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Shuddha Sveta Gunja - purified (*Abrus precatorius* Linn.) white variety experimental Pharmacology as anti-diuretic activity

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Abstract
Purpose: In present study was undertaken to investigate the Anti-diuretic activity of Hydroalcoholic seed extract of Shuddha sveta Gunja (*Abrus precatorius* Linn.) in Albino rats.
Method: The method of Lipschitz *et al*. was employed for the assessment of Anti-diuretic activity. Four groups of six rats were taken for the study. Groups: Normal, Control, Standard, Test-1 (200mg/kg), Test-2 (400mg/kg).
Results: The study showed that high and low doses of HASEAP (Hydro-alcoholic seed extract of *Abrus precatorius* Linn.) along with the effect on electrolytes like Na^+, K^+ and Cl^- showed significant Anti-diuretic activity.
Conclusion: It may concluded that Hydroalcoholic seed extract of Shuddha sveta Gunja *(Abrus precatorius* Linn.) possess Anti-diuretic activity in a Dose dependent manner which appeared to be comparable with that of the Standard drug Frusemide.

Keywords: Shuddha Sveta Gunja (*Abrus precatorius* Linn.), anti-diuretics, hydroalcoholic seeds extract of Shuddha Sveta Gunja

Introduction`

Medicinal plants offer numerous opportunities for the development of new drugs, as extract, pure compound, or derivative. The natural origin, however, does not guarantee their safety for medicinal purposes. Most plant products used in folk medicine have strong scientific evidence regarding their biological activities. However, the main obstruction to the use of plant preparations is the lack of scientific and clinical data in support of better understanding of the efficacy and safety of drugs. Different toxicological study data like acute and subchronic on medicinal plants or their preparations should be obtained in order to increase the assurance of their safety in humans, particularly for use in the development of pharmaceuticals

Experimental Pharmacology is the study through experimental use in controlled situations. Human and animal drug testing falls into the category of experimental pharmacology. Scientists design drugs as well as they can without Experimental evidence and then test them on humans or on animals in an experimental setting to gather more information and to perfect their drugs.

The use of drugs goes back to the origins of mankind. In historical times oral drug-lore became codified empiric drug theory (*Materia medica*) and ultimately, in the 19th century, experimental pharmacology. The main aim of experimental pharmacology is –

- To find out a therapeutic agent suitable for human use.
- Study the toxicity of the drug.
- Study the mechanism and site of action of drug.

The present study is Pre-clinical experimental pharmacology which involves the identification and optimization of trial drug and testing on animals to assess its efficacy and safety to be used on human volunteers.

Aim of the study

The present study aims to screen the antidiuretic activity of hydro-alcoholic seed extract of Shuddha Sveta Gunja - White variety (*Abrus precatorius* Linn.)

Fig 1: Sveta Gunja plant

Fig 2: Sveta Gunja Beeja

Fig 3: Shuddha Sveta Gunja seed

Materials and Methods

Collection of plant material

The seeds of *Abrus precatorius* Linn, White variety - Sveta Gunja were collected from the local forest dwellers in the area surrounding Hyderabad.

Preparation of extract

The seeds were purified by the procedure dola yantra svedana in Godugdha for 6 hrs, then it was dried in shade for a week to remove the moisture content, after drying it was grounded to coarse powder. The coarse powder was then subjected to extraction by maceration using ethanol and water in the ratio of 7:3. Finally the obtained filtrate was subjected to evaporation in a rotary flash evaporator under reduced pressure were a crude residue was formed.

Procurement of animals

Healthy albino rats of Wistar strain of either sex weighing about 150-200 g were used for the study. The animals were acclimatized for a period of one week prior to expose the experimental conditions. Animals were caged individually and kept in an air conditioned room at the temperature of 22±24 ^{0}C with 50% 10% relative humidity with 12 hours light and dark cycle. Throughout the study, rats were maintained at normal laboratory conditions, fed with standard rat pellet diet and drinking water *ad libitum*.

Chemicals

Chemicals used are sodium dihydrogen phosphate, sodium hydroxide, potassium chloride, sodium bicarbonate, sodium carbonate, hydrochloric acid, sodium chloride, trichloro acetic acid, thiobarbituric acid (TBA), hydrogen peroxide, epinephrine, DTNB, EDTA, tris buffer, sodium citrate were of laboratory standards.

Instruments

UV-Visible spectrophotometer (analytical systems, model no: AUV 2060), electronic balance (Shimadzu, Model no: DS-852 J), homogenizer (Ever shine, Modelno: 607), auto analyzer (Mispa excel, Version: 14e) and Cooling centrifuge (Remi, Model no: C-24 BL).

Procedure to evaluate antidiuretic activity

Animals were maintained under standard conditions of temperature and humidity. The method of Lipschitz *et al*. was employed for the assessment of antidiuretic activity. Four groups of six rats each were fasted and deprived of water for 18hrs prior to the experiment. On the day of experiment, normal group of animals were given normal saline orally (25ml/kg body weight) and the treated groups were given 200mg/kg and 400mg/kg body weight of the hydroalcoholic extract of *Abrus precatorius*. Linn., White variety (Purified). The standard group was given furosemide (20mg/kg) intraperitoneally.

The rats were placed in metabolic cages specially designed to separate faecal matter and urine. The urine volume was registered at hourly basis of post administration. During this period no food or water was given to the animals. The total urine volume was measured for both control and treated animals. The sodium, potassium and chloride ion concentration in the urine samples were determined and tabulated in Table 1.

Experimental protocol

The experimental animals were divided into 4 groups were containing 6 animals in a group (n=6)

Table 1: Names of Groups of Animals for experimental analysis

S. No	Groups	Treatment	Purpose of the study
1	Normal control	Treated with normal saline (25 mL/kg; *p.o.)*	To assess the parameters in normal control
2	Standard	Treated with furosemide (20 mg/ kg; *I.P*)	To assess the parameters in standard treated group
3	Test-1 (200 mg/kg)	Treated with HASEAP (p.o.)	To assess the parameters in low dose of HASEAP treated group.
4	Test-2 (400 mg/kg)	Treated with HASEAP (p.o)	To assess the parameters in high dose of HASEAP treated group

* HASEAP (Hydro-alcoholic seed extract of *Abrus precatorius* Linn.)

Statistical analysis

All the data was expressed as mean ± S.E.M. statistical significance between more than two groups was tested using one way ANOVA followed by Dunnett test and bonferroni test using computer based fitting program (Prism graph pad 5.0). Statistical significance was set accordingly. P value of < 0.05 has been considered as statistical significance level.

Results

Table 2: Effect of hydroalcoholic seed extract of Shuddha Sveta Gunja (*Abrus precatorius* Linn.) on urine volume, Cl^-, K^+ and Na^+

S. No	Groups	Urine volume (mL)	Cl^-(meq/L)	K^+ (meq/L)	Na^+ (meq/L)
1	Normal control	1.76± 0.692	158±1.41	89.8±2.85	236±8.53
2	Standard	5.14±0.018###	400±8.38###	327±7.34###	464±12.1###
3	Test-1 (200 mg/kg)	1.56±0.108*	147±3.15ns	72.7±2.81*	188±1.78***
4	Test-2 (400 mg/kg)	0.998±0.032**	126± 1.78***	65±2.08**	157±1.52***

All values are shown as mean ±SEM and n = 6.

p< 0.001, Standard group when compared with control group

*** p< 0.001, ** p< 0.01, * p< 0.05 when compared with control group

Discussion

Antidiuretics are the agents which decreases urine outflow by inhibiting the excretion water along with sodium. Vasopressin which is an antidiuretic hormone (ADH) released from the pituitary gland and acts on the kidneys to increase their reabsorption of water into the blood. This hormone mainly helps to maintain the optimum amount of water in the body, during the conditions like hypovolemia, physical stress and surgery. Not only ADH, aldosterone which is a steroidal hormone released from the adrenal cortex also responsible for the inhibiting the elimination of water and sodium.

Antidiuretics mainly used in the treatment of pituitary diabetes insipidus, nephrogenic diabetes insipidus, polyuria, nocturia or bed wetting. Currently available anti diuretic drugs are Anti diuretic hormone and its analogue desmopressin. There are numerous plants available and are claimed to possess antidiuretic properties but still they lack scientific experimentation.

In our study we had selected *Abrus precatorius* Linn., a woody twinning plant with characteristic toxic White variety seed. Sveta Gunja beeja, which was purified according to the classical method mentioned in Ayurvedic classics. Besides that it was a well-known medicinal plant which have been widely used in the many of the ayurvedic formulations. Several groups of secondary metabolites have been isolated from this species, including alkaloids, steroids and other triterpenoids, Isoflavanoquinones, anthocyanins, starch and tannins etc.

The pharmacological studies have shown that *Abrus precatorius* Linn. possesses a number of biological activities such as anti-bacterial, anti-cancer, anti-diabetic, anti-fertility, nehroprotective and anti-seratonergic (Anamika Das *et al*., 2016).

In the present study we had focused on antidiuretic activity of purified seeds of *Abrus precatorius* Linn., White variety, Shuddha Sveta Gunja Beeja. It was observed that both the low dose i.e, 200 mg/kg and high dose i.e, 400mg/kg, (1.56±0.108, 0.998±0.032), of HASEAP showed significant decrease in the urine outflow when compared with control and standard group (1.76± 0.692, 5.14±0.018), which is treated with normal saline and furosemide. Not only urine volume but also levels of various electrolytes like Na^+ (188±1.78, 157±1.52), K^+ (72.7±2.81, 65±2.08) and Cl^- (147±3.15ns, 126± 1.78), were decreased in respective groups.

Conclusion

Based on the obtained results finally it may concluded that hydroalcoholic seeds extract of *Abrus precatorius* Linn., White Vriety, Shodita Sveta Gunja Beeja possess antidiuretic activity and the possible mechanism might be due to regulation of ADH and aldosterone hormone were these are the hormones which regulates the body fluid and sodium levels. This action may be due to presence of Phytoconstitutents like Brassicasterol, Stigmasterol and β-sitosterol etc. and some other secondary metabolites like alkaloids. Further investigation is required for to evaluate the antidiuretic activity of *Abrus precatorius* Linn. with antidiuretic hormone.

Animal Expermintal study with Suddha Sveta Gunja seed powder in albino rats as anti diuretic activity

Fig 4: Animal house

Fig 5: Albino rats in a tray

Fig 6: Acclimization of Albino

Fig 7: Feeding the Albino rat with the test drug

Fig 8: Albino rat in the Metabolic

Fig 9: Collection of Urine

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