



E-ISSN: 2321-2187
P-ISSN: 2394-0514
IJHM 2017; 5(2): 16-17
Received: 15-01-2017
Accepted: 17-02-2017

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Antipyretic and anti-inflammatory activity of hill glory bower in experimental animal models

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Abstract

The Hill glory bower, (*Clerodendrum infortunatum*), is a perennial shrub belonging to the family Lamiaceae, also sometimes classified under Verbenaceae. It is the type species among ~400 species of *Clerodendrum*. It is one of the most well-known natural health remedies in traditional practices and traditional medicine. The antipyretic and anti-inflammatory activity of the leaves of *Clerodendrum infortunatum* was studied. The solvent extraction of the finely ground leaves was done by hot continuous Hydroalcoholic extraction using Soxhlet apparatus. Adult wistar albino rats 130-160 gm. were taken for experimentation. The Hydroalcoholic extract of the leaves of *Clerodendrum infortunatum* showed effective antipyretic and anti-inflammatory activity.

Keywords: *Clerodendrum infortunatum*, lamiaceae, antipyretic and anti-inflammatory activity

1. Introduction

“*Clerodendrum infortunatum* is a flowering shrub or small tree, and is so named because of its rather ugly leaf. The stem is erect, 0.5–4 m high, with no branches and produce circular leaves with 6 inch diameter. Leaves are simple, opposite; both surfaces sparsely villous-pubescent, elliptic, broadly elliptic, ovate or elongate ovate, 3.5–20 cm wide, 6–25 cm long, dentate, inflorescence in terminal, peduncled, few-flowered cyme; flowers white with purplish pink or dull-purple throat, pubescent. Fruit berry, globose, turned bluish-black or black when ripe, enclosed in the red accrescent fruiting-calyx. The stem is hollow and the leaves are 6-8 inch (15–20 cm) long, borne in whorls of four on very short petioles. The inflorescence is huge, consisting of many tubular snow white flowers in a terminal cluster up to 2 ft (0.6 m) long. The tubes of the flowers are about 4 inch (10 cm) long and droop downward, and the expanded corollas are about 2 inch (5 cm) across. The fruits are attractive dark metallic blue drupes, about a half inch in diameter. Fruit usually with 4 dry nut lets and the seeds may be with or without endosperm. It flowers from April to August. This plant grows in India, Burma, Bangladesh and other tropical countries. The major compounds are sterols, sugars, flavonoids and saponins. Novel crystalline compounds such as clerodolone, clerodone, clerodol and a sterol designated clerosterol have been isolated from the root. Seven sugars namely raffinose, lactose, maltose, sucrose, galactose, glucose and fructose are present. Fumaric acid, caffeic acid esters, β -sitosterol and β -sitosterol glucoside were isolated from the flowers. Apigenin, acacetin and a new flavone glycoside, characterised as the methyl ester of acacetin-7-O-glucuronide are isolated from the flowers. Saponin is one of the major compounds of the leaf. 24 beta-ethylsterols, clerosterol and 22-dehydroclerosterol, 24-methylsterols (24-methylcholesterol, 24-methylcholesterol, 24-methyl-22-dehydrocholesterol, and 24-methylthosterol) and 24 beta-ethyl-22-dehydrocholesterol are found in the seeds. Scutellarin and hispidulin-7-O-glucuronide are present in the leaf. Poriferasterol and stigmasterol are the components of the aerial parts”^[1].

2. Materials and methods

The leaves were used for this study. The leaves were cleaned, air dried and grinded into fine powder mechanically. The finely ground leaves were placed in a porous bag or “thimble” made of strong filter paper, which was placed in chamber of the Soxhlet apparatus. The extracting solvent Hydro Alcohol in flask was heated, and its vapors condense in condenser. The condensed extractant drips into the thimble containing the leaves, and extracts it by contact. The extracts were filtered and concentrated by evaporation. The crude extracts were tested for its antipyretic and anti-inflammatory activity. Before conducting the study the Animal Ethics Committee of the Gayatri College of Pharmacy, Gayatri Vihar approved the protocol. This study was conducted on Male albino rats; the effect of the *Clerodendrum infortunatum* leaf extract was tested.

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The animals marked test groups III to VI received 300 mg / kg body weight of extract. Methanol-water, extract of the leaves of *Clerodendron infortunatum* L. was screened for antipyretic activity. It was observed that hydroalcoholic, extract at a dose of 300 mg / kg body weight showed maximum antipyretic activity. The result indicated that the major component responsible for antipyretic activity present in Methanol-water, extracts.

Adult rats of 130-160 gm were taken and kept in polypropylene cages under standard conditions of 12:12 night and day cycles. They are fed with standard diet. Anti-inflammatory activity was evaluated using carrageenan induced hind paw edema method. Rats of either sex were divided into six groups of six animals each. The first group A served as control and received only vehicle, second group was administered standard drug Ibuprofen I.P 100mg / kg intra peritonially. The animals of third to sixth group were treated with Methanol, petroleum ether extract, orally. After 1 hour 0.1ml of 1% w/v suspension of Carrageenan was injected into sub plantar region of right hind paw of the all groups of animals. The degree of paw edema of the entire group was measured after 180 minutes. Paw volumes was measured by paw dipped in mercury. Paw edema was calculated by each rat by subtracting the baseline reading from 3 hour. The edema volumes in control (v_c) and in groups treated with test compounds (v_t) were calculated, percentage inhibition was calculated by using the formula % of inhibition = $(v_c - v_t) \times 100 / v_c$. % of inhibition was estimated to be 52.45% with Hydroalcoholic extract administered to the rats fed orally a dose of 300(mg/body wt) and for standard group it was 55.73% administrated with Acetyl salicylic acid.



Adult wistar albino rat



Clerodendrum infortunatum

3. Results & Discussion

It was observed that hydroalcoholic, extract at a dose of 300 mg / kg body weight showed maximum antipyretic activity. (See the Table 1) The result indicated that the major component responsible for antipyretic activity present in Methanol-water, extracts. Data was expressed as mean \pm SEM and the statistical difference between the groups was analyzed by using Student's t-test. The value of (*) $p < 0.05$ and (***) $p < 0.01$ was considered as statistically significant.

Table 1: Antipyretic effect of leaves of clerodendrum infortunatum

Sl. N	Dose	Initial Temperature (C)	Zero Hour	1.5 Hour	2.5 Hour	3.5 Hour	4.5 Hour
1	Control	37.62 \pm 0.28	39.06 \pm 0.18	39.30 \pm 0.18	39.40 \pm 0.38	39.23 \pm 0.18	39.15 \pm 0.15
2	Paracetamol	37.09 \pm 0.30	39.0 \pm 0.23*	38.93 \pm 0.24*	38.76 \pm 0.25	38.60 \pm 0.23*	38.40 \pm 0.23
3	Hydroalcoholic Extract	36.92 \pm 0.30	39.20 \pm 0.12**	38.42 \pm 0.42*	37.73 \pm 0.38*	37.10 \pm 0.20	36.77 \pm 0.10*

Mean \pm SEM, "*" indicates $p < 0.05$, "***" indicates $p < 0.01$

Table 2: Anti-inflammatory effect of leaves of clerodendrum infortunatum

Group Control	Vehicle	0 hrs 0.50 \pm 0.03	4 hrs 0.61 \pm 0.019	% of inhibition _
Standard	Acetyl salicylic acid	0.35 \pm 0.01*	0.27 \pm 0.03*	55.73%
Hydro alcoholic extract	300(mg/kg body wt)	0.35 \pm 0.12	0.30 \pm 0.03*	52.45%

Mean \pm SEM, "*" indicates $p < 0.05$, "***" indicates $p < 0.01$

It was observed that hydroalcoholic, extract at a dose of 300 mg / kg body weight showed nearly same % of inhibition with standard group administrated with Acetyl salicylic acid. So the anti-inflammatory activity of the leave extracts is encouraging.

4. Conclusion

Medicinal plants are now being used as model for antibacterial agents and it is because that plant based drugs cause less or no side effects when compared with synthetic drugs [2]. It was observed that hydroalcoholic, extract of the leaves of *Clerodendrum infortunatum* at a dose of 300 mg / kg body weight showed good result of antipyretic and anti-inflammatory activity.

5. References

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