

Evaluation of Anti-Inflammatory Activity of Hydro-Alcoholic Extract of *Canscora decussata* Roxib. Leaves

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Abstract: The present study investigates the anti-inflammatory activity of hydro-alcoholic extract of leaves of *Canscora decussata* Roxib. The medicinal values of the leaves of *Canscora decussata* have been mentioned in ancient literature as useful in disorders of inflammation. Dried leaves of *Canscora decussata* were extracted with hydroalcoholic solvent by using Soxhlet apparatus. The effect of hydroalcoholic extract of leaves of *Canscora decussata* were studied on formalin induced paw edema. The hydroalcoholic extract decreased the edema induced in hind paw. The hydroalcoholic extract of *Canscora decussata* (400 mg/kg b.w.) has showed significant anti-inflammatory. It has been concluded that hydroalcoholic extract of leaves of *Canscora decussata* Roxib. (400 mg/kg b.w.) augments that it is having good anti-inflammatory activity against formalin induced paw edema.

Key words: *Canscora decussata* • Anti-Inflammatory Activity • Formalin

INTRODUCTION

Nature has provided a complete store-house of remedies to cure all ailments of mankind [1]. This is where, nature provides us drugs in the form of herbs, plants and algae's to cure the incurable diseases without any toxic effect [2]. Inflammation is a pathophysiological response of living tissue to injuries that leads to the local accumulation of plasmatic fluids and blood cells. Though it is a defense mechanism, the complex events and mediators involved in the inflammatory reaction can induce, maintain, or aggravate many diseases [3]. The herbal medicines are getting more importance in the treatment of inflammation because of the toxic effect of the current therapy used to treat those inflammation using synthetic drugs. Herbal medicines are less toxic and less costly when compared to the synthetic drugs.

Canscora decussata Schult. is popularly known as "Shankhpushpi" and found throughout India, up to an altitude of 1300 m. It is also found to contain triterpenes, alkaloids and xanthenes. It is also a natural source of penta-oxygenated, hexa-oxygenated and dimeric xanthenes [4]. This plant contains bitter substances, oleoresin, triterpenes, alkaloids and xanthenes such as mangiferin

[5]. The leaves of *Canscora decussata* has been reported in the literature with beneficial effects in inflammation, hypertension, tuberculosis, nervous disorders and viral infections etc [6]. The present study was designed to investigate the anti-inflammatory effects of *Canscora decussata* in anti-inflammatory activity.

MATERIALS AND METHODS

Plant Material: The leaves of *Canscora decussata* were collected in the month of October from Katni (M.P). The specimen of plant was deposited in the Department of Botany and it has been identified by Saifia College, Bhopal (M.P) and a specimen voucher no. 312/bot/saifia/11) was issued.

Preparation of Extracts: The shade-dried powder of leaves extracted in a soxhlet extractor with hydro-alcoholic solvent gave 23% of extract.

Animals: Adult Wistar albino rats of both sexes weighing about 150±20 g were used for experiment. They were housed in standard environmental condition like, ambient temperature (25 ± 2°C), relative humidity (44-56%)

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Table 1: Effect of hydro-alcoholic extract of leaves of *Canscora decussata* on formalin induced paw edema in rats

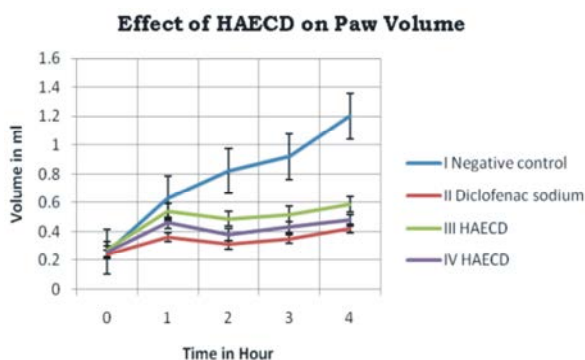
Group	Treatment (n=6)	Dose	Paw Volume (ml) Mean±SEM					% Inhibition at 4 th hr
			0 hr	1hr	2hrs	3hrs	4hrs	
I	Control group	1ml/100Gm	0.26±0.015	0.63±0.019	0.82±0.039	0.92±0.029	1.2±0.057	-
II	Diclofenac sodium	10mg/kg (p.o)	0.24±0.021 ^b	0.36±0.026 ^a	0.31±0.046 ^a	0.35±0.059 ^a	0.42±0.064 ^a	65III
	HAECD	200 mg/kg(p.o)	0.28±0.012 ^b	0.54±0.032 ^a	0.49±0.037 ^a	0.52±0.046 ^a	0.59±0.036 ^a	50.8
IV	HAECD	400 mg/kg(p.o)	0.26±0.022 ^a	0.46±0.012 ^a	0.38±0.05 ^a	0.43±0.038 ^a	0.48±0.071 ^a	60

a $p < 0.01$

b $p < 0.05$

One way ANOVA followed by Dunnet Multiple comparison test

Statistically significant when compared to control



Graph 1: Effect of HAECD on Formalin induced hind paw edema in Rat

and 12/12h light dark cycle. Animals had free access to standard pellet diet and water *ad libitum*. All animal experiments were carried out in accordance with the guidelines of CPCSEA. The institute animal ethical committee gave the approval for conducting animal experiments.

Anti-Inflammatory Activity by Formalin Induced Rat Paw Edema Method:

Albino rats of either sex weighing 150±20 g were divided in 4 groups (N=6). Group-I received 0.5% CMC suspension (control), Group-II received Diclofenac (reference standard 10 mg/kg, P.O), [7] Group-III received hydro-alcoholic extract (200mg/kg, P.O) and Group-IV received hydro-alcoholic extract (400 mg/kg, P.O) of *Canscora decussata* respectively. Animals were treated with drugs by oral route and subsequently 1 h after treatment; 0.1ml of formalin (40%) in normal saline was injected into the subplanter region of left hind paw to induce edema. The paw volume was measured initially at 0, 1, 2, 3 and 4hr after formalin injection using plethysmometer. The difference between the initial and subsequent values gave the actual edema volume which was compared with control. The inhibition of inflammation was calculated using the formula,

% inhibition = $100(1 - V_t/V_c)$, Where 'Vc' represents edema volume in control and 'Vt' edema volume in group treated with test extracts.

Statistical Analysis: Data analysis was carried out using one-way analysis of variance (ANOVA) followed by Dunnett's multiple comparison tests. $p < 0.05$ was considered statistically significant.

RESULTS

Formalin Induced Paw Edema: The effect of hydro-alcoholic extracts of *Canscora decussata* (200 and 400 mg/kg) in formalin induced paw edema in rats is shown in Table 1 and Graph 1. The hydro-alcoholic extracts of *Canscora decussata* (400 mg/kg) prevented the formation of edema induced by formalin and thus showed significant anti-inflammatory activity ($p < 0.05$). The hydro-alcoholic extracts of *Canscora decussata* (400 mg/kg) reduced the edema induced by formalin by 60% after 4hrs injection of noxious agent as compared to the control vehicle treated group. Diclofenac sodium at 10mg/kg inhibited the edema volume by 65%. On formalin induced acute inflammation model the hydro-alcoholic extract (400 mg/kg) produced better inhibition of paw edema.

DISCUSSION

Formalin induced oedema has been commonly used as an experimental animal model for acute inflammation. The nociceptive effect of formalin is biphasic, an early neurogenic component followed by a later tissue mediated response [8] Thus formalin-induced inflammation is a model used for the evaluation of an agent with probable antiproliferative activity. This experiment is associated with the proliferative phase of inflammation. The significant inhibitory activity shown by the extract of

Canscora decussata leaves (200 and 400 mg/kg) over a period of 4 h in formalin-induced inflammation was quite similar to that exhibited by the group treated with diclofenac sodium. The highest percentage inhibition activity was found in the dose of 400 mg/kg with the mean percentage inhibition of 60 after 4 hours of extract administration. These results indicate that the extract acts in later phases in dose dependent manner, probably involving arachidonic acid metabolites, which produce an edema dependent on neutrophils mobilization [9] This anti-inflammatory effect of the extract observed might be due to the presence of flavonoids and xanthenes in the plant.

CONCLUSION

The result obtained from the experiment it is concluded that the hydro-alcoholic extract of *Canscora decussata* (400 mg/kg) having good anti-inflammatory activities and it shown dose dependent activities. The results support the traditional use of this plant in inflammatory conditions and suggest the presence of biologically active components which may be worth further investigation and elucidation.

REFERENCES

1. Kokate, C.K., A.P. Purohit and S.B. Gokhale, 2002. Textbook of Pharmacognosy, Nirali Prakashan: Pune, 18: 1-4.
2. Trease, G.E. and M.C. Evans, 1983. Text book of Pharmacognosy. 12th edition. Balliere, Tindall: London, pp: 343-383.
3. Sosa, S., M.J. Balick, R. Arrigo, R.G. Esposito, C. Pizza and G.A. Altinier, 2002. Screening of the topical Anti-inflammatory activity of some Central American plants. J. Ethnopharmacol., 8: 211-5.
4. Pawal, J. and P. Maloor, 2011. Naturally occurring xanthenes from *Canscora decussata*. Journal of Herbal Medicine and Toxicology, 5(1): 11-16.
5. Chintalwar, G.J. and S. Chattopadhyay, 2006. Structural confirmation of decussatin; A *Swertia decussata* xanthone. Nat Prod Res., 20(1): 53-6.
6. Yogesh Baravalia, Yogeshkumar Vaghasiya and Sumitra Chanda, 2012. Brine Shrimp Cytotoxicity, Anti-inflammatory and Analgesic Properties of *Woodfordia fruticosa* Kurz Flowers. Iranian J. Pharm. Res., 11(3): 851-861.
7. Roy, A., J.K. Gupta and S.C. Lahiri, 1982. Further studies on anti-inflammatory activity of two potent indan-1-acetic acids. Indian J. Physiol. Pharmacol., 26: 206-214.
8. Greenwald, R.A., 1991. Animal model for evaluation of arthritic drugs. Met. Fin. Exp Clin. Pharmacol., 13: 75-83.
9. Just, M.J., M.C. Recio, R.M. Giner, M.J. Cullar, S. Manez and A.R. Bilia, 1998. Antiinflammatory activity of unusual Lupane saponins from *Bupleurum fruticosum*. Plant Med., 64: 404-407.