

Original Research

**ANTIPYRETIC ACTIVITY OF AQUEOUS EXTRACT OF LEAF OF *BOSWELLIA OVALIFOLIOLATA* IN YEAST INDUCED PYREXIA****P.Vasanth Kumar^{*1}, Dr.K.Vijaya¹ and M.Siddaiah²**¹Pacific University Udaipur Rajasthan, India.²P. Rami Reddy Memorial College of Pharmacy Kadapa, Andhra Pradesh, India.

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ABSTRACT

AIM: Antipyretic effect of the alcoholic extract of *Boswellia Ovalifoliolata* (Family- Burseraceae) against Brewer's yeast induced pyrexia model in albino rats of both sexes was investigated. Pyrexia was induced by subcutaneously injecting 20% w/v Brewer's yeast suspension (20 ml/kg) in the back below the nape of the neck of animals. 18 hours after the injection, the rectal temperature of each rat was measured. The temperature was measured at 0, 1, 2, 3 and 4 hours after drug administration. Paracetamol (150 mg/kg p. o.) was used as standard drug. The group received aqueous extract 600 mg/kg showed significant decrease in rectal temperature from 40.90 ± 0.1 to 37.40 ± 0.08 as compared with the group received standard drug. All the values are expressed as mean \pm standard deviation and analyzed for ANOVA and Dunnett's t-test. Differences between groups were considered significant at $P < 0.01$ levels.

KEYWORDS: *Boswellia Ovalifoliolata*, Antipyretic effect, Paracetamol, AEBO, Brewer's yeast**Corresponding Author: P. Vasanth Kumar****E Mail:** pvasanthtp@gmail.comIndian Research Journal of Pharmacy and Science; 7(2015) 309-314;
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INTRODUCTION

Medicinal plants are assuming greater importance in the primary health care of individuals and communities in many developing countries. Indian medicinal plants and their derivatives have been an invaluable source of therapeutic agents to treat various disorders. Herbal products are often perceived as safe because they are “natural”. In recent years herbal medicine is a major component in all traditional medicine systems, and a common element in Siddha, Ayurvedic, Homeopathic, Naturopathic, Traditional Chinese medicine, Considerable efforts have been directed towards the development of natural products from various plant sources ^[1].

Today a substantial number of drugs are developed from plants which are active against a number of diseases. The majority of these involve the isolation of the active ingredient (chemical compound) found in a particular medicinal plant and its subsequent modification. In the developed countries 25 percent of the medical drugs are based on plants and their derivatives and the use of medicinal plants is well known among the indigenous people in rural areas of many developing countries ^[2].

Pyrexia or Fever is defined as an elevation of body temperature. It is a response due to tissue damage, inflammation, malignancy or graft rejection. Cytokines, interleukin, interferon and Tumor Necrosis Factor α (TNF- α) are formed in large amount under this condition, which increase PGE2 which in turn triggers hypothalamus to elevate body temperature ^[3] Fever is associated with symptoms of sickness behavior which consist of lethargy, depression, anorexia, sleepiness, & inability to concentrate. This increase in set point triggers increased muscle tone &

shivering. However antipyretic medication can be effective at lowering the temperature which may include the affected persons comfort ^[4].

According to Ayurveda, pyrexia originates from a combination of indigestion, seasonal variations and significant alterations in daily routine ^[5]. Due to poor hygiene practices and malnutrition, children in developing countries frequently suffer from various forms of infections which present as fevers. These fevers are often accompanied by aches and pains which all lead to morbidity and mortality ^[6].

Antipyretics are drugs which can reduce elevated body temperature. Regulation of body temperature requires a delicate balance between production and loss of heat, and the hypothalamus which regulate the set point of body temperature. Drugs like paracetamol do not influence body temperature when elevated by factors such as exercise or increase in ambient temperature ^[7]

Boswellia Ovalifoliolata commonly known as ‘Kondasambrani’, is a much-branched, tree found growing wild in tropical and sub-tropical parts Seshachalam hills, South India. The leaves are like small and uniform. The inflorescence has tiny white flowers, in small spikes ^[8].

The leaf of *Boswellia Ovalifoliolata* is the preferred part of the plant used in Folklore traditional medicine for treating fever. Extract of fresh leaf of *Boswellia Ovalifoliolata* boiled with 100ml water is consumed lukewarm ^[9]. The preliminary phytochemical study of the *Boswellia Ovalifoliolata* revealed the presence of alkaloids, carbohydrates, phytosterols, tannins, flavonoids ^[10]. The antipyretic activity of many plants has been attributed to their saponins, terpenoids, flavonoids and steroids contents ^[11,12]. As the leaf of

Boswellia Ovalifoliolata is a Folklore traditional medicament used in ailments that caused fever, it will be a cost effective alternative approach to study the leaf extract of this plant for the development of an effective antipyretic agent. So the present study has been carried out to evaluate and compare the in vivo antipyretic activity of the aqueous extract by yeast induced pyrexia method.

MATERIALS AND METHODS

Plant Materials

Fresh leaves were collected from Tirumala hills, Chittoor district, Andhra Pradesh, India and authenticated by Dr. K. Madhava Chetty, Assistant Professor, Department of Botany S.V. University, Tirupati, and Andhra Pradesh, India. Voucher Specimen No. 1295 is kept for further future reference at S.V. University, Andhra Pradesh, India..

Preparation of the Plant Extracts

Fresh leaves of *Boswellia Ovalifoliolata* were washed, shade dried, powdered, passed through a #60 mesh sieve and were extracted. The aqueous extract was prepared by maceration in chloroform water (72hrs). The macerate was filtered through Whatmann No.1 filter paper and concentrated in a rotary flash evaporator at a temperature not exceeding 50°C.

Phytochemical analysis

Phytochemical analysis of different extracts was carried out by successive solvent extraction. Weighed quantity of air dried powdered plants was extracted in soxhlet apparatus successively with solvents started with petroleum ether (60°-80°C) followed by benzene, chloroform, acetone and alcohol (95% v/v). After extracting with each solvent, the marc was dried in hot

air oven below 50°C; finally the marc was macerated with chloroform water for 24 hours. Each extract was concentrated by distilling off the solvent and evaporating to dryness. The dry extracts were subjected to preliminary phytochemical screening for detection of various phytoconstituents^[12-16]

Experimental Animals

Wistar albino rats (200-250g) of both sexes were purchased from Sri Venkateswara Enterprises, Bangalore. Before and during the experiment rats were fed with standard diet (Gold Mohr, Lipton India Ltd). They were housed in polypropylene cages with paddy house bedding under standard laboratory condition for an acclimatization periods of 7 days prior to performing the experiment. This study was approved by institutional ethics committee for animal studies (IAEC/ACP/1220/a/08/CPCSE 08)..The animals had access to laboratory chow and water ad libitum^[13].

Acute oral toxicity study

An acute toxicity study was carried out to determination of LD₅₀ values by using different doses 5, 50, 300 and 5000mg/kg body weight of the extract in healthy adult female Swiss albino mice weighing between 25-35 body weights were selected for oral acute toxicity study. This study was carried out as per the OECD guidelines Number 401. From the toxicity study, it was indicated that the extract is safe up to dose 2.0g/kg body weight. It is very safe for further studies at different doses.

Experimental design

Body weights of the animals were recorded and they were randomly divided into 5 groups of 6 animals each as follows:

Group I : animals served as control and received vehicle orally at a dose of 3ml/kg (tween80,1% solution)

Group II : animals were treated with yeast via subcutaneous injection (20ml/kg).

Group III : animals were administered with yeast (20 ml/kg) and the standard drug paracetamol (150mg/kg b.w.), orally

Group IV : animals were administered with yeast (10ml/kg.) and with aqueous leaf extract of *Boswellia Ovalifoliolata* (150mg/kg b.w.), orally.

Group V : animals were administered with yeast (10ml/kg.) and with aqueous leaf extract of *Boswellia Ovalifoliolata* (300mg/kg b.w.), orally.

Group VI : animals were administered with yeast (10ml/kg.) and with aqueous leaf extract of *Boswellia Ovalifoliolata* (600mg/kg b.w.), orally.

Yeast induced pyrexia

Pyrexia was induced by subcutaneous injection of 20 % w/v of brewer's yeast (20ml/kg) in distilled water. Basal rectal temperature was measured before the injection of yeast, by inserting digital clinical thermometer to a depth of 2 cm into the rectum. The rise in rectal temperature was recorded 18h after yeast injection. Paracetamol 150mg/kg body weight was used as the standard antipyretic drug. Rectal temperature of animals was noted at regular intervals following the respective treatments. The temperature was measured at 1st, 2nd, 3rd and 4th hour after drug administration^[14,15].

Statistical Significance

The statistical analysis was done by ANOVA followed by Dunnet's test for multiple comparisons. $P < 0.01$ was considered significant in the experiment^[16]

Table. 1. Anti-pyretic activity of AEBO leaf by Brawers Yeast Induced Method.

Group	Dose mg/kg	0 hour	18 th hour	1 st Hour	2 nd Hour	3 rd Hour	4 th hour
Control (saline)	5ml	37.37± 0.4	37.45± 0.2	37.47± 0.3	37.39 ± 0.1	37.4± 0.1	37.4± 0.1
Paracetamol	150	37.53± 0.2	40.16± 0.3	38.22± 0.1*	37.83± 0.2*	36.84± 0.1*	36.54± 0.1*
AEBO	150	37.17± 0.3	40.22 ± 0.1	39.21± 0.2*	39.92± 0.1*	38.80± 0.2*	38.01± 0.2*
AEBO	300	37.22± 0.2	40.24± 0.2	39.42 ± 2.2*	38.86± 0.5*	38.48± 0.2*	38.38± 0.2*
AEBO	600	37.39 ± 0.1	40.90± 0.1	39.45 ± 0.4*	38.10± 0.1*	37.80± 0.8**	37.40± 0.8**

The values are expressed as mean ± SEM, n = 6 animals in each group. Statistical significant test for comparison was done by ANOVA followed by Dunnet's test. The raise in body temperature was compared with normal animals' values. $P < 0.001$, * $p < 0.05$, (p value as compared to control group)

RESULTS

Natural herbs have been used for medicinal purposes in many countries and continue to be a medicament for various ailments even with the revolution in antibiotics

and other synthetic medicine in modern scientific world. Non steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly prescribed drugs due to their consistent effectiveness in the

treatment of pain, fever, inflammation and rheumatic disorders. Since these drugs have toxic effect to the various organs of the body, search for safe herbal remedies with potent antipyretic activity received momentum recently. *Boswellia Ovalifoliolata* Willd (Burseraceae), which possess the active constituents like saponins, isoflavones, Boswellic acid, polysaccharides, Mg, P, Ca, is an important medicinal plant endemic to South Asian countries, whose medicinal properties are reported in traditional systems of medicine^[17-18]. The present study has been carried out to evaluate and compare with different doses antipyretic activity of the aqueous extract by yeast induced pyrexia method. Table 1 depicts the effect of the aqueous leaf extract of *Boswellia Ovalifoliolata* on

yeast induced pyrexia. The results indicated the highest antipyretic activity 600mg/kg dose is giving better result.

CONCLUSION

In conclusion, this study provides evidences for the antipyretic activity of *Boswellia Ovalifoliolata* which could partly contribute to its ethno medical use. However, further investigation is required to isolate the active constituents responsible for these activities and to elucidate the exact mechanisms of action.

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