

Analgesic Activity of Methanolic Extract of *Aegiceras corniculatum* Linn

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ABSTRACT: The leaves of *Aegiceras corniculatum* were extracted in absolute methanol to determine their analgesic activity. The analgesic activity was assessed on intact mice by tail flick latency in tail immersion method. Acetylsalicylic acid in the dose of 300 mg/kg is used as standard drug. Plant extracts were given in the doses of 300, 500 and 1000 mg/kg. Control group received 0.9% NaCl (saline) solution. All the doses administered orally. Results showed that *A. corniculatum* had potent analgesic activity.

Keywords: Analgesic activity, Albino mice, *Aegiceras corniculatum* (Linn)

INTRODUCTION

This is one of the most common mangrove plants. These plants often grow together to form a thicket that can be up to 4 m tall. It has no obvious above-ground roots. The leaves are oval and about 7 cm long.¹ *Aegiceras corniculatum* L. Blanco (*Aegicerataceae*) from Indus Delta, Sindh, Pakistan, was evaluated for anti-inflammatory activity and its mechanism using various in vivo and in vitro model systems. Different oedemogens such as carrageenan, dextran, histamine, serotonin, bradykinin, prostaglandin E₂, leukotriene B₄, arachidonic acid, phospholipase A₂ and hyaluronidase were injected into the hind paw of the rat. The hexane and ethyl acetate extracts from leaves and stem caused significant dose dependent inhibition (50-80%) of rat paw oedema in initial and late phases of inflammation (1-4 h). On the other hand, methanol was the only extract from leaves and stem that exhibited significant concentration dependent inhibitory response in the late phase of inflammation (3rd h) with an IC₅₀ of 8.0 Å± 0.35 mg/kg and 7.2 Å± 0.48 mg/kg, respectively. This effect was significantly better than commonly prescribed nonsteroidal anti-inflammatory agent aspirin (IC₅₀ = 48 Å± 0.96 mg/kg) and was equipotent to naproxen sodium (IC₅₀ = 8.7 Å± 0.23 mg/kg). It appears that extracts from *A. corniculatum* particularly methanol extract possess

appreciable anti-inflammatory property. Dextran-induced paw oedema causes the release of histamine and serotonin that are responsible for the onset of initial phase of inflammation.² To test whether the values of δ¹³C in mangrove plants are affected by Cd application, the seedlings of *Aegiceras corniculatum*, a dominant mangrove species, were cultured in soil supplied with CdCl₂ solution at the concentration of 0, 0.5, 2.5, 5, 20, 30 and 50 CdCl₂ mg/kg wet soils. Plants were grown in 10 replicate pots with 5 propagules each. After 5 months of Cd exposure, three pots contained 15 seedlings with average shoot heights were selected for each treatment.³

MATERIAL AND METHOD:

Collection of Plant Material: The leaves of *Aegiceras corniculatum* were collected from the Tamilnadu, and they were sent for authentication and confirmed by Dr. N.P.Singh, Department of Botany, Faculty of Science, Kamla Nehru institute Sultanpur Uttarpradesh, A voucher specimen is kept in the Department of Pharmacognosy, KNIMT, Faculty of Pharmacy.

PREPARATION OF EXTRACT:

The ground plant materials approximately 1 kg were soaked in 500 ml absolute methanol for about six weeks. The alcoholic extracts were then evaporated under reduced pressure in rotary evaporator and a

syropy residue so obtained was dissolved in small quantity of water and subjected to freeze drying. Freeze-dried extracts were collected in small glass bottles and kept at -30°C for further evaluation

PREPARATION OF SAMPLES FOR BIOASSAY:

Acetylsalicylic acid in a quantity of 300 mg and extracts of *Aegiceras corniculatum* in the quantities of 300, 500 and 1000 mg were homogenized in 1.5% aqueous suspension of gumtragacanth. The homogenate including the insoluble fraction was administered orally to animals on the basis of mg/kg of the body weight.

ANIMALS:

Albino mice for analgesic studies and albino mice for analgesic activity studies of either sex bred at the animal house of Welcome Lucknow Ltd. were used in the present study.

Weights of the mice and rats ranged from 20-25 g and from 160-210 g respectively. All animals were maintained in groups of five at $22 \pm 1^\circ\text{C}$ with light/dark cycle of 12:12 hours. They were starved overnight but allowed fresh water before administration

Of the plant extracts.

PROCEDURE FOR TESTING ANALGESIC ACTIVITY

Tail immersion method:

In present study analgesia was assessed according to the method of Luiz *et al.*⁴. Mice divided in the groups

of five each, were held in position in a suitable restrainer with the tail extending out. 3-4 cm area of the tail was marked and immersed in the water bath thermo-statistically maintained at 51°C . The withdrawal time of the tail from hot water (in seconds) was noted as the reaction time or tail flick latency. The maximum cutoff time for immersion was 180 seconds to avoid the injury of the tissues of tail. 0.2 ml of 0.9% NaCl solution was administered to control animals; plant extracts in ndoses of 300, 500 and 1000 mg/kg were given orally by intubation. The initial reading was taken immediately before administration of test and standard drugs and then 60, 90, 120,150, 180 and 210 minutes after the administration. The criterion for analgesia was postdrug latency which was greater than two times the pre-drug average latency as reported by Janssen *et al.*⁵ Tail flick latency difference or mean increase in latency after drug administration was used to indicate the analgesia produced by test and standard drugs.

STATISTICAL ANALYSIS

Values for analgesic activity were expressed as "mean increase in latency after drug administration \pm SEM" in terms of seconds whereas values for anti-inflammatory activity were expressed as "mean increase in paw volume \pm SEM". The significance of difference between means was determined by student's t-test values of $p < 0.05$ were considered significant and $p < 0.01$ as highly significant. All statistical procedures were performed according to the method of Alcaraz.⁶

Table: 1 Analgesic effect of methanolic effect of *Aegiceras corniculatum* in mouse tail immersion method.

Treatment	Dose/kg orally	Analgesia TFLD or Mean increase in \pm SEM Latency after drug administration					
		+60	+90	+120	+150	+180	+210
Saline	0.2ml	0.63 \pm 0.17	0.386 \pm 0.3	0.33 \pm 0.29	0.50 \pm 0.211	0.367 \pm 0.276	0.464 \pm 0.32
Aegeceras corniculatam	300	0.90 \pm 0.18	1.30 \pm 0.27	2.90 \pm 0.20	3.13 \pm 3.98	3.90 \pm 0.221	4.10 \pm 0.281
	500	1.02 \pm 0.04	2.31 \pm 0.30	3.16 \pm 0.32	3.62 \pm 0.185	4.02 \pm 0.165	3.45 \pm 0.281
	1000	2.23 \pm 0.31	3.33 \pm 0.34	4.59 \pm 0.64	5.43 \pm 0.80	9.36 \pm 1.470	3.45 \pm 0.281
Acetyl salicylic a ⁻	300	0.90 \pm 0.15	2.22 \pm 0.19	2.31 \pm 0.14	3.48 \pm 0.149	3.84 \pm 0.211	4.14 \pm 0.239

Significant Relative to control reading: $P < 0.05$ $P < 0.01$ (n=5)

SEM: =Standard error to mean

RESULTS AND DISCUSSION

Aegiceras corniculatum exhibited potent analgesic activity at the dose levels of 300, 500 and 1000 mg/kg. It is worth noting that this extract showed significant analgesic activity at low dose of 300 mg/kg even in the first hour of the test. The duration as well as the intensity of analgesia induced by *Aegiceras corniculatum* was dose dependent. The analgesic effect at 1000 mg/kg dose level was highest at +210 minutes after which the activity began to decrease. The analgesic activity shown by *Aegiceras corniculatum* at 300 mg/kg was almost comparable to that produced by acetylsalicylic acid, while at the dose levels of 500 mg/kg and 1000 mg/kg. *Aegiceras corniculatum* showed better analgesic effect than the reference drug and at the dose level of 1000 mg/kg the duration and intensity of analgesia was also greater than acetylsalicylic acid (Table 1).

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