PharmacologyOnLine December 30, 2014

Archives • 2014 • vol.3 •7-10

ANTIPYRETIC ACTIVITY OF HYDROALCOHOLIC EXTRACT OF *EMBELIA RIBES*

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Abstract

Pyrexia is indicatives of various disorders. Modern medicines are available for treatment of pyrexia, but they have few side effects. Several studies are ongoing Worldwide to search natural antipyretic agents with better efficacy and fewer or no side effects. This study was aimed at evaluating the antipyretic activity of *Embelia ribes* in rats against Brewer's Yeast-Induced pyrexia. Rectal temperature was recorded with digital thermometer at 0 h and Brewer's Yeast was injected. After 1 h again rectal temperature of the animals was recorded and hydro-alcoholic extract were administered to the treatment groups and aspirin 150 mg/kg orally to the positive control group. Then rectal temperature was recorded at the interval of one h for 4 h. *Embelia Ribes* has marked antipyretic activity in animal models and this strongly supports the ethnopharmacological uses of *Embelia Ribes* as an antipyretic plant

Keywords: Hydroalcoholic, antipyretic, *Embelia Ribes*

Introduction

It is also commonly known as false black pepper or vidanga. This species is reported to be vulnerable in the Western Ghats of Tamil Nadu and Karnataka states of India and at a lower risk in Kerala state of peninsular India. *E. ribes* grows in semi-evergreen and deciduous forests at an altitude of 1,500 m, throughout India. It is considered to be vulnerable due to excessive harvesting, because of its many uses *E. ribes* is a highly valuable medicinal plant with anthelmintic, carminative, antibacterial, antibiotic, hypoglycemic, and antifertility properties. [1]

Vaibidang is a Sanskrit name of *Embelia ribes* Burm. f. (Myrsinaceae), which is an important medicinal plants belonging to family Myrsinaceae. The plant is a scandent shrub, whose fruits are used in a large number of Ayurvedic formulations. This shrub is slender branched with elliptic-lanceolate and gland-dotted leaves. The fruit is globular and wrinkled, varying in colour from dull red to nearly black; a short pedicel is often present; the pericarp is brittle enclosing a single seed covered with a membrane. Flowers are dull white in colour with violet red fruits. Mature fruits turn brown or black.

Root is deeply penetrating in the soil and takes help of trees for their climbing habit. In North East region, it is commonly distributed in Arunachal Pradesh, Meghalaya and Mizoram in the altitudinal zone of 500 to 2500 msl. It is a red listed climbing shrub found in the semi-evergreen to evergreen forests of India, Sri Lanka, Malaysia and China [2]. The species is also reported to be vulnerable in the Western Ghats of Tamil Nadu and Karnataka states of India and at lower risk in Kerala state. The plant is locally called as Biakol-lata (Assamese), Baberang (Hindi), Biranga (Bengali), and is recorded from Itanagar, Kimin, Hunli, Dibang Valley, Nechephu and Dirang areas, Joram, and Hija areas near Hapoli in Lower Subansiri district of Arunachal Pradesh.

The species was also reported from upper Assam and from Cherapunji and Jowai areas of Khasi/Jaintia hills, and Mao areas of Manipur, Kawnpui - Aizawl, Serchhip areas of Mizoram in both high and low altitudes of north east India. It was also found that there are some morphological variations in leaf characters among the species collected from different altitudes. [3]

Materials and methods

Animals

Wistar rats (150–200 g) were group housed (n= 6) under a standard 12 h light/dark cycle and controlled conditions of temperature and humidity (25±2 °C, 55–65%). Rats received standard rodent chow and water *ad libitum*. Rats were acclimatized to laboratory conditions for 7 days before carrying out the experiments. All the experiments were carried in a noise-free room between 08.00 to 15.00 h. Separate group (n=6) of rats was used for each set of experiments. The animal studies were approved by the Institutional Animal Ethics Committee (IAEC), constituted for the purpose of control and supervision of experimental animals by Ministry of Environment and Forests, Government of India, New Delhi, India.

Chemicals

Aspirin (CDH, Delhi) were used in present study. Diazepam (Ranbaxy, India) was used as the standard drug (positive control) in various stress models.

Acute oral toxicity study

Acute oral toxicity study was performed as per OECD-423 guidelines (acute toxic class method). It was observed that the *Embelia ribes* extract was not lethal to the rats even at 2000mg/kg 2000mg/kg doses. Hence, 1/20th (100mg/kg) and 1/10th (200mg/kg) of this dose were selected for further study [4].

Antipyretic Activity

Experimental Design

- Group I: 2% v/v aqueous Tween 80 solutions (5 ml/kg body wt., p.o) [Control group]
- Group II: Aspirin (150 mg/kg body wt., p.o) [Standard group]
- Group III: 100 mg/kg *Embelia ribes* extract (ERE), p.o.
- Group IV: 200 mg/kg *Embelia ribes* extract (ERE), p.o.

Induction of Brewer's Yeast-Induced Pyrexia

The rats were divided into four groups of six each. The normal body temperature of each rat was measured rectally at predetermined intervals and recorded [2]. The rats were trained to remain quiet in a restraint cage. A thermometer probe was inserted 3-4 cm deep into the rectum and fastened to the tail by adhesive tape. Temperature was measured on a digital thermometer.

After measuring the basal rectal temperature, the animals were injected subcutaneously with 10 ml/kg body wt. of 15% w/v suspension of brewer's yeast, suspended in 0.5% w/v methylcellulose solution [5].
The rats were then returned to their housing cages. Nineteen hours after the yeast injection, the animals were again restrained in individual cages for rectal temperature recording.

Drug Administration
Nineteen hours after yeast injection, the *Embelia ribes* extract was administered orally at doses of 100 and 200mg/kg body wt. to two groups of animals, respectively. A similar volume (5 ml/kg body wt.) of 2% aqueous Tween 80 solutions was administered orally to the control group. The fourth group of animals received the standard drug, Aspirin (150 mg/kg body wt.), orally. The rats were restrained for rectal temperature recording at the nineteenth hour, immediately before *Embelia ribes* extract or 2% aqueous Tween 80 solution or Aspirin administration, and again at one hour intervals up to the four hours after yeast injection [6].

Evaluation of parameters
Antipyretic activity was evaluated by comparing initial rectal temperature (˚C) before yeast injection, with rectal temperature (˚C) after 18 hours of yeast injection at different time intervals [7, 8].

Result
The effect of Hydroalcoholic extract of *Embelia ribes* on yeast induced pyrexia has been shown in table no.1. Treatment with extracts at dose of 100 mg/kg and 200 mg/kg body weight and Aspirin at dose of 150mg/kg decreased body temperature of yeast induced rats. The results obtained from both standards and extracts treated groups were compared with the control group. A significant reduction in the yeast elevated rectal temp was observed in the test drug.

Discussion
The present results showed that the Hydroalcoholic extract of *Embelia ribes* posseses a significant antipyretic effect in yeast induced elevation of body temperature in experimental rats. It was revealed that the extract showed dose dependent antipyretic activity. At a dose of 200mg/kg it showed significant antipyretic activity.
From this normalization of body temperature was maintained sufficient periods of time. Flavonoids are known to target prostaglandins which are involved in the pyrexia. Hence the presence of flavonoids in the Hydroalcoholic extract of *Embelia ribes* may be contributory to its antipyretic activity.

Conclusion
The anti pyretic activity of Hydroalcoholic extract of *Embelia ribes* was assessed against brewer's yeast induced pyrexia in rats. The parameters maintained in this study were body temperature. The Hydroalcoholic extract of *Embelia ribes* showed significant decrease in body temperature. Hence, orally applicable Hydroalcoholic extract of *Embelia ribes* may have a great potential against the native total therapeutic agent currently available for treatment of pyrexia.

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Table: 1- Antipyretic effect of *Embelia ribes* extract.

Treatment/Dose	Initial rectal Temp. in °C before yeast injection	Rectal temp. in °C after 18 hours of yeast injection (Mean±Sem)				
		0 hr	1 hr	2 hr	3 hr	4 hr
Group I (2% aqueous Tween 80 solution, 5ml/kg, p.o)	37.00 ± 0.0	39.02 ± 0.23	39.30 ± 0.17	39.53 ± 0.17	39.70 ± 0.14	39.97 ± 0.05
Group II (Aspirin, 150mg/kg, p.o)	37.02 ± 0.2	39.90 ± 0.17	38.40 ± 0.15 [a]	38.00 ± 0.04 [a]	37.69 ± 0.20[a]	37.10 ± 0.26 [a]
Group III (ERE, 100mg/kg, p.o)	37.01 ± 0.3	39.91 ± 0.07	39.53 ± 0.10 [b]	39.30 ± 0.07 [b]	38.13 ± 0.03 [a]	37.40 ± 0.20 [a]
Group IV (ERE, 200mg/kg, p.o)	37.00± 0.3	39.92 ± 0.03	39.29 ± 0.09 [b]	38.30 ± 0.03 [a]	37.68 ± 0.20 [a]	37.10 ± 0.26 [a]