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RESEARCH ARTICLE

ANTIPYRETIC ACTIVITY OF ETHANOLIC EXTRACT OF PROSOPIS CINERARIA PODS

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ABSTRACT

Prosodies cineraria used in folk medicine to treat various ailments such as anemia, arthritis, asthma, toothache, ulcers and vertigo. Prosopis cineraria bark is used as remedy against the rheumatism, fever and inflammation. Pods is used for earache, toothache, pain relief from fractured bones. The aim of present study is to evaluate the antipyretic effect of Prosopis cineraria pods. Phytochemical screening of Prosopis cineraria pods were carried out to determine the presence of various phytoconstitutents. Antipyretic effect was evaluated by Brewer's yeast induced pyrexia method. Phytochemical screening revealed presense of various secondary metabolites. Ethanolic extract of Prosopis cineraria pods (PCEE) show significant Antipyretic activity at dose 400 mg/kg. The results indicate that ethanolic extract of Prosopis cineraria pods can be a good candidate for reducing fever and validates its use as useful folk medicine due to presence of various secondary metabolites.

INTRODUCTION

Prosopis cineraria is locally known as "Khejri" in India. it is used in folk medicine combat various ailments viz., anemia, arthritis, asthma, biliousness, boils, bronchitis, cholera, colic, toothache, ulcers and vertigo.[1-2] This is reported that Prosopis cineraria bark is used traditionally as remedy against the rheumatism. Pods are consumed as food in arid region of rajasthan, additionally considered as astringent. Aqueous pate of bark is applied externally to disinfect wound and promotes healing. [3] Pharmacologically it has demonstrated analgesic and anti-inflammatory activity. Fresh Leaves juice mixed with lemon juice is used for dyspepsia, extract of crushed pods is used for earache, toothache, pain relief from fractured bones. [4] From chemical point of view presence of phytosterols, flavonoids, tannins, phenols, carbohydrates, proteins and amino acids were detected in the preliminary phytochemical tests.[5] Literature survey revealed that antipyretic acivity of Prosopis cineraria pods has not been scientifically proven. Therefore, present study was aimed to evaluate the antipyretic acivity of Prosopis cineraria pods.

MATERIALS AND METHODLOGY

Chemicals and drugs

Paracetamol (Plethico pharmaceuticals, Indore) and brewer's yeast (HiMedia Laboratories Pvt Ltd, Mumbai, India), and other solvents were of analytical grade.

Collection and authentication of plant material

The fresh pods of Prosopis cineraria was collected from Jodhpur, Rajasthan, India and identified by senior taxonomist. R.P. Pandey of National Research Institute for Ayurveda-Siddha Human Resource Development, Gwalior, India

Extraction and phytochemical screening

The pods of Prosopis cineraria were dried, chopped and grinded by using mechanical grinder to obtained a coarse powder and extracted with petroleum ether to remove fatty substances. Then finally extracted (cold maceration) with ethanol to obtain the ethanol extract. The extracts were filtered and concentrated over water bath. Percentage yield of ethanolic extract was 6% w/w. Preliminary phytochemical study of extract was carried out to determine the presence of carbohydrates, proteins, flavonoids, alkaloids, terpenoids, fixed oils, glycosides in the extract. [6]

Animals

Healthy adult albino Wistar rats (200-225 g) of either sex were used for the study. The rats were acclimatized at controlled room temperature 25° ± 2°C and 12 h light-dark cycle for 7 days. Food and water were given ad libitum. The protocol of study approved by the Institutional Animal Ethics Committee (IPS/COP/IAEC/01) according to the guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), New Delhi, India.

Grouping and treatments

The animals were randomly divided into 4 groups 5 animal in each group. The PCEE were dissolved in 0.9% saline for oral administration.

Group I: Control group given 0.9% normal saline (p.o.).

Group II: Standard groups received (paracetamol 1 00 mg/kg, p.o.).

Group III & IV: PCEE (200 and 400 mg/kg, orally) treated groups.

Fever was induced by Brewer's yeast in normal saline 12.5% of 1 ml/100 gm body weight subcutaneously.

ANTIPYRETIC ACTIVITY

Brewer's yeast induced pyrexia: Rats were fasted for 18 h before inducing pyrexia. The initial rectal temperature was noted by digital thermometer to 3 c.m. depth into the rectum of the animal. Brewer's yeast in normal saline 12.5% of 1 ml/100 gm body weight subcutaneously administered to nap of the neck and the site of injection massaged to spread the suspension to induce fever. After 18 h the rise in rectal temperature was recorded. Animals show 1°C rise in body temperature were included in the study and administered with PCEE at dose (200 and 400 mg/kg) or paracetamol 100 mg/kg and 0.9% normal saline solution. The rectal temperature was recorded at 1, 2 and 3 h after dosing. [7]

Statistical analysis:

The results were analyzed by two-way ANOVA Bonferroni post hoc tests using Prism pad statistics software ver. 5. A statistical difference of $P < 0.05$ was considered significant in all test.

RESULTS AND DISCUSSION

Phytochemical screening:

Ethanolic extract revealed presence of carbohydrates, proteins, flavonoids, alkaloids, terpenoids, fixed oils, glycosides in the extract.

Antipyretic Activity

PCEE in low dose 200 mg /kg, effective only at 3 hr ($p < 0.05$) to reduce the fever. While PCEE dose of 400 mg/kg exhibited significant antipyretic effect at 2 and 3 hr ($p < 0.01$, $p < 0.001$, respectively) prominent effect of PCEE was observed at 3 hr. which is comparable to standard drug paracetamol 100 mg/kg (Table 1). Brewer's yeast (lipopolysaccharide, which is the cell wall component of Gram negative bacteria) is an exogenous pyrogen that binds to the immunological protein called the lipopolysaccharide binding protein. Fever Induced by yeast is known as pathogenic fever. This binding results in the synthesis and release of various endogenous cytokine factors such as interleukin (IL) -1, IL-6, and TNFa, which activate the arachidonic acid pathway, and ultimately result in the synthesis and release of prostaglandin E2 (PGE2).[8-9] PGE2 is a key mediator of fever acting on thermo sensitive and thermo integrative hypothalamic integrative neurons Inhibition of prostaglandin synthesis could be the possible mechanism of antipyretic action. Paracetamol act by inhibiting effect of pyrogen in preoptic region of hypothalamus. [10] PCEE produce antipyretic effects in higher dose 400 mg/kg comparable to the paracetamol treated group which may be due to inhibition of prostaglandin synthesis.

Phytochemicals present in pods ethanolic extract such as flavonoids, alkaloids, terpenoids, fixed oils, glycosides may be responsible for antipyretic effect.

CONCLUSION

In conclusion, Prosopis cineraria pods enriched with antipyretic activity and affirm its use as a remedy for the treatment of fever. However, the isolation of compounds responsible for antipyretic effect is future scope of the study.

DECLARATION of INTEREST

The authors declare that there is no conflict of interest.

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Table 1: Antipyretic effect of PCEE against Brewer's yeast induced pyrexia

Time (hrs)	Control group	Standard Paracetamol 100 mg/kg	PCEE 200 mg/kg	PCEE 400 mg/kg
0	98.48 ± 0.19	98.10 ± 0.32	98.88 ± 0.58	98.71 ± 0.2
18 h	101.31 ± 0.25	101.70 ± 0.51	101.34 ± 0.42	101.38 ± 0.30
1	101.44 ± 0.48	99.81 ± 0.28**	101.56 ± 0.55	100.9 ± 0.26
2	101.66 ± 0.22	98.29 ± 0.60***	100.88 ± 0.45	99.88 ± 0.57**
3	101.38 ± 0.18	98.68 ± 0.39***	100.12 ± 0.29*	99.31 ± 0.37***

Two way ANOVA Non repeated measure using Bon Ferroni post hoc test * p<0.05 ** p<0.01* p<0.**