Study of Antipyretic Activity of Parthenium Hysterophorus in Rats

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ABSTRACT

Introduction: Parthenium hysterophorus is an aggressive ubiquitous annual herbaceous weed with no economic importance unravelled till now. The decoction of P. Hysterophorus has been used in traditional medicine to treat fever, diarrhoea, neurologic disorders, urinary tract infections, dysentery, malaria and as emmenagogue. Objective: The study was conducted to screen the antipyretic activity of hydro-alcoholic extracts of Parthenium Hysterophorus.  

Materials and Methods: Thirty healthy rats weighing between 200-250gms were divided into five groups of six animals each, with 50% sex ratio. The initial rectal temperature of each animal was recorded by digital thermometer. The pyrexia was induced by injecting 20ml/kg (s.c.) of 20 per cent aqueous suspension of Brewer’s yeast in normal saline below the nape of the neck and rectal temperature was recorded by clinical thermometer immediately before (18 h) and 18 h after (0 h) Brewer’s yeast injection. The difference in temperature between 0 hour and respective time interval was found out by statistical method. The potency of extract to bring down the temperature was compared with that of the control group.  

Results: PH extract at 200 and 400 mg/kg produced significant antipyretic activity at 1 h after drug administration, whereas PH extract (800 mg/kg) and aspirin(300 mg/kg) showed significant antipyretic activity throughout the observation period up to 6 h. The extract showed marked antipyretic activity in a dose dependent manner.  

Conclusion: Parthenium hysterophorus has marked antipyretic activity.  

Keywords: Extract, Parthenium hysterophorus, Pyrexia, rats.

INTRODUCTION

Parthenium Hysterophorus is an aggressive ubiquitous annual herbaceous weed with no economic importance unravelled till now. It is commonly known as ‘altamisa’, carrot grass, bitter weed, star weed, white top, wild feverfew, “Scourge of India” and congress grass. Parthenium Hysterophorus is a prolific weed belonging to Asteraceae family. It is used by some tribes as remedy for inflammation, eczema, skin rashes, herpes, rheumatic pain, cold, heart trouble and gynaecological ailments. Parthenium Hysterophorus has been found to be pharmacologically active as analgesic in muscular rheumatism, therapeutic for neuralgia and as vermifuge.[2]

This weed is also reported as promising remedy against hepatic amoebiasis. Parthenin, the major constituent of the plant, exhibits significant medicinal attributes including anticancer property.[3] The flowers showed significant anti-
tumour activity and parthenin exhibited cytotoxic properties against T cell leukaemia, HL-60 and Hela cancer cell lines.[4]
P. hysterophorus has hypoglycaemic activity against alloxan-induced diabetic rats. So, flower extract of this weed can be used for developing drug for diabetes mellitus.[5] Till now very less work has been done regarding anti-pyretic activity of Parthenium hysterophorus. Hence, this study was done to evaluate these unexplored properties of Parthenium hysterophorus.

**MATERIALS AND METHODS**

**Animals**
Healthy adult wistar rats of either sex weighing 150 - 250 gm were used to study the anti-pyretic activity by Yeast induced hyperpyrexia in rats.

**Plant**
Fresh Parthenium hysterophorus was collected from the nearby area and was authenticated by local botanist of Science College. Aerial parts were shade dried and powdered in the department of pharmacology.

**Preparation of extract**
The powder (Aerial parts) was macerated for 24 hours in 70 % v/v ethanol. The hydro-alcoholic extracts was obtained by percolation using 70 % v/v ethanol as a solvent. Percolated solution was again shade dried and extract was obtained. Fresh solution was prepared by dissolving extract in distilled water before each experiment.

**Preparation of drug formulation**
For oral administration Parthenium Hysterophorus extract was used which was prepared by dissolving the extract in distilled water before each experiment.

**DRUGS, CHEMICALS AND INSTRUMENTS**

a) Drugs
Tab. Ecosprin 75 mg (USV limited Mumbai)

b) Chemicals
Brewer’s yeast

c) Instruments
Percolator- Borosil (Alka Scientific Co. Nagpur)
HICKS Digital thermometer with beeper

**METHOD**

**Yeast-induced pyrexia in rats**[6]
The albino Wistar rats of either sex were divided into 5 groups, 6 animals in each group (total 30 animals).
- Group 1 - Control- received distilled water
- Group 2 - PH extract 200mg/kg orally
- Group 3- PH extract 400mg/kg orally
- Group 4 - PH extract 800mg/kg orally
- Group 5- Standard drug aspirin 300mg/kg orally

Prior to the experiment, the rats were maintained in separate cages for 7 days and the animals with approximately constant rectal temperature were selected for the study. Fever was induced by injecting 20ml/kg (s.c.) of 20 per cent aqueous suspension of Brewer’s yeast in normal saline below the nape of the neck and rectal temperature was recorded by clinical thermometer immediately before (18 h) and 18 h after Brewer’s yeast injection. Aspirin (300 mg/kg, p.o.) was used as standard drug for comparing the antipyretic action of Parthenium hysterophorus extract.

All the results were expressed as Mean ± Standard Deviation (SD). The differences between experimental groups were compared by one-way Analysis of Variance (ANOVA) followed by test. The results were considered statistically significant when *p < 0.05, **p< 0.01-very significant, ***p< 0.001-Highly significant as compare to control.

**RESULTS**
The experimental rats showed a mean increase of 0.86°C in rectal temperature, 18 h after Brewer’s yeast injection. PH extract at 200 and 400 mg/kg produced significant (P<0.05 and P<0.01, respectively) antipyretic activity at 1 h after drug administration, whereas PH extract (800 mg/kg) and aspirin (300 mg/kg) showed significant antipyretic activity throughout the observation period up to 6 h (Table 1 and Fig 1).

**DISCUSSION**
Fever is provoked by many exogenous substances in animal models, including bacterial endotoxins and microbe infection. Exogenous pyrogen induces the production of pro-inflammatory cytokines, such as interleukin-1β (IL-1β), IL-6, interferon-α (IFN-α), and tumor necrosis factor-α (TNF-α), which enter hypothalamic circulation and stimulate the release of local prostaglandins (PGs), thereby resetting the hypothalamic thermal set point[7]. Like aspirin, PH extract showed antipyretic activity which is likely due to inhibition of the synthesis and/or release of local PGE2 into the preoptic area of anterior hypothalamus.[7][8] It is well known that most of the anti-inflammatory, analgesic drugs possess antipyretic activity. Parthenium hysterophorus revealed weak antipyretic effect at low doses (200 and 400 mg/kg) but at higher dose (800 mg/kg), (Table 1 and Figure 1) it produced marked antipyretic activity in Brewer’s yeast induced febrile rats. In general, non-steroidal anti-inflammatory drugs produce their antipyretic action through inhibition of prostaglandin synthetase within the hypothalamus.[9],[10] Although, there is no direct evidence of Parthenium hysterophorus to interfere with prostaglandin synthesis in hypothalamus but it can be supported by a related study in which Parthenium hysterophorus was found to inhibit prostaglandin biosynthesis. Therefore, it appears that antipyretic action of Parthenium hysterophorus may be related to the inhibition of prostaglandin synthesis in hypothalamus. In conclusion, the present study demonstrates
that Parthenium hysterophorus has marked antipyretic activity.

Table 1: Antipyretic activity of Parthenium Hysterophorus extract by yeast induced hyperpyrexia model

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose (mg/kg)</th>
<th>Rectal temperature in °C at time (h) mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH extract</td>
<td>200 orally</td>
<td>36.43 ± 0.11</td>
</tr>
<tr>
<td>PH extract</td>
<td>400 orally</td>
<td>36.71 ± 0.09</td>
</tr>
<tr>
<td>PH extract</td>
<td>800 orally</td>
<td>36.68 ± 0.06</td>
</tr>
<tr>
<td>Standard Aspirin</td>
<td>300</td>
<td>36.75 ± 0.11</td>
</tr>
</tbody>
</table>

- N - Six animals in each group; Values are mean ± SD. * P<0.05, ** P<0.01, *** P<0.001 when compared to control.
- A - Temperature just before yeast injection.
- B - Temperature just before drug administration.
- c - Change in temperature following yeast injection.

Figure 1: Antipyretic activity of Parthenium Hysterophorus extract by yeast induced hyperpyrexia model
CONCLUSION
Parthenium Hysterophorus has marked antipyretic activity.

What this study adds:
1. What is known about this subject?
P. Hysterophorus has been used in traditional medicine to treat fever, diarrhoea, neurologic disorders, urinary tract infections, dysentery, malaria and as emmenagogue.

2. What new information is offered in this study?
Parthenium hysterophorus has marked antipyretic activity.

REFERENCES

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