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Preliminary Phytochemical Analysis and Screening of *Clerodendrum Phlomidis* Linn for Its Antipyretic Activity

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The current study was focussed to evaluate the antipyretic potential of the hexane and methanol extracts of the whole plant *Clerodendrum phlomidis* (Linn). (Family: Verbenaceae) HECP and MECP on normal body temperature and yeast - induced pyrexia in albino rats. The whole plant Clerodendrum phlomidis was collected from Ayurvedic garden, Anna hospital, Arumbakkam, Chennai and they were authenticated and confirmed. The pulverized plant material (1000 gm) was extracted successively with hexane and methanol solvents in a soxhlet apparatus. Adult albino rats of either sex weighing 180 - 200g were taken for the experiment. Yeast suspension (10 ml / kg body wt.) increased rectal temperature after 19 hours of subcutaneous injection. The HECP and MECP at doses of 100mg, 300mg and 500mg / kg body temperature and yeast - provoked elevated temperature in a dose dependent manner. The effect also extended up to 5 hours after the drug administration. The anti-pyretic effect of HECP and MECP was comparable to that of a standard antipyretic agent paracetamol (150 mg / kg body wt, P.O).

Key words: Antipyretic activity, HECP, MECP, Clerodendrum phlomidis (Linn).

INTRODUCTION

Clerodendrum phlomidis Linn is a large bush or small tree belonging to the family verbenaceae.[1] It is widely distributed throughout India in the drier parts, Baluchistan and Ceylon.[2] This plant is commonly known as "Thalanji" in Tamil. The Juice of leaves is used as an alternative and bitter tonic. The decoction of its roots is used as an astringent and demulscent in gonorrhoea.[3] The whole plant has known to possess hypoglycemic effect.[4] Secondary metabolites such as β-sitosterol, lupeol acetate, scutellarein, D-mannitol, ceryl alcohol and flavanoids have been isolated from *Clerodendrum phlomidis*.[5-7] It has come to our attention that the rural people of Tamilnadu, India use the Juice of the plant for the relief of fever. Based on the traditional use of the plant as an antipyretic agent, the present study was carried out in an experimental animal model to substantiate the folklore claim.

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MATERIALS AND METHODS

Collection of Plant Material

The plant was collected from Ayurvedic garden, Anna hospital, Arumbakkam, Chennai. The authentication and confirmation of the plant was established by Dr.Mrs.Sasikala Ethirajulu, Assistant Research Officer, Dept. of Botany, CSMDRIA, Chennai. A voucher specimen (SRMCP 12/8) has been deposited in the herbarium of the Dept. of Pharmacognosy for future reference. The whole plants were dried under controlled temperature (shade) and stored in a closed vessel for further use.

Preparation of Extracts

The dried and pulverized plant material (1000 gm) was subjected to hot continuous extraction with hexane (63 - 70^{o}C) and methanol (95^{o}C) as solvents respectively in a soxhlet extractor. After each extraction, the solvent was removed in vacuo in a rotary evaporator to provide dry extracts. The dried mass was kept in a refrigerator and was used as and when required for the experiment. The percentage extractive

values of hexane and methanolic extracts was found to be 8.58% and 5.2% respectively. The extracts were subjected preliminary qualitative tests to identify the various phytoconstituents present in plants.[8] From preliminary phytochemical screening, both the extracts showed the presence of steroids, flavanoids, triterpenoids, phenols and coumarins further confirmed by thin-layer chromatography study.

Animals

Adult albino rats (wistar strain) of either sex weighing 180 - 200 g were used. The animals were maintained under suitable nutritional and environmental conditions through out the experiment. The animals were maintained under standard laboratory condition for an acclimatization period of seven days prior to performing the experiment.

Study on normal body temperature

Rats of either were divided into seven groups comprising six in each group for this experiment. The body temperature of each rat was measured rectally at predetermined intervals before and for 5 hours after administration of either 2% aqueous tragacanth solution (control) or HECP and MECP at doses of 100, 300 and 500 mg/kg body weight orally.

Induction of yeast induced pyrexia

Rats were divided into eight groups of six rats each. The normal body temperature of each rat was measured rectally at predetermined intervals and recorded.[9] Fever was induced as per the method described.[10] The rats were trained to remain quiet in a restraint cage. A thermister probe was inserted 3-4cm deep into the rectum and fastened to the tail by adhesive tape. The temperature was measured on a thermometer. After measuring the basal rectal temperature, animals were given a subcutaneous injection of 10ml/kg body wt of 15% w/v yeast suspended in 0.5% w/v methyl cellulose solution. Rats were then returned to their housing cages. After 19 hours of yeast injection, the animals were again restrained in individual cages for the recording of their rectal temperatures as described previously.

Drug administration

After 19 hours of yeast injection, the HECP and MECP were administered orally at doses of 100, 300 and 500 mg / kg body wt. to six groups of animals respectively. A similar volume (5ml/kg body wt) of 2% aqueous tragacanth solution was administered orally to the control group of animals. The eighth group of animals received the standard drug paracetamol (150 mg / kg body wt.) orally. Rats were restrained for recording of their rectal temperatures at the nineteenth, immediately before HECP or MECP or paracetamol administration and again at one hour's interval up to twenty - third hour, after yeast injection.

Statistical Analysis

Data was expressed as mean $\pm$ standard error of means. Statistical analysis was made by using Kruskal Wallis (non - parametric) Anova test at different time intervals.[11,12,13]

RESULTS

Effect of the HECP & MECP on normal body temperature in rats was presented in Table 1. It was found that the HECP and MECP at doses of 100 mg / kg body wt. caused significant lowering of body temperature up to 4 hours following its administration. This effect was maximal at doses of 300 and 500 mg/kg body wt. in a dose dependent manner and it caused significant lowering of body temperature upto 5 hours after its administration. The subcutaneous injection of yeast suspension markedly elevated the rectal temperature after 19 hours of administration. Treatment with HECP and MECP at doses of 100, 300 and 500 mg/kg body wt decreased the rectal

Table 1: Effect of extract of *Clerodendrum phlomidis* Linn on normal body temperature

Treatment mg/kg/body wt.	Rectal Temperature (°C) before and after treatment					
	0h	1h	2h	3h	4h	5h
Control (Normal Saline)	37.4 ± 0.2	37.2 ± 0.1	37.4 ± 0.3	37.3 ± 0.2	37.3 ± 0.1	37.0 ± 0.2
HECP 100	37.2 ± 0.1	36.7 ± 0.3*	36.6 ± 0.2**	36.5 ± 0.3**	36.7 ± 0.2**	36.8* ± 0.3
HECP 300	37.3 ± 0.2	36.2 ± 0.1***	36.2 ± 0.2***	36.3 ± 0.2**	36.7 ± 0.2**	36.7 ± 0.2**
HECP 500	37.1 ± 0.2	35.8 ± 0.2***	35.8 ± 0.2***	35.8 ± 0.1***	35.9 ± 0.2***	36.0 ± 0.2**
MECP100	37.3 ± 0.2	37.0 ± 0.1 *	35.6 ± 0.2**	35.6 ± 0.1**	37.5 ± 0.3**	36.8 ± 0.2*
MECP 300	37.1 ± 0.1	36.4 ± 0.1***	36.2 ± 0.2***	36.3 ± 0.2**	36.7 ± 0.3**	36.9 ± 0.2**
MECP 500	37.2 ± 0.2	37.1 ± 0.2***	36.5 ± 0.4***	36.3 ± 0.1***	36.8 ± 0.4***	36.9 ± 0.2**

Table 2: Anti-pyretic activity of *Clerodendrum phlomidis* Linn

Treatment mg / kg / body wt.	Rectal Temperature (°C) after yeast injection at					
	0h	19h	20h	21h	22h	23h
Control (Normal Saline)	37.6 ± 0.02	39.6 ± 0.02	39.5 ± 0.03	39.3 ± 0.07	39.1 ± 0.03	39.04 ± 0.03
Paracetamol 150	37.8 ± 0.01	39.7 ± 0.03	38.4 ± 0.01***	38.0 ± 0.01***	37.8 ± 0.05***	37.7 ± 0.03***
HECP 100	37.5 ± 0.04	39.7 ± 0.01***	39.0 ± 0.01**	38.5 ± 0.02**	38.3 ± 0.05**	37.9 ± 0.09***
HECP 300	37.4 ± 0.01	39.7 ± 0.01	38.8 ± 0.04***	38.3 ± 0.05***	37.9 ± 0.08***	37.1 ± 0.06***
HECP 500	37.6 ± 0.07	39.7 ± 0.07	38.5 ± 0.01***	37.8 ± 0.03***	37.5 ± 0.01***	37.5 ± 0.05***
MECP 100	37.7 ± 0.03	39.7 ± 0.02	39.5 ± 0.01**	38.4 ± 0.01**	38.0 ± 0.01**	31.4 ± 0.08***
MECP 300	37.3 ± 0.02	39.7 ± 0.01	37.8 ± 0.04***	37.6 ± 0.03***	36.5 ± 0.02***	30.2 ± 0.01***
MECP 500	37.4 ± 0.07	39.7 ± 0.04	37.4 ± 0.01***	36.8 ± 0.02***	35.2 ± 0.04***	35.0 ± 0.03***

Values expressed as mean ± SEM, n = 6 in each group. ***P < 0.001, **P < 0.01, as compared to the control values of corresponding hour.

temperature of the rats in a dose dependent manner the antipyretic effect started as early as 1 hour, and the effect was maintained for 4 hours, after its administration. The standard drug paracetamol at 150 mg/kg body wt. dose significantly reduced the yeast provoked elevation of body temperature. The results obtained from the standard drug treated and HECP, MECP treated rats were compared with the control (2% aqueous tragacanth solution) group and we observed a significant reduction in the yeast - elevated rectal temperature (Table 2).

DISCUSSION

Fever may be a result of infection or one of the sequelae of tissue damage, inflammation, graft rejection or other disease states. Antipyretics are drugs which reduce elevated body temperature. Regulation of body temperature requires a delicate balance between the production and loss of heat, and the hypothalamus regulates the set point at which body temperature is maintained. In fever this set point is elevated and drugs like paracetamol do not influence body temperature when it is elevated by factors such as exercise or increases in ambient temperature.[14] The present results shows that the HECP and MECP possesses a significant antipyretic effect in yeast provoked elevation of body temperature in rats, and its effect is comparable to that of standard drug paracetamol. Furthermore, the HECP and MECP also significantly reduced the normal body temperature, and this is to be studied further for the exact mechanism of action.

CONCLUSION

The antipyretic activity of Clerodendrum phlomidis (Linn) supports its use in the traditional medicine to reduce fever but further studies are needed to elucidate the exact mechanism by which Clerodendrum phlomidis (Linn) plant extract exerts the antipyretic effect.

REFRENCES

1. Sharma SK, Govil JN, Singh VK. Recent Progress in Medicinal Plants. Vol. 10, USA : Studium Press; 2005. P.82.
2. Kritikar KR, Basu BD. Indian Medicinal Plants. Vol.3, Dehradun: International Book Distributors and Publication; 2005. P. 1947.
3. Nadkarni KM. Indian Materia Medica. Vol.1, Mumbai: Popular Prakashan Publication; 1993. P. 353.
4. Majumdar DK, Govil JN, Singh VK, Rajeev KR. Recent Progress in Medicinal Plants. Vol.9, USA: Studium Press; 2005. P.431.
5. Gupta RK, Chandra S, Mahadevan V. Indian J Pharmacy 1967; 29 : 102.
6. Subramanian SS, Nair AGR. J Indian Chem Soc 1972; 49 : 1069.
7. Harborne JB. Phytochemical methods : A guide to modern techniques of plant analysis. London : Chapman and Hall; 1998. P. 78-79.
8. Trease GE, Evans WC. Text Book of Pharmacognosy. 12th Edn, London : Balliere Tindall; 1985. P. 344, 505.
9. Murugesan T, Mandal SC, Bhakta T, Das T, Pal M, Saha B.P., Phytomedicine 2000; 7(3) : 231.
10. Smith PK, Hambourger WE. J Pharmacol Exp Ther 1935; 54 : 346.
11. Kulkarni SK. Hand Book of Experimental Pharmacology. 2nd Edn, New Delhi : Vallabh Prakashan Publication; 1993, P. 83.
12. Bolton S, Bon C. Pharmaceutical Statistics. 4th Edn, Blacksburg : Marcel Dekker Publication; 2004, P. 437.
13. Sundar Rao PSS, Richard J. An Introduction to Biostatistics. 3rd Edn. New Delhi : Prentice Hall of India Pvt Ltd; 1997, P. 111.
14. Goodman, Gilman. The Pharmacological Basis of Therapeutics. 9th Edn, New Delhi : Mc Graw Hill; 1996, P. 959-975.