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Research

Evaluation of antipyretic and antioxidant activity of *Barleria prionitis* Linn. Root extract against brewer's yeast induced pyrexia in albino wistar rat

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Abstract

This study evaluates the antipyretic and antioxidant activities of the ethyl acetate extract of *Barleria prionitis* Linn. root. Utilizing both in vitro and in vivo methods, the extract demonstrated significant efficacy in free radical scavenging and reducing yeast-induced pyrexia in Albino wistar rats. Phytochemical screening revealed the presence of phenolics, tannins, alkaloids, and other bioactive compounds. The antioxidant activity was quantified using the DPPH assay, with an IC50 value comparable to ascorbic acid. In vivo studies showed a dose-dependent reduction in rectal temperature. These findings validate the traditional medicinal uses of *B. prionitis* Linn. and suggest its potential as a natural therapeutic agent for fever and oxidative stress-related conditions.

Keywords: *Barleria prionitis* Linn., Antipyretic activity, Antioxidant activity, Phytochemicals, DPPH assay, Ethyl acetate extract, Natural medicine, Pyrexia, Free radical scavenging.

INTRODUCTION

The word "herb" has been derived from the Latin word, "herba" and an old French word "herb". Now a days, herb refers to any part of the plant like fruit, stem, bark, flower, leaf, stigma or a root, as well as a non-woody plant. Earlier, the term "herb" was only applied to non-woody plants are also used as food, flavonoid, medicine or perfume and also in certain spiritual activities.Plants have been used for medicinal purpose long before pre historic period. Ancient unani manuscripts Egyptian papyrus and Chinese writing described the use of herbs. Evidence exist that Unani Hakims, Indian vaids and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Indigenous cultures such as Rome, Egypt, Iran, Africa and America used herbs in their healing rituals, while other developed traditional medical systems such as Unani, Ayurveda and Chinese Medicine in which herbal therapies were used systematically.

Traditional systems of medicine continue to be widely practiced on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several synthetic drugs and

development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments. Among ancient civilizations, India has been known to be rich repository of medicinal plants. The forest in India is the principal repository of large number of medicinal and aromatic plants, which are largely collected raw materials for manufacture of drugs and perfumery products. About 8000 herbal remedies have been codified in AYUSH system in INDIA. Ayurveda, Unani, Siddha and Folk (tribal) medicines. Among these systems, Ayurveda and Unani medicines are most developed and widely practiced in India.

Recently WHO (World Health Organization) estimated that 80 percentage of people worldwide rely on herbal medicines for some aspect of their primary health care needs. According to WHO, around 21,000 plant species have the potential for being used as medicinal plants. As per data available over three-quarters of the world population relies mainly on plants and plant extracts for their health care needs. More than 30% of the entire plant species, at one time or used for medicinal purpose. It has been estimated, that in developed countries such as United States, plant drugs constitute as much as 25% of total drugs, while in fast developing countries such as India and China, the contribution is as much as 80%. Thus, the economic importance of medicinal plants is more to countries such as India than to rest of the world. These countries provide two-third of the plants used in modern system of medicine and the health care system of rural population depend on indigenous system of medicine.

Treatment with medicinal plant is considered very safe as there is no or minimal side effects. These remedies are in naturally, which is the biggest advantage. The golden fact is that, use of herbal treatment is independent of any age groups and the sexes. The ancient scholars only believed that herbs are only solution to cure a number of health related problems and diseases. They conducted thorough study about the same, experimented to arrive at accurate conclusions about the efficacy of different herbs that have medicinal value. Most of drugs, thus formulated are free of side effects or reactions. This is the reason why herbal treatment is growing in popularity across the globe. Herbs such as *Chamomile, Calamus, Ajwain, Basil, Cardamom, Chrysanthemum, Coriander, Fennel, Peppermint* and *Spearmint, Cinnamon, Ginger* and *Turmeric* are helpful in promoting good blood circulation. Therefore, they are used as cardiac stimulants [(1)]. The traditional preparations comprise medicinal plants, minerals, organic matter and plant preparations of therapy. Thereare list recorded evidence of their use in Indian, Chinese, Indian texts include Rigveda, Athervaveda, Charak Samhita and Sushruta Samhita. The herbal medicines/traditional medicaments have therefore been derived from rich traditions of ancient civilizations and scientific heritage.

Why Herbal Medicines?[(1)]

Herbal medicines are being used by about 80% of the world population primarily in the developing countries for primary health care. They have stood the test of time for their safety, efficacy, cultural acceptability and lesser side effects. The chemical constituents present in them are a part of the physiological function of living flora and hence they are believed to have better compatibility with the human body. Ancient literature also mention herbal medicines for age–related disease namely memory loss, osteoporosis, diabetic wounds, immune and liver disorders etc., for which no modern medicine or only palliative therapy is available. These drug are made from renewable resources of raw materials by eco-friendly processes and will bring economic prosperity to the masses growing these raw materials[(2)]

PLANT PROFILE[(9,10,11)]

Barleria prionitis Linn. is a famous perennial plant commonly known as porcupine flower or vajradanti. It is a shrub with yellow flowers and two flat seeds shielded with mattes hairs, inhabit most part of India. Various part of the plant such as leaves, roots, aerial parts, flowers and stems are used in the traditional system of medicine. Owing to its incredible odontalgic property, it is extensively used in treating bleeding gums and toothache. From the pharmacological point, the plant has been effectively screened for antibacterial, antifungal, antiviral, anti-inflammatory, antifertility, antioxidant, enzyme inhibitory, hepatoprotective, antihypertensive, anticancer and anticataract activities. Compounds such as tannins, saponins, glycosides, phenolic acids, phytosterols and terpenes have been identified in the plant.

It is an erect, perennial, prickly, and evergreen shrub, usually single-stemmed, growing to about 1.5m in height from a single taproot. Lateral roots branching in all direction. The leaves are up to 100mm long 40mm wide, oval-shaped though narrow at both ends (ellipsoid). The base of the leaves is protected by three to five sharp, 10-20mm long, pale- colored spines. The yellow- orange tubular flowers with several long protruding stamens, Flowers are packed in bunches tightly together at the top of the plant, but they also occur singly at the

bases of leaves, seed capsule which is oval-shaped has two fairly large, flat seeds, shielded with mated hairs with a sharp pointed beak. Stems and branches are stiff and smooth and light brown to light gray in color. The plant contains some specific compounds such as Barlenoside, Barlerine, Acetylbarlerine and Balarenone and some common secondary metabolites Such as lupeol, bete-sitosterol, vanillic acid and syringic acid. This review provides morphological, ethno medical, pharmacological and phytochemical data of the plant *B.prionitis* Linn. *Barleria prionitis* Linn. also known as the porcupine flower, which belong to the family acanthaceae and genus *Barleria*. It is native to India, also distributed widely throughout Asia including Malaysia, Pakistan, Philippines, Sri Lanka, Bangladesh, Yemen and tropical Africa, Sri Lanka and Eastern Southern and Central Africa.

Fig 01:Plant of *Barleria prionitis* Linn

Fig 02:Dried root of *Barleria prionitis* Linn.

Synonym
Barleria hystrix; Barleria echinate; Barleria spicata; Barleria appressa

Common name
Porcupine flower; Vajradanti

Classification

Kingdom	Plantae
Sub kingdom	Tracheobionta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Asteridae
Order	Scrophulariales
Family	*Acanthaceae*
Genus	*Barleria*
Species	*Prionitis*

Vernacular names

Tamil	Sulli malar, Manjachemulli
Kannada	Gorante, Mullujaali
Malayalam	Manjakkanakambaram, Kanakambaram
Hindi	Kanakambar, Vajradanti
English	Porcupine flower, *Barleria*

Fig 03:Dried plant of *Barleria prionitis* Linn.

Root: The root extract of *Barleria prionitis* Linn. showed the antifertility potential. Oral administration of methanol root extract reduced the sperm formation in male albino rats. Root extract decreased the formation of round spermatids, sperm motility, spermatogonia, preleptotene spermatocytes population and mature leydig cells.
Leaves: *Barleria prionitis* Linn. showed diuretic effect was reported by the extract of leaves.
Stem: *Barleria prionitis* Linn showed hepatoprotective effect was reported by the extract of stem.

Aim and objectives

The preliminary evaluation of the Antipyretic and Antioxidant activity of *Barleria prionitis* Linn. root in Albino wistar rat.

Successive Hotsoxhlet extraction of the powdered root of *Barleria prionitis* Linn.(by using Ethyl acetate). Phytochemical screening of the extract obtained from the source of *Barleria prionitis* Linn. root. Estimation of phenolic content in Ethyl acetate extract of *Barleria prionitis* Linn. root. Evaluation of in vitro Antioxidant activity of Ethyl acetate extract of the root of *Barleria prionitis* Linn. by DPPH method. Evaluation of in vivo Antipyretic activity of Ethyl acetate extract of the root of *Barleria prionitis* Linn. by Brewer's yeast induced pyrexia model.To assessment of statistical evaluation.

MATERIALS AND METHODS

Procurement of *Barleria prionitis* Linn. Root

The root of *Barleria prionitis* Linn. were collected from the Kaspakaranai, Kandachipuram (taluk), Villupuram (District), Tamil Nadu. The collected root was identified and authenticated by the Dr. K.N.Sunil Kumar, Research Officer/Sci-II and HOD, Department of Pharmacology, Siddha Central Research Institute, Arumbakkam, Chennai – 600 106.

Preparation of Extract

The root of *Barleria prionitis* Linn. were shade dried, crushed to produce coarse powder and subjected to successively extraction in hot soxhlet using solvent Ethyl acetate based on their polarity. The extract were double filtere by using muslin cloth and concentrated by evaporation on a water bath.

Hot Soxhlet Extraction Procedure[14]

In this method, the finely ground crude drug 100g was placed in a porous bag or thimble made of filter paper, which was placed in chamber of the Soxhlet apparatus. The extracting solvent in flask was heated, and its vapors condense in condenser. The condensed extractant drip into the thimble containing the crude drug, and extracts it's by contact. When the level of liquid in chamber rises to the top of siphon tube the liquid contents of siphon into flask. This process was continuous and it was carried out until a drops of solvent from the siphon tube does not leave residue when evaporate.

Phytochemical Studies

Preliminary Phytochemical Analysis[13]

All the extract of powdered root of *Barleria prionitis* Linn.were subjected to various qualitative tests for the identification of various plant constituents present in this species.

Total Phenolic Content[20]

TPC was analysed by the Folin–Ciocalteu colorimetric method using gallic acid as standard developed by with modification and expressed as mg/g gallic acid equivalent (GAE) on dry weight basis.The 25mg of plant extract were dissolved in 10ml of 50% MeOH:H2O (1:1), at room temperature and in its 1ml, 1ml of Folin's Reagent (1N) and 2 ml of Na_2CO_3 (20 %) were added subsequently. The test mixture was mixed properly on cyclomixer, left at room temperature for 30 min and maintained to 25ml with water. The absorbance of test mixture was measured at 725nm. The blank was performed using reagent blank with solvent. Gallic acid was used as standard. The calibration curve was plotted using standard gallic acid.The data for total phenolic contents of sample were expressed as mg of gallic acid equivalent weight (GAE) per 100g of sample.
The formula was used to calculate total phenolic content (TPC);

C = cV / m
C – Total phenolic content in mg GAE/g
c – Concentration of gallic acid obtained from calibration curve in mg/ml
V – Volume of extract in ml
m – Mass of extract in gram

In Vitro Method

1-Diphenyl-2-Picrylhydrazyl (Dpph) Assay[18,19]

Principle

- DPPH is nitrogen centered free radical that show strong absorbance at 517nm. DPPH assay is based on the measurement of the scavenging ability of antioxidants towards the stable DPPH radical.
- To evaluate the antioxidant activity of specific compounds or extracts (antioxidant) were allowed to react with a stable radical DPPH solution. Extent of DPPH radical scavenged was determined by the decrease in intensity of violet colour in the form of IC_{50} values.

$$(DPPH)+ (H\text{-}A) \longrightarrow DPPH\text{-}H +(A)$$

Procedure

The stable DPPH was used for determination of free radical-scavenging activity of the extracts. The 0.1mM solution of DPPH in methanol (22.2 mg in 1000 ml) was freshly prepared. Different concentrations of extract were added at an equal volume to methanolic solution of DPPH. After 30 min at room temperature, the absorbance was recorded at 517nm. Ascorbic acid was used as standard controls. IC_{50} values denote the concentration of sample, which is required to scavenge 50% of DPPH free radicals. Radical scavenging activity was calculated by the following formula,
RSA (%) =(Abs control – Abs sample / Abs control) x 100
Where,
Abs control - Absorbance of control
Abs sample - Absorbance of sample.
The antioxidant activity of plant extract was expressed as IC_{50} and compared with the standard.

In Vivo Method[14]

Animals

Male and female albino rats (weight 150- 200 gm.) were used. The animals were fed on standard diet and water in the laboratory for a week. Before starting the experiment, the rats were subjected to fasting for 24 hours.

Drugs and Chemicals

Drugs : Paracetamol
Solvent : Tween-80
Extract : Ethylacetate

Experimental Animals

The present study was conducted after obtaining approval from Institutional Animal Ethical Committee (IAEC) and this protocol met the requirements of national guidelines of CPCSEA/IAECapproval no: 1917/GO/S/16/CPCSEA,20/09/2021 and 06/AEL/IAEC/MMC, Date: 14.08.2024.The male and female albino wistar rats (30 rats-either sex) were procured from Animal house, Madras Medical College, Chennai-03.

Acute Toxicity Study

Upto 2000mg/kg of the Ethyl acetate extract of *Barleria prionitis* Linn. root was reported, No morbidity/mortality in previous studies as per OECD guideline No.423. Therefore 1/10th and 1/5th dose of 200 mg/kg and 400mg/kg of Ethyl acetate extract of *Barleria prionitis* Linn. root were fixed for further in vivo evaluation.

Antipyretic Activity Study[14]

Brewer's Yeast Induced Pyrexia In Rat

Antipyretic activity on Albino wistar rats were screened with Brewer's yeast induced pyrexia. The rats were divided into five groups of six each. The basal rectal temperature of the rats were measured by introducing 1-2cm of digital thermometer in rectum. After measuring the basal rectal temperature, the pyrexia was induced by subcutaneous injection, 20% suspension of brewer's yeast in normal saline at a dose of 10 ml/kg of body weight. After 18hrs of yeast injection, rat which showed a raise in temperature of at least 1°C for the study. Immediately after 18hrs of yeast injection, animals in the various groups were treated.

Table01: Drug administration of in vivo method of Antipyretic activity of *Barleria prionitis* Linn. Root

Group No	Group Name	Treatment And Route Of Administration	No.of Animals
GROUP 1	Positive control	Normal saline (10ml/kg b.w.p.o).	6
GROUP 2	Negative control	20% w/v of brewer's yeast (10ml/kgb.w.s.c).	6
GROUP3	Standard	20% w/v of brewer's yeast (10ml/kg) + Paracetamol (150 mg/kg b.wp.o).	6
GROUP 4	Treatment control (Low dose)	20% w/v of brewer's yeast (10ml/kg) + Ethyl acetate extract of *Barleria prionitis* Linn.root (200mg/kg b.w.p.o).	6
GROUP 5	Treatment control (High dose)	20% w/v of brewer's yeast (10ml/kg) + Ethyl acetate extract of *Barleria prionitis* Linn.root (400mg/kg b.w.p.o).	6

Statistical Analysis

Here all values of statistical analysis are expressed as Mean±SEM. The data were statistically analyzed by using one way ANOVA followed by dunnett's test for individual comparison of group with control "P" values ≤0.01 was considered as significant.

RESULTS

Extraction

Percentage yield = (weight of extract in gm / weight of plant material in gm) X 100/1
Weight of extract in gm = 75gm
Weight of plant material in gm = 500gm
The percentage yield of the Ethyl acetate extract of *Barleria prionitis* Linn. root were obtained through Hot soxhlet extraction method was found to be **15 % w/w.**

Fig 04: Ethyl acetate extraction of *Barleria pronitis* Linn. root

Phytochemical Analysis

The phytochemicals present in the Ethyl acetate extract of *Barleria prionitis* Linn**.** root was shown in **Table 02**.

Table 02: Phytochemical analysis of Ethyl acetate extract of *Barleria prionitis* Linn. Root

S.No	Phytochemical Constituents	Test	Result
1	Carbohydrates	Molisch's test	+
		Benedict's test	+
		Fehling's test	+
		Tollen's test	+
2	Glycosides	Seliwanoff's test	+
		Keller-Killani test	-
		Legal's test	-
		Borntrager's test	-
3	Alkaloids	Dragendorff's test	+
		Mayer's test	+
		Hager's test	+
4	Phenolics and Tannins	Ferric chloride test	+
		Lead acetate test	+
		Gelatin test	+
5	Flavonoids	Shinoda's test	-
		Alkaline reagent test	-
6	Saponins	FoamTest	-
7	Steroids and terpenoids	Salkowski test	+
		Liebermann-Burchard test	+
		Noller's test	+
8	Proteins and amino acids	Biuret test	+
		Ninhydrin test	+
		Millons's test	+
9	Fats and fixed oil	Spot test	-
		Saponification test	-

" + " Presence; " - " Absence

Quantification of Total Phenolic Content

The quantification of total phenol content of Ethyl acetate extract of *Barleria prionitis* Linn. root was estimated as per procedure. The results of the total phenolic content was obtained from this evaluation were illustrated in **Table 03.**

Table 03: Total phenolic content in Ethyl acetate extract of *Barleria prionitis* Linn. root

Sample	Concentration (mg/ml)	Absorbance
Standard (Gallic acid)	5	2.939
	2.5	1.673
	1.25	0.769
	0.625	0.656
	0.312	0.578
	0.156	0.383
	0.078	0.276
	0.039	0.178
Ethyl acetate extract of *Barleria prionitis* Linn. root	1ml	0.356

*The total phenol content present in the sample was found to be = **1.7 mg/100g**.*

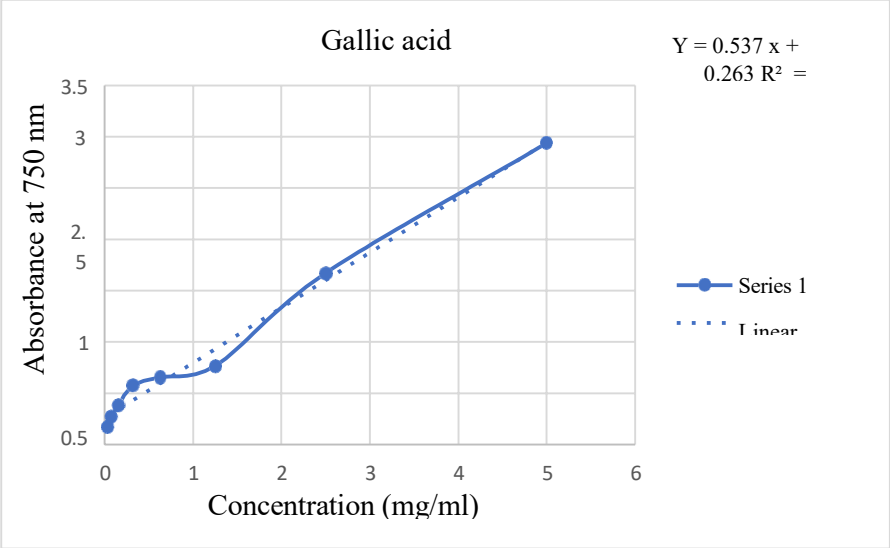

Fig 05: Total phenolic content present in *Barleria prionitis* Linn. root

In Vitro Anti-Oxidant Studies

The in vitro antioxidant activity of Ethyl acetate extract of *Barleria prionitis* Linn. root was evaluated by using the DPPH (1-Diphenyl 2-picrylhydrazyl) assay, with the procedure detailed on previousely**.** The results obtained from this evaluation were illustrated in **Table 04.**

Table 04: DPPH Radical scavenging activity of *Barleria prionitis* Linn. root

S.No	Tested sample ncentration (µg/ml)	D Value at 517nm(in triplicates)			% inhibition of the sample
1.	Control	0.985	0.987	0.988	-
2	500 µg/ml	0.199	0.205	0.201	**79.547**
3.	250 µg/ml	0.226	0.241	0.246	75.8959
4.	100 µg/ml	0.369	0.339	0.35	64.2326
5.	50 µg/ml	0.515	0.509	0.503	48.3773
6	10 µg/ml	0.728	0.738	0.721	26.0649
7	Ascorbic acid	0.176	0.187	0.189	81.3387

This table was showing the tested sample concentrations (in µg/ml), along with the corresponding OD values at 517nm and the percentage of inhibition. The control group had OD values of 0.985, 0.987, and 0.988, serving as the baseline for comparison. The Ethyl acetate extract of *Barleria prionitis* Linn. root exhibited varying degrees of inhibition, with higher concentrations demonstrating greater inhibition.

The highest inhibition of 79.547% was observed at 500µg/ml. Ascorbic acid, a reference compound, showed an inhibition of 81.3387%. These results highlight the antioxidant activity of extract, with higher concentrations exhibiting stronger inhibition of DPPH radicals compared to the control group.

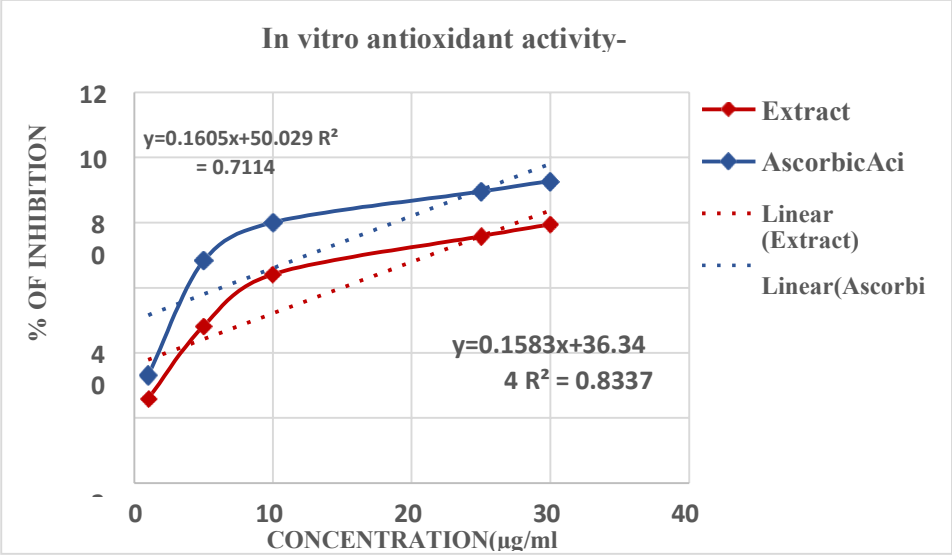

Fig 06: Antioxidant activity of *Barleria prionitis* Linn. root

The IC50 value of Ethyl acetate extract of *Barleria prionitis* Linn. root was determined to be 60.94 µg/ml. The normal range for the IC50 value of ascorbic acid is 61.01 µg/ml. In comparison, the Ethyl acetate extract of *Barleria prionitis* Linn root, demonstrated a slightly lower IC50 value compared to the IC50 value of ascorbic acid (61.01µg/ml). This indicates that Ethyl acetate extract of *Barleria prionitis* Linn. root possesses a similar potency to ascorbic acid in terms of inhibiting the target or producing the desired effect.

In Vivo Antipyretic Studies

The in vivo Antipyretic activity of Ethyl acetate extract of *Barleria prionitis* Linn. root on brewer's yeast induced pyrexia in Albino wister rat, as per the procedure. The results were illustrated in **Table 05.**

Table 05: Antipyretic activity of Ethyl acetate extract of *Barleria prionitis* Linn. root result

S. No	Treatment	Dose	Rectal Temp. After 18 Hr Yeast Induced Pyrexia (0hr)	Treatment With Extract		
				1hr (ºC)	2hr (ºC)	3hr (ºC)
1	Positive control	10 ml/kg (2%v/v)	37.40±0.6	37.30±0.7	37.60±0.6	37.50±0.4
2	Negative control (yeast)	10 ml/kg (20%w/v)	40.43±0.1	40.18±0.1	39.22±0.1	39.13±0.2
3	Standard group (paracetamol)	150 mg/kg	40.42±0.1	38.64±0.2***	38.45±0.2***	37.67±0.2***
4	Test group – Low dose	200 mg/kg	40.66±0.1	39.67±0.5**	39.14±0.2**	38.67±0.1**
5	Test group – High dose	400 mg/kg	40.56±0.1	39.28±0.2***	38.05±0.1***	37.74±0.1***

The statistical analysis was done by ANOVA followed by Dunnet's test for multiple comparisons. $P < 0.01$ was considered significant in the experiment.Values are expressed as Mean±SEM. n = 6 in each group, "*" indicate $P < 0.01$ compared to positive control. As per the procedure Brewer's yeast indused subcutaneously for all groups , except Positive control group. After 18 hours each group basal rectal temperature was increased and it were noted by using digital thermometer.

Standard group was treated by paracetamol (150 mg/kg), Test groups was treated by Low dose (Ethyl acetate extract 200 mg/kg) and High dose (Ethyl acetate extract 400 mg/kg). Rectal temperature of animals were

noted at regular intervals following the respective treatments. The temperature was measured at 0, 1st, 2nd and 3rd hour after drug administration.

Fig 07: Antipyretic ativity of Ethyl acetate extract of *Barleria prionitis* Linn. root

Fig 08: In vivo method of Ethyl acetate extract of *Barleria prionitis* Linn. root

DISCUSSIONS

Herbal medicines derived from the plant extracts are being increasingly utilized to treat a wide variety of clinical diseases, though relatively little knowledge about their mode of action is available. For the field of modern medical science, the herbal drugs are to be subjected for several processes such as identifications, isolation, purification, characterization, structural elucidation and therapeutic evaluation.

Fever is a complex physiologic response triggered by infections or aseptic stimuli. Elevation in body temperature occurs when the concentration of prostaglandin E2 (PGE2) increases within parts of the brain. Such an elevation contributes to a considerable alteration in the firing rate of neurons that control the thermoregulation process in the hypothalamus. It is now evident that most of the antipyretic drugs exert their action by inhibiting the enzymatic activity of cyclooxygenase(COX) and consequently reducing the levels of PGE2 within the hypothalamic region.

Since antipyretic activity is commonly mentioned as a characteristic of drugs or compounds, which have an inhibitory activity on prostaglandins biosynthesis, the yeast induced hyperpyrexia in rat model was employed to investigate the antipyretic activity of the extract. Yeast induced pyrexia is called pathogenic fever which is due to the production of prostaglandins (PGE2) which set the thermoregulatory center at a higher temperature

Phytochemical Screening

The analysis of the Ethyl acetate extract of *Barleria prionitis* Linn. root revealed the presence of various phytochemicals, such as alkaloids, carbohydrates, steroids, and tri-terpenoids, phenolics, tannins, proteins and amino acids. These phytochemicals are known to have potential therapeutic properties and can contribute to the Antipyretic properties. These compounds possess antioxidant, anti-inflammatory and antimicrobial properties, that can aid in reduce body's temperature. Although beta sitosterol was present in root and it was produced antipyretic activity. So ethyl acetate extract of *Barleria prionitis* Linn. root suggests that it may still have valuable antipyretic properties.

The antioxidant properties of phenolic present in the ethyl acetate extract of *Barleria prionitis* Linn. root can help reduce oxidative stress and protect cells from damage, promoting antipyretic activity. Alkaloids, carbohydrates, tannins, proteins and amino acids are also present in ethyl acetate extract of *Barleria prionitis* Linn. root. They can help to promoting antipyretic activity.

Quantification Of Total Phenol Content

The analysis of the Ethyl acetate extract of *Barleria prionitis* Linn. root indicated a total phenol content of 1.7 mg/100g, The hydroxyl groups present in phenolic compounds of Ethyl acetate extract of *Barleria prionitis* Linn. root helps to facilitate free radical scavenging activity. So, the presence of phenolic compounds with antioxidant properties can help to protect against oxidative stress and promote antipyretic properties.

In Vitro Method

The Ethyl acetate extract of root of the *Barleria prionitis* Linn. shows the presence of phenols, alkaloids and tannins. Phenolic compounds such have been shown to possess significant antioxidant activity. Phenolics are the most widely spread secondary metabolite in plant kingdom. These diverse group of compounds have potential of natural antioxidant and have ability to act as both efficient radical scavengers. The antioxidant activity of phenols is due to their redox properties, hydrogen donors and singlet oxygen quenchers.

Antioxidant activity of *B.prionitis* Linn. root which may be due to the presence of barlerinoside, shanzhisidemethylester, 6-O-trans-P-coumaroyl-8-O-acetylshanzhisidemethylester, barlerin, acetylbarlerin. The result of DPPH scavenging activity assay in this study indicates the ethyl acetate soluble fraction was potentially active. The scavenging activity of ethyl acetate soluble fraction compared with the standard drug ascorbic acid suggest that the plant is also a potent scavenger of free radicals. However further study aimed at characterization of active constituents responsible for antioxidant activity.

In Vivo Method

The ethyl acetate extract of *Barleria prinitis* Linn. root were showed more pronounced effect in lowering the hyperthermia, but found to have similar effect as the standard drug Paracetamol at 3rd hour of administration. The extracts are likely to reduce pyrexia by reducing brain concentration of prostaglandin E2 (PGE2) especially in the hypothalamus through its action on COX-3 or by enhancement of the production of the body's own antipyretic substances like vasopressin and arginine.

Antipyretics have been shown to suppress fever by inhibiting prostaglandin synthetase, resulting in the blockade of the synthesis of prostaglandin in the brain or suppressing the rise of interleukin-1α production subsequent to steroids like beta-sitosterol have been shown to exert antipyretic effect, which results in reduction of prostaglandin levels thus reducing the fever and pain.

Analysing the results of present study, it can be inferred that the ethyl acetate extract of *Barleria prionitis* Linn. root at the dose of 200mg/kg and 400mg/kg possess a antioxidant and antipyretic activity. Therefore, this ethyl acetate extract of *Barleria prionitis* Linn. root could be considered for the treatment of pyrexia disorder by conducting further pharmacological studies and mechanism of antipyretic action, as well as to identify the active compound(s) responsible for this bioactivity in the animal model.

SUMMARY AND CONCLUSION

The root of *Barleria prionitis* Linn. belonging to the family Acanthaceae have been investigated in systemic way covering preliminary phytochemical investigation and pharmacological aspects in a attempt to rationalize its uses as drug of therapeutic response. The dried root of the *Barleria prionitis* Linn. were extracted with Ethyl acetate (by Hot soxhlet extraction method) and yield was found to be 15%w/w respectively. The Ethyl acetate extract *Barleria prionitis* Linn. root were subjected to qualitative phytochemical tested to find out the active constituents, Which showed the presence of Alkaloids, Steroids, Carbohydrate, Tannins, Proteins and Amino acids are present in Ethyl acetate extract. Antioxidant activity of Ethyl acetate extract of *Barleria prionitis* Linn. root were determined in vitro by using 1-diphenyl-2-picrylhydrazyl assay. The results of the investigation revealed that the Ethyl acetate extract of *B.prionitis* Linn. root showed significant DPPH radical activity which was calculated in terms of IC_{50}. The ethyl acetate extract of the root of *Barleria prionitis* Linn. root were likely to reduce pyrexia by reducing brain concentration of prostaglandin E2 (PGE2) especially in the hypothalamus through its action on COX-3 or by enhancement of the production of the body's own antipyretic substances like vasopressin and arginine. The results of this study indicate that the ethyl acetate extract of *Barleria prionitis* Linn. root possesses a significant antipyretic activity.

The present study highlights the significant antipyretic and antioxidant activities of the ethyl acetate extract of *Barleria prionitis Linn.* root. The extract demonstrated effective free radical scavenging activity in the DPPH assay, with an IC50 value comparable to standard ascorbic acid, indicating its strong antioxidant potential. Additionally, the in vivo antipyretic activity exhibited a dose-dependent reduction in yeast-induced pyrexia in albino wistar rats, validating its traditional use in managing fever.

Phytochemical analysis confirmed the presence of bioactive compounds such as phenolics, tannins, and alkaloids, which are likely responsible for the observed pharmacological effects. These findings not only support the traditional applications of *B. prionitis Linn.* but also establish its potential as a natural therapeutic agent for oxidative stress and fever-related conditions. Further studies focusing on the isolation and characterization of specific active compounds and elucidating their mechanisms of action are recommended to explore its full therapeutic potential.

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