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(Research article)

ANTIPYRETIC ACTIVITY OF WHOLE PLANT OF *LEPIDAGATHIS CRISTATA* WILLD. IN BREWER'S YEAST INDUCED HYPER PYREXIA RATS

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ABSTRACT

The objective of the present work was to study the antipyretic activity of whole plant of *Lepidagathis cristata* Willd, belongs to family Acantahaceae. The Petroleum ether extract was taken for the study and evaluated for antipyretic activity using Brewer's yeast induced pyrexia in Wister strain albino rats. The Petroleum ether extracts at a dose of 100mg/kg & 200mg/kg were evaluated for antipyretic activity. The extract of *Lepidagathis cristata* plant showed a significant ($P < 0.01$) dose dependent antipyretic effect in yeast induced elevation of body temperature in experimental rats. The Petroleum ether extracts of *Lepidagathis cristata* plant have significant antipyretic activity when compared with the standard drug.

Keywords: *Lepidagathis cristata*, Antipyretic activity, Brewer's yeast.

INTRODUCTION

Pyrexia or fever is caused as a secondary impact of infection, malignancy or other diseased states. It is the body's natural function to create an environment where infectious agents or damaged tissues cannot survive. Normally, the infected or damaged tissue initiates the enhanced formation of pro-inflammatory mediators (cytokines, such as interleukin 1β, α, β, and TNF- α), which increase the synthesis of prostaglandin E2 (PgE2) near hypothalamic area and thereby trigger the hypothalamus to elevate the body temperature. When body temperature becomes high, the temperature regulatory system, which is governed by a nervous feedback mechanism, dilates the blood vessels and increases sweating to reduce the temperature. When the body temperature becomes low, hypothalamus protects the internal temperature by vasoconstriction. High fever often increases faster disease progression by increasing tissue catabolism, dehydration, and existing complaints, COX-2 expression to reduce the elevated body temperature by inhibiting PgE2 biosynthesis. These synthetic agents irreversibly inhibit COX-2 with a high selectivity and are toxic to the hepatic cells, glomeruli, cortex of brain, and heart muscles. Natural COX-2 inhibitors have lower selectivity with fewer side effects [1,2]. A natural antipyretic agent with reduced or no toxicity is therefore, essential. Hence, the present study was designed to determine the antipyretic effect of petroleum ether extract of *Lepidagathis cristata*.

Lepidagathis cristata Willd. (family: Acantahaceae) Crested Lepidagathis is a perennial herb, with almost no stem. Branches, 20 cm long, arise out of a globose head on the ground, and spread out. Flowers also arise stalk less from this globose head. Flowers are pale pink, 2-lipped. The upper lip is notched, and the lower lip is divided into 3 lobes. Medicinal uses: In Chattisgarh, they use this herb in treatment of fever

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particularly in treatment of Malarial fever. The decoction of leaves is used internally for this purpose. Its utility in treatment of fever has given it the name Bukhar Jadi in reference literatures; the use of this herb in treatment of itchy affections of skin has been mentioned. The traditional healers of Chhattisgarh Plains are aware of this use. In many parts of Chhattisgarh, the cattle owners use the decoction of this herb to wash the cattle in rainy season in order to keep it free from flies [3]. Therefore, the main objectives of present study were to investigate the anti-pyretic activity of the Petroleum Ether Extract of *Lepidagathis cristata* is being reported here.

MATERIALS AND METHODS

Plant material

The whole plant of *Lepidagathis cristata* was collected from Tirumala hills, Tirupati, Andhra Pradesh. India. It was identified and authenticated by Prof. *Madhava Chetty, K.*, Taxonomist, S.V. University, Tirupati, Andhra Pradesh, India. A voucher specimen has been kept in our laboratory for future reference.

Preparation of plant extract

The collected whole plant was dried at room temperature, pulverized by a mechanical grinder, sieved through 40mesh. About 100g of powdered materials were extracted with petroleum ether (60˚-80˚C) using soxhlet apparatus. The extraction was carried out until the extractive becomes colourless. The extract is then concentrated and dried under reduced pressure. The solvent free semisolid mass thus obtained is dissolved in tween 80 and used for the experiment. The percentage yield of prepared extracts was around 8.4%w/w.

Animals Used

Albino rats (180–200 g) of either sex were maintained in a 12 h light/dark cycle at a constant temperature 25 ◦C with free access to feed (Sai durga feeds and foods, Bangalore) and water. All animals were fasted prior to all assays and were allocated to different experimental groups each of six rats. Moreover, the animals were kept in specially constructed cages to prevent coprophagia during the experiment. All experiments were carried out according to the guidelines for care and use of experimental animals and approved by Committee for Control and Supervision of Experiments on Animals (CPCSEA). Ethical committee clearance was obtained from IAEC (Institutional Animal Ethics Committee) of CPCSEA.

Acute toxicity study

The acute toxicity of Petroleum Ether extracts of *Lepidagathis cristata* whole plant was determined as per the OECD guideline no. 423 (Acute Toxic Class Method) It was observed that the test extract was not lethal to the rats even at 2000mg/kg 2000mg/kg doses. Hence, $1/20^{th}$ (100mg/kg) and $1/10^{th}$ (200mg/kg) of this dose was selected for further study [4].

Experimental Design

Group I: 2% v/v aqueous Tween 80 solutions (5 ml/kg body wt., p.o)
[Control group]

Group II: Paracetamol (150 mg/kg body wt., p.o) [Standard group]

Group III: 100 mg/kg PELC suspended in 2% v/v aqueous Tween 80 solutions, p.o.

Group IV: 200 mg/kg PELC suspended in 2% v/v aqueous Tween 80 solutions, 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 (Vogel, 2002). 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 PELC 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, Paracetamol (150 mg/kg body wt.), orally. The rats were restrained for rectal temperature recording at the nineteenth hour, immediately before PELC or 2% aqueous Tween 80 solution or paracetamol administration, and again at one-hour intervals up to the four hours after yeast injection [6].

Evaluation of parameters

Anti pyretic 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].

Statistical Analysis

All the values are expressed as mean ± S.E.M for 4 groups of six animals each. The data were analyzed for significance using the unpaired two-tailed Student's t-test.

RESULTS AND DISCUSSION

The effect of PELC on yeast-induced pyrexia was studied, and it was found that PELC at doses of 100 mg/kg and 200 mg/kg caused significant lowering of body temperature up to fourth hour following its administration. This effect was maximum at a dose of 200 mg/kg, in a dose-dependent manner, and caused significant lowering of body temperature up to fourth hour after its administration. The subcutaneous injection of yeast suspension markedly elevated the rectal temperature at the nineteenth hour after administration. The results showed that the petroleum ether extracts of *Lepidagathis cristata* L. possesses a significant antipyretic effect in the yeast-provoked elevation of body temperature in rats, and its effect is comparable to that of Paracetamol (standard drug).

The antipyretic effect started as early as the first hour after administration, and the effect was maintained for four hours after its administration. The standard drug paracetamol at the dose of 150 mg/kg significantly reduced the yeast-provoked elevation of body temperature [9]. The results obtained for both the standard drug-treated and PELC treated rats were compared with the control (2% aqueous Tween 80 solutions) group, and a significant reduction in the yeast-elevated rectal temperature was observed in the plant extract (Table 1).

Table:- 1 Antipyretic effect of Petroleum ether extracts of *Lepidagathis cristata.*

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)	37.05±0.02	39.16 ± 0.05	39.20 ± 0.04	39.42 ± 0.05	39.69 ± 0.04	39.95 ± 0.06
Group II (Paracetamol, 150mg/kg, p.o)	37.14±0.01	39.09 ± 0.03	38.44 ± 0.01 [a]	38.16 ± 0.01 [a]	37.68 ± 0.05 [a]	37.21 ± 0.03 [a]
Group III (PELC, 100mg/kg, p.o)	37.09±0.03	39.98 ± 0.01	39.50 ± 0.01 [b]	39.34 ± 0.02 [b]	38.13 ± 0.05 [b]	37.51 ± 0.08 [a]
Group IV (PELC, 200mg/kg, p.o)	37.10±0.07	40.12 ± 0.07	39.25 ± 0.01 [a]	38.20 ± 0.03 [a]	37.65 ± 0.01 [a]	37.18 ± 0.05 [a]

Each value represents mean ± SEM (n=6); [a] $p<0.001$, [b] $p<0.01$, as compared to control.

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