests characteristic of
triterpenoids. Its infrared spectrum showed characteristic absorption bands at 3460-3400 (broad, OH stretching), 2970-2880 (C-H stretching), 1650 cm\(^{-1}\) (C=C stretching).

**1H-NMR**: (\(\delta, \text{CDCl}_3\)): 4.53 and 4.67 (=CH\(_2\)), 3.33 and 3.85 (d, \(J = 11\) Hz each – CH\(_2\)OH), 3.18 (dd, \(J = 12, 5\) Hz H-3\(\alpha\)), 2.44 (m, H-19), 1.67 (s, =C-CH\(_3\)), 0.75 (s, 3H), 0.85 (s, 3H), 0.96 (s, 3H), 0.98(s, 3H), 1.02 (s, 3H) for five tertiary methyl groups.

**13 C-NMR**: (\(\delta, \text{CDCl}_3\)): 38.8 (C-1), 27.4 (C-2), 79.0 (C-3), 38.3 (C-4), 55.4 (C-5), 18.3 (C-6), 34.3 (C-7), 41.0 (C-8), 50.6 (C-9), 37.4 (C-10), 20.9 (C11), 25.6 (C-12), 37.0 (C-13), 42.8 (C-14), 27.1 (C-15), 29.3 (C-16), 46.4(C-17), 47.8 (C-18), 48.8 (C-19), 150.3 (C-20), 29.8 (C-21), 34.0 (C-22), 28.0 (C-24), 6.1 (C-25), 6.1 (C-26), 14.7 (C-27), 60.8 (C-28), 109.6

**CAC-2** (Lupeol, 20mg)

**CAC-3** (Betulin, 30mg)

**CAC-4** (2-methylanthraquinone, 25mg)

**CAC-5** (Scopoletin, 80mg)

**CAC-6** (Corchoroside A, 20mg)

Corchoroside A

five tertiary methyl groups. \(^{13}\)C-NMR : (\(\delta, \text{CDCl}_3\)): 38.8 (C-1), 27.4 (C-2), 79.0 (C-3), 38.3 (C-4), 55.4 (C-5), 18.3 (C-6), 34.3 (C-7), 41.0 (C-8), 50.6 (C-9), 37.4 (C-10), 20.9 (C11), 25.6 (C-12), 37.0 (C-13), 42.8 (C-14), 27.1 (C-15), 29.3 (C-16), 46.4(C-17), 47.8 (C-18), 48.8 (C-19), 150.3 (C-20), 29.8 (C-21), 34.0 (C-22), 28.0 (C-24), 6.1 (C-25), 6.1 (C-26), 14.7 (C-27), 60.8 (C-28), 109.6
The compound was crystallized from methanol-ethyl scopoletin. Chemical tests, the compound was identified as 153.0 (C-7), 164.1 (C-2). Based on the spectral data and respectively. 1H-NMR: and 7.25 were assigned for the two protons H-5 and H-8, J=6.0 Hz, boi H3-6), 2.82 (1H, m, H-17), 3.21 (1H, m, boi H-3 ), 4.17 (1H, m, H-3), 4.87 (1H, dd, J=2.0 , 10.0 Hz , boi H-21), 5.89 (1H, s, H-5). The two singlet signals appeared at δ H 6.80 and 6.25 (H-3, J= 6.0 Hz). The singlet signals appeared at δ H 6.80 and 7.25 were assigned for the two protons H-5 and H-8, respectively. 1H-NMR: (CD3OD): d = 127.8 (C-1), 145.5 (C-2), 135.3 (C-3), 127.7 (C-4), 127.4 (C-5), 134.3 (C-6), 134.2 (C-7), 127.5 (C-8), 183.7 (C-9), 183.3 (C-10), 22.1 (CH3). The data and the result correspond with 2-methylanthraquinone, and is in good agreement with that of 2-methylanthraquinone and further the identity was confirmed by comparison with an authentic sample by m.m.p and co-TLC.

This compound was obtained as yellow crystal, mp: 202-204 °; IR (KBr) λ max cm⁻¹: 3340, 3106, 2990, 1710, 1600; UV max (MeOH) nm: 230, 254, 260, 298, 346 ; FAB-MS m/z:193 [M-H]⁻; 1H-NMR and 13C-NMR spectral data were in accord with the molecular formula C10H10O4. The 1H-NMR spectrum revealed the presence of two doublets at δH 7.90 (H-4, J = 6.0 Hz) and 6.25 (H-3, J= 6.0 Hz). The compounds were identified as â-sitosterol, lupeol, betulin, 2-methylanthraquinone, scopoletin and corchoroside-A and the identity was confirmed by comparison with authentic sample (m.m.p and co-TLC).

RESULTS AND DISCUSSION

The chemical examination of the capsules of *C. austuans* yielded six compounds from the capsules. The compounds were identified as â-sitosterol, lupeol, betulin, 2-methylanthraquinone, scopoletin and corchoroside-A. These isolates betulin 2-methylanthraquinone and corchoroside -A were reported for the first time from *C. austuans* capsules.

REFERENCES


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