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Original Research Article

Evaluation of Diuretic Activity of aqueous extract of *Ipomoea batatas* (L)

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Abstract: A diuretic is any substance that promotes the production of urine. This includes forced diuresis. There are several categories of diuretics. All diuretics increase the excretion of water from bodies, although each class does so in a distinct way. Alternatively, an ant diuretic such as vasopressin, or ant diuretic hormone, is an agent or drug which reduces the excretion of water in urine. In medicine, diuretics are used to treat heart failure, liver cirrhosis, hypertension, influenza, water poisoning, and certain kidney diseases. Some diuretics, such as acetazolamide, help to make the urine more alkaline and are helpful in increasing excretion of substances such as aspirin in cases of overdose or poisoning. Diuretics are often abused by those with eating disorders, especially bulimics, in attempts to lose weight. The antihypertensive actions of some diuretics (thiazides and loop diuretics in particular) are independent of their diuretic effect. That is, the reduction in blood pressure is not due to decreased blood volume resulting from increased urine production, but occurs through other mechanisms and at lower doses than that required to produce diuresis. Indapamide was specifically designed with this in mind, and has a larger therapeutic window for hypertension (without pronounced diuresis) than most other diuretics. The main objective of the present research work is to isolate the bioactive molecules and evaluate the diuretic activity of aqueous extract of *Ipomoea batatas*the phytochemical analysis of aqueous extract of Ipomoea batatas root showed the presence of various phytochemical constituents such as flavonoids, carbohydrates, tannins, phenol. The effect of aqueous extract of root of Ipomoea batatas on rats with reference to biochemical changes in serum. The group-II (Standard Hydrochlorothiazide 10 ml/kg, p. o) animals showed significant ($P<0.01$) increase in total urine volume ml/100 gm/hr (10.44 ml). Whereas animals received AEIB significantly ($P<0.01$) increase in total urine volume ml/100 gm/hr (4.44 and 8.06 ml) and significantly ($P<0.05$) increased total 200 & 400 mg/kg doses respectively. The results of most several clinical investigations showed the efficacy and safety of carbohydrate, flavonoids are using diuretic activity give a fine action comparative standard drugs. The phytochemical studies revealed the presence of Carbohydrate, flavonoids, Tannins in the AEIB these may be responsible for its pharmacological activities.

Keywords: Diuresis, vasopressin, hypertension, flavonoids etc

INTRODUCTION

The sweet potato (*Ipomoea batatas*) is a dicotyledonous plant that belongs to the family convolvulaceae. Its large, starchy, sweet-tasting, tuberous roots are a root vegetable. Literature survey on the plant showed that leaves have a high content of polyphenolics - anthocyanins and phenolic acids, with at least 15 biologically active anthocyanins with medicinal value. The aim of the present study is to prepare the aqueous extract of *Ipomoea batatas*and to evaluate invitro anti-inflammatory activity by membrane stabilizing method. Phytochemical analyses of IBAE showed the presence of phenols, flavonoids, tannins, anthraquinones, and reducing sugars. It has been shown that the anti-inflammatory activity is may be because of phenols and flavonoids. The aqueous extract, IBAE has shown significant membrane stabilization at 200mg/ml indicated by the reduced absorbance [1].

Ipomoea batatas (L.) Lam. from the family Convolvulaceae is the world's sixth largest food crop. The tubers of *Ipomoea batatas*commonly known as sweet potato are consumed as a vegetable globally. The tubers contain high levels of polyphenols such as anthocyanins and phenolic acids and vitamins A, B and C, which impart a potent antioxidant activity that can translate well to show wound healing effects. To check their effects on wound healing, the peels and peel bandage were tested on various injury models in rats in the present study. The methanolic extracts of the peels and peel bandage of *Ipomoea batatas*tubers (sweet

potato) were screened for wound healing by excision and incision wound models on Wistar rats. Three types of gel formulations were prepared, viz., gel containing 3.0% (w/w) peel extract, gel containing 6.0% (w/w) peel extract and gel containing 10% (w/w) peel extract. Betadine (5% w/w povidone iodine cream) was used as a reference standard. In the incision wound model, Tensile strength of the skin was measured. Epithelization time, wound contraction, hydroxy proline content of the scab, and ascorbic acid and malondialdehyde content of the plasma were determined in the excision wound model [2].

MATERIALS AND METHODS

Plants material collection and authentification:

Fresh tubers of sweet potato were collected from Kodad market. The plant roots of *Ipomoea batatas*were collected in was collected from the areas around Nalgonda, India in the month of Jan-2016. The plant were identified and authenticated by Dr. S. Baburaj, Botanist, Department of Botany, Thyagarajar College of arts and science, Madurai. The root was washed with water to remove soil and other extraneous matter. This was then dried under shade for few days. Then the shade dried root was homogenized to get coarse powder and was stored in air tight containers.

Drugs and chemicals:

The standard drug Hydrochlorothiazide purchased from Local Retail Pharmacy Shop and solvents and other chemicals used for the extraction and phytochemical screening were provided by Institutional Store and were of LR and AR grade.

Experimental animals:

Male Albino rats of wistar strain weighing about (150-200gm) were used. They were housed in polypropylene cages at room temperature (25^0C) under proper humidity 44-55% conditions and maintained on normal (12-12 hr) day-night cycle. The animals were fed with commercial rat pellets (Amrut laboratory animal feed Ltd. India) and were given water ad libitum. The experimental protocol and all the procedures were approved by Institutional animal ethical committee (IAEC) of KP Labs (KPL\IAEC\2016\07).

Methodology for extraction:

The fresh tube will be collected shade dried and p [powdered mechanically. About 100 gm of tubers powered will be extracted with 200 ml of water and allow for 24 hr. Filter twice by Watmans filter paper at RT For 4h using a mechanical shaker. The extract will be dried at 400c under vacuum under reduced pressure.

Experimental protocol for the evaluation of diuretic activity:

Diuretic activity was determined followingthemethods. The rats were randomly divided into four groups of sixanimals each as follows: The animals were fasted overnight (18 h) prior to the test but with free access totapWater only and then were given an oral loading of normalsaline (0.9%) of 0.05 ml per g body weight.Immediatelyafter administration, the rats were paired and placedinmetabolism cages [3].

Group I (Normal Control): Normal water (5ml/kg, p.o).
Group II (Standard treated): Hydrochlorothiazide (10mg/kg body weight, p.o)
Group III (AEIBDose-1): AEIB (200 mg/kg body weight, p.o)
Group IV (AEIB Dose-2): AEIB (400mg/kg body weight, p.o).

Collection of Urine sample:

Urine was collected in agraduatedcylinder and its volume was recorded at 2 h intervals for 8h. Cumulative urine excretion was calculated in relationtobody weight and expressed as ml/100 gb.w.

STATISTICAL ANALYSIS:

The treated groups were compared with the respective toxicant control group; the results were reported as mean ± SEM of 6 animals. The statistical significance was determined by using one way analysis of variance (ANOVA) followed by Dunnet's multiple comparison test $P<0.05$ was considered statistically significant.

RESULTS AND DISCUSSION

Phytochemical screening [4, 5, 6, 7]:

The preliminary phytochemical analysis of AEIB showed the presence of various phytochemical constituents like Carbohydrates, Phenol, flavonoids, Tannins etc.

Evaluation of diuretic activity:

The effect of aqueous extract of root of *Ipomoea batatas* on rats with reference to biochemical changes in serum is shown in (Table 2). The group-II (Standard Hydrochlorothiazide 10 ml/kg, p.o) animals showed significant ($P<0.01$) increase in Total Urine Volume ml/100gm/hr (10.44 ml). Whereas animals received AEIB significantly ($P<0.01$) increase in Total Urine Volume ml/100gm/hr (4.44 and 8.06 ml) and significantly ($P<0.05$) increased Total 200 & 400 mg/kg doses respectively (Fig: 1).

Table 2: Effect of Aqueous extract of *Ipomoea batatas* root Diuretic Activity on rats

Group	Tretmet (Dose)	Urine Volumeml/100gm/hr

I	Normal Water (5ml/kg, p.o)	5.03 ± 0.4
II	Standard Hydrochlorothiazide (10ml/kg,p.o)	10.44 ± 5.5#
III	AEIB Dose-I (200mg/kg, p.o)	4.44 ± 0.76*
IV	AEIB Dose-II (400mg/kg, p.o)	8.06 ± 5.65*

The values are Mean ± S.E.M of 3 observations, *p<0.01when compared with to Standard Group.

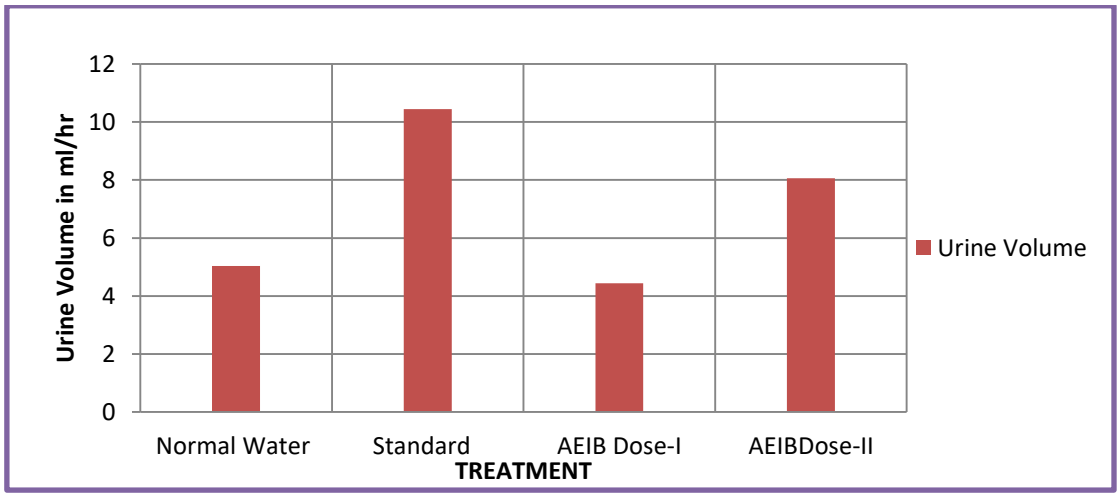

Fig 3: Effect of Aqueous extract of *Ipomoea batatas* root Diuretic Activity on rats

The present study revealed that the Root of *Ipomoea batatas* exhibits the diuretic Activity. In spite of tremendous advances made in modern medicine but still there is safe and effective medicine available. There are numerous plants and polyherbal drugs available based on ethno pharmacological information, we attempted to evaluate the diuretic activity of Ipomoea batatas (root). In the present study, the evaluate the diuretic activity of the AEIB. Aqueous extract of *Ipomoea batatas* root were administered to experimental rats at doses of 200 and 400 mg/kg p.o Hydrochlorothiazide (10 mg/kg) was used as positive control in study. The diuretic effect of the extracts was evaluated by measuring urine volume. The results of the evaluations carried out on the extract are listed in Table 2. Urine volume was significantly increased by the 400 mg dose of aqueous extract in comparison to control group. The diuretic effect of the extracts was comparable to that of the reference standard Hydrochlorothiazide.

The phytochemical analysis of aqueous extract of *Ipomoea batatas* root had shown the presence of various phytochemical constituents such as flavonoids, carbohydrates, tannins, phenol. The effect of aqueous extract of root of Ipomoea batatas on rats with reference to biochemical changes in serum is shown in (Table 2). The group-II (Standard Hydrochlorothiazide 10 ml/kg, p.o) animals showed significant (P<0.01) increase in total urine volume ml/100 gm/hr (10.44 ml). Whereas animals received AEIB significantly (P<0.01) increase in total urine volume ml/100 gm/hr (4.44 and 8.06 ml) and significantly (P<0.05) increased total 200 & 400 mg/kg doses respectively (Fig: 2).The results of most several clinical investigations showed the efficacy and safety of carbohydrate, flavonoids are using diuretic activity give a fine action comparative stander drugs. The phytochemical studies revealed the presence of Carbohydrate, flavonoids, Tannins in the AEIB these may be responsible for its pharmacological activities.

CONCLUSION

The present study revealed that Root of *Ipomoea batatas* contains phytoconstituents like flavonoids, Carbohydrates, Tannins. Treatment with Aqueous extracts of *Ipomoea batatas* a root at 200 mg/kg and 400 mg/kg doses significantly increase the diuresis. The diuretic effectwhichappeared to be comparable to that produced by thereference diuretic Hydrochlorothiazid. The presentstudyprovides a quantitative basis for explaining the folkloricuseof *Ipomoea batatas* a diureticagent. The diuretic could be due to presence of Carbohydrate, flavonoids and Tannins. So, from the above findings, it was concluded that aqueous extract of *Ipomoea batatas* root posse's significant diuretic property. Further studies are sin progress to isolate the active constituents and also to evaluate the exact mechanism of action.

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