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ANTIPYRETIC ACTIVITY OF *EUPATORIUM ADENOPHORUM* LEAVES

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ABSTRACT: In present investigation, the leaf of *Eupatorium adenophorum* Spreng. of family Asteraceae is tested for antipyretic activity. The decoction of the said leaves is been used by the Naga tribe in curing fever since ancient times. To prove its claim scientifically the present study was done. The effect of aqueous extracts of leaves was tested on yeast induced pyrexia in albino rats. Prior to the study, acute oral toxicity testing of drug was performed as per OECD guidelines. The drug dosage of 300, 400 and 500 mg/Kg body weight was tried on the fever induced rats. It was compared with the standard drug Paracetamol (150 mg/Kg body wt) fed rats. The aqueous extract of leaves showed significant antipyretic activity after 2 hours in the dosage of 300, 400 and 500 mg/Kg body wt as that of compared standard drug paracetamol. Thus preclinical crude drug of *Eupatorium adenophorum* was proved to be effective antipyretic agent as claimed by the Nagas.

Key words: *Eupatorium adenophorum*, leaves, antipyretic, paracetamol

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INTRODUCTION

The Naga tribes of Manipur dwell at hilltops and in inhospitable terrains. This ethnic group is isolated from the main civilization. Therefore they totally depend on the nature for their livelihood. During sickness they prefer herbal remedies. The ethno botanical survey with respect to pyrexia revealed various potent plant drugs used by these tribes for curing fever. (Ringmichon C.L., Bindu G, 2014; Jain S.K, 1991) The leaves of *Eupatorium adenophorum* Spreng. is one among the herbs recommend by the 'Khanong' (medicine men) for pyrexia. Besides, they use the leaves to cure stomachache; the juice is applied on cuts and wounds. (Bailey, 1951; Hajra et al., 1995; Kumar, 2002).

The leaves of *Eupatorium adenophorum* Spreng. belongs to family Asteraceae. It is known as "Japanpu" by the Naga tribes of Manipur. It is a shrub densely covered with hairs. Leaves are opposite, cuneate – serrate margin and pubescent on both the surfaces. (Sinha S.C, 1996; Deb, 1983; Deshpande, 1993; Singh, N.P, et al., 2002) Fresh leaves or its dry power is boiled and the decoction is recommended thrice a day for lowering the body temperature. (Prajapati, P.S, 2003) Although this plant drug is in use by the Nagas, to prove scientifically antipyretic activity was carried out on albino rats.

MATERIAL AND METHODS

Plant materials

After ethno botanical survey the leaves of *Eupatorium adenophorum* Spreng. was procured from the remote villages of Senapati and Ukhrul districts of Manipur with the help of 'Khanong' (medicine man) with prior permission from the village authority. The mature leaves were obtained during the month of May. The botanical identity was confirmed using the standard herbaria at, Botanical Survey of India (BSI) Shillong. The plant is deposited at K.V. Pendharkar College, Dombivili (Voucher No. KV 538)

Preparation of aqueous extract

The leaves were collected and subjected to artificial drying at 34°C and ground to form powder. (Mukherjee P.K, 2002).It was stored in closed, airtight containers with silica bags.

Animals

Laboratory bred male Wistar albino adult rats weighing 150–200 gms were used for the studies. All the animals were procured from Haffkine Bio-Pharmaceutical Corporation, Mumbai. The animals were housed in standard environmental conditions of temperature (21±2°C), humidity (55±10%) and a 12 hr light-dark cycle. They were supplied with commercial pellet diet and water *ad libitum*. The experimental protocol was approved by the Animal Ethic Committee.

Acute toxicity study

Acute toxicity study was carried out as per the procedure given in OECD Guideline No. 420. The male Wistar albino rats (150-200 gm) were used in the study. The leaves of *Eupatorium adenophorum* at the dose of 2 gm/Kg body weight was given to 6 animals. The animals were continuously observed for 14 days for mortality and general behavior. No death was observed till the end of the study. The drug was considered safe up to the dose of 2 gm/Kg body weight. From the results, test drug dose of 300, 400 and 500 mg/Kg body weight was chosen for the efficacy studies. (Vogel G.H, Vogel W.H, 2002; OECD 2004; Smith P.K, Hambouger W.E, 1935).

The experiment was conducted in four groups of rats consisting of six rats in each group as follows:

Group 1: Standard paracetamol (150mg/Kg body wt. orally)

Group2: Aqueous extract of *Eupatorium adenophorum* leaves (300mg/Kg bwt. orally)

Group 3: Aqueous extract of *Eupatorium adenophorum* leaves (400mg/Kg bwt.orally)

Group 4: Aqueous extract of *Eupatorium adenophorum* leaves (500mg/Kg bwt.orally)

Induction of pyrexia

Rats were caged at constant room temperature. Normal rectal temperature was recorded by using thermostat probe and its hourly variation was noted over a period of 4 hours. The rats with normal temperature ranging between 36.0^0 – 36.5^0 were taken for the experiment. They were segregated into the above groups. The pyrexia was induced according to the standard protocol. A suspension of 15% yeast suspended in 0.5% w/v methyl cellulose solution was made. 10 ml/kg body wt. of suspension was injected subcutaneously. They were fasted during the experiment. After 19 hrs the rectal temperature was recorded to be more than 38^0C. (Chattopadhyay et.al., 2005; Lakshman K, et. al., 2006; Mukherjee P.K, et.al., 1996; Udupa et. al., 2007; Vimala R, et . al ., 1997).

Treatment

To determine the antipyretic activity after 19 hrs each group of rats was treated with the respective dose. Group I served as standard and received orally 150mg/Kg bwt. of paracetamol. Group II, III & IV animals were fed with test drug of *Eupatorium adenophorum* at dose of 300, 400 and 500 mg/Kg body weight. The rectal temperature was recorded at hourly interval for a period of 3 hours after administration of the drug. (Paschapur Mahesh et. al., 2009; Patro C. P, et. al., 2007)

Statistical analysis

The data obtained are expressed as Mean ± SE in tables. The data was statistically analyzed by student t test. P value < 0.01 were considered to be significant. (Mahajan B.K, 1979).

RESULTS

In acute oral toxicity study, *Eupatorium adenophorum* at dose of 2 gm/ Kg body weight showed no mortality in rats. The animal behaviour was found to be unchanged. Therefore drug dose of 300, 400 and 500mg/Kg body weight was selected for further investigation.

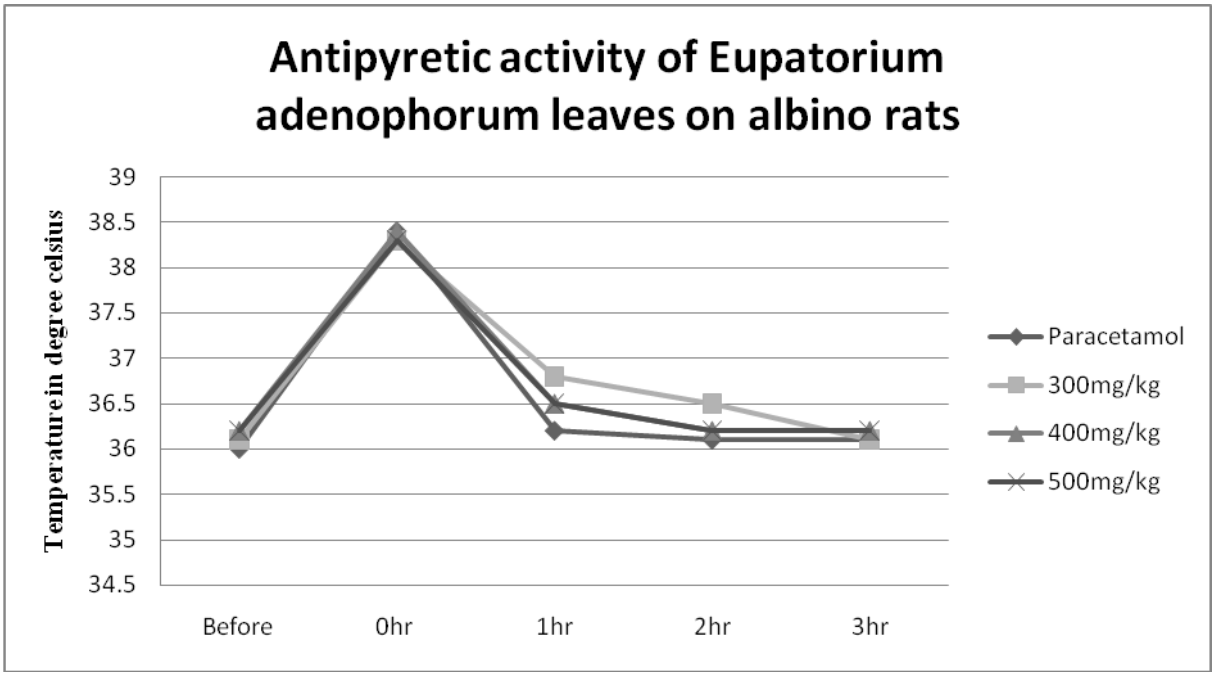
Aqueous extracts of *Eupatorium adenophorum* leaves at doses 300 and 400 mg/ kg body weight showed a significant decrease in pyretic temperature in second hours of treatment respectively. At the dose of 500mg/kg body weight the body temperature lowered significantly at first hour of treatment. The standard drug paracetamol at the dose 150mg/kg body weight regained the normal body temperature after two hours of treatment respectively. (Table 1, Graph 1).

Table No. 1 Antipyretic activity of orally administered aqueous extracts of *Eupatorium adenophorum* leaves on yeast induced pyrexia.

Groups	Before	0hr	1hr	2hrs	3hrs
I Standard Paracetamol	36.0± 0.01*	38.4±0.02 *	36.2±0.06*	36.1±0.04*	36.1±0.03*
II 300mg/Kg body wt. leaves	36.1±0.04 *	38.3±0.07*	36.8±0.06*	36.5±0.06*	36.1±0.03*
III 400mg/Kg body wt. leaves	36.2±0.04*	38.4±0.05*	36.5±0.06*	36.2±0.05*	36.2±0.04*
IV 500mg/Kg body wt. leaves	36.2±0.04*	38.3±0.06*	36.5±0.07*	36.2±0.05*	36.2±0.04*

Values are given in mean± S.E.M. (n=6); * indicate significant results P<0.01

Graph 1



DISCUSSION

In the recent years, there is an increasing interest in the search for potential drugs, especially of plant origin. The herbal drugs are capable of masking the untoward side effects of steroidal and non steroidal drugs. In present study aqueous extracts of *Eupatorium adenophorum* leaves were investigated for their antipyretic activity as claimed by the Naga tribes of Manipur. This experimental investigation was carried out in albino rats. The said plant drug doses of 300 and 400 mg/Kg body weight lowered the body temperature after two hours of administration. This result was similar to that of standard drug paracetamol (150mg/Kg body weight) on comparison. At the 500 mg/Kg body weight the body temperature came to normal within one hour. Thus the dose of 500mg/Kg body weight proved to be a significant dose than the standard paracetamol that too without any side effects. Thus *Eupatorium adenophorum* leaves known to be antipyretic drug only by the Naga tribes of Manipur will be known to manifold. Future detailed phytochemical analysis as well as clinical trials will be carried out.

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