

Research Article

Phytochemical investigation and Diuretic activity of *Abelmoschus moschatus* Medikus

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ABSTRACT

Abelmoschus moschatus Medikus is used in the traditional medicine as diuretic. In the present study, the diuretic activity of Petroleum ether, Chloroform, Alcohol extract of *Abelmoschus moschatus* Medikus was studied and the activity was compared with furosimide as standard. The alcoholic extract exhibited significant diuretic activity as evidenced by increased total urine volume and the urine concentration of Na⁺, K⁺ and Cl⁻. The results thus support the *Abelmoschus moschatus* Medikus use of as diuretic agent. These results clearly indicate that *Abelmoschus moschatus* Medikus is effective against free radical mediated diseases.

Keywords: Diuretic activity, *Abelmoschus moschatus* Medikus, Flavanoids.

INTRODUCTION

Herbs are used as medicine since time immemorial. Many of the natural products in plants of medicinal value offer us new sources of drugs which have been used effectively in traditional medicine. There is an increased consciousness regionally and globally in production and use of plants with healing property. *Abelmoschus moschatus* Medikus (Malvaceae)^{1,2,3,4} is a prostate herb rooting at nodes, internodes elongate creeping, flowering and fruiting time is September and January. Propagation by seeds. Seeds are used for dysuria, diseases of nervous system and aphrodisiac in ayurveda. A perusal of literature revealed that its diuretic effects remain to be studied. Here in we report the diuretic effect of the Petroleum ether, Chloroform, Alcohol extract of *Abelmoschus moschatus* Medikus in albino rats.

MATERIALS AND METHODS

The plant materials were collected from Tirunelveli District, Tamilnadu, India and authenticated by Dr.Chelladurai, survey of medicinal plants unit, Palayamkottai. The voucher specimen was kept at Dept .of. Pharmacognosy in our laboratory for future reference.

Preparation of the Extract

The Plant *Abelmoschus moschatus* Medikus was dried in the shade. Then the shade dried leaves were powdered to get a coarse powder. About 750g of dry powder was extracted first with petroleum ether (40-60°C) by hot percolation using Soxhlet apparatus. The extractions were continued for 72 hours. The petroleum ether extract was filtered and concentrated to a dry mass by using vacuum distillation. Brownish green oil was obtained (5.25g). The marc left after the petroleum ether extract was taken and subsequently extracted with chloroform up to 72 hours. The chloroform extract was then filtered and concentrated to a dry mass. A brownish green residue was obtained (4.9g).The marc left after the chloroform extraction was dried and extracted with alcohol. The extraction was continued up to 72 hours. The alcohol extract was filtered and concentrated by vacuum distillation. A dark brown residue was obtained (6.2g). The extractive values are reported in Table 1. TLC studies were carried out using n-butanol :acetic acid : water (4:1:1) using ninhydrin spraying reagent, the inference is green in colour. R_f values were calculated at different spots. The preliminary phytochemical analysis^{5,6} were carried out to find out the phyto

constituents present in the crude extracts Table 2.

Diuretic Activity

Male rats (wister albino strain) weighing 150 to 180gm were maintained under standard condition of temperature and humidity. The method of Lipschitz et al^{7,8} was employed for the assessment of diuretic activity. The experimental protocols have been approved by the Institutional Animal Ethical Committee. Four groups of six rats in each and were fasted and deprived of water for eighteen hours prior to the experiment. The first group of animals serving as control, received normal saline(10ml/Kg,p.o.); the second group received furosemide (25mg/Kg,i.p.) in saline; the third, fourth, fifth groups received the Pet ether, Chloroform, Alcohol extract at the doses of 200 mg/Kg, respectively, in normal saline. Immediately after administration the animals were placed in metabolic cages (2 per cage), specially designed to separate urine and faeces, kept at room temperature of $25 \pm 0.5^\circ\text{C}$ through out the experiment. The urine was collected in measuring cylinders up to 3 hrs after dosing. During this period, no food or water was made available to animals. The parameters taken for individual rat were body weight before and after test period, total concentration of Na^+ , K^+ , and Cl^- in the urine. Na^+ , K^+ concentrations were measured by Flame photometry⁹ and Cl^- concentration was estimated by titration¹⁰ with silver nitrate solution(N/50)using three drop of 5% potassium chromate solution as indicator. Furosemide sodium salt was given by stomach tube. Optimal dose activity relation was found to be 20mg/Kg of furosemide per kg body weight in series of supportive experiments. Results are reported as mean \pm SD, the test of significance ($p < 0.01$ and $p < 0.05$) was stastically Table 3.

Statistical analysis

All the results are expressed as mean \pm standard error. The data was analysed statistically using ANOVA followed by

student 't' test¹¹ at a probability level of $P < 0.01$.

RESULTS

Diuretic activity

The preliminary phyto chemical analysis showed the presence of flavanoids, saponins, carbohydrates, terpenoids and alkaloids in all the extracts.. The Alcohol extract 200mg/Kg p.o. showed significant increase in excretion of sodium, potassium and chloride ions in the urine in a dose dependent manner. The obtained effect was comparable to that of furosemide (25mg/Kg). Increase in urine output a sufficient index for assessing the diuretic effect through estimating the urinary concentration of Ion like Na^+ , K^+ , Cl^- etc., may reveal in specific the Ion responsible for the diuretic activity. The results reveals that electrolyte excretions and diuretic activity of various extract of *Abel Moschatus Medikus* treatment possess significant diuretic activity at $P < 0.01$, but when compared to petroleum ether and Chloroform extract, the Hydro alcoholic extract possess more significant diuretic activity at $P < 0.01$. Also all extract produced significant fall in potassium excretion compare to control.

DISCUSSION

Diuretics relive pulmonary congestion and peripheral edema. These agents are useful in reducing the syndrome of volume overload, decreases cardiac workload, oxygen demand and plasma volume, thus decreasing blood pressure¹². Thus, diuretics play an important role in hypertensive patients. In present study, we can demonstrate that ethanol, aqueous and chloroform extract may produce diuretic effect by increasing the excretion of Sodium, Potassium and Chloride. The control of plasma sodium is important in the regulation of blood volume and pressure; the control of plasma potassium is required to maintain proper function of cardiac and skeletal muscles¹³. The regulation of Sodium, Potassium balance is also intimately related to renal control of acid-

base balance. The Potassium loss that occurs with many diuretics may lead to hypokalemia. For this reason, generally potassium-sparing diuretics are recommended¹⁴. In present study chloroform and alcohol extracts showed elevated levels of Potassium in urine, which may increase risk of hypokalemia and hence its potassium sparing capacity has to be investigated. Active principles such as

flavonoids, saponins and terpenoids are known to be responsible for diuretic activity^{15,16,17}. Results of present investigation showed that alcohol is most effective in increasing urinary electrolyte concentration of all the ions i.e Sodium, Potassium and Chloride followed by chloroform and pet ether extracts while other extracts did not show significant increase in urinary electrolyte concentration.

Table 1: Extractive Values

S. No.	SOLVENT	COLOUR OF THE EXTRACT	PERCENTAGE OF YIELD
1	Petroleum ether	Dark Brown	3.7422
2	Chloroform	Dark Brown	2.5124
3	Alcohol	Dark Brown	2.4620

Table 2: Phytochemical Screening of *Abelmoschus moschatus Medikus*

EXTRACT	PET.ETHER	CHLOROFORM	ETHANOL
STEROLS	+	+	+
TERPENOIDS	-	-	-
CARBOHYDRATE	-	+	+
FLAVANOIDS	-	+	-
PROTEINS	-	-	+
ALKALOIDS	-	-	-
GLYCOSIDES	-	-	-
TANNINS	-	-	+
SAPONINS	-	-	-
PHENOLIC COMPOUNDS	-	-	+
FIXED OIL & FATS	+	+	+

(+) Presence of Constituents

(-) Absence of Constituents

Table 3: Electrolyte excretion and diuretic activity of various extracts of *Abel Moschatus Medikus*

Group	Treatment	Dose	Urine Volume	Electrolyte Na+ Mg/lit	Excretion K+ Mg/lit	Cl- Mg/lit	Na+/K+
G1	Normal control	100mg/kg	8.0 ± 2.00	64.97± 2.33	53.76± 3.24	27.73± 2.31	1.20
G2	Standard control	25 mg/kg	18.6 ±3.00	153.65± 4.97	22.09± 1.88	83.60± 2.91	6.95
G3	Treatment control	200mg/kg Pet.ether extract	8.9 ± 2.2	106.29± 5.32	38.25± 2.37	60.79 ± 2.16	2.77
G4	Treatment control	200mg/kg Chloroform extract	9.3± 2.6	120.30± 4.68	40.40± 2.65	65.60± 3.16	2.97
G5	Treatment control	200mg/kg Hydro alcoholic extract	12.8± 2.8	131.76± 3.62	45.47± 2.11	70.01± 2.65	2.89

* Values are expressed as Mean ± SEM

* Values are find out by using one way ANOVA followed be Newman Keul's multiple range test.

* Values were significantly different from normal control at P<0.01

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