Isolation of triterpenoids from the leaf of *Avicennia marina*

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**ABSTRACT**

A simple and sensitive method for isolation of triterpenoids from the leaf of *Avicennia marina*. Soxhlet extraction method was used to get petroleum ether extract. The separations of triterpenoids were carried out by column chromatography and preparative thin layer chromatography. The structure of these compounds was determined by spectroscopic analysis such as FT-IR, UV, Mass spectra, $^{13}$C NMR.

**KEYWORDS**

*Avicennia marina*; Triterpenoids; Lupeol.

**INTRODUCTION**

*Avicennia marina* is commonly known as gray mangrove and Vernacular name is Tella mada belongs to the family Aviceniaceae. It is grown as a shrub or tree to a height of three to ten meters or up to 14 meters in tropical regions. It is more wildly grown in the saline intertidal zone of sheltered coast lines. It has been reported to tolerate extreme weather condition, high winds. The bark and leaf of this plant have antimicrobial activity. *Avicennia marina* is a medium-sized tree growing in tropical region. The 15 species in the single genus of Avicenniaceae family are found on tropical coasts as constituents of mangrove vegetation¹¹. The previous phytochemical investigations on the different species of *Avicennia* resulted in the isolation of essential oil and sugars like arabinose, glucose and ribose. Among other compounds alkaloids, flavonoids, steroids, terpenoids and iridoids are most considerable components². In India, *Avicennia marina* is widely distributed in saline intertidal zone of sheltered coast lines. These plants are used in traditional medicine to treat skin diseases³. The earlier studies on this plants resulted in the isolation of Iridoid glucosides, fatty acids, sterols and hydrocarbons²⁵, also in vitro antimalarial activity and cytotoxicity of *A. marina* were reported⁶. The detail phytochemical studies have been carried out *Avicennia marina* and nothing has been reported on the triterpenoids of this species. Since this plant has good medicinal properties, the present work has been undertaken to isolate and identify secondary metabolites. In this paper the isolation and structural elucidation of the lupeol by using spectroscopic techniques like UV, IR, $^{1}$H NMR, $^{13}$C NMR and EIMS are being reported.

**EXPERIMENTAL**

**Apparatus**

Melting points were determined on a kolfer hot-stage apparatus. UV spectrum was taken using a Shimadzu UV-pharmspec 1700 Spectrometer. IR spectra were recorded on Shimadzu FTIR-8400 S Spectrometer. $^{1}$H NMR and $^{13}$C NMR spectra were ob-
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Plant materials

The leaf and bark of Avicennia marina was collected from Thane district of Maharashtra. A voucher specimen was deposited at the Herbarium of the Department of Botany, Nashik.

Extraction and isolation

The plant material was dried in shade. The powder of leaf (1Kg) of A. marina was extracted in a Soxhlet apparatus for five days in contact with petroleum ether. This extract was concentrated in vacuo and subjected to flash column chromatography over silica gel (Merck Kieselgel GF254). Elution of the column first with chloroform, increasing amounts of EtOAc in chloroform and finally with methanol gave lupeol (100mg) upon multiple preparative TLC using chloroform -EtOAc (95:5) and (90:10) respectively.

Lupeol

White crystals (MeOH), mp 210-212°C; [α]D

RESULTS AND DISCUSSION

The petroleum ether extract of the leaf and bark of A. marina afforded triterpenoids. The isolated compounds were identified by spectroscopic analysis as well as by comparisons of their spectral data with previously reported values. Triterpenoids from the leaf

Lupeol was isolated as white crystals from methanol and gave mp 210-212°C [α]D +30.4°C (C, 0.58 in CHCl3). Its IR spectrum exhibited hydroxyl [νmax: 3610, 1020cm⁻1] and exomethylene [νmax: 3070, 1640, 887 cm⁻1] absorption. The mass spectrum displayed a molecular ion [M+]+ peak at m/z 426 corresponding to C30H50O together with fragments at m/z 411 [M+ -15] and 408 [M+ -18] which were due to the loss of methyl group and a molecule of water from the molecular ion peak. The mass spectrum also showed a base peak at m/z 41 [C13H5]+ arising from the loss of the side chain of lupeol. The 1H NMR spectrum exhibited six tertiary methyl singlets at [δH: 0.75, 0.77, 0.80, 0.92, 0.94 and 1.02], a methine group at [δH: 1.66 (br d, J = 0.5 Hz)], a secondary carbinol group at [δH: 3.20 (dd, J = 9.6 and 6.2 Hz)] and an exomethylene group at [δH: 4.58 (1H, d, J = 0.4 Hz) and [δH: 4.65 (1H, dq, J = 0.4 and 0.5 Hz)] typical of pentacyclic triterpenoid [8,9] of the lupeol (1). The structural assignment of was further substantiated by its 13C NMR spectrum which showed seven methyl groups at [δC: 28.0 (C-23), 19.3 (C-30), 18.0 (C-28), 16.1 (C-25), 15.9 (C-26), 14.6 (C-27), 18.0 (C-28), 109.5 (C-29), 19.4 (C-30).

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CONCLUSIONS

The plant Avicennia Marina has good medicinal properties, isolation of triterpenoids from the leaf deserve the analytical merits. Method is simple, rapid, selective and obtained reproducible results. Present work has been undertaken to isolate and identify secondary metabolites.

REFERENCES