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Research Article

DIURETIC ACTIVITY OF *PISTIA STRATIOTES* LEAF EXTRACT IN RATS

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ABSTRACT
The leaf extracts of *Pistia stratiotes* were subjected to screening of antidiabetic and diuretic activity in rats. The oral administration of the extracts (200mg/kg body weight) produced significant antihyperglycemic (P*<0.001) action, as well as Diuretic action. The antihyperglycemic action of the extracts may be due to the blocking of glucose absorption. From the obtained result it was concluded that *Pistia stratiotes* possess potent antidiabetic and diuretic activity.
KEYWORDS: Antidiabetic, Antihyperglycemic, Diuretic, *Pistia stratiotes*

INTRODUCTION

Diabetes mellitus has affected a considerable population and in future it will be a major disorder affecting people across the globe, irrespective of sex, age and socio-economic status. Insulin has proved to be effective to some extent in increasing the life expectancy of diabetic patients, but is not a permanent solution since there are many drawbacks of this therapy. Also the therapy with oral hypoglycemic agents is not satisfactory. Thus, the search for new therapeutic agents devoid of adverse effect, originating from plants used in traditional medicine would be of interest.

Pistia stratiotes (Araceae), Syn. watercabbage, Jalkumbhi is an aquatic plant, stoloniferous, floating on lakes, streams, stagnant waterponds and in lime rich water, throughout India. It is distributed in the tropical and subtropical region of Asia, Africa and America[1]. A number of medicinal properties are attributed to the plant, particularly the leaves. The plant is considered antiseptic, antitubercular and antidysentric. An analysis of leaves and stems reported moisture (92.9%), Protein (1.4%), fat (0.3%), Carbohydrate(2.6%), fibre (0.9%), Ash(1.9%),CaO (0.2%), leaves are rich in Vitamin A,C and also contain Vitamin B[2]. Leaves are found to contain 2-di-C-glcosylflavones of vicenin and lucenin type, anthocyanin-cynidin-3-glcosylflavones-vitexin and orientin[3]. In Ayurveda *Pistia stratiotes* has been acknowledged to treat various diseases and disorders, hence, this study is planned to establish scientific data on the validity of the claimed therapeutic value.

MATERIALS AND METHOD

Plant material: The leaves of *Pistia stratiotes*, collected from local supplier of Lucknow, India and authenticated from, Taxonomical Division National Botanical Research Institute, Lucknow, while voucher (sample No. N.B.R.I/CIF/Re/ 08/2008/32) was deposited in taxonomy lab, Ethnopharmacology division, NBRI, Lucknow for future reference.

Preparation of Extract: A definite weight of crude drug powder was taken in a soxhlet apparatus after making moderately coarse and then continuous hot soxhlet extraction was done by various solvent in a sequence of increasing polarity as follows: Chloroform<Methanol. The leaves of the plant were washed with distilled water, dried & comminuted to powder form,(60 mesh) before starting extraction with subsequent solvent, the powder was dried of all its previous solvent content by spreading out on paper. The extract was then concentrated in Buchi Rota evaporator.

Animals: Healthy male Wistar rats each weighing 150-200 g were used for study. The rats were housed in polypropylene cages and maintained under standard conditions (12 h light and dark cycles, at 25 $\pm 3^0$C and 56-60% humidity). Standard palletized feed and tap water were provided *ad libitum*. The study was conducted with due approved from the Institutional Animal Ethics Committee (IAEC) and confirms to the guidelines for use & care of Animals laid down by Committee for Purpose of Control supervision on experimental Animals (CPCSEA) no. BBDNITM/ IAEC/ clear/09/2008.

PHARMACOLOGICAL STUDIES

Diuretic activity: (Lipschitz method): Diuretic activity was carried out as per the method of Lipschitz et.al. This test is based on water and Sodium excretion in test animals & compared to rats treated with high dose of Urea. Male rats weighing about 100-200 mg were used. Six animals per group were placed in metabolic cages provided with a wire mesh bottom & the funnel to collect the urine. A stainless sieve was placed in the funnel to retain the feces and to allow urine to pass. The rats were fed with standard diet Fifteen hours prior to the experiment, food and water was withdrawn. Three animals were placed in a metabolic cage. For screening procedure, two groups of three animals were used for one dose of test compound. The standard and test compound were given orally. Additionally 5ml of 0.9% NaCl solution per 100 g body weight was given by gavage. Urine excretion was recorded after 5 and after 24 hr. The Sodium and Potassium content of urine was determined by flame photometry[4].

Statistical Analysis: Comparison between control and drug treated groups were made by One Way Analysis of Variance (ANOVA) followed by Newman Keuls Test and methanolic extract was considered to be significant.

RESULT & DISCUSSION

According to the observation table Na^+/ K^+ ratio of 2.3 ± 0.07, 2.4 ± 0.09, were obtained for methanolic extract, chloroform extract resp (As shown in table 1) The normal value for Na^+/ K^+ ratio is reported to be 2.05-2.83. If the ratio of Na^+/ K^+ falls below the normal in plasma, the aldosterone secretion will be decreased and if the ratio rises, the aldosterone secretion will be increased. Significant increases in Sodium ion excretion was observed in case of Methanolic extract, Chloroform extract, but less then the Furosemide[5]. Saponins, volatile oil, sterols and triterpenes[6] are known to possess diuretic activity.

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Table 1: Determination of Diuretic activity of various extracts

S.n	Groups	Dose mg/kg	Vol of urine after 5 hr (ml)	Vol of urine after 24 hr (ml)	Sodium ion concentration (m m/l)	Potassium ion concentration (m m/l)	Na^+/ K^+
1.	Group-I	Saline	2.33±0.21	3.1±0.30	71.6±0.2	31.9±0.7	2.24±0.004
2.	Group-II	4.0	5±0.36	8.33±0.33	95.5±1.22**	45.7±0.9*	2.25±0.008
3.	Group-III	1000	3.8±0.48	8.66±0.42	92.0±0.60**	43.9±0.3*	2.5±0.05
4.	Group-IV	200	3±0.25	8.66±0.30***	90.5±0.15**	41.9±0.6*	2.3±0.07
5.	Group-V	200	1.8±0.30	3.1±0.1	88.4±0.15*	42.4±0.60*	2.4±0.09

Group-I- Normal Control; Group-II- Animals treated with standard drug Furosemide; Group-III- Animals Treated with Urea; Group-IV- Animals treated with methanolic extract; Group-V- Animals treated with Chloroform extract

Values are expressed in Mean±SEM (n=6)

P*<0.05, P**<0.01, P***<0.001

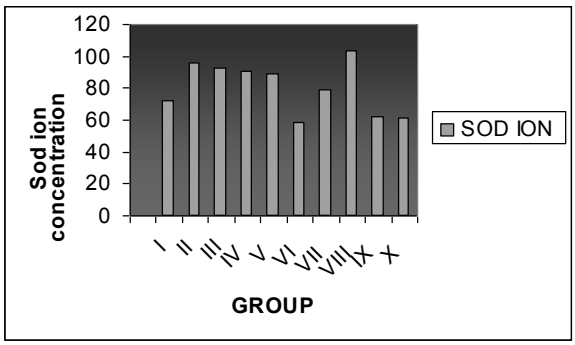

Fig 1: Effect of Various extract on sodium ion concentration

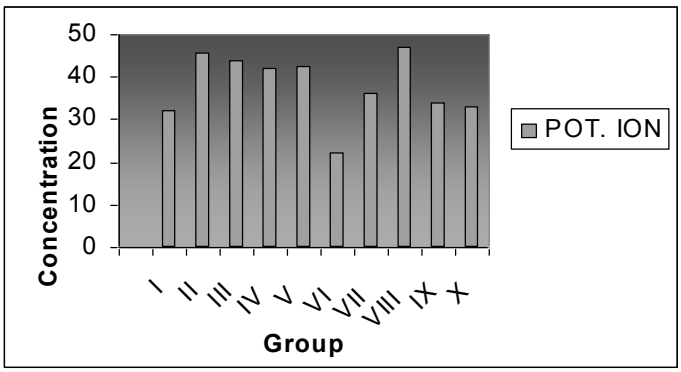

Fig 2: Effect of various extract on Potassium ion concentration

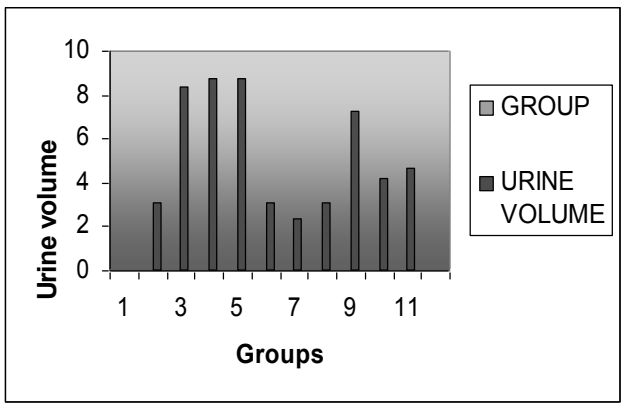

Fig 3: Effect of various extract on Urine volume

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