
INVESTIGATION ON DIURETIC ACTIVITY OF MEDICINAL PLANTS: *Chlorophytum borivilianum* AND *Asparagus racemosus*

Dhananjay Rai

Research Scholar, Glocal School of Pharmacy
The Glocal University Mirzapur Pole, Saharanpur (U.P)

Dr. Kailaspati Prabhakar Chittam

Research Supervisor, Glocal School of Pharmacy
The Glocal University Mirzapur Pole, Saharanpur (U.P)

ABSTRACT:

The Diuretic activity of *Chlorophytum borivilianum* and *Asparagus racemosus leaves* was studied. The fractions of ethyl acetate, methanol showed significant increase in the urine elimination, while benzene fraction doesn't show diuresis. All the groups were comparing to control group, frusemide was used as reference standard drug in this screening activity. The phytochemical screening study showed the presence of flavonoids, saponins, terpenoids, and steroid content in both the plants extract. The diuretic effect in all the extract may be due to phytochemicals present in the fractions except benzene fraction of *A. indicum*.

KEYWORDS: *Asparagus racemosus leaves* , expectorant, Ethyl acetate, traditional, frusemide.

INTRODUCTION:

Traditional plants *Chlorophytum borivilianum* and *Asparagus racemosus leaves* various parts used in treating various ailments of human. The *chlorophytum borivilianum* belongs to family malvaceae. Roots of these plants are useful in treating uterine heamorrhagic discharges, seeds used in the treatment of bronchitis, piles and gonorrhoea, leaves used in lumbago, toothache, different kinds of inflammation, bark of this plant is used as an emollient¹.

It is Erect velety temntose under shrubs, stems round, frequently tinged with purple. Leaves ovate to orbicular cordate, flowers solitary on jointed penduncles, orange yellow or yellow, capsules hispid, hardly larger than the calyx, erect, seeds 3-5, reniform tubercled or minutely stellate-hairy, black or dark brown. Whole plant used as a febrifuge, anthelminitic and an anti-inflammatory properties and it also reported urinary tract problems , bark astringent and diuretic².

asparagus racemosus leaves is another traditionally used medicinal plant, it belongs to family Amaranthaceae. It is commonly known as kate wali chaulai in hindi, used as vegetable and cultivated throughout India and other tropical countries. leaves used to cure jaundice, as antioxidant, the roots used as expectorant, lower menstrual flow, leprosy.³ The juice of whole plant used to prevent inflammation, laxative, diuretic, digestible, in diabetes, piles and gonorrhoeal.⁴ *asparagus racemosus leaves* is an erect glabrous herb with hard stem, the herb is often reddish with many grooved branches with spines. Leaves 3.2-7.5 cm long, 1.3 to 3.8 cm width ovate, obtuse, spinous apiculate, glabrous above, petioles 2, 6-3cm long. Flowers numerous, sessile, in dense axillary clusters and in terminal interrupted spikes, bracteaules, linear, bristle pointed, usually longer than the sepals.⁵ Although a number of studies have been performed on these well-known traditional plants^{6,7,8,9}. But no work reported on its diuretic effect on fractions of leaves. Hence this is an attempt to investigate the diuretic effect of these plants.

MATERIALS AND METHODS:

The leaves of *Chlorophytum borivilium* and *asparagus racemosus leaves* were collected in the month of Aug-Sep from the local area and surroundings of Global university campus Saharanpur, Uttar Pradesh.

Preparation of extracts:

The shade dried, leaves were coarse powdered and packed in to soxhlet column and extracted with ethanol(70%). The extract was fractioned with Benzene and methanol for *asparagus racemosus leaves*,. Ethyl acetate and methanol for *Chlorophytum borivilium* leaves, and the extracts were concentrated under reduced pressure (bath temp 50°C) and the yield of the extract was calculated. The dried extract was stored in airtight container in refrigerator below 10°C. The solution of Benzene, ethyl acetate were prepared using 1% gum acacia and methanol solution were prepared using distilled water and used for the diuretic activity.

Animals used:

Albino mice weighing 20-25 g and albino rats of Wistar strain weighing 150-200 g were used for studying acute toxicity and diuretic activity respectively. Animals were maintained under standard laboratory conditions. Study protocol was approved from the Institutional Animal Ethics Committee (IAEC).

Acute Toxicity Study:

The acute toxicity of ethyl acetate, methanol and benzene extracts of *Chlorophytum borivilium* and *asparagus racemosus leaves* were determined in female albino mice. Animals were fasted overnight prior to the experiment. Fixed dose (Annexure-2d) method of CPCSEA, OECD guideline No. 420, was adopted for the study¹⁰. 1/10th of LD₅₀ cut off values taken as screening dose.¹⁰

Diuretic activity¹¹:

The Chlorophytum borivilianum benzene and methanol extract at the doses of 100, 200 mg/kg, and *asparagus racemosus* ethyl acetate and methanol extracts at 100,400mg/kg p.o., Evaluated for the diuretic Activity according to Lipschitz et.al (1943) on the either sex rats. The animals fasted and deprived of water for 18 hr prior to the experiment. Albino rats were divided into six groups of 6 animals each. Group I treated a control receives normal saline (25ml/kg) orally. Group II as standard, receives frusemide 20mg/kg orally, groups III, IV and Vth were received the extract at doses of 100,200 and 400mg/kg.p.o. Immediately after dosing the animals were separately placed in metabolic cages which were attached with graduated measuring cylinder, the volume of urine collected up to 5hrs. the Na⁺ and K⁺ ion concentration in the samples were determined using flame photometer, the Cl⁻ ion concentration was found titremetric method against AgNo₃ solution results obtained were compared with that of control and analyzed by student's 't' test. Six groups of six rats in each group were fasted and deprived of water for 18 hours prior to the experiment.

Group I : Control (Normal saline 25ml/kg p.o)

Group II : Standard (Furosemide (20mg/kg i.p)

Group III: *A. spinus* Ethyl acetate fraction (100mg/kg p.o)

Group IV: *A. spinus* Methanol fraction (200mg/kg p.o)

Group V: *A. indicum* Benzene fraction (100mg/kg p.o)

Group VI: *A. indicum* Methanol fraction (400mg/kg p.o)

Statistical Analysis:

The results were subjected to statistical analysis using ANOVA and the values of significance were determined at p<0.001.

RESULTS:

The phytochemical screening of the extracts of *asparagus racemosus* leaves and *chlorophytum borivilianum* leaves revealed presence of saponins, flavonoids, steroid, terpenoids and glycosides. Due to presence of these phytoconstituent may be showed significant diuretic effect, at the doses of 100 and 200mg/kg o ethyl acetate and methanol leaves extract of *A spinus*. In *A.indicum* leaves extract of methanol showed significant diuretic effect at the dose of 400mg/kg, but benzene fails to show the effect. But benzene extract moderately increases the Na⁺, K⁺, Cl⁻ ion excretion when compared to control group. (Table No.1)

Table 1: Anti-inflammatory Activity of ASPARAGUS RACEMOSUS LEAVES (L) and CHLOROPHYTUM BORIVILIANUM(L) LeavesExtracts

Groups	Drugs	Dose mg/kg	Mean Volume of Paw Oedema (ml) at					% Inhibition
			0 min	30 min	60 min	120 min	180 min	
I	Control	--	0.70±0.04	0.74±0.51	0.97±0.07	1.03±0.12	1.01±0.08	--
II	Standard	10	0.51±0.08	0.56±0.07	0.49±0.05***	0.50±0.06***	0.48±0.05***	53.47
III	ASEAF	100	0.85±0.01	0.87±0.08	0.83±0.07**	0.81±0.1***	0.71±0.06***	30.7
IV	ASEF	200	0.63±0.09	0.67±0.02	0.61±0.06***	0.62±0.01***	0.59±0.06***	42.58
V	AIEAF	100	0.83±0.1	0.92±0.03	0.93±0.05 ^{ns}	0.91±0.06**	0.89±0.093*	12.85
VI	AIMF	400	0.89±0.03	0.96±0.04	0.94±0.01 ^{ns}	0.83±0.01**	0.78±0.02**	23.80

Values are mean± S.E.M (n=6); ***p<0.001, **p<0.01, *p<0.05, ns=not significant. Student's't' test

DISCUSSION:

The ethyl acetate and methanol extracts of *Chlorophytum borivilianum* and *Asparagus racemosus* increases the Na⁺, K⁺, Cl⁻ excretion, caused alkalinisation of urine, showed strong diuretic activity and carbonic anhydrase inhibition activity. These effects were observed predominantly at 100, 200 and 400 mg/kg doses and there was no dose response relationship. This study strongly suggests that the above two traditional plants are acting as a thiazide like diuretic with a carbonic anhydrase inhibitory activity which restates the claim as a diuretic herb.12

CONCLUSION:

From the above result we can conclude that the Ethyl acetate, methanol fractions of *Chlorophytum borivilianum* and *Asparagus racemosus* at the 100,200 and 400mg/kg p.o body weight possess more significant diuretic activity by increasing the total urine output and increased excretion of sodium and potassium salts, that are comparable to the control group, and also increased excretion of potassium salts as compared to standard frusemide drug. These experimental results have established pharmacological evidence for the traditional claim of the plants to be used as diuretic agent. Further studies are necessary to better evaluate its safety and modes of action.

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