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Antipyretic Activity of *Artabotrys hexapetallus* Flower Extract

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ABSTRACT

The objective of the study of antipyretic effect of ethanolic extract of flowers of *Artabotrys hexapetallus* tested on yeast induced pyrexia in albino rats. The flower extract at oral doses of 100, 250 and 500 mg/kg has been used to investigate the antipyretic potential of flowers extract. At a dose of 500 mg/kg body weight showed significant reduction in body temperature on yeast induced pyrexia when compared to standard drug Paracetamol (200 mg/ml).

Keywords: Antipyretic activity, Paracetamol, Ethanolic extract, *Artabotrys hexapetallus*.

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INTRODUCTION

Pyrexia or fever is caused as a secondary impact of infection, tissue damage, inflammation, graft rejection, 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 1β, α, β and TNF-α), which increase the synthesis of prostaglandin E2 (PGE2) near preoptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature.[2] Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE2 biosynthesis. Moreover, these synthetic agents irreversibly inhibit COX-2 with high selectivity but are toxic to the hepatic cells, glomeruli, cortex of brain and heart muscles, whereas natural COX-2 inhibitors have lower selectivity with fewer side effects[1] A natural antipyretic agent with reduced or no toxicity is therefore, essential.

Regulation of body temperature requires a delicate balance between the production and loss of the heat and the hypothalamus regulates the set point at which body temperature is maintained. In fever this set point is elevated and paracetamol like drugs promote its return to normal. These drugs do not influence body temperature when it is elevated by such factors as exercise or increase in the ambient temperature. The screening of natural products has led to the discovery of so many potent Anti-pyretic drugs[3].

MATERIALS AND METHODS

Animals

Male albino rats of Wistar strain approximately weighing 160-180g were used in this study. They were healthy animals purchased from the Indian Institute of Science, Bangalore. The animals were housed in spacious polypropylene cages bedded with rice husk. The animal room was well ventilated and maintained under standard experimental conditions (Temperature 27 ± 2º C and 12 hour light/dark cycle) throughout the experimental period. All the animals were fed with standard pellet diet and water were provided *ad libitum*. They were acclimatized to the environment for one week prior to experimental use. The animal feed composition is crude protein (22.3%), crude oil (4.01%), crude fibre (4.02%), Ash (8.02%) and sand silical (1.02%).

Preparation of plant extract

The flowers of *Artabotrys hexapetallus* L. were dried in the shade. The powder material of flowers was macerated with 70% ethanol at room temperature for 3 days and then suction filtered through a Buchner funnel. The solvent was removed by rotary evaporation under reduced

pressure at a temperature below 45°C. The resulting ethanolic extract was kept at 20°C until screening for their antipyretic and wound healing activity.

Experimental Design

Antipyretic activity was measured by slightly modifying the method described by Adams *et al*., (1968) Rats were fasted overnight with water *ad libitum* before the experiments. Animals were divided into five groups containing six animals each. Pyrexia was induced by subcutaneously injecting 20% w/v brewer's yeast suspension (10ml/kg) into the animal's dorsum region. 19h after the injection, the rectal temperature of each rat was measured using a digital thermometer (SK-1250 MC, Sato keiryoki Mfg.). Only rats that showed an increase in temperature of at least 0.7°C were used for experiments. Animals were divided in to 5 groups, each containing six animals.

Group I : Control (received distilled water)

Group II : Ethanolic extract of Artabotrys hexapetalus (100 mg/kg)

Group III : Ethanolic extract of Artabotrys hexapetalus (250 mg/kg)

Group IV : Ethanolic extract of Artabotrys hexapetalus (500 mg/kg)

Group V : Standard drug (received Paracetamol (200 mg/kg)

Temperature was measured at 0, 1, 2, 3 and 4hr after drug administration. Paracetamol (200 mg/kg) was used as standard drug.

Statistical Analysis

Values are expressed as mean ± SD for six rats in the each group and statistical significant differences between mean values were determined by one way analysis of variance (ANOVA). A value of $p<0.01$, $p<0.001$ were considered statistically significant.

RESULTS AND DISCUSSION

Table 1: Antipyretic activity of *Artabotrys hexapetallus* on Yeast-induced hyperpyrexia in rats

Treatment Groups	Doses mg/kg	0 hr	1hr	2 hrs	3 hrs	4 hrs
Group I	-	39.19 ± 0.37	39.86 ± 0.61	39.22 ± 0.63	38.07 ± 0.51	38.11 ± 0.71
Group II	100	39.09 ± 0.29	36.56 ± 0. [a51]	36.38 ± 0.33 [a]	36.03 ± 0.63 [a]	36.16 ± 0.41 [a]
Group III	250	39.06 ± 0.17	35.61 ± 0.45 [a]	35.88 ± 0.35 [b]	35.88 ± 0.33 [a]	35.91 ± 0.42 [a]
Group IV	500	39.19 ± 0.63	35.94 ± 0.31 [b]	36.33 ± 0.51 [a]	36.06 ± 0.52 [a]	36.09 ± 0.54 [a]
Group V	200	39.31 ± 0.31	36.01 ± 0.15 [b]	36.04 ± 0.46 [b]	36.06 ± 0.52 [a]	36.12 ± 0.56 [a]

Values are expressed as mean ± SE. [a] *P* < 0.001. [b] *P* < 0.05.

The results of effect of ethanolic extract of *Artabotrys hexapetallus* tested on yeast induced pyrexia in albino rats are depicted in Table 1.Ethanolic extract produced significant ($P<0.05$) antipyretic effect. At a dose of 500 mg/kg body weight, ethanolic extract reduced (36.09 ± 0.54) % of elevated rectal temperate compared to paracetamol (36.12 ± 0.56) % after 4 hours.

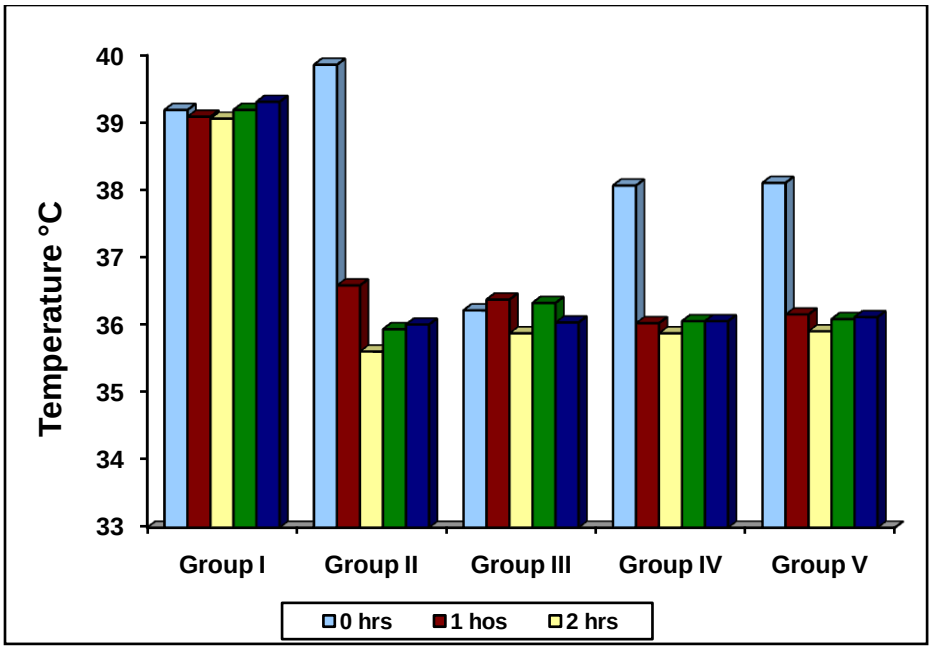

Figure 1: Antipyretic activity of *Artabotrys hexapetallus* on Yeast-induced hyperpyrexia in rats

Pyrexia or fever is caused as a secondary impact of infection, tissue damage, inflammation, graft rejection, 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 1β, α, β and TNF-α), which increase the synthesis of prostaglandin E2 (PGE2) near preoptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature[4] .

As the temperature regulatory system is governed by a nervous feedback mechanism, so when body temperature becomes very high, it dilate the blood vessels and increase sweating to reduce the temperature; but when the body temperature becomes very low hypothalamus protect the internal temperature by vasoconstriction. Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE2 biosynthesis. Moreover, these synthetic agents irreversibly inhibit COX-2 with high selectivity but are toxic to the hepatic cells, glomeruli, cortex of brain and heart muscles, whereas natural COX-2 inhibitors have lower selectivity with fewer side effects[5].

Search for safe herbal remedies with potent antipyretic activity received momentum recently as the available antipyretic, such as paracetamol, aspirin, nimusulide etc. have toxic effect to the various organs of the body[6]. The acute toxicity result reveals that this plant might be considered as a broad non-toxic one. The antipyretic activity exhibited that the ethanol extract of flower possess a significant antipyretic effect in maintaining normal body temperature and reducing boiled milk induced elevated rectal temperature in rabbits and their effect are comparable to that of standard antipyretic drug paracetamol. Such reduction of rectal temperature of tested animals by the extract at 500 mg/kg appears to be due to the presence of a single bioactive principles or mixture of compounds in them. The phytochemical analysis of the fractions showed the presence of flavonoids.

The antipyretic activity observed can be attributed to the presence of flavonoids have been reported to exhibit antipyretic effect[7,8] The present study, therefore, supports the claims of traditional medicine practitioners as an antipyretic remedy.

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