Ancient Science of Life Vol. No. XXI (3) January 2002 Pages 205 - 207

REVIEW ON PHYTOCHEMICAL AND MEDICINAL ASPECTS OF JUSSIAEA SUFFRUTICOSA LINN.

T. Murugesan, Sanghamitra Sinha, M. Pal and B.P. Saha

Department of Pharmaceutical Technology,
Jadavpur University, Calcutta – 700 032, India.

Received: 4.6.2001 Accepted: 8.10.2001

Summary: *The whole plant of Jussiaea suffruticosa Linn. Has been widely used in traditional medicine of India. Important bioactive molecules of the plant extract have been explored with modern phytochemical approaches and reported to consist of betulinic acid, quercetin and β-sitosterol. Furthermore, the experimental data obtained from rational clinical studies indicated that the methanol extract of the whole plant has found to possess potent anti-HIV, anti-diabetic, anti-diarrheal, anti- inflammatory, anti-pyretic, diuretic and psychopharmacological activities in several animal models. This paper reveales the phytochemical and clinical importance of the plant extract.*

INTRODUCTION

Jussiaea suffruticosa Linn. (Family-Onagraceae) is well known as Banlaunga (Hindi), Banlabunga (Sanskrit), Lalbunlunga (Bengali) and Nirkkirambu (Tamil) in traditional medicine of India. The plant is semi-shrubby, erect, perennial, 60-90 cm height with yellow flower distributed as a weed in cultivated paddy fields and wet fields throughout India and Ceylon (Anonymous, 1986; Anonymous, 1966; Nadkarni et al., 1992). Rheede under the name of "Carambu" describes this plant as medicine and gives its Sanskrit name as "Bhallavi-anga", no such name, however appears in the list of plants mentioned by Sans Welers. Ainsile quotes Rheeds, and says that plant called "Hoemarago" in Ceylon. Millor has noticed that the fruits of *Jussiaea suffruticosa* resemble to the clove. All the Indian vernacular names bear testimony to resemblance of the fruit with clove and the Marathi name "Water clove" indicates the habitat of the plant, which is similar to that of European willow herb *Epilopium angustifolium* (Willium Dymock, 1976).

HISTORY OF USE AS ETHNOMEDICINE.

Almost every part of *Jussiaea suffruticosa* is claimed to possess various medicinal uses. Leaves are mucilaginous and used in Malaya for poulticing in headache orchitis, gland in the neck and nervous diseases (Chopra, 1969; Anonymous, 1986). Whole plant reduced to pulp and steeped in buttermilk is considered to be useful in diarrhea and dysentery. A decoction (I in 20) is astringent, carminative, diuretic and vermifuge. As an astringent, it is given in haemoptysis and leucorrhea. The juice of the whole plant is useful to treat fever, jaundice and diabetes. In Africa, the plant enters into prescription of rheumatoid arthritis (Nadkarni et al., 1992; Chopra, 1969; Anonymous, 1986, Kirtikar and Basu, 1935).

BIOACTIVE COMPONENTS OF JUSSIAEA SUFFRUTICOSA LINN.

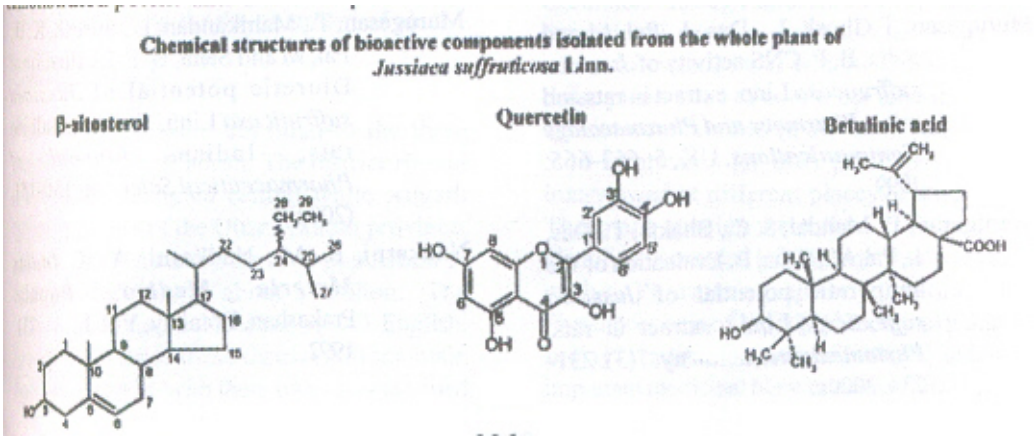
The plant was collected during the month of November, shade dried and coarse powdered. Then extracted with 80% methanol and the solvent was removed by distillation under reduced pressure. This extract has shown positive test for the presence of flavonoids, steroids, tannins, and saponins. The extract was further refractionated with several solvents and subjected to chromatographic separations, The diethyl ether fraction of methanol extract on polyamide column chromatographic separation yielded a flavonol, quercetin using the mobile phase n-Butanol: Acetic acid: Water (BAW – 4:1:5) (Murugesan et al., Unpublished data-2000a). The petroleum ether faction of methanol extract on silica gel column chromatography [with chloroform: methanol (1:1)] resulted separation of a steroidal compound, β- Sitosterol (Murugesan et al., unpublished data 2000b). Hexane extract of the whole plant was 'Subjected to fractional crystallization and column chromatography successively for isolation of a steroidal triterpenoid, betulinic acid (Desai et al., 1976).

CLINICAL STUDIES ON JUSSIAEA SUFFERUTICOSA LINN.

The minimum lethal dose (MLD) of the methanol extract of whole plant of *Jussiaea suffruticosa* (MEJS) was found to be 2.5 g/kg in intraperitoneal routs and more than 3.5 g/kg in oral rout of administration. The MEJS was found to possess significant CNS depressant efficacy in rats and mice (Murugesan et al., 1999). The MEJS exhibited potent anti-pyretic effect in yeast provoked elevation of body temperature in tats (Murugesan et al., 2000c) and it also inhibited the replication of HIV –l (IIIB) in MT-4 cells (Murugesan et al., Unpublished data, 2000d). The MEJS demonstrated potent anti-diarrheal profile in castor oil induced diarrhea, PGE2 induced enteropooling and Gastro intestinal motility test in tats (Murugesan et al., 2000e). The MEJS showed effective hypoglycemic potentials in a similar fashion as glybenclamide, a standard hypoglycemic agent in rats (Murugesan et al., 2000f) and it was found to possess pronounced anti inflammatory efficacy on carrageenin and serotonin induced paw edema volume as well as in cotton pouch induced granuloma in rats (Murugesan et at., 2000g). The MEJS also produced potent anti-tussive effect on sulphur dioxide induced cough in albino mice (Murugesan et at., 2000h) and effective diuretic activity in albino rats (Murugesan et al., 2000i).

DISCUSSION

The Whole plant of *Jussiaea suffruticosa* consists of the biologically important chemical components such as betulinic acid, quercetin and β-sitosterol, Moreover, the methanol extract of the whole plant has demonstrated significant anti- HIV, anti-diarrheal, anti-inflammatory, anti-pyretic, anti-tussive, diuretic and psychopharmacological effects in different experimental clinical studies. Based on these results, it can be suggested that the plant extract and plant products of *Jussiaea suffruticosa* Linn. Will be very much useful for various human ailments and it will also play important role in the herbal drug market globally in near future.



REFERENCE

Anonymous. ***The Wealth of Inilia***, Publication and Information Directorate, CSIR, New Delhi, **Vol. 1.:** 311.1966.

Anonymous. ***The Useful Ptmts of India***, Publication and Information Directorate, CSIR, New Delhi, 305-1986.

Chopra, R.N. ***Glossary of Indian Medicinal Plants (suppl***). Publication and information Directorate, CSIR, New Delhi, 48. 1969.

Desai, H.K. Gawad, D.H., Govindackari, T.R. Joshi, B.S., Parthasarathy, Ramachandran, K.S. Ravindranath, K.R., Sidhaye, A.R. and Viswanathan, N. Chemical Investigation of Some Indian Plants: Part ***IX India J. Chem***., 14 (B): 473-475.1976.

Murugesan, T., Sanghamitra Sinha, Pal M and Saha, B.P. Structural elucidation and anti-diabetic evaluation of a flavonol from *Jussiaea suffruticosa* Linn. ***Journal of Ethnopharmacology,*** Ireland, (Unpublished data, 2000a).

Murugesan, T., Sanghamitra Sinha, Pal M and Saha, B.P. Structural elucidation and anti-diabetic evaluation of a flavonol from Jussiaea suffruticosa Linn. ***Planta Medica***, UK, (Unpublished data, 2000b)

Murugesan, T., Ghosh L., Das, J., Pal, M and Saha, B.P. CNS activity of *Jussiaea suffruticosa* Linn. extract in rats and mice. ***Pharmacy and Pharmacology Communications.*** UK, 5: 663-665. 1999

Murugesan, T., Mandal, S.C., Bhakta, T., Das, J., Pal M., Saha, B. Evaluation of the antipyretic potential of *Jussiaea suffruticosa* Linn. extract in tats, ***Phytomedicine,*** Germany, 7(3): 231-234.2000c.

Murugesan, T., Sanghamitra Sinha, Erick De Clercq, Christophe Pannacouque, Myrium Witurouw, Pal M and Saha, B.P. Anti- HIV and Cytotoxicity effects of *Jussiaea suffruticosa* Linn. extract. Fitoterapia, Italy, (Unpublished data, 2000b)

Murugesan, T., Ghosh LMukherjee, K., Pal, M.and Saha, B.P. Evaluation of anti-diarrheal profile of *Jussiaea suffruticosa* Linn. extract in albino rats. ***Phytotherapy Research,*** UK, 14:381-383. (2000e)

Murugesan, T., Bhaskara Rao., Sinha, S., Biswas, S., Pal, M., Saha, B.P. Anti-diabetic evaluation of *Jussiaea suffruticosa* Linn. extract in rats. ***Pharmacy and Pharmacology*** Communications. UK, 6; 1-4 (2000f)

Murugesan, T., Pal, M and Saha, B.P. Evaluation of anti-inflammatory potential of *Jussiaea suffruticosa* Linn. extract in albino rats. ***Scientific Abstract,*** International Congress on Ethnopharmacology, Metz, France, May 11-13, Number 54. (2000g)

Murugesan, T., Ghosh LMukherjee, K., Pal, M. and Saha, B.P. Evaluation of anti-tussive potential of *Jussiaea suffruticosa* Linn. extract in albino mice, Phytotherapy Research, UK, 14:541-542. (2000h)

Murugesan T., Manikandan, L., Suresh, K.B., Pal, M and Hash B.P. Evaluation of Diuretic potential of *Jussiaea suffruticosa* Linn. extract in albino rats. Indian *Journal of Pharmaceutical sciences,* 150-151. (2000i)

Nadkarni K.M. Nadkarni, A.K. ***Indian Materia Medico***. Popular Prakashan, Bombay, Vol.I, 731. 1992.