



DIURETIC ACTIVITY OF *COMMIPHORA CAUDATA* (WIGHT & ARN. ENGL.)

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ABSTRACT

Ethyl acetate and methanolic extracts of *Commiphora caudata* syn: *Protium caudatum* were tested for diuretic activity in rats. The parameters studied were body weight before and after test period, total urine volume, Na⁺, K⁺ and Cl⁻ content in urine. In the present study, ethyl acetate and methanolic extracts of *Commiphora caudata* (200 mg/kg of body weight) exhibited increase in urine volume and increase in Na⁺ excretion. Frusemide was used as a reference diuretic.

Key words: *Commiphora caudata*, Diuretic activity.

INTRODUCTION

The plant *Commiphora caudata* (family : Burseraceae) is claimed to possess astringent, sweet, cooling, aphrodisiac, diuretic and antidiabetic activities. It is used for fever, strangury, vitiated conditions of vata and pitta in siddha systems of medicine. The leaves are useful in rheumatism. It was reported to contain tannins, carbohydrate and oleo-gum resin^{1,2}. The prolonged use of synthetic diuretics is known to produce serious side effects such as diabetonic effect, electrolyte imbalance, impotence and hyperuricemia³. Hence search for natural diuretics that possess established therapeutic efficacy and at the same time devoid of these adverse effect is justified. Therefore, an effort has been made to experimentally determine the diuretic activity of ethyl acetate and methanolic extracts of *Commiphora caudata*.

EXPERIMENTAL

Materials: The entire parts of plant (including roots) were collected from

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vasudevanallur. Tirunelveli, India during the month of February 2006 and identified by a botanist of Government Siddha Medical College, Palayamkottai, Tirunelveli. The plant was dried in shade for 6 days and coarsely powdered.

Extraction

The coarsely powdered material was extracted separately with ethyl acetate and methanol (AR grade), Sd fine-Chemicals by soxhletion for six hours and concentrated in a rotary evaporator. Green colored and dark green colored residues were obtained in ethyl acetate and methanol extracts, respectively. The yield of the extracts were 8.10% and 10.80, respectively.

Method

The method of Lipschitz et. al⁴ was employed for the assessment of diuretic activity of the extracts. Adult healthy albino rats of either sex, each weighing 150-170 g were used for the study. All the animals were maintained under standard conditions of temperature and humidity. Four groups of six rats were fasted and deprived of water for 18 hrs prior to the experiment. On the day of the experiment, priming dose of normal saline 25 mL/kg was given to all the rats by oral intubation. Ethyl acetate and methanolic extracts of *Commiphora caudata* were suspended in normal saline and reference drug frusemide was dissolved in water. Group I served as the negative control and received only normal saline orally. Second group received frusemide (20 mg /kg; orally.) as a reference diuretic while third and fourth group received ethyl acetate and methanolic extracts at the dosage of 200 mg/kg orally 1 hour prior to the administration of normal saline.

Immediately after dosing, the rats were placed in metabolic cages (3 in each cage) specially designed to separate urine and faeces and kept at room temperature $25 \pm 0.5^{\circ}\text{C}$ through out the experiment. The urine was collected in measuring cylinders up to 5 hours after the administration of drugs. During this period, no water or food was made available to the animals. The total volume of urine collected was measured for both; control and treated groups. The parameters taken for each individual rat were body weight (before and after test period), total urine volume and concentrations of Na^+ , K^+ and Cl^- in urine.

Analytical procedure

Concentrations of Na^+ and K^+ in urine were measured by flame photometry (Elico model) and concentrations of Cl^- in urine was estimated by titrating with N/50 silver nitrate solution using 3 drops of 5% potassium chromate solution as indicator. All the results are expressed as mean $\text{meq/L} \pm \text{SEM}$, $n = 6$. The level of significance ($p > 0.001$)

was statistically analysed using student "t" test.

RESULTS AND DISCUSSION

Table 1 shows diuretic activity of ethyl acetate and methanolic extracts of *Commiphora caudata*. The urine volumes of animals treated with ethyl acetate and methanolic extracts were 2.82 ± 0.08 and 3.12 ± 0.08 , respectively. Na^+ , K^+ and Cl^- levels in the urines of ethyl acetate and methanolic extracts treated animals were 98.4 ± 7.3 , 84.2 ± 3.9 and 82.30 ± 5.8 and 109.2 ± 1.42 , 86.6 ± 0.76 and 84.52 ± 1.34 , respectively. The Na^+ and K^+ ratio of ethyl acetate and methanolic extracts were found to be 1.16 and 1.38, respectively.

Table 1. Diuretic activity of *Commiphora caudata*

Treatment	Dose (mg/kg)	Urine volume (mL)	Electrolyte excretion			
			Na^+ (meq/L) m \pm SEM	K^+ (meq/L) m \pm SEM	Total chloride μ moles m \pm SEM	Na^+/K^+ ratio. meq/L
Control	Saline 25 mL/kg	1.21 ± 0.08	95.5 ± 1.43	98.3 ± 0.88	85.0 ± 1.3	0.97
Frusemide	20	$3.55 \pm 0.09^*$	$138.8 \pm 0.19^*$	$114.6 \pm 1.49^*$	$95.0 \pm 1.35^*$	1.46
Ethyl acetate extract	200	2.82 ± 0.08	98.4 ± 7.3	84.2 ± 3.9	82.30 ± 5.8	1.16
Methanolic extract	200	$3.12 \pm 0.08^*$	$109.2 \pm 1.42^*$	86.6 ± 0.76	84.52 ± 1.34	1.38

p values versus control by students 't' test* $p > 0.001$. Values are mean \pm SEM, n = 6

Both the extracts increase the excretion of Na^+ where as they did not affect the K^+ and Cl^- excretion significantly when compared with control. The urine volume and Na^+ excretion of methanolic extract is more than that of ethyl acetate extract, indicating that the methanolic extract has better diuretic activity than that of ethyl acetate extract. Unlike frusemide, the K^+ excretion was not affected by both the extracts. It may be due to the fact

that the extracts may act as potassium sparing diuretics like spiranolactone, triamterene and amiloride. Further studies are required to elucidate the exact mechanism by which *Commiphora caudata* extracts exerts the diuretic effect.

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