

**ANTI-INFLAMMATORY ACTIVITY OF ALCOHOLIC AND
AQUEOUS EXTRACTS OF *WEDELIA CHINENSIS***

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Summary

The present study deals with the investigation of phytochemically evaluated alcoholic and aqueous extract of whole plant of *Wedelia chinensis* for its anti-inflammatory activity. The anti-inflammatory activity was evaluated by carrageenan induced rat paw oedema method for acute inflammation and cotton pellet granuloma method for chronic inflammation. The standard drug was Diclofenac sodium for carrageenan induced rat paw oedema method (25 mg/kg) and Indomethacin (5 mg/kg) for cotton pellet granuloma method. In both methods alcoholic extract at a dose level of 500 mg/kg was found to possess more significant activity as compared to aqueous extract.

Keywords: *Wedelia chinensis*, Asteraceae, Anti-inflammatory activity, Carrageenan, Albino rats

Introduction

Inflammation is essentially a protective response of living mammalian tissue to injury. It is a body defense reaction in order to eliminate or limit the spread of injurious agent. As such, inflammation is also intimately interwoven with repair process. There are various components to an inflammatory reaction that can contribute to the associate symptoms and tissue injury. Oedema formation, leukocyte infiltration and granuloma formation represent such components of inflammation [1]. Oedema formation in the paw is the result of a synergism between various inflammatory mediators that increase vascular permeability and /or the mediators that increase blood flow [2]. Several experimental models of paw oedema have been described. Carrageenan-induced paw oedema is widely used for determining the acute phase of the inflammation. Histamine, 5-hydroxytryptamine and bradykinin are the first detectable mediators in the early phase of Carrageenan-induced inflammation [3], whereas prostaglandins are detectable in the late phase of inflammation [4]. A large numbers of Indian medicinal plants are attributed with various pharmacological activities because they contain a diversified class of phytochemicals. It is believed that current analgesia-inducing drugs such as opioids and non-steroidal anti-inflammatory drugs are not useful in all cases, because of their side-effects and potency [5]. As a result, a search for other alternatives seems necessary and beneficial. Traditional and folklore medicines play an important role in health services around the globe. Ayurveda, the traditional medicinal system in India, describes certain plants which strengthen the host immune system.

Wedelia chinensis (Asteraceae), a perennial herb, is one of the most commonly occurring plants in India. In Hindi, it is known as bhangra and pilabhangra. It has a renowned position in Indian system of medicine and is used as anti-inflammatory, anthelmintic, febrifuge and in various hepatic disorders like viral hepatitis [6, 7].

Material and Methods

Plant material: The whole plant of *Wedelia chinensis* was collected from local area of New Delhi and authenticated by Dr. Anjula Pandey, National Herbarium of Cultivated Plant, National Bureau of plant genetic resource, New Delhi and the specimen voucher no. was NHCP/NBPGR/2008/5/1947.

Plant extract: The plant material was dried, reduced to moderately coarse powder and then about 200 gm materials were defatted with petroleum ether (60-80°C), alcohol (95%) and water. The extracts were dried under vacuum (yield 12.6%).

Preliminary Phytochemical Studies: The different extracts were then subjected to qualitative phytochemical screening for the identification of the phytoconstituents. Petroleum ether extract showed the presence of steroids, alcoholic extract showed the presence of glycosides and alkaloids and aqueous extract showed positive test for glycosides and saponins.

Animals: Adult albino rats (200-250 gm b.w) were used for anti-inflammatory activity. The animals were maintained under standard laboratory conditions (ambient temperature of 25°±2°C with 55-65% relative humidity and 12 h light/dark cycle). These animals had free access to water and normal laboratory diet. (Lipton India Limited).

The institutional animal ethics committee (IAEC) approved the use of animals for the present study, (**Ethical clearance number: 711/02/a/CPCSEA**).

Determination of anti-inflammatory activity:

- 1. Carrageenan-induced paw oedema method:** Oedema was induced artificially by subplanter injection of 0.1 ml of 1% freshly prepared suspension of carrageenan in to the right hind paws of the rats of different groups of six animals each. The paw volume was measured initially and then at 1, 2 and 3 hours after the carrageenan injection by using a mercury plethysmometer.

The test group received alcoholic and aqueous extract of *Wedelia chinensis* at a dose level of 500 mg/kg, standard group received Diclofenac sodium (25 mg/kg) [8]. These groups were studied with reference to the control. All the treatments were made orally 30 minutes before the injection of carrageenan. The percentage inhibition was calculated by using the formula [9, 10, 11].

$$\% \text{ inhibition} = (V_c - V_t) / V_c \times 100$$

Where

V_c = Oedema volume of control

V_t = Oedema volume of test

2. Cotton pellet granuloma pouch method: Cotton pellet granuloma was induced according to the method of D' Arcy et.al. [12]. Sterilized cotton pellets each weighing 10 mg were implanted in both axilla and groin of each rat under light ether anaesthesia. Twenty four rats were divided into four groups as shown in table for various treatments for five days. The test group received Indomethacin (5 mg/kg) [13]. Subsequently, on the sixth day all pellets were dissected out under ether anesthesia and dried at 70 °C for 6 hours and weight of each granuloma was determined.

Statistical analysis: All the data obtained from the above studies were statistically evaluated and the significance of various treatments was calculated using student's t-test. A value of $p < 0.05$ was considered significant as compared with control [14].

Results

The results obtained from various parameters are summarized in the tables given below.

Effect of *Wedelia chinesis* extracts on carrageenan induced rat paw oedema

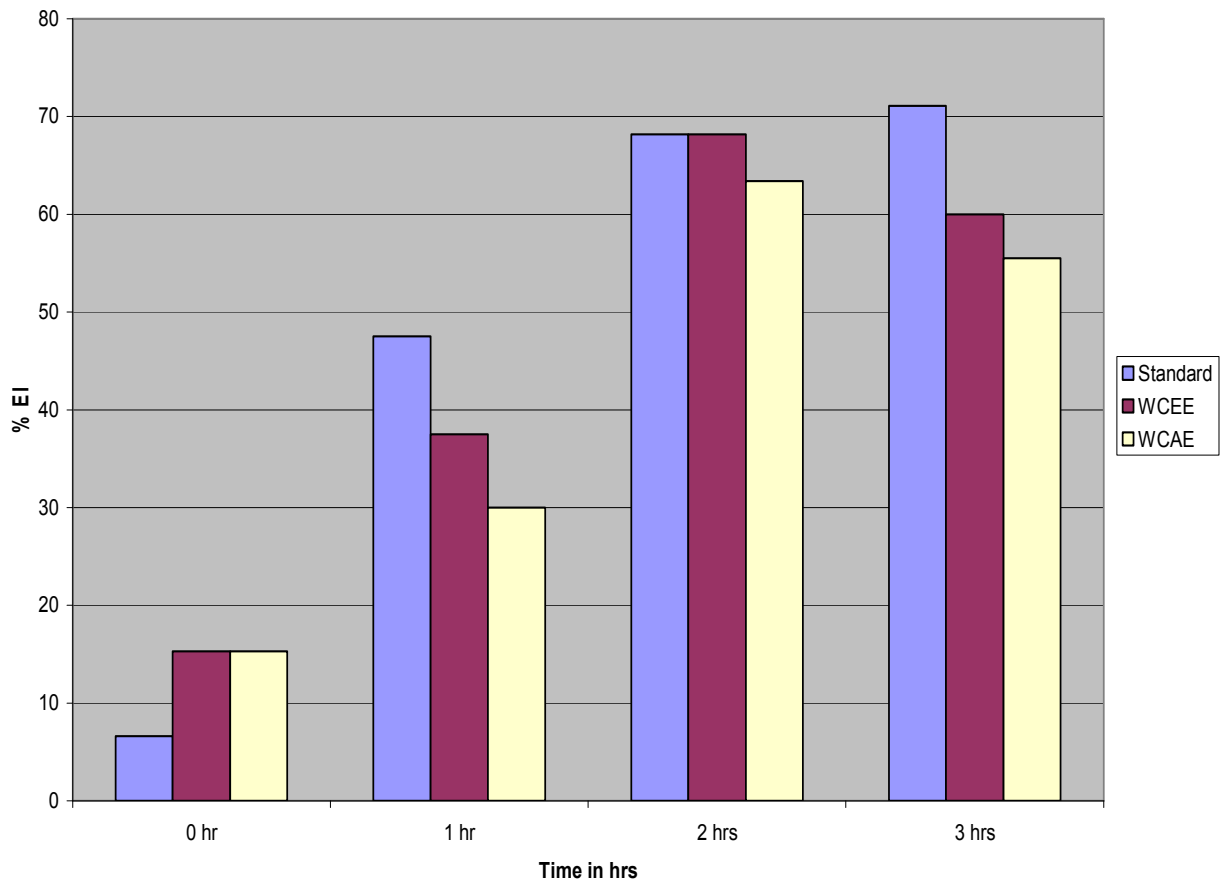


Table 1: Effect of aqueous and alcoholic extracts of *Wedelia chinensis* on carrageenan induced rat paw oedema

GROUPS	DOSE (mg/kg)	PAW VOLUME AFTER CARRAGEENAN INJECTION							
		0 hr		1 hr		2 hr		3 hr	
		EV	EI (%)	EV	EI (%)	EV	EI (%)	EV	EI (%)
Control	-	0.15±0.02	-	0.4±0.03	-	0.63±0.04	-	0.45±0.05	-
Diclofenac Sodium	25	0.16±0.02	6.66	0.21±0.03 ^c	47.5	0.2±0.03 ^d	68.2	0.13±0.02 ^d	71.1
WCEE	500	0.13±0.02	15.38	0.25±0.04 ^b	37.5	0.2±0.02 ^d	68.2	0.18±0.04 ^c	60.0
WCAE	500	0.13±0.02	15.38	0.28±0.03 ^a	30.0	0.23±0.02 ^d	63.4	0.2±0.03 ^c	55.5

Values are expressed as mean ± SEM. (n=6)

^ap<0.05, ^bp<0.02, ^cp<0.01, ^dp<0.001 as compared to control group.

Table 2: Effect of Alcoholic and aqueous extracts of *Wedelia chinensis* on cotton pellet granuloma pouch in rats

S. No.	Groups	Dose (mg/kg)	Weight of cotton pellet induced granuloma (mg)	Percentage Inhibition
1	Control	-	36.87±0.0901	-
2	Indomethacin	5	22.39±0.0657 ^b	39.27
3	WCEE	500	23.95±0.0861 ^b	35.05
4	WCAE	500	28.29±0.0416 ^a	23.27

Values are expressed as mean ± SEM. (n=6)

^ap<0.01, ^bp<0.001 as compared to control group.

Discussion

The present study shows that both alcoholic and aqueous extract of *Wedelia chinensis* possesses anti-inflammatory activity on carrageenan induced oedema in rat paw. The activity profile of extract closely resembled to that of Diclofenac sodium.

Carrageenan induced paw oedema was taken as a prototype of exudative phase of acute inflammation. Inflammatory stimuli microbes, chemicals and necrosed cells activate the different mediator systems through a common trigger mechanism. The development of carrageenan-induced oedema is believed to be biphasic. The early phase is attributed to the release of histamine and serotonin [8, 15, 16].and the delayed phase is sustained by the leukotrienes and prostaglandins [17].

To further verify the anti-inflammatory activity of the extracts and its effects on the proliferative phase of inflammation, cotton pellet granuloma formation was used. The alcoholic extract at a dose level of 500 mg/kg showed a significant inhibitory effect on granuloma formation as compared to aqueous extract. This study revealed that the alcoholic extract was active against the inflammation induced by a foreign body. This effect of extract was less pronounced than that of indomethacin.

Conclusion

From the above results, it can be deduced that alcoholic extract has shown more significant activity as compared to aqueous extract. Phytochemical screening has shown the presence of alkaloids and glycosides in alcoholic extract. The potent activity may be attributed to the presence of these phytoconstituents. More detailed studies are, however, necessary to identify the active principle(s) and exact mechanism of action.

Acknowledgement

The authors are thankful to Dr. Anjula Pandey, Taxonomist, National Herbarium of Cultivated Plants, National Bureau of Plant Genetic and Resources, New Delhi for identification and authentication of the plant and to the Department. of Pharmaceutical Technology, MIET, Meerut for providing research facilities to carry out the work

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