ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Antipyretic Studies on Stem Bark Aqueous Extract of *Millingtonia Hortensis* Linn. F.

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ABSTRACT

Millingtonia hortensis Linn.F (Bignoniaceae) is a traditional medicinal plant widely used in south -East Asia for its fragrant flowers. It is commonly known as Cork tree, Akash neem and Neem chameli. The present study aims at exploring the antipyretic potential of aqueous extract of stem bark of *Millingtonia hortensis* Linn.F The study was carried out using Yeast induced Hyperthermia model at 200mg/kg and 400mg/kg and compared with the reference standard of paracetamol at 150mg/kg body weight. The study revealed that the extract possess significant antipyretic property dose dependently as compared to the negative control group and the results were highly comparable to that of the standard drug paracetamol. Isolation and characterization of the active molecule from the aqueous extract of *Millingtonia hortensis* L.F may leads to a novel drug of herbal origin at lower cost.

Keywords: *Millingtonia hortensis*, antipyretic, yeast, paracetamol and hyperthermia.

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ISSN: 0975-8585

INTRODUCTION

Fever is a common medical symptom that are primarily associated with elevation of body temperature and is often accompanied along with certain sickness-related behavioural features such as depression, sleepiness, lethargy, hyperalgesia, anorexia, etc. A large number of conditions such as infections, skin inflammations, immunological disorders, tissue destruction, cancer, metabolic disorders and reaction to incompatible blood products, may usually accompany fever [1]. Fever may be defined as a complex physiologic response to a disease, mediated by pyrogenic cytokines and characterized by a rise in core temperature, generation of acute phase reactants and activation of immune systems [2]. 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]. According to Ayurveda, pyrexia is a condition that originates from a combination of indigestion, seasonal variations and significant alterations in daily routine [4]. Antipyretics are drugs that can reduce the increased 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[5]. Today a substantial number of drugs are developed from plants which are active against a number of diseases.

Millingtonia hortensis Linn (Bignoniaceae)-is an ornamental tree, grown in gardens and parks as an avenue tree. The tree has its wide spread throughout south Asia, especially in India. The tree is easily identified by its highly scented fragrant flowers and it is a rich source of essential oil, flavonoids, tannins and alkaloids[6]. In the Thai folkfore medicine, the tree is used as antipyretic, sinusitis, cholagogue and tonic[7]. In the present study, an attempt had been made to scientifically validate the antipyretic potential of the stem bark aqueous extract of *Millingtonia hortensis* Linn.F (Bignoniaceae), in order to bring out novel drug at lower cost and to serve the humanity with less or no side effects.

MATERIALS AND METHODS

Plant Material

Millingtonia hortensis Linn (Bignoniaceae)trees were identified and authenticated by Dr. N. Ravichandran, Botanist and the herbarium specimen of the same was deposited in, Centre for Advanced Research in Indian System of Medicine, SASTRA University, Thanjavur (Specimen number: SASTRA 103). The barks were collected using coppicing technique in the month of September – October and shade dried.

The extract

Shade dried barks of *Millingtonia hortensis* Linn (Bignoniaceae) was coarsely powdered and passed through sieve # 10. 100gms of this sieved powder was weighed accurately and subjected to aqueous extraction using 0.3% of chloroform as preservative by maceration technique. The extract prepared was filtered and condensed by vacuo evaporator.

Animals

Wistar rats (150-175g) of approximately same age used in the present studies. The animals were fed with standard pellet diet and water *ad libitium*. All the animals were housed in polypropylene cages. The animals were kept under alternate cycle of 12 hours in darkness and light. The animals were acclimatized to the laboratory condition for a period of one week before starting the experiment. The experiment protocols were approved by Institutional Animal Ethics Committee after securitization.

Antipyretic studies

The antipyretic studies were carried out by Yeast induced hyperthermia model using rats. For the induction of fever, 20% w/v of brewer's yeast in distilled water was administered by subcutaneous injection. All animals were induced pyrexia by injecting 10ml/kg of brewer's yeast solution under the skin in between the shoulder blades. The site of injection was massaged in order to spread the suspension beneath the skin. Basal rectal temperature was measured before the injection of yeast, by inserting digital clinical thermometer to a depth of 2cm into the rectum. The rise in rectal temperature was recorded after 18hrs of yeast injection.

ISSN: 0975-8585

The febrile rats were selected and were divided into four groups of 6 animals each. Group I served as negative control and received only distilled water. Group II served as positive control and were treated with paracetamol 150mg/kg body weight, orally. Group III and IV were treated with *Millingtonia hortensis* aqueous extract of 200mg/kg and 400mg/kg body weight, orally. The doses were fixed on the basis of OECD Guidelines 423. The rectal temperature of all groups of rats was recorded at 60, 120, 180, 240 and 300min post treatment. Decrease in rectal temperature post treatment indicated the antipyretic effect[8-10].

Statistical Analysis

Statistical analysis was performed by one way (ANOVA) followed by using results were expressed as mean ± SEM for 6 rats in each group. P< 0.05 was considered significant.

RESULTS AND DISCUSSIONS

Figure 1: Histogram showing the Rectal temperature in °C before the induction of pyrexia

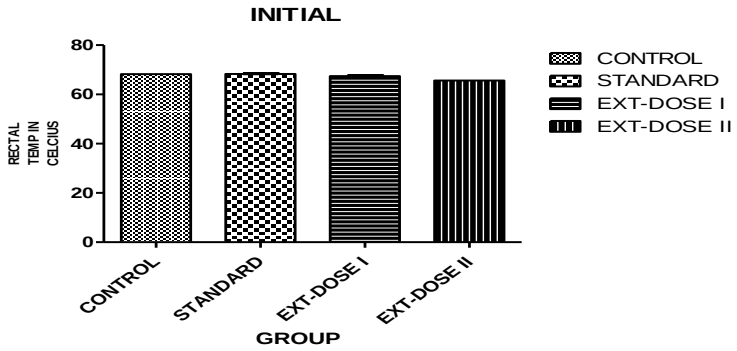

Figure 2: Histogram showing the rectal temperature in °C after the induction of pyrexia(after 18hrs of pyrexia induction)

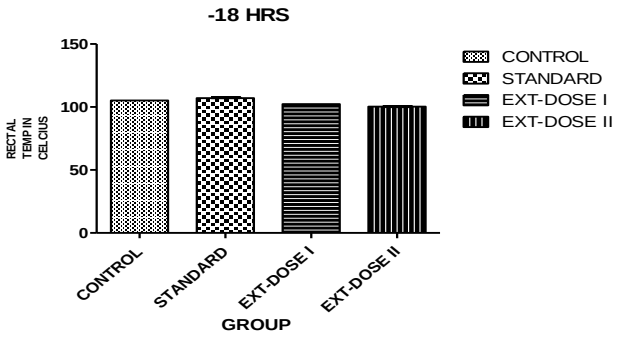

Figure 3: Histogram showing the rectal temperature in °C after the 1st hr of treatment

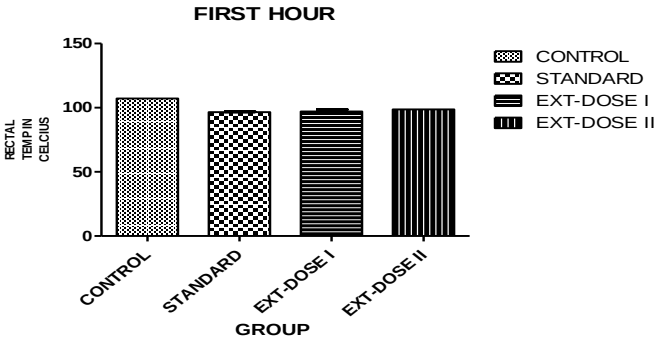

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Figure 4: Histogram showing the rectal temperature in °C after the 2nd hr of treatment

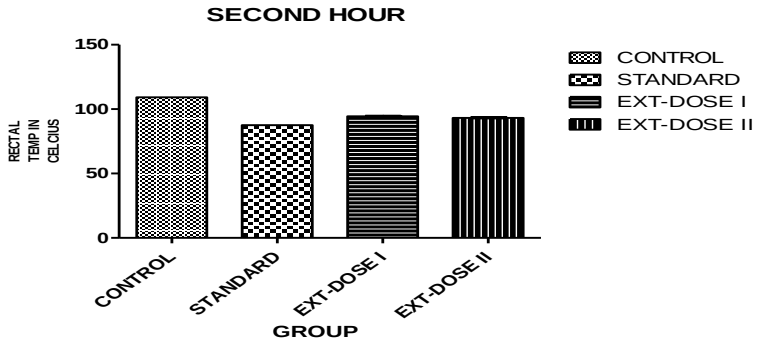

Figure 5: Histogram showing the rectal temperature in °C after the 3rd hr of treatment

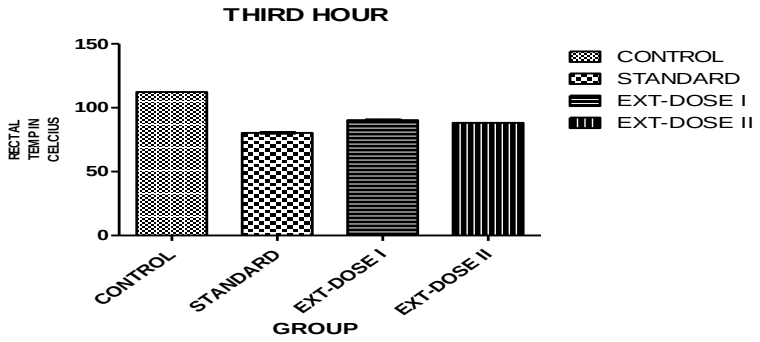

Figure 6: Histogram showing the rectal temperature in °C after the 4th hr of treatment

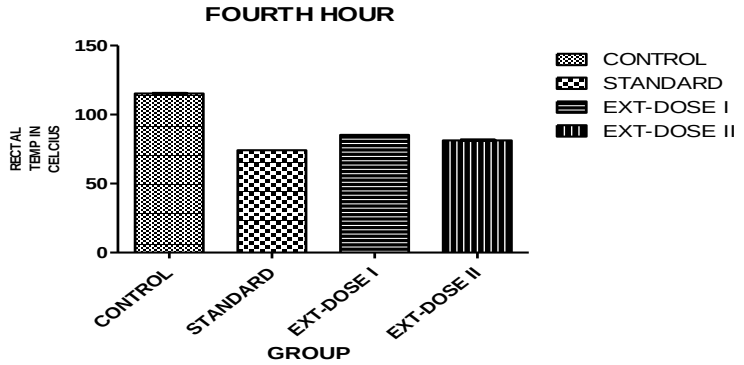

Figure 7: Histogram showing the rectal temperature in °C after the 5th hr of treatment

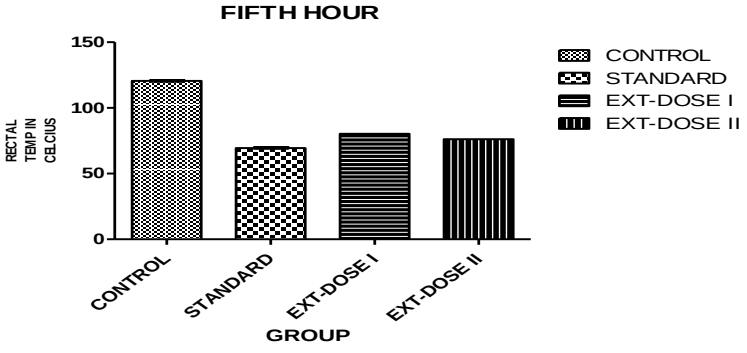

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Table 1: Antipyretic studies on *Millingtonia hortensis* L.F aqueous extract

GROUP	RECTAL TEMPERATURE(CELCIUS)						
	Before Induction of Pyrexia	18 Hrs after induction of pyrexia	Rectal temperature after treatment				
			60min	120min	180min	240min	300min
I	67.66±0.24	105.08±0.31	108.5±.71	108.83±0.47	112.16±0.70	115.66±0.61	120.00±0.36
II	68.00±0.31	106.91±0.15	96.83±0.33***	86.83±0.60***	80.00±0.36***	74.50±0.42***	69.50±0.42***
III	67.08±0.30	101.91±0.15	100.33±0.24***	94.16±0.65***	89.5±0.76***	85.33±0.42***	79.83±0.30***
IV	66.16±0.30	99.91±0.31	98.83±0.30***	92.16±0.47***	88.16±0.30***	80.33±0.66***	75.33±0.71***

All the values are mean ± SEM and compared to negative control ***p<0.001 , n=6

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 [11&12]. Thus the search for an ideal antipyretic drug had become as never-ending challenge. It is worth searching for herbal materials that are equally efficacious but less toxic and comparatively free from side effects, as substitutes for synthetic drugs such as paracetamol[1]. The results of the present study were exhibited in table 01 and figures 1 to 7. The present study revealed that *Millingtonia hortensis* L.F aqueous extract possess significant antipyretic action dose dependently for an observation period of five hours as compared to the negative control group. The results were comparable to that of the standard drug paracetamol.

CONCLUSIONS

The study clearly revealed that stem bark aqueous extract of *Millingtonia hortensis* L.F possess significant antipyretic property similar to that of the standard drug paracetamol, thus confirming the folkfore medicinal properties of the tree. Furthermore isolation, characterization of active phytoconstituents from *Millingtonia hortensis* L.F stem bark may lead to a novel drug of herbal drug category with less or no side effects and can be of lesser cost effective.

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