PHYTOCONSTITUENTS FROM THE ROOTS OF FICUS BENGALENSIS

Kiran S. Divi¹2, Srinivas Rao P.¹2, Krishna N.¹ and Ganapaty S.²*

¹Divi’s Laboratories Limited, Research & Development, Chippada, Bheemunipatnam, Visakhapatnam-531162, Andhra Pradesh, India.
²GITAM Institute of Pharmacy, GITAM University, Gandhi Nagar, Rushikonda, Visakhapatnam-530045, Andhra Pradesh, India.

ABSTRACT

Ficus bengalensis is traditionally used by rural folk for the treatment of various skin infections and also as wound healing drug. The authors have made an attempt to provide a scientific support to the folklore claims hence the roots are examined chemically which afforded β-sitosterol, bergapten, umbelliferone and ursolic acid. The coumarins like bergapten and umbelliferone are known for treating skin infections,. Occurrence of these coumarins may be responsible for its activity.

KEYWORDS: Ficus bengalensis, bergapten and umbelliferone.

INTRODUCTION

Ficus bengalensis, a deciduous small to medium sized tree belonging to the family Moraceae. Different parts of F. bengalensis are used as analgesic, anti-oxidant, antidiabetic, diuretic, wound healing, antiparasitic, vermifuge and for treating hemmorhoids and veneral diseases.¹⁶ The plant is also reported to treat throat pain, asthma, dyspnea and eczema. Though F.bengalensis widely used in traditional medicine, its chemistry is not explored. In view of this, the authors have examined the roots of F. bengalensis for its chemical constituents.

 MATERIALS AND METHODS

Column chromatography and TLC were carried out using silica gel (60-120 mesh) and silica gel G (Acme) respectively. Visualization of the TLC plates was done by spraying 5%
methanolic sulphuric acid. Melting points were recorded by Boietus melting point apparatus. UV spectra were obtained on systronics UV spectrophotometer, IR spectra were recorded on BUCK scientific -500 spectrophotometer using KBr pellets. $^1$HNMR spectra were taken on BRUKER AM 400 MHz with TMS as an internal standard.

EXPERIMENTAL

Collection of the plant material
The plant material was collected from Western Ghats of Karnataka and the identity was established by Dr. M. Venkaiah, Department of Botany, Andhra University, Visakhapatnam.

Extraction of the plant material
Air dried powdered roots (1.2Kg) of Ficus begalensis was subjected to extraction with methanol for 6 hrs. The procedure was repeated for 3 times. The extract was concentrated and dried under vacuum to get a residue of 22.14gms. The extract was diluted with respective solvents and screened chemically.

RESULTS AND DISCUSSION

Characterization of the isolated compounds

$\beta$-Sitosterol: It was crystallized from petroleum ether as colorless needles, m.p- 134-136$^0$C, gave positive color reaction with Liebermann- Burchard test. The IR spectrum showed bands 2970, 2950, 2880, 1470, 1385 and 1055 cm$^{-1}$. The $^1$H NMR spectrum showed peaks at $\delta$ 0.83-1.01(methyls), 3.47 (1H broad C$_3$α-H) and 5.35(1H, m, C$_5$-H).

Bergapten: It was obtained from the hexane chloroform fraction as white needles, m.p 187-188$^0$C, gave yellow colour for coumarin test and red colour for furanoid test indicating the presence of furanocoumarin. UV spectrum showed absorption bands at 224,252,270 and 308 characteristic of furanocoumarin. $^1$H NMR revealed the presence of lactone and furan rings and aromatic methoxy group. The identity was further confirmed by the comparison with an authentic sample through m.m.p and co-TLC.

Umbelliferone: It was crystallized as colorless crystals from chloroform fraction, m.p 229-231$^0$C, it exhibited bright blue florescence under UV indicating coumarin moiety and also showed absorbance at UV $\lambda_{\text{max}}$ 206 and 325nm. The $^1$H NMR showed peaks at $\delta$ 6.19 and 7.93 as AB type signals assigned to H-3 and H-4 and ABX type with signals at $\delta$ 7.52, 6.87
and 6.70. The identity was further confirmed by the comparison with an authentic sample through m.m.p and co-TLC.

**Ursolic acid:** It was obtained from methanol-chloroform fraction as crystalline flakes, m.p 280-282°C and gave play of colours (pink –blue-green) in Libermann- Burchard test for sterol. The $^1$HNMR revealed the presence of seven methyl groups, olefinic proton and carboxylic acid group. The identity was further confirmed by the comparison with an authentic sample through m.m.p and co-TLC.

**CONCLUSION**
The chemical examination of chloroform extract of the roots of *Ficus bengalensis* afforded four compounds, β- sitosterol, bergapten, umbelliferone, ursolic acid which were characterized by chromatographic and spectroscopic techniques.

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**REFERENCES**