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Research Article

ANTIPYRETIC ACTIVITY OF WHOLE AERIAL PART FROM *ARGYREIA NERVOSA*

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ABSTRACT

Argyreia nervosa is an important medicinal plant belonging to family *Convolvulaceae* has been employed in various medical systems from an ancient time for the treatment of different diseases including antibacterial, antifungal, antipyretic etc. The present study was designed to investigate the antipyretic activity of methanol and ethyl acetate extract of whole aerial part of *Argyreia nervosa.* Study was carried out on healthy wistar rats weighing about 150-200 g, using brewer's yeast-induced pyrexia for antipyretic study. Present study reveals the significant effects.

Keywords: *Argyreia nervosa, Argyreia speciosa*, Convolvulaceae, Brewer's yeast-induced pyrexia, Antipyretic activity.

INTRODUCTION

The use of plants as medicine is as old as human civilization. People of all ages in both developing and developed countries use plants in an attempt to cure various diseases and to get relief from physical sufferings. Natural products are a source for bioactive compounds and have potential for developing some novel therapeutic agents.

Argyreia nervosa is a Vine Forb/herb[1] belongs to family *Convolvulaceae* in hindi it is known as samundar-ka-pat[2], Its botanical synonym[1] is *Argyreia speciosa*. It is distributed throughout India, up to an altitude of 300 m, often cultivated native in India from Assam and Bengal to Karnataka[3,4,5]. Leaves are 7.5-3.0 by 6.3-2.5 cm. (sometimes even larger), ovate, acute glabrous above, persistently white-tomentose beneath, base cordate; petioles 5-15 cm. long, white-tomentose: characteristic odour and slightly bitter taste[3, 6]. Stem stout, white tomentose, characteristic odour and slightly bitter taste[6]. Traditionally it was used in gleet, gonorrhoea, strangury and chronic ulcers. A preparation 'Fortege' made from this plant along with several other ingredients is used for curing sexual disorders in males. Another drug 'Speman' consisting of several ingredients of plant material including this species, is reported to exhibit anabolic-cum androgen-like activity in mice[3], In stomach complaints, sores on foot, small pox, syphilis, dysentery and diarrhoea[4].

MATERIALS AND METHODS

Collection, Authentication and Preparation of Plant Material

The fresh Aerial part collected from local area of Barpali, (Dist-Bargarh, Orissa). The plant was authenticated by Botanical Survey of India (BSI), Central National Herbarium Howrah, Kolkata, India. Ref. no. CNN/I-I/49/2010/Tech.II/285. The whole aerial part was dried under shade and powdered by the help of mechanical process. Powder of whole aerial part was stored in a suitable place.

Extraction

The dried powder plant material was extracted with ethyl acetate and methanol, by successive cold maceration method with increasing order of their polarity. The powdered drug was extracted for 7 days with each solvent. The extract was then filtered using filter paper and the filtrate so obtained was evaporated in a distillation unit[7].

Phytochemical Screening

Qualitative tests for the presence of plant secondary metabolites such as carbohydrates, alkaloids, tannins, flavonoids, proteins, saponins and glycosides were carried out on the extracts using standard procedure[8, 9,10].

Method

The antipyretic activity of whole aerial part from *Argyreia nervosa* studied using yeast induced pyrexia method on rat. The experiment protocols were approved by the Institutional Animal Ethics Committee prior to the conduct of the animal experiments.

Healthy Wistar rats weighing about 200-250 g were taken. The rats showing 37.5 ± 0.5° C were selected. They were fasted for 24hrs before inducing pyrexia. Pyrexia was induced by injecting subcutaneously 12% w/v suspension of yeast (1 mL /100 g. Body weight) and they were allowed to feed. They were divided into 4 groups having 6 in each and numbered.

The rectal temperature was recorded after 10 h using a clinical thermometer by introducing one inch in to the rectum and keeping it inside for one minute. The temperature first recorded after 10 h of yeast administration was taken as zero hour reading. The control, standard and test substances were given to the animals by gastric tube. After the drug was administered, the temperature of all the rats in each group was recorded at an interval of 1½ h, 2½ h, 3½ h, and 4½ h. The mean temperature was found out for each group and compared with the value of standard drug[11].

Acute Toxicity Studies

The acute oral toxicity study of the extract was carried out by using wistar rats of either sex weighing between 150-200 g as per revised OECD (Organisation for Economic Cooperation and Development) guidelines 423. The ethyl acetate and methanolic extract of whole aerial part from *Argyreia nervosa* was administered orally to overnight fasted animals at the dose of 250 mg/kg, 500 mg/kg, 1000 mg/kg and 3000 mg/kg of body weight. After administration of the extracts, the animals were observed continuously for the first two hours, for any toxic manifestation. Thereafter, observations were made at regular intervals for 48 h. Further the animals were under investigation up to a period of 2 week for mortality and general behaviour[12].

Experimental Groups

Rats were randomly allotted into different experimental groups each containing six animals (n=6). List of experimental groups and respective drug treatment along with the dose used are tabulated in the Table 1.

Table 1: Showing experimental groups and drug treatment with the dose

S. No.	Groups (n=6)
Group I	Control (2% gum acacia solution, p.o)
Group II	Pyrexia + Paracetamol(30 mg/kg, p.o)
Group III	Pyrexia + Ethyl acetate extract(300 mg/kg, p.o)
Group IV	Pyrexia + Methanolic extract (300 mg/kg, p.o)

Statistical Analysis

All results are expressed as mean ± standard error. The data was analyzed statistically using ANOVA followed by Dunnett's Multiple Comparison Test using SPSS 10.0 statistical software. The level of significance was fixed at 5%.

RESULTS AND DISCUSSION

Extracts

The dried powder of plant material was extracted with ethyl acetate and methanol by successive cold maceration method. The ethyl acetate and methanol extracts so obtained having yield 3.57% w/w and 4.93% w/w respectively and a general study reveal yield, consistency and color of extracts given in Table 2.

Preliminary Phytochemical Studies

Ethyl acetate extract of whole aerial part from *Argyreia nervosa* shows the presence of fixed oil, fats, phytosterols, glycosides, flavonoids, alkaloids, tannins and phenolic compounds while methanol extract shows the presence of carbohydrates, protein, amino acids, fixed oil, fats, phytosterols, glycosides, flavonoids, alkaloids, tannins and phenolic compounds.

Acute Toxicity Studies

Acute toxicity studies were carried out to evaluate the drug's toxicity and to determine the minimum effective dose of the drug extracts, using albino rats. No death was observed till the end of the study. The extract was found to be safe up to the dose of 3000 mg/kg, hence 1/10th of the tested dose, 300 mg/kg dose was chosen as the experimental dose.

Table 2: Yield, color and consistency of extracts

Extracts	% age Yield (w/w)	Consistency	Color	Color under UV
Ethyl acetate	3.57%	Sticky	Greenish black	Brown
Methanol	4.93%	Greasy	Dark black	Dark brown

Table 3: Acute toxicity studies

S. No.	Dose (mg/kg)	Observation
1	250	No Death
2	500	No Death
3	1000	No Death
4	3000	No Death

Antipyretic Activity

The present study was undertaken to evaluate the antipyretic activity of ethyl acetate and methanol extracts of whole aerial part from *Argyreia nervosa* in yeast induced pyrexia rats. The different doses of the extracts were administered to various groups of animals as per the acute toxicity study. The results of antipyretic activity are shown in Table 4. The results of present study revealed that both extracts showed significant activity ($p < 0.05$), from 1 ½ h onwards**.** Yeast induced fever is called pathogenic fever. Its etiology includes production of prostaglandins, so inhibition of prostaglandin synthesis could be the possible mechanism of antipyretic action as that of paracetamol[13].Therefore, the antipyretic activity of ethyl acetate and methanol extracts of whole aerial part from *Argyreia nervosa* is probably by inhibition of prostaglandin synthesis in hypothalamus. The reduction in elevated body temperature may be due to the presence one/more group of phytoconstituents in the extracts.

Table 4: Antipyretic activity of whole aerial part from *Argyreia nervosa*

Drug/ Extract	Initial Temp.(^{0}C)	Rectal Temperature ^{0}C at Time(hr) ± SEM					%reduction
		0 h	1 ½ h	2 ½ h	3 ½ h	4 ½ h	
Control	37.6 ± 0.5	39.53 ± 0.2	39.13 ± 0.15	39.44 ± 0.03	39.23 ± 0.03	39.06 ± 0.03	
Paracetamol	37.36 ± 0.6	39.96 ± 0.37	37.85 ± 0.08*	37.73 ± 0.13*	37.66 ± 0.03*	37.46 ± 0.5*	96.15
Ethyl acetate extract	37.08 ± 0.21	39.56 ± 0.06	38.96 ± 0.48*	38.73 ± 0.26*	38.16 ± 0.14*	37.63 ± 0.06*	77.82
Methanolic extract	37.31 ± 0.08	39.73 ± 0.26	39.66 ± 0.2*	39.06 ± 0.43*	38.51 ± 0.32*	37.59 ± 0.28*	88.42

Each value is Mean ± S.E.M (n=6),*Denotes significant difference when compared to control values at $p<0.05$

CONCLUSION

The ethyl acetate and methanol extract of whole aerial part from *Argyreia nervosa* exhibited antipyretic activity in experimental animal models. The results of this study provide a scientific basis for the utilization of *Argyreia nervosa* in traditional medicine. Further studies and tests are needed to explore the exact active principle responsible for the antipyretic activity.

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