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Evaluation of Diuretic Activity of Leave Extract of Cassia Auriculata Linn

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KEYWORDS

Cassia auriculata; Diuretic activity, Urine output

ABSTRACT:

The objective of this study is to identify and estimate the diuretic activity of ethanolic extract of leaves of Cassia Auriculata Linn. The extraction of leaves was done by the process of maceration followed by estimating the preliminary parameters, pharmacological screening, and urine sample analysis on albino rat. The preliminary studies involved the study about the presence of carbohydrates, alkaloids, glycosides, tannins, proteins, flavonoid, saponins, and phenols. On the basis of preliminary study, it has been found that the leaves of cassia auriculata linn shows the presence of carbohydrates, alkaloids, glycosides, tannins, proteins, flavonoid, saponins, and phenols. On the basis of study diuretic activity of ethanolic extract of leaves of cassia auriculata linn, it has been found that, the volume of urine sample of medicated albino rat is greater as compared to the volume of sample of non-medicated (controlled rat). This shows the diuretic activity of cassia auriculata linn with crude ethanolic extract of leaves.

Introduction

Diuretics are a kind of medication that enhances the volume of urine by inhibiting the release of anti-diuretic hormones or vasopressin(1). It mainly decreases the reabsorption of Sodium and water in the kidney due to which, volume of urine increases(2). It has a great potency in the treatment of CHF, nephritis, hypertension, toxemia in case of pregnancy. The allopathic medicines produce good effect, but due to different adverse effect of medications to the entire part of the body, its less preferred to use(3).

To maintain the homeostasis in the body, kidney helps in regulation of water level as well as the required quantity of various electrocytes in the body. With the effect of anti-diuretic hormone (vasopresin), it regulates the level of water in the body. Kidney also helps in maintaining the concentration of calcium, chloride, sodium, phosphate, and other ions in the body(4).

In order to reduce the effect of adverse drug reaction, Cassia Auriculata linn, an herbal medicine that provides a good diuretic activity with lesser side effects(5). It can also be used to cure the diabetic conditions, skin diseases, leprosy(6). The various parts of plant of cassia auriculata linn can be used for preventing various diseases like- roots, flowers, leaves, etc. In addition, Cassia auriculata has various advantage in the recent time for its use ayurvedic medicine(7). The present study was carried out in an attempt to evaluate the diuretic effects of Cassia auriculata(8).

Materials and Methods

Plant

A common wild plant found in various parts of the tropical subcontinent including India is *Cassia Auriculata Linn*. a member of the *Fabaceae* family, commonly referred as 'Tarwar'. The plant was obtained from Kolar, Bangalore district, Karnataka. Since there had not yet been any systematic research on the evaluation

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of the species in relation to the development of standardisation parameters and pharmacological screening with respect to diuretic activity of the plant for its medicinal use.

Authentication of Plant/Plant Material

The authentication of leaves of cassia auriculata linn on the basis of organoleptic and microscopically studies was done from Botanical Survey of India, Central Regional Centre, Prayagraj, Uttar Pradesh.

Animals

In this diuretic activity, Albino Rat (20 gm) was used. They were obtained from M/S Chakraborty Enterprises, Kolkata, and the study was done following standard conditions as accordance to the guidelines of CPCSEA.

Successive Extraction of Leaves

The ethanolic extraction of leaves of cassia auriculata linn was done by the process of maceration. In this process, the leaves are crushed in coarsely powdered crude drug form, further placed in stoppered container containing solvent and allowed to stand for 72 hours at room temperature(9). In frequent duration, agitation was done until the leaves are completely dissolved. After 72 hours, the mixture is strained, and the solid material was pressed in order to remove the solvent completely(10). The collected solvent in the clarified by standing it for some duration. The obtained ethanolic extract was further processed for testing of various preliminary test(11).

Preliminary Phytochemical Screening of Extract

The preliminary photochemical test like alkaloid, glycoside, tannins, flavonoids, phenols, saponin, carbohydrates was done using leaves of cassia auriculata linn(12).

Pharmacological Screening Methodology

Acute Toxicity Study

The acute oral toxicity of the Cassia auriculata leaves ethanolic extract (CALEE) was determined in fasted albino rat by fixed dose method according to OECD guidelines No. 423(13).

Diuretic Activity

In this method, albino rat of either sex was used. The rat was divided five groups (n=6) and were fasted for 24 hours prior to the experiment(14).

Group 1: Control- Normal saline.

Group 2: Hydrochlorothiazide- Standard drug 10 mg/kg.

Group 3: CALEE 100 mg/kg.

Group 4: CALEE 400 mg/kg.

The diuretic activity of CALEE in albino rats was studied by the Lipschitz Test. Male Albino rats were divided into 5 groups of 6 rats in each. The group I serves as normal control received vehicle (2% CMC in normal saline 10 ml/kg), group II with Hydrochlorothiazide (10 mg/kg, p.o) in vehicle; other groups III, IV were treated with low, and high doses of CALEE in vehicle(15,16).

Immediately after the extract treatment all the rats were hydrated with saline (15 ml/kg) and placed in the metabolic cages (3 per cage), specially designed to separate urine and faeces and kept at 21°C±0.5°C. The total volume of urine collected for 24 hours was measured at the end. During this period no food and water was made available to animals. Various parameters like total urine volume and concentration of Sodium, Potassium and Chloride in the urine were measured and estimated respectively(17).

Results and Discussion

The macroscopic study of leaves of cassia auriculata linn like colour, odour, taste, shape, and size of the leaves was done for the morphological identification of the plant and the observed morphological studies were compared with the standards. The observed morphological parameters are discussed in the table given below:

S. No.	Parameters	Standard	Observed
1.	Colour	Green	Green
2.	Odour	Pungent	Pungent
3.	Taste	Bitter	Bitter
4.	Shape	Alternate, stipulate,	Alternate, stipulate,
5.	Size	8-12.5 cm long	9.5 cm long

Journal of Chemical Health Risks
www.jchr.org
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Figure 1: Showing Plant of Cassia Auriculata Linn

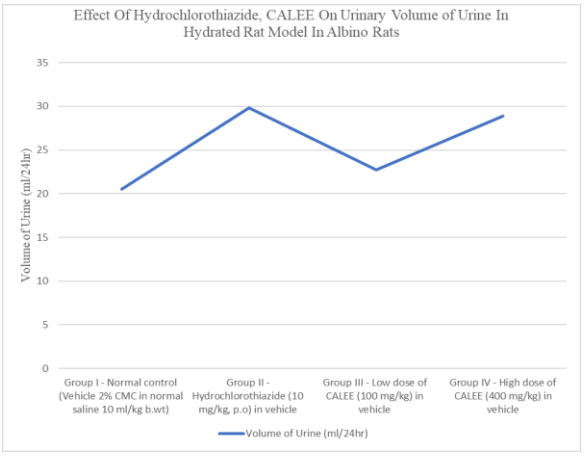
Preliminary Phytochemical Screening of Cassia Auriculata Linn

S/NO	CHEMICAL TEST	ETHANOLIC EXTRACT OF LEAVES
	Alkaloid	Present
	Glycosides	Present
	Phenols	Present
	Tannins	Present
	Saponins	Present
	Proteins	Present
	Carbohydrates	Present
	Flavonoids	Present

Evaluation of Urine Sample And Analysis Of Electrolytes

Effect Of Hydrochlorothiazide, CALEE On Urinary Volume of Urine in Hydrated Rat Model In Albino Rats

Sr. No	Group	Volume of Urine (ml/24hrs)
	Group I - Normal control (Vehicle 2% CMC in normal saline 10 ml/kg b.wt)	20.5 ml
	Group II - Hydrochlorothiazide (10 mg/kg, p.o) in vehicle	29.8 ml
	Group III - Low dose of CALEE (100 mg/kg) in vehicle	22.7 ml
	Group IV - High dose of CALEE (400 mg/kg) in vehicle	28.9 ml



Graph 1: Showing graph of Group v/s Volume of Urine (ml/24 hrs)

Effect of Hydrochlorothiazide, CALEE (Cassia Auriculata Linn Ethanolic Extract) on Urinary Sodium, Potassium and Chloride in Hydrated Rat Model In Albino Rat

Sr. No	Group	Level of Sodium (mmol/l)	Level of Potassium (mmol/l)	Level of Chloride (mmol/l)
	Group I - Normal control (Vehicle 2% CMC in normal saline 10 ml/kg b.wt)	115.6 mmol/l	45.7 mmol/l	81.3 mmol/l

Journal of Chemical Health Risks
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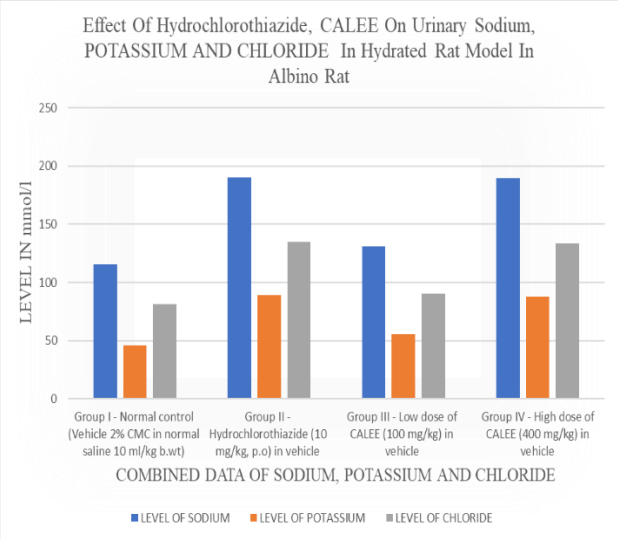
	Group II - Hydrochlorothiazide (10 mg/kg, p.o) in vehicle	190.5 mmol/l	89.2 mmol/l	134.6 mmol/l
	Group III - Low dose of CALEE (100 mg/kg) in vehicle	130.7 mmol/l	55.8 mmol/l	90.6 mmol/l
	Group IV - High dose of CALEE (400 mg/kg) in vehicle	189.6 mmol/l	87.9 mmol/l	133.8 mmol/l



Graph 2: Showing graph of Group v/s Level of Sodium, Potassium, Chloride in mmol/l

Conclusion

The morphological characters of leaves of Cassia Auriculata Linn was found to be identical as standards. As per Preliminary phytochemical Evaluation of leaves Cassia Auriculata Linn, the ethanolic extract of Cassia Auriculata Linn contains alkaloids, glycosides, phenols, tannins, saponins, proteins, carbohydrates and flavonoids, which shows the characteristic features of Cassia Auriculata Linn. Evaluation studies on the basis of volume of urine sample with controlled, hydrochlorothiazide, low concentration (100 mg) and high concentration (400 mg) , as the concentration of CALEE increases, volume of urine also increases from 20.5ml/24hrs to 28.9ml/24hrs which shows the diuretic effect of ethanolic extract of leaves of Cassia Auriculata Linn. On increasing the dose of Cassia Auriculata Linn ethanolic extract, the amount of sodium, potassium, and chloride also increases which shows the diuresis effect on electrolytes.

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Journal of Chemical Health Risks

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