Des-N-Methylnoracronycine from the roots of *Carissa conjesta*. Wight

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The methanolic extract of the roots of *Carissa conjesta* on a sequence of chromatographic techniques afforded a des-N-methylnoracronycine, an acridone alkaloid, carissone, carindone, lupeol besides stigmasterol, ursolic acid and its methyl ester. This is the first report of isolation of an alkaloid from the roots of *C. conjesta* and also from *Carissa* genus. All the isolated compounds were characterised by spectroscopic methods.

Key words: Apocynaceae, *Carissa congesta*, des-N-methylnoracronycine

INTRODUCTION

Carissa congesta Wight (Apocynaceae), is a woody climbing shrub grown up to 3-5 metres and is distributed throughout India and other tropical and subtropical countries. The plant is known by different local names in India and has many traditional values; its fruit is edible, while its pungent root is used locally for variety of medicinal purposes. These include stomachic, vermifuge, cardiotonic, hypotensive, anthelmentic and to treat remittent fever. A recent pharmacological studies on the extracts of *Carissa* species showed an increase in free histamine in the guinea pig lung and a pronounced decrease in blood pressure at 1 mg/kg dose which lasted for 4-5 hours. [1–6] The metabolites isolated so far from *C. congesta* include carissone, carindone, lupeol, stigmasterol, urosolic acid, carinol and other lignans and terpenoids. Some of the compounds possess cardiotonic and anticonvulsant activities. Considering the chemical diversity and pharmacological significance of *C. congesta*, this study is aimed to isolate the bioactive molecules from the roots of *C. congesta*. Hence, the authors have examined chemically the roots, and the results are given here under.

MATERIALS AND METHODS

Plant Material

The roots of *Carissa congesta* were collected from Narsipatnam, Visakhapatnam, India and were authenticated by Dr. M. Venkaiah, Professor, Department of Botany, Andhra University, Visakhapatnam India and a voucher specimen (SG/CCR/06/11) has been deposited at the herbarium, College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, India.

Extraction

The air dried roots (1.0 kg) of *C. congesta* were powdered moderately, defatted with petroleum ether (4L, each) for four times. The defatted plant material was extracted with methanol (4L, each) for four times and the extracts were combined and concentrated under reduced pressure to get a reddish brown residue (180 g). The residue gave a positive reaction with Liebermann-Burchard test, Ferric chloride test, Shinoda, Kedde's reagent and Mayer's reagent, for sterols and triterpenoids, phenolics, flavonoids, cardenolides and alkaloids, respectively.

Isolation and Purification of the Compounds

A portion of the methanolic extract (150 g) was adsorbed over silicagel and dried for about 24 hours in desiccator, adsorbed methanolic extract was column chromatographed over silica gel (Acme, 100-200 mesh) using petroleum ether, petroleum ether-chloroform (Chloroform concentration gradually increased by 10%), chloroform and chloroform-methanol (methanol concentration gradually increased by 10%) mixtures as eluents. Elution with petroleum ether afforded pale yellow coloured fractions, which upon concentration and crystallization resulted in colourless flakes lupeol.(3) On further elution with petroleum ether-chloroform 80:20, chloroform and chloroform-methanol 95:5 afforded compounds carissone (1), carindone(2) and des-n-methylnoracronycine(4). Four compounds were separated and purified by a series of chromatographic techniques. They were identified as carissone (1), carindone (2), lupeol (3), and des-n-methylnoracronycine

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(4). All the four isolates were characterised by UV, IR, Mass, ^{1}H-NMR, ^{13}C-NMR, HMQC and HMBC experiments and comparison with literature data.

RESULTS

Carissone (1)

11-hydroxy-4-eudesmen-3-one, colourless solid, mp 74–75°C, R_F 0.65 (pet. ether 40–60+EtOAc, 3:7). [α]22/D+125.0 (c, 0.01 in $CHCl_3$): [α]19/D+136.6 (c, 1.025 in $CHCl_3$)). The spectral data (^{1}H-NMR and ^{13}C-NMR, mass spectra) were consistent with data reported in the literature.[2–3]

Carindone (2)

Pale yellow solid, m.p. 266-268°C, R_f 0.52 (pet. ether 40- 60+EtOAc, 3:7). UV and ^{1}H NMR spectral data were consistent with literature.[2–3]

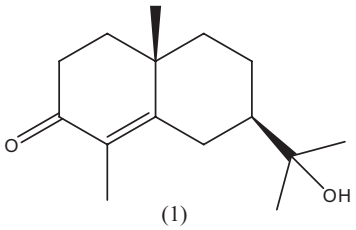
Lupeol (3)

Colourless flakes. The EI HRMS spectrum showed a molecular peak at *m/z* 426.3862 and the ^{1}H and ^{13}C NMR data agreed with that of lupeol.[2–4]

Des-n-methylnoracronycine (4)

Obtained as bright yellow prisms, mp 246–248°C, UV, IR (bands 3,300, 1,640, 1,585, 1,535 cm-1) and the ^{1}H NMR spectra (DMSO-d_6, 400 MHz) showed the peaks at δ 1.47 (3H, s, H-14), 3.64 (1H, d, *J* = 12 Hz, H-15), 3.76 (1H, d, *J* = 12 Hz, H-15), 5.66 (1H, d, *J* = 10 Hz, H-12), 6.10 (1H, s, H-2), 6.82 (1H, d, *J* = 10 Hz, H-11), 7.21 (1H, t, *J* = 7.6 Hz, H-7), 7.33 (1H, d, *J* = 7.6 Hz, H-6), 7.78 (1H, d, *J* = 7.6 Hz, H-8), 14.42 (1H, br, OH at C-1); 13C-NMR (DMSO-d_6, 100 MHz): 22.5 (C-14), 67.5 (C-15), 80.6 (C-13), 98.2 (C-2), 103.3 (C-4), 107.6 (C-9a), 117.1 (C-8), 120.9 (C-6), 121.9 (C-12), 123.0 (C-11), 124.2 (C-7), 125.8 (C-8a), 138.1 (C-10a), 148.8 (C-4a), 149.4 (C- 5), 162.2 (C-3), 165.5 (C-1), 182.9 (C-9).[7–9]

Structures



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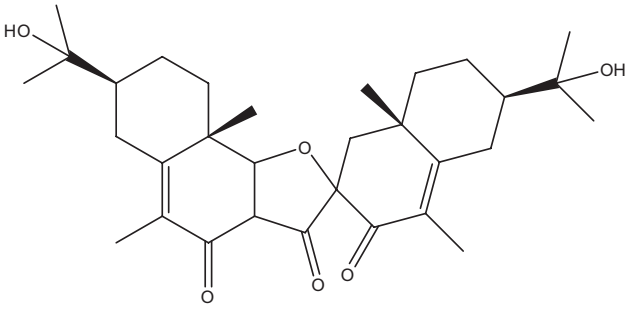

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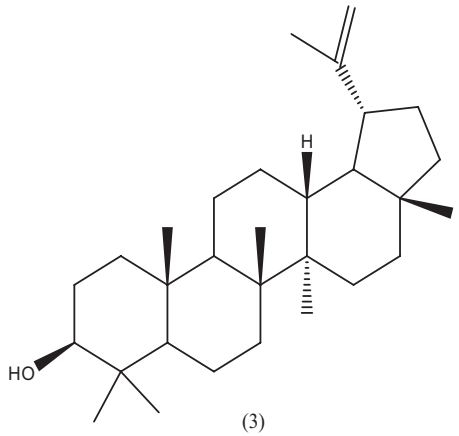

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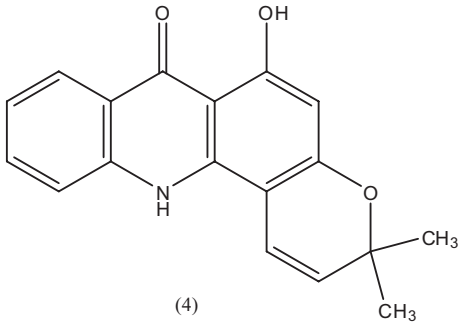

(4)

DISCUSSION

Carissa congesta has been reported as rich source for sesquiterpene glucosides, volatile oils, triterpenoids and lignans. Some metabolites like carandoside, carissin, carindone and some lignans are known for their significant biological activities.[1–6] The genus *Carissa* was also recorded as anticonvalescent,[10] antiviral and hypoglycaemic drug. We now isolated des-n-methylnoracronycine, an acridone alkaloid for the first time from this genus *Carissa*. Acridone alkaloids are biologically active as cytotoxic, antiviral, antimalarial and inhibition of Epstein-Barr virus activation.[11] Quite recently, acridones attracted broad attention as a component of photosensitizers used in photodynamic therapy, a newly introduced cancer treatment. Hence, we are progressing now with the pharmacological activities of the isolated acridone alkaloid des-n-methylnoracronycine.

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