

## To Compare the Effects of Tribulus Terristris with Furosemide on Urine Volume and Electrolytes

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### Abstract

**Background:** Tribulus terrestris belongs to Zygophyllaceae family, although the plant was recognized as a diuretic and aphrodisiac but, its efficacy as diuretic has never been evaluated. The objective of this study was to evaluate and compare its effect on urine volume and electrolytes with furosemide. It is a Comparative study.

**Material and Methods:** The study was conducted in

Fatima Memorial Medical and Dental College, Lahore the department of Pharmacology and Therapeutics, Post Graduate Medical Institute, Lahore. The duration of study was two weeks. Twenty Four rabbits of mixed breed were purchased locally and kept in the animal house of Postgraduate Medical Institute, Lahore for a week for acclimatization before starting the experiment. Twelve hours light and dark cycle was maintained. They were fed on grass, grain, seasonal vegetables and water ad libitum. Animals were weighed for calculation of dosage of herb. They were divided into three equal groups randomly. Group Tt was given Tt while Group F was given furosemide, while group C was not given any drug.

**Results:** (Tt vs F), the change in 24 hours urine volume was found statistically significant  $P < 0.05$  on day 01 and day 15. Serum  $\text{Na}^+$ ,  $\text{K}^+$  levels were also found statistically significant  $P < 0.05$  throughout the study period.

**Conclusion:** The results of our study reveal that Tt has diuretic properties but is less efficacious than furosemide. Keeping in view, the result of our study, we recommend that the use of this herb may be promoted as diuretic agent, it may be helpful in pulmonary oedema and other oedematous conditions.

**Key words:** Control = CT. Tribulus terrestris = Tt. Furosemide = F. Versus = VS. Sodium =  $\text{Na}^+$ . Potassium =  $\text{K}^+$ .

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### Introduction

Herbal medicine has been defined by WHO<sup>8</sup> as a plant

derived material or preparation with therapeutic or other human benefits which contain either raw or processed ingredients from one or more plants.<sup>1</sup>

*Tribulus terrestris* belongs to Zygophayllaceae family.<sup>2,3</sup> It is a natural herb commonly known as puncture vine and grow throughout India. The plant was recognized as a diuretic and aphrodisiac.<sup>4,6</sup> The ancient Greeks used it as Styptic: in the treatment of postpartum haemorrhage, epistaxis and gastrointestinal bleeding. It is also used as a remedy for inflammation and arthritis in South Africa.<sup>2,6</sup>

Abnormalities in fluid volume and electrolyte composition are common and important clinical disorders. Drugs that block specific transport function of renal tubules are valuable clinical tools in the treatment of these disorders. Although various agents that increase urine volume (diuretic) have been described since antiquity.<sup>5</sup>

## Material and Methods

**Setting:** In the department of Pharmacology and Therapeutics, Post Graduate Medical Institute, Lahore.

**Duration:** Study duration was two weeks.

**Sample Size:** Twenty Four rabbits of mixed breed were purchased locally and kept in the animal house of Postgraduate Medical Institute, Lahore for a week for acclimatization before starting the experiment. Twelve hours light and dark cycle was maintained. They were fed on grass, grain, seasonal vegetables and water ad libitum. Animals were weighed for calculation of dosage of herb. They were divided into three equal groups of 8 rabbits each.

**Drug used:** *Tribulus terrestris* extract (Aqueous) and Furosemide.

**Preparation of Extract:** *Tribulus terrestris* was purchased from local market with the help of experts of PCSIR, Lahore. The herb was made free of particulate impurities manually and spread in a stainless steel tray for drying.<sup>7</sup>

The extract was prepared by Maceration method (5 gm in 100 ml water). 100 gram air dried *Tribulus terrestris* was soaked in 2 liter (2000 ml) of distilled water in a flask for 24 hours, shaking frequently during 6 hours and allowed to stand for 18 hours. Than filtrate was taken and fiber waste material was discarded. After that concentrated dry powder extract was obtained by evaporating the filtrate at 70°C in a scientific instrument / oven mod Eminex 854 SCHWABACH, Germany Din 12880 Kim Nem Temp. 220.<sup>8</sup>

The dry powder extract thus obtained was weighed with electronic balance which came out to be 8.5 gram / 100 gram air dried tribulus terrestris and this dry powder of herb was dissolved in 1000ml D/W to get herbal preparation as 100 mg/ml for oral use. Herbal preparation was kept in refrigerator.<sup>9</sup>

**Methodology**

Twentyfour rabbits of mixed breed were divided into three groups; control (CT), Tribulus terrestris (Tt) and furosemide (F).

**Group – I (Ct)**

Control groups (No medicine). They were kept under the same condition and handled like drug group animals.

**Group – II (Tt)**

They received tribulus terrestris, 100 mg / kg body weight and administered orally twice daily.<sup>3</sup>

**Group – III (F)**

They received Furosemide, 5 mg/kg body weight administered orally twice daily.<sup>10</sup>

**Collection of Sample**

For urine collection rabbits were kept in special cages for twenty four hours on day 0 and day 14, completed on day 1 and day 15.

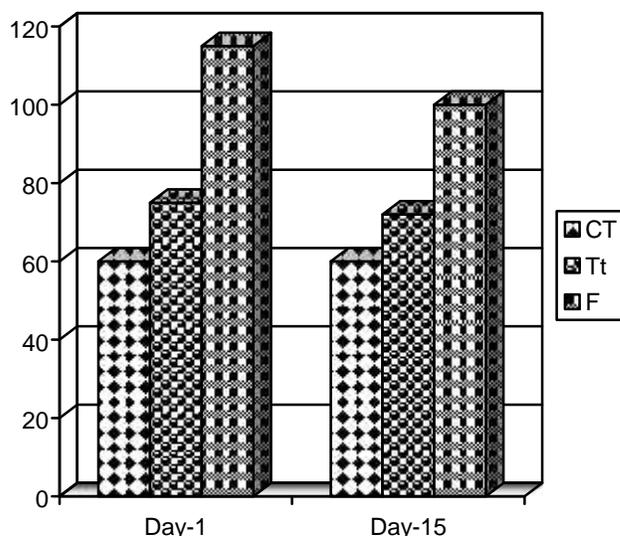
**Urine**

Twenty four hours urine sample was collected in plastic bottles attached below the cages. The urine samples were taken two times during the study period i.e. on day 1 and day 15.

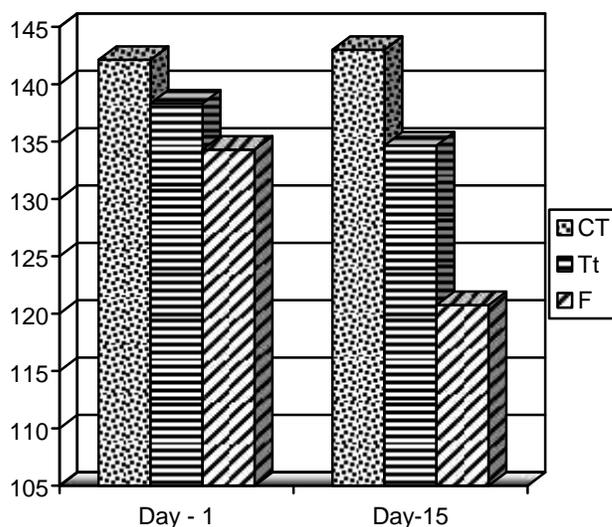
**Blood**

Blood was collected two times during study on day 1 and day 15, from the marginal vessels of the ear. For this purpose hairs were shaved from the ear margin. It was then disinfected with 70% alcohol. Xylene was applied for vasodilatation and 5 ml of blood was taken in a disposable syringe and then kept in centrifuge

tube, the bleeding vessel was pressed with a sterilized cotton swab till stoppage of bleeding. Xylene was removed first by alcohol and then by soap and water. The collected blood was allowed to clot at room temperature and then centrifuged a 3000 rpm for ten minutes. Serum was separated with the help of an automatic micropipette and stored in a clean and dry serum storage vial in a deep freezer for further analysis.



**Graph 1:** Effect of Drugs on Urine Volume (ml).

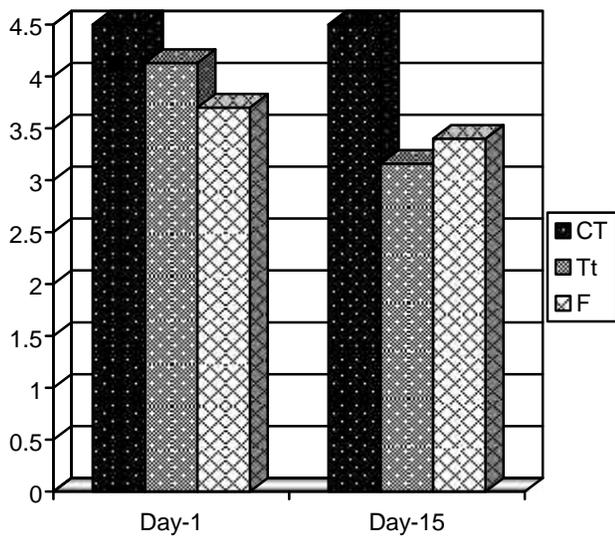


**Graph 2:** Sodium Serum Level (mmol/L).

**Statistical Analysis**

Data is analyzed by SPSS program in computer and

value of significance (P-Value) kept ( $< 0.05$ ).



**Graph 3:** Effect of drugs on Serum Potassium Level (mmol/L)

## Results

(Tt vs F), the change in 24 hours urine volume was found statistically significant  $P < 0.05$  on day 01 and day 15. Serum  $\text{Na}^+$ ,  $\text{K}^+$  levels were also found statistically significant  $P < 0.05$  throughout the study period.

## Discussion

The results of our study reveal change in 24 hours urine volume (Increased) and  $\text{Na}^+$ ,  $\text{K}^+$  serum levels (decreased) in comparison with the control group and the results are consistent with the study conducted in 2003.<sup>11</sup> Tribulus terrestris produced diuresis and similar results are seen in various studies conducted on the herb.<sup>12,4,3,13-15</sup>

Furosemide is a high ceiling loop diuretic agent and its effects are mentioned that it rapidly promotes excretion of water and salt.<sup>16</sup>

It significantly increased the 24 hours urine volume and reduction of serum  $\text{Na}^+$  level as compared to Tt group but the effect on serum potassium were not similar.

We conclude that our findings have demonstrated that Tt has diuretic properties but less effective than conventionally used furosemide, even then its addition



**Table 1:** Effect of Drugs on urine Volume (ml).

Groups	Day 1	Day 15	Comparison of levels Day 1 – 15
	Mean ± SEM		Significance
Control	60.00 ± 2.31	60.00 ± 4.63	1.00
Tribulus terrestris	75.00 ± 2.99	72.00 ± 3.90	.649
Furosemide	115.00 ± 2.99	100.00 ± 7.07	.138

is good and useful in the treatment of pulmonary oedema and other oedematous condition for example congestive cardiac failure, kidney disease, where diuretic agents are clinically indicated, alone or in combination. Tribulus terrestris may be used in combinations with potassium sparing diuretic. Because Tt lose K<sup>+</sup> and K<sup>+</sup> sparing diuretics conserve K<sup>+</sup>, to normal the serum K<sup>+</sup> level. Therefore Tt and angiotensin converting enzyme inhibitors may be given together in hypertension to control blood pressure as well as serum K<sup>+</sup> level.

Results are shown in tables and presented in graphs.

**Table 2:** Comparison of effect of drugs on Urine Volume (ml).

Group	Comparison of levels	
	Day 1	Day 15
	Significance	
Control Vs Tribulus terrestris	.005	.066

**Table 3:** Sodium Serum Level (mmol/L).

Groups	Day 1	Day 15	Comparison of levels Day 1 – 15
	Mean ± SEM		Significance
Control	142.13 ± .30	143.00 ± .35	.155
Tribulus terrestris	138.33 ± .07	134.66 ± .25	0.00
Furosemide	134.30 ± .07	120.75 ± .57	0.00

**Table 4:** Comparison of effects of drugs on Sodium Serum Level (mmol/L)

Group	Comparison of levels	
	Day 1	Day 15
	Significance	
Control Vs Tribulus terrestris	.000	.000
Tribulus terrestris Vs Furosemide	.000	.000

**Table 5:** Effect of drugs on Serum Potassium Level (mmol/L).

Group	Day 1	Day 15	Comparison of levels
	Mean ± SEM		Day 1 – 15
			Significance
Control	4.50 ± .11	4.50 ± .12	1.00
Tribulus terrestris	4.13 ± .03	3.16 ± .04	.000
Furosemide	3.70 ± .10	3.40 ± .10	.072

**Table 6:** Comparison of effect of drugs on Serum Potassium Level (mmol/L).

Group	Comparison of levels	
	Day 1	Day 15
	Significance	
Control Vs Tribulus terrestris	.004	.000
Tribulus terrestris Vs Furosemide	.000	.009

**Conclusion**

The results of our study reveal that Tt has diuretic properties less than furosemide without producing much disturbance in urine volume and electrolyte. Keeping in view, the result of our study, we recommend that the use of this herb may be promoted as diuretic agent, will be helpful in pulmonary oedema and other oedematous conditions after evaluating the parameters of this herb and drug interaction.

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