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Research Article

PHYTOCHEMICAL STUDIES OF *JASMINUM SAMBAC*

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Abstract: *Jasminum sambac* belongs to Oleaceae, found useful in various system of medicine. Volatile oils from the species are extracted possess numerous pharmacological and phytochemical propeties. The leaves are shade dried powdered and subjected to hydroalocoholic extraction, isolation by column chromatography followed by charcterisation using various spectral methods. The present research lead to the seperation of chlorocoumarin, coumarin derivative and kaempferol a flavanoidal derivative were identified and characterized by physical and spectrascopical methods**.** The present study was an attempt to isolate the phytoconstituents present in the leaves of *Jasminum sambac*.

Key words: *Jasminum sambac*, *Oleaceae*, chlorocoumarin, kaempferol

INTRODUCTION

JS is a sub erect shrub with young shoots of ovate or elliptic glabrous simple leaves, entire margin, and acute apex with opposite arrangement, grown as an ornamental shrub in gardens and cultivated throughout the tropical and subtropical parts of India [1]. Leaves, roots and flowers are used as lactifuge. The whole plant is used as diuretic, emmengogue, antihelminthtic and deobstruent. Otto from flowers is used as deodorant and leaf preparations are used to treat insanity[2] . The phytochemical literature of *Jasminum sambac* revealed the presence of dotricontanol, oleanolic acid, daucosterol and hesperidin and dotriacontanic acid isolated from the roots[3]. In addition,the presence of glycosidic precursors such as benzyl 6-O- ß-D-xylo pyranosyl ß-glucopyranoside (beta –primeveroside), 2-phenyl ethyl ß primeveoroside, 2- Phenyl ethyl 6-O–alphaL–rhamnoside were reported[4]. Prelimnary phytochemical screening reported the presence of alkaloids, glycosides and tannins [5]. The plant also exhibited antilactation effect, antiviral, anti bacterial, antiproliferative, anti acne, anti inflammatory [6-10]. The present research was an attempt to investigate the phytochemical studies of *Jasminum sambac.*

MATERIAL AND METHODS

Plant materials

The leaves of *Jasminum sambac were* collected from the foot hills of Tirumala, Tirupati, Andhra Pradesh. All the plants were authenticated by Dr. Madhava Chetty, Professor, Dept of Botany, S.V. University, Tirupati. Voucher specimens were preserved in the Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.

Apparatus required

UV-Spectra (Systronics), IR Spectra (Perkin Elmer) spectra were recorded. ^{1}H NMR spectra was obtained (AVIII Bruker, 500 MHz), ^{13}C NMR (AVIII Bruker, 500 MHz) spectra were recorded using the solvents $CDCl_3$ and MeoD. Electro Spray Ionization mass spectra were recorded using HP 1100 MSD.

Processing of the material

The collect plant material was dried in shade, coarsely powdered and subjected to extraction and stored in air tight container for further use.

Extraction and isolation

Dried plant material were ground to coarse powder was defatted with petroleum ether(60-80°C,4 hrs) using Soxhlet extractor, further with extracted hydroalcohol (70%v/v) till the exhaustion of the material. The extract was evaporated under reduced pressure and the residue was subjected to column chromatography. The column was prepared in ethyl acetate and left overnight, the column contents were eluted with gradient elution starting with pet ether: toluene followed by chloroform, ethyl acetate, methanol and water (90:10, 70:30, 50:50, 30:70 and 10:90). Chloroform:ethylacetate (80 :20) and ethylacetate : methanol(20:80) eluted the compound JS-1, a coumarin derivative and JS-2 , a flavnoidal derivative was separated.

RESULT

Spectral analysis of JS-1

Pale yellow, amorphous, sparingly soluble in water. UV $\lambda_{max:}$ 229 and 340nm. FT-IR: V_{max} cm^{-1}: 3389, 2958, 2932, 2873, 2440, 1723, 2732, 1565, 1454, 1401, 1607, 1621, 1378, 1275, 1259, 1228, 1182, 1105, 1072, 1044, 1121, 1029, 1010, 990, 951, 932, 893, 867, 830,754, 686, 612, 526 and 455, indicated the amino and nitro group with aromaticity and asymmetry. The ^{1}H NMR spectrum showed of the isolated compound showed the presence of protons at position at 2,3,4,5,6,7,8,9,10 at δ δ9.54(s, J=1.00, H-2), δ 8.54 (s,J=0.93,H-3), δ7.90 (s, J=10.13, H-4), δ 7.66 (dd, J=10.13, H-5), δ 7.22 (dd, J=10.13,3.95,H-6), δ 7.50 (s, J=3.92, H-7), δ 7.20 (s, J=1.06, H-8), δ 8.27 (s, J=0.96, H-9) and δ 8.33(s, J=0.89, H-10) respectively showed the presence of aromatic aldehyde proton. ^{13}C NMR spectrum showed the characteristic carbon relevant to the position at 2, 3, 4, 4a and 5 at δ167.98, δ 113.04 δ 131.69 ,δ 117.373 and δ 153.59, showed the presence of aromatic and C_5 is oxygenated. The mass spectrum showed the fragments and fragmentation at 468, m/z 418, 399.9, 380.5, 342, 303, 281, 249, 229, 206,170,157,141, 113, 97, 85,71 and 61 indicated the presence of CH_3Cl, water molecule, H_3O, C_3H_2, C_3H_3, carbon group, of hydroxyl group and hydrogen atom, H_3O, C=CH, two molecules of water, C-H atom, oxygen atom, water molecule, oxygen atom, carbon atom, CH_2 group and five hydrogen atom respectively. The molecular formula was identified as C_{27} H_{13} O_6 Cl(Figure 1). The data was compared and upon close proximity with the earlier literature, the compound JS-1 was found to be chlorocoumarin[11-17].

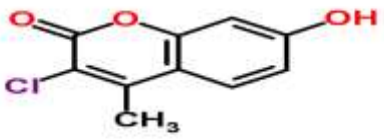

Figure 1 Structure of chlorocoumarin

Spectral analysis of JS-2

Yellow, amorphous, sparingly soluble in water. UV $\lambda_{max:}$ 214nm, 268 nm and 335nm. Upon addition of NaOH (285, 322 and 430 nm), $AlCl_3$ (265, 350 and 420 nm), HCl (265 and 352 nm), CH_3CooNa (275, 300 and 380nm) and H_3Bo_3 (267, 319 and 380 nm). FT-IR: cm^{-1}:3433 , 2925 , 2372, 1703 ,1683, 1654,1604, 1452, 1380,1332, 1259, 1176, 1122, 1074, ' 819,, and 594 indicated the presence of aromatic monosubstituted ring. The ^{1}H NMR spectrum showed the characteristic hydrogen relevant to the position at δ 3.448, (J=6.17, H=1) δ 3.736, (J=6.17, H=1), δ 4.24, (J=6.17, H=1) δ 4.26, (J=6.17, H=1) δ 5.47, (J=1.65, H=1) δ 5.45, (J=1.65, H=1), δ 5.34, (J=1.67, H=1) δ 6.89, (J=3.65, H=1) δ 6.88, (J=3.65, H=1) δ 6.87, (J=3.65, H=1) δ 6.44, (J=4.01, H=1) δ6.43, (J=4.01, H=1) δ 6.21, (J=1.71, H=1) (δ 7.97) indicated the presence of phenolic and aromatic proton. The ^{13} C NMR spectrum showed the characteristic carbon relevant to the position at 2, 3 ,4, 5, 6, 7, 8, 9 and 10 at δ 146.3, 135.8, 176, 160.65, 98.07, 163.5, 93.5, 156.2, 103 respectively. In addition, position of carbon at 1', 2', 6' and 3' & 5'at δ121.65, 114.6 129.4 and 115 indicated the presence of aromatic carbon, alkyl group and aromatic carbon. The mass spectrum showed the fragments and fragmentation of 287 (M +100%), m/z 257 , 240,212,164,152,120, 68and 23 showed the presence of two molecules of methyl group, hydroxyl group, two molecules of C_2 H_4, O_3, one carbon atom, two oxygen atoms, C_4H_4, and CH_3CHOH respectively. The molecular formula was deduced as C_{15} H_{10} O_6. The data was compared and upon close proximity with the earlier literature the compound JS-2 was found to be kaempferol(Figure2) [18-20]. This compound is being identified for the first time from the plant *Jasminum sambac.*

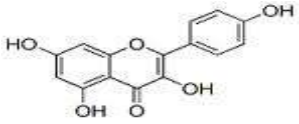

Figure 2 Structure of kaempferol

CONCLUSION

The data were compared and upon close proximity with the earlier literature the compound JS-1 and JS-2 was found to be chlorocoumarin and kampferol respectively. These compounds are being identified for the first time from this plant *Jasminum sambac.*

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