
Evaluation of Diuretic Potential of *Jussiaea suffruticosa* Linn. extract in Rats

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Methanolic extract of the aerial parts of *Jussiaea suffruticosa* Linn. (MEJS) was evaluated for its diuretic potential in albino rats. The parameters monitored during the evaluation of diuretic potential are total urine volume, body weight before and after the test, concentration of electrolytes such as sodium (Na⁺), potassium (K⁺) and chloride (Cl⁻) in urine. The urine volume of the MEJS-treated rats was two fold higher when compared to control (saline) group. Excretions of electrolytes have also been increased when compared to the control group. The diuretic potential of MEJS was statistically significant and comparable to that of the standard diuretic agent furosemide.

The plant *Jussiaea suffruticosa* Linn. (Onagraceae) is well known as Banlunga (Hindi), Lablunga (Bengali), Nirrkirambu, Kattukrambu (Tamil) in Indian traditional medicines¹. The plant is semi-shrubby, erect, perennial, 60-90 cm high, distributed as a weed in cultivated paddy fields and wet fields throughout India and Srilanka¹⁻⁴. The whole plant, reduced to bulb and steeped in buttermilk is useful in dysentery and diarrhea. The decoction of this plant is used as a vermifuge, astringent, carminative, diuretic and anthelmintic²⁻⁴. On the basis of the traditional medicinal uses of the plant as a diuretic, the present study was carried out to provide pharmacological evidence for the folklore medical use.

Jussiaea suffruticosa Linn. plants were collected from a cultivated paddy field in the month of November near Thanjavur, Tamilnadu. The taxonomical identification of the plant was established by Botanical Survey of India, Shibpur, Howrah and a voucher specimen has been kept in our research laboratory for future reference. The whole plants were dried under shade.

The dried plants were powdered and passed through a 40-mesh sieve. The powdered plant was extracted with 90% methanol in soxhlet extraction apparatus. A semi-solid mass was obtained (yield 9.5% w/w with respect to the dried powder) after complete elimination of solvent

under reduced pressure. The chemical constituents were identified by qualitative analysis and confirmed by thin layer chromatography for the presence of flavonoids, steroids, alkaloids and tannins. The methanolic extract of *Jussiaea suffruticosa* (MEJS) was stored in a dessicator and a weighed amount was suspended in normal saline for the present study.

Adults Wistar rats of either sex weighing 140-170 g were used. The animals were housed in standard metal cages provided with food and water *ad libitum*. The method of Lipschitz *et al.* (1943)⁵ and Kavimani *et al.* (1997)⁶ was followed for the evaluation of diuretic activity. The animals were divided into four groups (6 in each), were fasted and deprived of water for 18 h prior to the experiment. On the day of experiment, two groups were given normal saline 25 ml/kg, p.o., in which the MEJS 200 and 400 mg/kg were suspended. The third and fourth groups received saline (control) and furosemide 20 mg/kg (standard), respectively. Immediately after the administration, the animals were placed in metabolic cages (2 per cage) specially designed to separate urine and faecal matter and observed at room temperature of 25±0.5°. During the course of experiment, no food and water was made available to the animals. The urine was collected and measured upto 5 h of the administration. The total volume of urine collected from control as well as standard group was also measured. The parameters monitored for each

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TABLE 1 : EFFECT OF MEJS ON EXCRETORY PARAMETERS

Treatment	Measured parameters of experimental groups			
	Total urine volume (ml/kg)	Total sodium (μ moles/kg)	Total potassium (μ moles/kg)	Total chloride (μ moles/kg)
Saline (control)	20.2 \pm 0.36	83.4 \pm 0.64	33.4 \pm 0.54	750.7 \pm 0.43
Furosemide 20 mg/kg (std.)	66.4 \pm 0.45*	170.4 \pm 0.50*	75.2 \pm 0.72*	3084.4 \pm 0.85*
MEJS 200 mg/kg	33.6 \pm 0.27*	111.8 \pm 0.94*	50.4 \pm 0.54*	1868.3 \pm 0.65*
MEJS 400 mg/kg	40.6 \pm 0.42*	159.8 \pm 0.45*	83.6 \pm 0.54*	2887.8 \pm 0.52*

Each value is a mean \pm SEM of six samples. *Denote Significant difference when compared to control values at $P \leq 0.05$, MEJS denotes methanolic extract of *Jussiaea suffruticosa* Linn

individual rat were, body weight before and after experiment, total urine volume and concentrations of Na⁺, K⁺ and Cl⁻ in the urine. The concentration of sodium and potassium were analyzed using a flame photometer and the amount of chloride was estimated as silver nitrate solution (2.096 g/l) consumed using one drop of 5% potassium chromate solution as indicator.

The urine volume of MEJS administered rats was elevated and particularly the rats which received MEJS at 400 mg/kg, excreted twice the volume when compared to the control group (saline). The excretion of sodium, potassium and chloride ions has also been increased. All results were compared with those of furosemide treated group (Table. 1).

The results obtained in the present study indicate that MEJS act as an effective hypernatraemic, hyperchloremic and hyperkalaemic diuretic. MEJS is also found to possess a very significant activity on the renal system of the rat. The diuretic potential observed with MEJS was in a dose-dependent manner. The maximum activity was observed in the animals administered with 400 mg/kg body weight of MEJS as well as in those animals which received furosemide (20 mg/kg). On the basis of these results, it is possible to conclude that MEJS in the doses tested produced significant diuretic

activity in rats and this observation supports the folklore practice of using this plant as a diuretic.

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REFERENCES

1. Anonymous, The wealth of India, Vol. I, Publication and Information Directorate, CSIR, New Delhi, 1966, 311.
2. Anonymous, The useful plants of India, Publication and Information Directorate, CSIR, New Delhi, 1986, 305.
3. Kirtikar, K.R., Basu, B.D., In; E. Blatter., J.F. Caius, Mhaskar., Eds. Indian Medicinal Plants. Bishen Singh and Mahendra Pal Singh, Dehradun, 1935, 2020.
4. Nadkarni, K.M., Nadkarni, A.K., Indian Materia Media, Vol, I, Popular Prakashan, Bombay, 1992, 731.
5. Lipschitz, W.L., Hadidian, Z. and Kerpcar, A., J. Pharmcol. Exp. Ther., 1943, 79, 97.
6. Kavimani, S., Ilango, R., Thangadurai, J.G., Jayakar, B., Majumdar, U.K. and Malaya Gupta., India J. Pharm. Sci. 1997, 96.
7. Kushal, R., Tripathi, R.M., Veeranjanyalu, A., Krishnamoorthy, A., Thapar, G.S. and Varma R.K., India J. Pharmcol. 1993, 25, 95.