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SCREENING OF ANTI-INFLAMMATORY ACTIVITY OF *COLEUS AROMATICUS*

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ABSTRACT

The anti-inflammatory effect of the aqueous leaf extract of *Coleus aromaticus* was evaluated using the carrageenan induced rat paw edema. The extract at doses of 250 and 500 mg/kg produced significant ($P < 0.001$) reduction in paw edema when compared with control. The percentage inhibition of paw edema of *Coleus aromaticus* at 500 mg/kg was significant when compared to diclofenac sodium 10 mg/kg at 3rd and 4th hours of study. The results obtained suggest that the aqueous extract of *Coleus aromaticus* exhibited potent anti-inflammatory activity, which may be due to inhibition of mediators released from 2nd phase of inflammation.

Key words: *Coleus Aromaticus*, Anti-inflammatory activity, Carrageenan

INTRODUCTION

Coleus aromaticus Benth., (Lamiaceae), syn. C. ambonicus (Lour.) Spreng. Or *Plectranthus ambonicus* (Lour.), is known as Indian/country borage. It is a large succulent aromatic perennial herb, much branched, highly aromatic pubescent herb with distinctive smelling leaves[1]. The plant consists of hispidly villous or tomentose fleshy stem about 30-90 cm[2]. Leaves are simple, broad, ovate and very thick; thickly studded with hairs; on the lower surface, the glandular hairs are most numerous and give rise to a frosted appearance. The taste of the leaf is pleasantly aromatic with the agreeable and refreshing odour. The leaf is dorsiventral with distinction of adaxial and abaxial faces. The surface of leaf is smooth and densely clothed with distinction of adaxial and abaxial faces. The surface of leaf is smooth and densely clothed with glandular and nonglandular trichomes. *Coleus aromaticus* is reported to possess antilithiotic[3], chemopreventive[4], anti-oxidant[5] and antiepileptic[6] potential. Other folk uses include treatment of cough, ulcers, boils, swellings, headache, urogenital

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disorders and jaundice[1]. The extract of *C. aromaticus* consists of flavonoids, tannins, volatileoils and alkaloids[7-9].

EXPERIMENTAL

Preparation of aqueous extract

About 500 g of fresh leaves were cut to small pieces and the fresh juice was prepared by adding water (30 mL), with the help of mixer. The fresh juice was filtered and concentrated to a dry mass by simple distillation; black dry residue was collected and stored[3].

Animals

Adult healthy wistar rats weighing 150-180 g were selected for the present study. The animals were grouped and housed in polyacrylic cages, with not more than six animals per cage and maintained under standard laboratory conditions. They were allowed free access to standard dry pellet diet and water ad *libitum*. The experimental protocol was subjected to the scrutiny of the Institutional Animal Ethics Committee and was cleared by the same before starting.

Evaluation of anti-inflammatory activity

The activity was evaluated by using carrageenan induced hind paw edema method. The wistar rats were divided into four groups comprising of six animals in each group (n = 6). The animals were fasted overnight and deprived of water only during the experiment. Inflammation of the hind paw was induced by injecting 0.1 mL of the 1% w/v carrageenan in sodium carboxy methyl cellulose suspension into the sub-plantar surface of the right hind paw. The positive control group was treated with diclofenac sodium (10 mg/kg). The test group received the aqueous extract of *C. aromaticus* at the dose of (250 mg/kg and 500 mg/kg). All the treatments were given one hour before the carrageenan injection. The measurement of paw volume was accomplished immediately by displacement technique using the mercury plethysmometer before the carrageenan injection and at 1, 2, 3, 4, 5 hours after the carrageenan injection. Edema was expressed as the increment in paw valume due to carrageenan administration[10].

Statistical analysis

Results are expressed as mean ± S. E. M. and were analyzed statistically by ANOVA followed by Dunnett's t. test. Values of $P < 0.05$ were considered as statistically significant.

Table 1: Effect of aqueous extract of *C. aromacticus* in carrageenan induced rat hind paw edema

Group	Treatment	Dose (mg/kg)	Paw volume (mL)				
			1 hr	2 hr	3 hr	4 hr	5 hr
1	Control	--	0.39±0.02	0.46±0.01	0.63±0.01	0.67±0.01	0.71±0.01
2	Diclofenac sodium	10	0.22 ±0.02 a*** (41.87)	0.24±0.02 a*** (46.37)	0.26±0.02 a*** (58.72)	0.32±0.02 a*** (51.73)	0.38±0.02 a*** (45.54)
3	CAE	250	0.29±0.01 a** b* (25.63)	0.30±0.01 a*** b^{ns} (34.05)	0.39±0.01 a*** b*** (38.09)	0.44±0.01 a*** b*** (33.32)	0.46±0.01 a*** b* (35.20)
4	CAE	500	0.25±0.01 a*** b^{ns} (34.18)	0.28±0.01 a*** b^{ns} (39.12)	0.35±0.01 a*** b** (43.38)	0.42±0.01 a*** b** (36.31)	0.43±0.01 a*** b^{ns} (39.43)

Values are Mean ± Standard Error Mean of 6 animals (n = 6)
a-Group 2, 3, 4 vs Group 1, b-Group 3, 4 vs Group 2
CAE = *Coleus aromaticus* extract
*= P < 0.05, **= P < 0.01, ***= P < 0.001, ns = non-significant, when compared to control and standard by ANOVA followed by Dunnett's t test.
Values in the paranthesis indicate percentage inhibitions at different time intervals.
Percentage inhibition = (1 - Et/Ec)*100
Ec = Edema volume of control group, Et = Edema volume of test group.

RESULTS AND DISCUSSION

Carrageenan induced edema is commonly used as an experimental animal model for the evaluation of acute inflammation and is believed to be biphasic. The first phase is due to release of histamine and serotonin, the second phase is caused by the release of bradykinin, protease, prostaglandins and lysosomes[11]. It has been reported that the second phase of edema is sensitive to most clinically effective anti-inflammatory agents[12]. When compared with the control, aqueous extract and diclofenac sodium treated group showed (Table 1) significant reduction (P < 0.001) in paw edema volume for 1 to 5 hours. The results showed

significant ($P < 0.001$) anti-inflammatory activity, when compared to diclofenac sodium at second phase (3rd and 4th hour) of inflammation (Table 1). The percentage inhibition of paw edema at 500 mg/kg was significant, when compared to diclofenac sodium at 3rd and 4th hour. It is evident from the study that the anti-inflammatory activity might be due to inhibition of bradykinin, protease, prostaglandins and lysosomes. The results obtained in the present study indicate that the aqueous extract of *C. aromaticus* is capable of imparting protection against carrageenan induced inflammation and its anti-inflammatory effect is more or less similar with the standard drug, diclofenac sodium (during 3rd hour). It can be concluded that *Coleus aromaticus* shows significant anti-inflammatory activity at 3rd and 4th hours due to inhibition of second phase mediators of inflammation. But, the activity is not confined to any single active constituent of leaf extract.

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