

Diuretic Activity of *Sufoof-e-Suzak Qawi* an Unani Polyherbomineral Formulation

K.L. KRISHNA and S.S. AGRAWAL

For author affiliations, see end of text.

Received May 6, 2006; Revised May 29, 2006; Accepted June 5, 2006

This paper is available online at <http://ijpt.iuums.ac.ir>

ABSTRACT

The *Suffof-e-Suzak Qawi* is an unani polyherbomineral formulation and is being used in the alternative system of medicine for its anti-gonorrhoeal and diuretic activity. It is an official monograph in national formulary of unani medicine (NFUM) and reported as anti-gonorrhoeal and diuretic. The aqueous suspension of the formulation was studied for its possible diuretic activity and its effect on urinary sodium and potassium excretion. The results were compared with animal groups treated with vehicle and standard drug furosemide. When tested in healthy adult rats the formulation at a dose of 500, 750 and 1000 mg/kg has shown increase in the urinary output and urinary sodium excretion but not any increase in the urinary potassium excretion at all dose levels. The present study showed that, the aqueous suspension of *Suffof-e-Suzak Qawi* has diuretic activity comparable with the standard drug furosemide in producing urinary output and urinary sodium excretion and has no effect on urinary potassium excretion.

Keywords: *Saluretric, Diuretic, ISM & H, Alternative system of medicine, Unani*

The *Sufoof-e-Suzak Qawi* (SESQ) is an unani polyherbomineral formulation with official monograph in NFUM and it has been reported as anti-gonorrhoeal and diuretic [1]. It is a powdered formulation which contains 10 different plant/mineral constituents: *Samag-e-darakte-e-beer* (*Zizyphus jujuba*), *Gul-e-tesu* (*Butea monosperma*), *Satt-e-gilo* (*Tinospora cardifolia*), *Satt-e shilajit* (Asphaltum), *Rewand chini* (*Rhem officinalis*), *Tabashir* (*Bambusa bambos druce*), *Dhana heel khurd* (*Elletaria cardamomum*), *Jawakar* (Potassium carbonate), *Shora qalmi* (Potassium nitrate) and *Nabat safaid* (Sucrose). Some of its constituents are known medicines and reported as depurative, diuretic, anthelmintic, anti-convulsant, giardiasis, antihepatotoxic, bactericidal and fungistatic (*Butea monosperma*) [2-5], antidiarrhoeal, fever, antiulcer and old wound (*Zizyphus jujube*) [6], bittertonic, astringent, potent aphrodisiac (*Tinospora cardifolia*) [7, 8], free radical scavenging activity (Asphaltum) [9], stomachic, tonic, cathartic properties, astringent (Rhubarb) [10], generally given in fever to assuage thirst, expectorant (Tabashir) [11], powerful aromatic, stimulant, carminative, stomachic and diuretic (*Elletaria cardamomum*) [12-14]. Some of the constituents of SESQ (*Butea monosperma*, *Tinospora cardifolia* and *Elletaria cardamomum*) are reported as diuretic agents. With this background the diuretic activity of SESQ was carried out to find its possible effect on uri-

nary excretion including urine sodium and potassium excretion.

MATERIALS AND METHODS

Drug Sample

The formulation was procured from Center Council for Research on Unani Medicine (CCRUM), Hyderabad, under the project of ISM & H for standardization work. The same sample was used as received for the studies. The formulation was given orally as 2.5 % gum acacia suspension at different dose levels. The suspension was prepared by triturating the powdered formulation with 2.5% gum acacia in a glass mortar unidirectionally with water.

Experimental Animals

Studies were done on healthy male albino rats weighing about 200-250 g and the animals were obtained from college animal house and permission was taken from institutional animal ethical committee. The animals were housed in animal house and kept in 12 hr light dark cycle, and allowed to access food and water *ad libitum*, except the brief period during the experiment. Rats were divided into five groups each of six animals. Group I received 2.5 % gum acacia solution

Table 1. Shows the effect of aqueous suspension of Sufoof-e-Suzak Qawi on urinary output at doses of 500,750 and 1000 mg/kg orally.

Sl. No.	Treatment	Volume of urine collected for 24 h (mL) Mean \pm SEM
01	Control	7.7 \pm 0.59
02	SESQ 500 mg/kg	9.78 \pm 0.78*
03	SESQ 750 mg/kg	11.61 \pm 1.02*
04	SESQ 1000 mg/kg	12.53 \pm 0.80*
05	Furosemide 5 mg/kg	13.98 \pm 0.80***

Stat significance * $p < 0.05$ s *** $p < 0.001$ h

(vehicle treated), group II – IV received aqueous suspension of powdered formulation at a dose of 500, 750 and 1000 mg/kg and group V received standard drug Furosemide 5 mg/kg. All doses were given with 25 mL/kg saline.

Measurement of Diuretic Activity

Method of Lipschitz et al. 1943 [15] was followed Rats were fasted overnight and treated with vehicle, aqueous suspension of the powdered formulation at different dose levels and standard drug as stated above along with 25 mL/kg saline. The rats were placed in metabolic cages individually as soon as the treatments. The urine sample was collected after 24 h and measured by using a standard measuring cylinder. The amount of urine collected for 24 h was compared with that of control and standard drug treated groups.

Measurement of Urine Sodium and Potassium Level

Estimation of Sodium and Potassium content of the urine samples treated with drug suspension at different doses as well as other groups were done by using a lab model Mediflame photometer. The urinary Sodium and Potassium content of the formulation treated groups were compared with that of control and standard drug. The effect of drug sample on the Sodium and Potassium urinary excretion was calculated.

Statistical Analysis

The results were expressed as mean \pm SEM. All statistical comparisons were made by means of student's t-test and a p -value smaller than 0.05 was considered as significance.

RESULTS

Table 1 shows that the urine volume collected for 24

Table 2. Shows the effect of aqueous suspension of Sufoof-e-Suzak Qawi on urinary sodium and potassium output at doses of 500,750 and 1000 mg/kg orally

Sl No.	Treatment	Sodium (meq/L) Mean \pm SEM	Potassium (meq/L) Mean \pm SEM
01	Control	1.85 \pm 0.04	0.62 \pm 0.02
02	SESQ 500 mg/kg	2.08 \pm 0.07	0.62 \pm 0.02
03	SESQ 750 mg/kg	3.10 \pm 0.10***	0.68 \pm 0.16
04	SESQ 1000 mg/kg	3.16 \pm 0.11***	0.65 \pm 0.01
05	Furosemide 5 mg/kg	3.32 \pm 0.06***	0.78 \pm 0.02

Stat significance * ** $p < 0.001$ h

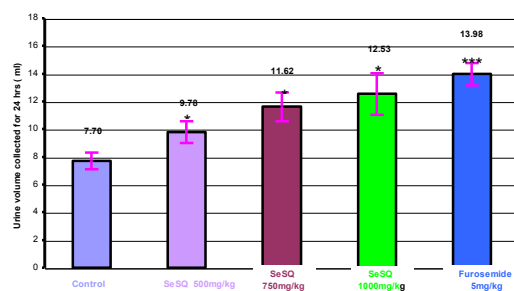


Fig 1. Shows the effect of aqueous suspension of Sufoof-e-Suzak Qawi at a dose of 500, 750 and 1000 mg/kg orally on urinary Sodium Excretion in urine Samples collected for 24 h- meq/L (Mean \pm SEM). (Animal used: Rats, n=6)

hours for vehicle and formulation treated orally at dose levels of 500, 750 and 1000 mg/kg and Furosemide 5mg/kg treated group was found to be 7.7 \pm 0.59, 9.7 \pm 0.78, 11.6 \pm 1.02, 12.5 \pm 0.80 and 13.9 \pm 0.80 mL respectively. Table 2 also shows that the urinary sodium content was found to be 1.85 \pm 0.04, 2.08 \pm 0.07, 3.01 \pm 0.10, 3.16 \pm 0.11 and 3.32 \pm 0.06 meq/L for vehicle, formulation at different dose levels and standard drug treated groups respectively. Table 2 shows that the urinary potassium output was found to be 0.62 \pm 0.02, 0.62 \pm 0.02, 0.68 \pm 0.16, 0.65 \pm 0.01 and 0.78 \pm 0.02 meq/L for vehicle, formulation at different dose levels and standard drug treated groups respectively.

DISCUSSION

The vehicle, aqueous suspension of the formulation at different doses and standard drug were given orally and urine collected for 24 hrs was measured and Sodium and Potassium content of the urine collected for 24 hrs were estimated. The aqueous suspension of the SESQ has shown significant increase in the urine volume at 500, 750 and 1000 mg/kg dose levels as compared to control and standard drug treated groups under the same condition (Fig 1). The aqueous suspension of SESQ was found to increase the urinary Sodium output (Fig 2) but not potassium at all dose levels (Fig 3).

SUMMARY AND CONCLUSION

The present study showed that the aqueous suspension of the SESQ significantly increases the urine output

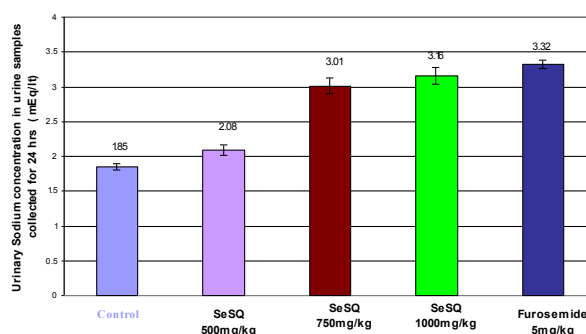


Fig 2. Shows the effect of aqueous suspension of Sufoof-e-Suzak Qawi at a dose of 500, 750 and 1000 mg/kg orally on urine output for 24 h - mL (Mean \pm SEM). (Animal used: Rats, n=6).

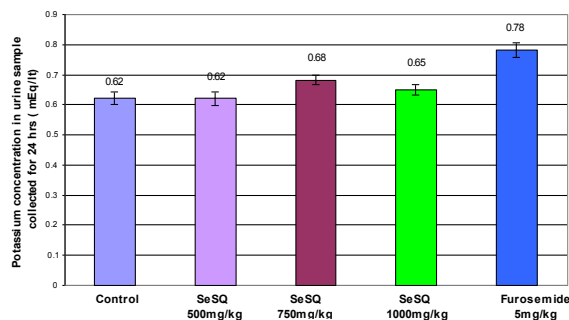


Fig 3. Shows the effect of aqueous suspensions of Sufoof-e-Suzak Qawi at a dose of 500, 750 and 1000 mg/kg orally on urinary Potassium excretion in urine samples collected for 24 h -meq/L (Mean+SEM). (Animal used: Rats, n=6).

and excretion of urinary Sodium and had no effect on the urinary Potassium excretion. Diuretics have two separate connotations: increase urinary per se and net loss of solute (i.e. electrolytes) and water (i.e. saluretic).

These two processes are involved in the suppression of renal tubular reabsorption of electrolytes, water and low molecular weight organic compounds into the blood stream and as a consequence, promote the formation of urine [16]. An attempt to extrapolate the diuretic action of plant extract/herbs from rat to man using the activity of Furosemide in the organism as a guideline has been reported [17]. The result clearly shows that the aqueous suspension of SESQ at a dose of 500, 750 and 1000 mg/kg administered orally produce significant dose dependant increase in urinary excretion and urinary Sodium loss but no effect on urinary Potassium loss with respect to control and standard drug treated groups. The maximum increase in urine output was 12.5 mL for 1000 mg/kg and maximum Sodium excretion was 3.16 meq/L. These data demonstrate that the formulation has diuretic effect and is as potent as Furosemide. This indicates the use of SESQ in alternative medicine (Unani) as a diuretic agent based on a sound mechanistic background. However the above calculation only provide lead for further investigation of the pharmacological action of SESQ in a more appropriate models like anaesthetized dogs and isolation of active principles and finding the phytochemical(s) responsible for the diuretic activity and the mechanism of action [17].

ACKNOWLEDGEMENTS

The author is highly thankful to AICTE for sponsoring to the higher studies under Quality Improvement Programme and department of ISM & H, Ministry of Health and Family welfare, Govt. of India for providing gift samples and necessary guidelines.

REFERENCES

1. National Formulary of Unani Medicine, published by Govt. of India, Ministry of Health and Family Welfare, New Delhi, 244.
2. Kiritikar KR, Basu BD. Indian Medicinal Plants, Vol-I, International book distributors, Booksellers & Publishers 9/3, Rajpur road. Dehradun, India. 1998;788-9.
3. Prashant D, Asha MK, Amit A, Padmaja R. Anthelmintic activity of *Butea Monosperma*. *Fitoterapia*. 2001;72(4):421-2.
4. Kasture VS, Chopde CT, Deshmukh VK. Anticonvulsant activity of *Albizia lebbek*, *Hibiscus rosa sinensis* and *Butea monosperma* in experimental animals. *J Ethnopharmacol*. 2000;71(1-2):65-75.
5. Agarwal AK, Tripathi DM, Sahai R, Gupta N, Saxena RP, Puri A, Singh M, Mishra RN, Dubey CB, Saxena KC. Management of giardiasis by a herbal drug Pippali Rasaana a clinical study. *J Ethnopharmacol*. 1997;56(3):233-6.
6. Kiritikar K. R and Basu B.D. Indian Medicinal Plants, Vol-I, International book distributors, Booksellers & Publishers 9/3, Rajpur road. Dehradun India. 1998;589-91.
7. Raghunathan K, Roma Mitra. Pharmacology of Indigenous drugs. Volume-I central council for research on ayurvedic and Siddha (department of ISM & H) Ministry of health and family welfare, Govt. of India. New Delhi 1999; 321-53.
8. Sisodia P, Laxmi Narayana V, Pharmacological studies of *Tinospora cardifolia*. *Indian J Physio Pharmacol*. 1961;2:21.
9. Vaishwarar I, Kowale CN, Jiddewar GG. Effect of two Ayurvedic drugs *Shilajeet* & *Eclinal* on changes in liver & serum lipids produced by carbon tetrachloride. *Indian J Exp Bio*. 1976;14(1):57-8.
10. Nadkarni KM. *Amomum subulatum* and *Elettaria Cardamomum* in Indian Materia Medica. 1954, 3rd ed, Dhootapapashwar, Bombay, p. 594.
11. Kiritikar K. R and Basu B.D. Indian Medicinal Plants, Vol-I, International book distributors, Booksellers & Publishers 9/3, Rajpur road. Dehradun India. 1998;878-9.
12. Nadkarni KM. *Amomum subulatum* and *Elettaria Cardamomum* in Indian Materia Medica. I. Dhootapapashwar, Bombay. 1954; p. 475-6, 593-4.
13. Kiritikar K. R and Basu B.D. Indian Medicinal Plants, Vol-I, International book distributors, Booksellers & Publishers 9/3, Rajpur road. Dehradun India. 1998; p. 556-78.
14. Raghunathan K, Roma Mitra, Pharmacognosy of Indigenous Drugs. Volume-I, Central Council for Research in Ayurvedic and Siddha (Department of ISM & H), Ministry of Health and Family Welfare, Govt. of India, New Delhi, p. 321-53.
15. Lipschitz WL, Hadidian Z, Kerpesar A. Bioassay of diuretics. *J Pharmacol Exp Ther*. 1943;79:97-110.
16. De Stevens G. Diuretics: Chemistry and Pharmacology. 1st ed. Academic Press, New York, 1963; p. 2-7 and 52-8.
17. Englert E and Harnischfeger G. Diuretic action of aqueous orthosiphon extract in rats. *Planta Medica*. 1992;58:237-8.

CURRENT AUTHOR ADDRESSES

- K.L. Krishna, JSS College of Pharmacy, SS Nagara, Mysore, Karnataka, India-570015. E-mail: krishpharm@rediffmail.com (corresponding author).
- SS Agrawal, Professor, Principal and Head, Department of Pharmacology, Delhi Institute of Pharmaceutical Sciences and research (DIPSAR), New Delhi, India-110017.