https://ijrps.com

ISSN: 0975-7538
Research Article

Elucidation of pharmacognostic profiles and pharmacological activity of *Tephrosia Purpurea*

Saravana Kumar.K*[1], Chandra Sekhar K.B[2], Jayachandra Reddy.P[3], Grace Rathnam[4], Sankari.E[1], Nagaveni.P[1]

[1]Seshachala College of Pharmacy, Tirupati Chennai Highway, Puttur, Chittoor Dist. – 517583, Andhra Pradesh, India

[2]Department of Chemistry, Jawaharlal Nehru Technological University Anantapur, Anantapur - 515 002, Andhra Pradesh, India

[3]Department of Pharmaceutical Analysis, Krishna Teja Pharmacy College, Tirupati, Chittoor District - 517 506, Andhra Pradesh, India

[4]Department of Pharmaceutics, C.L. Baid Metha College of Pharmacy, Jyothi Nagar, Old Mahabalipuram Road, Thorapakkam, Chennai - 600 096, Tamil Nadu, India

ABSTRACT

The Cause of fever in patients is mainly due to, when the body's immune response is triggered 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 extract of *Tephrosia Purpurea* leaves 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 ($P<0.01$) compared to that of control.

Keywords: Pyrogens; Methanolic extract; Anti-Pyretic activity; Pyrexia; Brewer's yeast

INTRODUCTION

A fever is higher than normal body temperature, it is a symptom caused by a variety of illnesses. The general consensus is that temperatures of >100.6° F rectally, >99.4^{0}F auxiliary and >98.6°F degrees orally (though diurnal variation make some say >90.0° F orally) constitute fever (Alam Khan MD et al., 2007). 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 (Burkhart CG et al., 1999).

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. *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 (Deshpande SS et al., 2003), hepato-protective (Hajare SW et al., 200), other species of Tephrosia like Tephrosia falciformis also possess anti-helmintic, anti-pyretic activity (Hullathi KK and Sharada MS 2007). *Tephrosia Purpurea* has been reported to possess hepato-protectives (Clausion GA and Pathol Immunopathol 2011), mast cell stabilizing effect in various experimental models (Murthy MSR and Srinivasan M 1993).

The present study was design to evaluate the antipyretic activity of methanolic extract of leaves of *Tephrosia Purpurea* .

MATERIALS AND METHODS

Plant Collection and Authentication

The leaves of the plant *Tephrosia Purpurea* were collected from Sri.Venkateswara University campus, Tirupati A.P., India, and authentified by Dr. K.Madhava Chetty, Department of Botany, S.V. University, Tirupathi, A.P, India

The *Tephrosia Purpurea* plant scientific profile (William C Evans 2006) mentioned in table 1 as follows,

* Corresponding Author
Email: saravanakumar156@gmail.com
Contact: +91-90000 90348
Received on: 10-09-2011
Revised on: 02-10-2011
Accepted on: 04-10-2011

Table 1: The *Tephrosia Purpurea* plant scientific profile mentioned

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

Preparation of extract (Gardner D R et al., 2003)

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 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 a dessicator and used for further experiment as well as for identifying their chemical group which are present.

Acute toxicity studies (Ecobichon DJ 2008)

Acute toxicity studies for aqueous methanolic extract of *Tephrosia Purpurea* was carried out in rats at different doses (1000-2000 mg/kg orally) showed no gross evidence of any abnormalities in the mice up to the end of 72 hr of the observation period. This indicates the society of extract. Further, it is reported that methanolic extract of *Tephrosia Purpurea* is found to be safe dose of 1600 mg/kg. Hence further pharmacological investigation was carried at dose levels of 200, 400 mg/kg. Acute toxicity study was done as per OECD-425 guidelines.

ANTI – PYRETIC ACTIVITY

Yeast induced pyrexia model

Rats were divided into four groups of six rats each (Neha S et al., 2009). The normal body temperature of each rat was measured rectally and recorded. Pyrexia was induced by injecting subcutaneously the Brewer's yeast suspension which were 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 19th hr of yeast injection, the animals were again restrained in individual cages for the recording of their rectal temperature as described previously (Sachdev Yadav et al., 2011).

They were distributed into four groups of six animals in each group. METP was dissolved in 2% aqueous tween 80 solution 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 solution (10 ml/kg) orally. The reduction of rectal temperature was measured in each animal at 19th, 20th, 21st and 22nd hr after yeast administration. The fall in temperature was recorded & reported.

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 antipyretic activity and they were housed in light controlled room (12:12h) at constant temperature (22 $\pm$ 2^{0}C) conditions. Animals were fed with standard laboratory diet (lipton Feed, Bombay, India) and water.

Table 3: Identifications of Phytochemical constituents

S. No	Phytochemical	Tephrosia Purpurea
1	Alkaloids	+ ve
2	Flavanoids	+ ve
3	Catachols	- ve
4	Phenolic compounds	- ve
5	Steroids	+ ve
6	Glycosides	+ ve
7	Tannins	+ ve
8	Purpurin	+ ve

Table 4: Anti-pyretic effect of *Tephrosia Purpurea*

Test animal	0 hr	18th hr	19th hr	20th hr	21st hr	22nd hr
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

Extraction

The dried powder of *Tephrosia Purpurea* was extracted with aqueous methanol by soxhelation. The yield of aqueous methanolic extract (Jana Goutam Kumar et al., 2010) is 14.0 gm.

Identification of Phytochemical Constituents

All extracts obtained during successive extraction of *Tephrosia Purpurea* leaves were examined for the presence of various phytoconstituents by performing qualitative phytochemical tests (Surve Suvidha et al., 2009) and the results are recorded in table 3.

Anti – Pyretic Activity

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

DISCUSSION

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 upto 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 (Arjun Patra et al., 2009). 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 phytoconstituents 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 and tested 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 antiinflammatory and antinociceptive activities. It is well known that most of the antiinflammatory 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.

REFERENCES

Alam Khan MD, Abdullahi Bahi M, Abdul Alim, Al-Basi, Antipyretic activity of roots of Leportea Cranulate Gand in rabbit. Pharm Biology 2007; 4: 312-315.

Arjun Patra, Shivesh Jha, Narasimha Murthy, Aher Vaibhav D, Pronobesh Chattopadhyay, Anti-inflammatory and antipyretic activities of hygrophila spinosa T. anders leaves (Acanthaceae). Tropical J Pharm Research April 2009; 8(2): 133-137.

Burkhart CG, Burkhat CN and Lehmann PF, Acne: A review of immunologic and microbiological factors. J Post Grad Med 1999; 75: 328-331.

Clausion GA, Pathol Immunopathol, Hepatoprotective activity of mimosapudica in carbon tetrachloride induced hepatotoxicity in rats. Journal of Herbal Medicine and Toxicology 2011; 5: 27-32.

Deshpande SS, Shah GB and Pharmar NS, Antiulcer activity of *Tephrosia Purpurea* in rats. Indian Journal of Pharmacology 2003; 35: 168-172.

Ecobichon DJ, The Basic of Toxicological and Phytochemical Screening study of Mitragyna inermis. Journal of Medicinal Plant Research 2008; 2: 279-284.

Gardner DR, Lee ST, Molyneux R, Edgar J, Preparative Isolation of Swainsonine from Locoweed:Extraction and purification procedures. Journal of Applied Phytochemal Analysis 2003; 4: 259-266.

Hajare SW, Suresh Chandra, Tandan SK, Sarma J, Lal and Telang AG, Analgesic and anti-pyretic activities of Dalbergia sissoo leaves. Indian Journal of Pharmacology 2000; 32: 357-360.

Hullathi KK, and Sharada MS, Comparative Antipyretic activity of Patha : An Ayurvedic drug. Pharmacog Magazine 2007; 3: 173-176.

Jana Goutam Kumar, Patel Naresh, Sahoo Prasenjit, Gupta Anshita, Gunjan Mahesh, Antipyretic potential of different extract of cassia fistula linn (Fabaceae) bark. IJRAP 2010; 1(2): 634-636.

Murthy MSR, and Srinivasan M, Hepatoprotective effect of *Tephrosia Purpurea* in experimental animals. Indian Journal of Pharmacology 1993; 25, 34-36.

Neha S, Ranvir GD, Jangade CR, Analgesic and antipyretic activities of curcuma longa rhizome extracts in wistar rats. Veterinary World 2009; 2(8): 304-306.

Sachdev Yadav, Mayank Kulshreshtha, Mradul Goswami, Chandana, Rao & Veena Sharma, Elucidation of analgesic and antipyretic activities of ficus bengalensis linn. Leaves in rats. Journal of Applied Pharmaceutical Sciences 2011; 01(01): 38-41.

Seth SD. Text book of Pharmacology 2nd Edition, Published by Read Elsevier India Private Limited, India; 165-169: 2005.

Surve Suvidha S and Patil Anuja, Evaluation of pharmacognostical, phytochemical and pharmacological activity of Tephrosia Purpuria. IJRPD 2009; 1(2): 1-6.

William C Evans. Trese and Evans Pharmacognosy 15th Edition, Published by Reed Elsevier India Private Limited, India; 418: 2006.