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Evaluation of anti-pyretic activity of *Tephrosia purpurea*

E Sankari
Assistant Professor, Department of Pharmaceutical Chemistry, C.L Baid Metha College of Pharmacy, Thoraipakkam, Chennai, Tamil Nadu, India

Abstract
The aim of the present study is to evaluate the antipyretic activity on methanolic leaves extract of Tephrosia purpurea using yeast induced pyrexia method in albino rats. The fever occurs in patients is mainly due to the body's immune response is caused by pyrogens (fever producing substances). Pyrogens usually come from a source outside the body and in turn, stimulate the production of pyrogens inside the body. The plant is reported to contain coumarins, falvonoids, carotenoids, flavanones, iso-flavanones and quercetin. The plant has been reported to have anti-pyretic, anti-helmintic, hepato-protective, anti-ulcer, anti-inflammatory, antimicrobial properties. The methanolic leaves extract of Tephrosia Purpurea was investigated for its anti-pyretic activity. Anti pyretic potential of methanolic extract was evaluated by Brewer's yeast induced pyrexia test. The pyrexia in rats was reduced significantly (P<0.01) when compared to that of control by using standard drug paracetamol.

Keywords: tephrosia purpurea, antipyretic activity, yeast induced pyrexia, methanolic leaves extract

Introduction

Tephrosia purpurea L. belongs to family Fabaceae, commonly known as Kattu Kolingi in Tamil and Sharapunka in Sanskrit. It is indigenous to India and is also found in Ceylon, Mauritius, Tropical Africa and Subtropical regions. It is one of the most important plants used in the traditional system of medicine. A fever is higher than normal body temperature, it is a symptom caused by a variety of illnesses [1]. The general consensus is that temperatures of >100.6^0 F rectally,>99.4^{0}F auxiliary and >98.6^{0}F degrees orally (though diurnal variation make some say >90.0^{0}F orally) constitute fever. Pyrexia is caused as a secondary impact of infection, malignancy (or) other diseased states. It is the body's natural defense to create an environment where infectious agent (or) damaged tissue cannot survive. Normally the infected (or) damaged tissue initiates the enhanced formation of pro inflammatory mediator's (cytokines like interleukin la, a, and TNF-a) which increase the synthesis of prostaglandin E2 (PGE2) near peptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature [2]. High fever often increases faster disease progression by increasing tissue catabolism, dehydration &existing High fever often increases faster disease progression by increasing tissue catabolism, dehydration &existing complaints, as found in HIV. Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE2 biosynthesis. These synthetic agents irreversibly inhibits COX-2 with high selectivity but are toxic to the hepatic cells, glomerulus, cortex of brain and heart muscles, Whereas natural COX-2 inhibitors have lower selectivity with fewer side effects. A natural anti-pyretic agents with reduced or no toxicity. Tephrosia Purpurea is a species belongs to plant family Fabaceae. It grows as common wasteland weed. It is traditionally as folk medicine. Sarapunkha is used in treatment of spleenic diseases, ulcers [3], hepato-protective [4], other species of Tephrosia like Tephrosia falciform is also possess anti-helmintic, anti-pyretic activity [5]. Tephrosia Purpureahas been reported to possess hepato protectives [6], mast cell stabilizing effect in various experimental models [7]. The leaves are reported to be useful in jaundice6. In the present study, antipyretic potential of methanolic extract of plant have been evaluated by comparing with the standard drug paracetamol. The present study was design to evaluate the antipyretic activity of methanolic leaves extract of Tephrosia Purpurea.

Materials and Methods

Plant Collection and Authentication

Collected from Sri. Venkateswara University campus, Tirupati A.P., India, and authentified by Dr. K. Madhava Chetty, Department of Botany, S.V. University, Tirupa-thi, A.P, India The Tephrosia Purpurea plant scientific profile [8]. Mentioned in table 1 asfollows,

Table 1: The TephrosiaPurpureaplant scientific pro- file mentioned

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Genus	Tephrosia
Species	Purpurea
Botanical Name	TephrosiaPurpurea

Preparation of extract [9]

The collected plant material was dried under shade and then powdered with a mechanical grinder, sieved using sieve no: 44. About 500 gm of powdered drug was extracted successively with aqueous methanol as solvent by soxhlet apparatus. The solvent was completely removed by vacuum and semisolid mass was obtained(8.93% w/w with respect to

the powdered material).The methanolic extracts were stored in refrigerator and a required quantity was weighed and suspended in 2% aqueous Tween 80 solution for the experiments. The extraction was carried out until the drug becomes exhausted. The solvents were recovered from their extract by distillation under reduced pressure. The dried extract thus obtained was kept in desiccators and used for further experiment as well as for identifying their chemical group which arepresent.

Experimental Animals

Albino Wistar rats of either sex weighing 150-200 gm body weight were used for determination of the anti- pyretic activity and they were housed in light controlled room (12:12h) at constant temperature (22 ± 2^0C) conditions. Animals were fed with standard laboratory diet (lipton Feed, Bombay, India) and water.

Acute toxicity studies [10]

Acute toxicity studies for aqueous methanolic extract of Tephrosia Purpurea was carried out on swiss albino mice having an average body weight of 20-25 gms. The methanolic extract of Tephrosia purpurea in different doses were prepared by diluting with 2% aqueous tween 80 solution were administered orally to 20 mice and the percent mortality was noted up to 20 days of experimentation. The higher doses were administered for that on the same treatment animals. Acute toxicity study was done as per OECD-425 guidelines.

The result of the acute toxicity studies with different doses were presented in table-2.

Table 2: Acute Toxicity Studies of METP in mice

Treatment	Dose mg/kg	No. of Animals	No. of Survival	No. of Death	% Mortality	LD_{50}
Control	2% Aq. Tween 80 (5ml/kg)	20	20	Nil	0	-
METP	100	20	20	Nil	0	-
METP	200	20	20	Nil	0	-
METP	400	20	20	Nil	0	-
METP	800	20	20	Nil	0	-
METP	1600	20	20	Nil	0	-

METP- Methanolic Extract of Tephrosia Purpurea.

Experimental Animals

Albino Wistar rats of either sex weighing 150-200 gm body weight were used for determination of the anti- pyretic activity and they were housed in light con- trolled room (12:12h) at constant temperature (22 ± 2^0C) conditions. Animals were fed with standard labor- atory diet (lipton Feed, Bombay, India) and water.

Table 3: Identifications of Phyto chemical constituents

S. No	Photochemical	Tephrosia Purpurea
1	AlkaloidS	+ ve
2	Flavanoids	+ ve
3	Catachols	- ve
4	Phenolic Compounds	- ve
5	SteroidS	+ ve

Anti–Pyretic Activity

Yeast induced pyrexia model [11]

Rats were divided into four groups of six rats each. The normal body temperature of each rat was measured rectally and recorded. Pyrexia was induced by injecting subcutaneously the Brewer's yeast suspension which was acclimatized to remain quite in a restraint cage. A fixable thermister probe coated with the lubricant was inserted 3-4 cm deep into the rectum and fastened to the tail by adhesive tape. The temperature was measured on a thermometer (60 Sec.). After measuring the basal rectal temperature, the animals were given a subcutaneous injection of 10 ml/kg weight of 15% (W/V) yeast suspended in 0.5% W/V methyl cellulose solution. Rats were then returned to their housing cages, after 19thhr of yeast injection, the animals were again restrained in individual cages for the recording of their rectal temperature as described previously [12].

They were distributed into four groups of six animals in each group. METP was dissolved in 2% aqueous tween 80 solutions in the doses of 200 mg/kg and 400 mg/kg were administered orally to group I and group II respectively. Group III were administered with paracetamol (150 mg/kg) orally, which serves as standard, control group was given with 2% aqueous tween 80 solutions (10 ml/kg) orally. The reduction of rectal temperature was measured in each animal at 19th, 20th, 21st and 22ndhr after yeast administration. The reduced temperature was recorded and reported.

Table 4: Anti-pyretic effect of Tephrosia Purpurea

Test animal	0 hr	18thhr	19thhr	20thhr	21sthr	22ndhr
Control (yeast)	36.05± 0.009	37.13±0.056	37.67±0.089	37.70±0.155	37.66±0.080	37.58±0.031
Group I (200 mg/kg)	36.68± 0.055	37.61±0.02**	37.45±0.050*	37.09±0.120**	36.85±0.012**	36.70±0.044**
Group II (400 mg/kg)	36.36± 0.184	37.5±0.028**	37.06±0.011	36.83±0.053**	36.53±0.086**	36.36±0.10**
Group III Standard Paracetamol 150 mg/kg)	36.20± 0.57	36.89±0.080**	36.51±0.196	36.20±0.057**	36.10±0.025**	35.09±0.172**

N= six animals in each group; values are presented as mean + SEM
* = P>0.05; ** = P<0.01 When Compared to Control

Results and Discussion

Extraction

The dried powder of Tephrosia Purpurea was extracted with aqueous methanol by Soxhelation. The yield of aqueous Methanolic extract [13] is 14.0gm.

Identification of Phytochemical Constituents

All extracts obtained during successive extraction of Tephrosia Purpurea leaves were examined for the presence of various phyto constituents by performing qualitative phyto chemical tests [14] and the results are recorded in table3.

Anti – Pyretic Activity

Anti pyretic activity of Tephrosia Purpurea on Brewer's yeast induced pyrexia in rats as shown in table 4.

Acute toxicity studies for the determination of LD_{50} values were performed with different doses for the extract and it

was found safe to administer up to 1.6 gm/kg is presented in table 2. The dried powder of Tephrosia Purpurea leaves (500 gm) was extracted with 95% aqueous methyl alcohol by maceration. The yield of aqueous methanolic extract is 14 gm. All the extracts obtained during successive extraction of Tephrosia Purpurea leaves were examined for the presence of various phyto constituents by performing qualitative phytochemical tests and results are recorded in table 3. Effect of METP extract on normal body temperature in rats is presented in table 4.

The antipyretic activity studied by using Brewer's yeast solution shows significant reduction in elevated body temperature. This effect was maximal at the doses of 400 mg/kg of METP in dose dependent manner. The antipyretic effect started as early as 1 hr the effect was maintained for 4 hr after administration. Both the standard drug paracetamol 150 mg/kg andtested METP extract significantly reduced the yeast elevated rectal temperature compared to that of control group.

Conclusion

In Conclusion the present study demonstrates that methanolic extract of Tephrosia Purpurea leaves has marked antipyretic activity. According to the literature review, the other species of Tephrosia showed anti-inflammatory and antinociceptive activities. It is well known that most of the anti-inflammatory drugs Posses antipyretic activity. Hence we attempt to evaluate the antipyretic activity of related species of Tephrosia Purpurea. It is concluded that the present study demonstrates METP has marked antipyretic effect and result are shown in table-4.

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Conflict of interest

No conflict of interest

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