IJBPAS, September, 2012, 1(8): 1182-1187

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

DIURETIC ACTIVITY OF LEAVES EXTRACT OF ANOGEISSUS ACUMINATE AND GYMNOSPORIA EMERGIATA

HEMAMALINI K* AND VASIREDDY U

Teegala Ram Reddy College of Pharmacy, Meerpet, Hydrabad, India

Corresponding Author: E Mail: iictrrcp@gmail.com

ABSTRACT

The aim of this study was to investigate diuretic effects of leaf extract of Anogeissus acuminate and Gymnosporia emergiata in normal rats. Methanolic extract Anogeissus acuminate and Gymnosporia emergiata leaves were administered to experimental rats orally at doses of 300mg/kg. p.o. Hydrochlorothiazide (10mg/kg) was used as positive control in study. The diuretic effect of the extract was evaluated by measuring urine volume and excretion of sodium-potassium content. Urine volume was significantly increased by methanolic extract in comparison to control group. While the excretion of sodium was also increased by extract (300mg/kg). The methanolic extract had the additional advantage of potassium-conserving effect. We can conclude that methanolic extract of Anogeissus acuminate and Gymnosporia emergiata produced notable diuretic effect which appeared to be comparable to that produced by the reference diuretic HCTZ (hydrochlorothiazide). The present study provides a quantitative basis for explaining the folkloric use of Anogeissus acuminate and Gymnosporia emergiata as a diuretic agent.

Keywords: Diuretic Activity, Anogeissus Acuminate, Gymnosporia Emergiata, Hydrochlorothiazide, Medicinal Plants

INTRODUCTION

A variety of naturally occurring drugs such as Anogeissus acuminate and Gymnosporia emergiata were tested for various pharmacological effects. The plant Anogeissus acuminate Roxburgh is a tall tree, with small leaves (Combretaceae), Cultivated

in south Asia, Arabian Peninsula and Africa. Leaves contain tannins 9.32% and non tannins 9.22% **[1]**. Gymnosporia emergiata wildenow grows widely in most of the aravallies and Indian deserts and it's a woody shrub belongs to a family Celastraceous **[2]**. Leaves of these plants were found to possess Anti-HIV activity, antiulcer, analgesic, and anthelmintic and antilice. Anogeissus acuminate and Gymnosporia emergiata is used as folk reported in treatment of insomnia. There is no report on the diuretic studies of the extract of dried leaves of Anogeissus acuminate and Gymnosporia emergiata. So far, though it is used in folk medicine. Thus it was considered worthwhile to take up such an investigation in detail.

MATERIALS AND METHODS

Collection of leaves of Anogeissus acuminate and Gymnosporia emergiata was done in the month of may. Taxonomic identification of the plant was done by Dr. Madhava chetty Department of Botany, S.V University, Trupathi, and Andhra Pradesh, India. Anogeissus acuminate and Gymnosporia emergiata were dried in shade for 15-20 days. After complete drying, leaves were pulverized to a coarse powder of 40 mesh size in a mechanical grinder.

Extraction Procedure

The leaves were powdered and then defatted with petroleum ether at 60-70 ºC. the powdered material was then air dried and subjected to sohxlet extraction for 18 h at 50-55 ºC to obtain methanolic extract of leaves of Anogeissus acuminate and Gymnosporia emergiata. The extract was thereafter concentrated under vacuum and then air-dried **[3-5]**.

Animals

Adult male Wister rats, each in the weight range of 180-200g, used. The animals were randomly allocated to four treatment groups of 6 animals each and kept in cages and housed under standard conditions of temperature, humidity and dark light cycle (12h012h).

Experimental Protocol

Diuretic activity was determined by the methods of **[6]**, with minor modifications. The rats were randomly divided into four groups of six animals each as follows:

(1) Control-given 5 ml/kg body weight of deionizer water

(2) Methanolic extract of leaves of Anogeissus acuminate-300mg/kg of body weight.

(3) Methanolic extract of leaves of Gymnosporia emergiata -300mg/kg of body weight. And

(4) Hydrochlorothiazide (Ref. STD)-10 mg/kg body weight.

In all cases, the volume of the dose was administered 5 ml/kg body weight. The animals were fasted overnight (18h) prior to the test but with free access to water only, then were given an oral loading of normal saline (0.9%) of 0.05 ml per g body weight. Immediately after administration, the rats were paired and placed in metabolism cages. Urine was collected in a graduated cylinder and its volume was recorded at 2 h intervals for 8 h. Cumulative urine excretion was calculated in relation to body weight and expressed as ml/100 gm of body weight. Electrolyte (Na^+ and K^+) concentrations estimated (as described below) from the urine sample of each pair of rats at the end of the experimental period (8h) and expressed as mequiv/100g body weight **[7,8]**.

Measurement of Urine Output and Analysis of Electrolytes

Na^+ and K^+ concentrations were measured using a Toshniwal group model TCM-35 flame Photometer. The instrument was calibrated with standard solutions containing different concentrations of Na^+ and K^+.

Statistical Analysis

The results were expressed as mean values ± S.E.M (standard error of mean) for pairs of rats. Statistical was carried out by analysis of variance (ANOVA)

RESULTS

In the present study, methanolic extract of Anogeissus acuminate and Gymnosporia emergiata were subjected to preliminary chemical tests.

Table 1 shows the presence of various chemical constituents. Both the extracts were subjected to pharmacological screening to evaluate acute toxicity studies and diuretic activity. Both the extracts were screened for diuretic activity and the extracts were administered orally at the dose of 200 mg/kg b.w Urine volume (ml), urine pH, Concentration of Na+, K+, and Cl- electrolytes (mmol/l) in the urine were recorded. The ratio of the concentration of Na/K and diuretic index at the end of 5 hours was calculated to assess the diuretic potential of the extracts of Anogeissus acuminate and Gymnosporia emergiata.

In the control group, the volume of the urine for 5 hours was found to be 4.56±0.35 and in standard group it was found to be 8.51±0.75. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. The volume of urine for 5 hours was found to be 7.43±0.25 and 6.12±0.38 respectively.

In the control group, the urine pH for 5 hours was found to be 7.00±0.85. in standard group

its was found to be 6.71±0.06. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. The volume of urine for 5 hours was found to be 6.66±0.09 and 6.73±0.46 respectively.

In the control group, the excretion of sodium for 5 hours was found to be 111.8±3.42 mmol/l and in the standard group it was found to be 173.0±8.33 mmol/l. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. The volume of urine for 5 hours was found to be 159.30±8.26 and 132.20±3.69 respectively.

In the control group, the excretion of potassium for 5 hours was found to be 70.26±1.08 mmol/l and in the standard group it was found to be 82.17±2.75 mmol/l. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. The volume of urine for 5 hours was found to be 78.94±1.28 and 74.83±1.85 respectively.

In the control group, the excretion of Chloride for 5 hours was found to be 58.38±5.30 mmol/l and in the standard group it was found to be 92.62±5.36 mmol/l. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. The volume of urine for 5 hours was found to be 86.30±6.23 and 55.86±6.82 respectively.

The ratio of the concentration of sodium ions to that of the potassium ions in the control group was found to be 1.59, and standard group, it was found to be 2.10. In the methanolic extract of Anogeissus acuminate and Gymnosporia emergiata. it was found to be 2.02 and 1.77 respectively.

Table 1: Summary of The Parameters of Diuretic Activity of Different Plant Extracts

Group	Urine volume (ml/100g g/5 hours)	Urine pH	Na^+ (mmol/l)	K^+ (mmol/l)	Cl^- (mmol/l)	$Na^{+/K+}$	T/C (Diuretic index)
Control	**4.56±0.35**	**7.00±0.85**	**111.8±3.42**	**70.26±1.08**	**58.38±5.30**	**1.59**	**-**
Standard	**8.51±0.75*****	**6.71±0.06^{ns}**	**173.0±8.33*****	**82.17±2.75****	**92.62±5.36****	**2.10**	**1.87**
MEAA	**7.43±0.25*****	**6.66±0.09^{ns}**	**159.30±8.26*****	**78.94±1.28***	**86.30±6.23****	**2.02**	**1.63**
MEGE	**6.12±0.38^{ns}**	**6.73±0.46^{ns}**	**132.20±3.69^{ns}**	**74.83±1.85^{ns}**	**55.86±6.82^{ns}**	**1.77**	**1.34**

Data are Presented as Mean ± SEM, n= 6, ns= Non Significant, *P<0.05 Compared to Control, **P<0.01 Compared to Control, **P<0.001 Compared to Control (ANOVA Followed by Dunnett's Test). 'T' Stands for Urine Collected for Extracts, 'C' Stands for Urine Collected for Control and 'S' Stands for Urine Collected for Standard Drug.

DISCUSSION

An attempt has been made in the present study to evaluate the diuretic activity of methanolic extract of Anogeissus acuminate and Gymnosporia emergiata.

The results of the present study revealed that the methanolic extract of Anogeissus acuminate present a potent diuretic activity. The diuretic potency was comparable to that of the standard drug HTC. Here the extract of Anogeissus acuminate increases the Na^+ and K^+ excretion, which may be acting like a loop diuretic. A number of compounds have been identified like alkaloids, tannins saponins and mixture of triterpenoid saponins **[9, 10]** in the leaves of Anogeissus acuminate and may be these constitute are responsible for the diuretic, natriuretic and kaliuretic activity.

The preliminary photochemical analysis revealed that flavonoids, phenolic compounds and alkaloids are present in methanolic extract of Anogeissus acuminate. These natural products might be acting synergistically or individually to produce diuresis. It is also possible that the methanolic extract might manifest cumulative effect of several active principles in the extract. In conclusion, the present studies support traditional use of Anogeissus acuminate for its diuretic effect.

REFERENCE

[1] Anonymous the wealth of India Raw Materials CSIR, New Delhi, 59, 1950, 296.

[2] Mathew KM, Celastraceae, An Excursion flora of central Tamilnadu, India, Reprint Editon, 1995, 83-85.

[3] Mukherjee KP, Quality Control of Herbal Drugs, Business Horizons, New Delhi, India, 2004.

[4] Kokate CK, Pharmacognosy, Nirali Prakashan, Pune, India, 2004.

[5] Evans CW, Trease and Evans, Pharmacognosy, Elsevier Ltd, China, 2002.

[6] Kau ST and Andrews D, Method for Screening Diuretic agents in rats, J.Pharmacol. Meth, 11, 1984, 67.

[7] Abdalaa S, Martin HD and Benjumea D, Diuretic activity of smilax canariensis, an endemic canary island species, J. Ethnopharmacology, 2008.

[8] Abdalaa S, Martin HD, Benjumea D and Gutierrez LJ, Diuretic activity of some Withania aristata fractions, J. Ethnopharmacology, 117, 2008, 496.

[9] Varsheny IP and Badhwar G, Saponins and sapogenins of Mimusops elengi, Proceeding of National Academy of sciences of the

United States of America, 41, 1972, 21-23.

[10] Sahu NP, Koike K, Jia Z and Nikaido N, Triterpenoid Saponins from Mimusops elengi, Phytochemistry, 44, 1997, 1145-9.