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Research Article

# EXPERIMENTAL EVALUATION OF ANALGESIC AND ANTI INFLAMMATORY POTENTIAL OF LEAVES OF *ANTIDESMA ACIDUM* ON WISTAR ALBINO RATS

Arathi Krishnan[1], Ravi Mundugaru[2]*, Suma Mallya[3], Sridhar Bairy[4], Ravishankar B[5]

[1]PG Scholar, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Udupi, India

[2]Research Officer, Department of Pharmacology and Toxicology, SDM Centre for Research in Ayurveda and Allied Sciences, Udupi, India

[3]Associate Professor, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Udupi, India

[4]Professor and HOD, Department of Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Udupi, India

[5]Professor of Experimental Medicine and Director, Department of Pharmacology and Toxicology, SDM Centre for Research in Ayurveda and Allied Sciences, Udupi, India

***Correspondence**

Ravi Mundugaru

Research Officer, Department of Pharmacology and Toxicology, SDM Centre for Research in Ayurveda and Allied Sciences, Udupi, India

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**ABSTRACT**

*Antidesma acidum* is a folk plant of Euphorbiacae occurring in and around Udupi district in India. It is effectively used in the folklore medicine in the management of low backache and arthritis. The present study aimed to evaluate the anti inflammatory and analgesic activity in wistar albino rats. Aqueous extract of leaves of *A. acidum* were evaluated for possible analgesic and anti inflammatory activities in wistar albino rats. Eddy's hot plate test was used for analgesic effect. The effect of extract on the acute inflammation was investigated on Carrageenan induced paw oedema. The preliminary phytochemical screening of the aqueous extract of the plant *Antidesma acidum* revealed the presence of flovanoids, saponins, steroids and phenols. The animals were divided into three groups control, standard and test. The control group administered with distilled water, standard group with Ibuprofen 100 mg/kg and the test group with 500 mg/kg aqueous leaves extract of plant *Antidesma acidum.* The test drug found to be inhibits the Carrageenan induced paw oedema significantly and increased the latency period in the analgesic test. The result suggest that the test group has significant analgesic and anti inflammatory potential. This study reveals that the leaves of *Antidesma acidum* are a potent analgesic and anti inflammatory activity which supports the traditional claim.

**Keywords:** *Antidesma acidum,* Ibuprofen, Flovanoids, Carrageenan, Anti inflammatory.

## INTRODUCTION

*Antidesma acidum* belongs to family of Euphorbiacae generally found as herbs or shrubs along the tropical Himalayas, West Bengal, India found generally in raining season throughout the South Canara district in India[1-3]. *A. acidum* is a folk plant; which is used for the management of low backache, muscle pain, neuralgiasis by folklore practitioners. These symptoms are mainly associated with inflammation at different parts of the body [4]. So there is a treatment search for better anti inflammatory and analgesic drugs with lesser side effects[5-8]. The present drugs used for many inflammation and pain are like NSAIDs are associate with greater side effects so there is arising scope for traditional medicines have lead to increase emphasis on the use of plant materials as a sources of medicines for wide variety of human ailments[8-9]. Hence the present research work has been carried out to evaluate the analgesic and anti inflammatory property of aqueous extract of leaves of *Antidesma acidum* (AAA) to prove this activity scientifically.

## MATERIALS AND METHODS

### Plant collection and authentication

Leaves of *A. acidum* Retz were collected from SDM medicinal plantation during November 2010. It was authenticated by department of Pharmacognosy at SDM Research Centre Udupi, India. A voucher specimen (No. 19/12121701) has been deposited for further future reference.

### Preparation of extract

The leaves of *A. acidum* were shade dried, pulverized, finely sieved and soaked in 2 l of distilled water for 24 h, after which it was filtered and used for the experimentation.

### Experimental animals

Albino rats of wistar strains of either sex between 150 to 250 g were obtained from animal house attached to department of Pharmacology, SDM Research Centre Udupi, India. The experimental protocol was approved from the institutional ethical committee under the reference no. SDMCRA/IAEC/ 16/12/2010. The animals were fed with normal rat diet and

water *ad libitum* throughout the study. They were acclimatized in the laboratory condition for two weeks prior to the experimentation. The housing provided has the following conditions: controlled lighting of 12:12 h light and dark cycle, temperature of 25ºC and relative humidity of approximately 50 %.

**Animal grouping**

Wistar albino rats of either sex weighing 180 g to 220 g, 18 rats were divided into three different groups, six in each group. Control group were administered with normal tap water at a dose of 10 ml /kg, the standard group were administered with Ibuprofen 100 mg/kg for analgesic and anti inflammatory study, the test groups were administered with AAA at a dose of 500 mg/kg for test group.

**Procedure for testing anti inflammatory activity**

Carrageenan induced hind paw oedema test in rats were carried out by method of Winter *et. al*[10]. The acute anti inflammatory activity was evaluated by Carrageenan induced paw oedema method in wistar albino rats. Acute inflammation was produced by injecting 0.1 ml of 1 % carrageenan solution into sub plantar surface of rat's hind paw. The group specific drugs were administered 1 h before the Carrageenan injection. The paw volume up to the tibio-tarsal articulation was measured using a Plethysmometer at basal, 1 h, 3 h and 6 h after Carrageenan injection and expressed as ± SEM (n = 6). Average volume for trial group and standard group were compared for statistical significance with those of control group

**Procedure used for testing analgesic activity**

**Eddy's Hot plate method**

The analgesic activity of AAA was assessed using hot plate method of Eddy and Leimbach (1953)[11]. The temperature was maintained at 55 ± 0.2 $^0$c. This is hot enough to cause discomfort without tissue damage. Animals licked their forelegs and jumped as an indication of pain. These rats were treated with suspensions as follows: control group received normal water in 0.5 % gum acacia. The test groups received 500 mg/kg of AAA. The standard group received Ibuprofen 100 mg/kg by the oral route. One hour later they were placed on hot plate. The time taken by the animal to lick the fore or hind paw or jump out of the plate was taken as the latency time.

**Statistical analysis**

The experimental data were expressed as Mean ± SEM. Statistical analysis was carried out by one way analysis of variance followed by Dunnet's multiple comparison's' test and p value < 0.05 implied statistical significance of results obtained.

**Table 1: Effect of *Antidesma acidum* in carrageenan induced paw oedema test**

| Group Dose mg/kg | Paw volume measured at various time intervals after carrageenan injection( ml) | | | | |
|---|---|---|---|---|---|
| | Basal | 30 minutes | 1 h | 3 h | 6 h |
| Water control | 0.60 ± 0.027 | 0.83 ± 0.05 | 0.97 ± 0.041 | 1.00 ± 0.39 | 1.16 ± 0.092 |
| Ibuprofen (100 mg/kg) | 0.55 ± 0.066 | 0.87 ± 0.05 | 0.93 ± 0.087 | 0.71 ± 0.042* | 0.59 ± 0.086** |
| *A. acidum* 500 mg/kg | 0.51 ± 0.27 | 0.80 ± 0.11 | 0.94 ± 0.038 | 0.88 ± 0.035 | 0.76 ± 0.077* |

Each value represented in Mean± SEM, *p < 0.05, **p < 0.01 in comparison with control group (one way ANOVA).
AAA – aqueous extract of leaves of *Antidesma acidum*

**Table 2: Analgesic activity: Effect of aqueous extract of leaves of *Antidesma acidum* on thermal stimuli induced pain in rats**

| Group / Dose (mg/kg) | Duration of latency of jumping response in (sec) at various time interval | | | | |
|---|---|---|---|---|---|
| | Basal | 1h | 2h | 3h | 4h |
| Water control | 3.52 ± 0.18 | 3.51 ± 0.17 | 3.56 ± 0.16 | 3.52 ± 0.17 | 3.50 ± 0.17 |
| Ibuprofen (100 mg/kg) | 3.65 ± 0.10 | 4.32 ± 0.25** | 5.23 ± 0.11*** | 5.39 ± 0.15*** | 5.52 ± 0.19*** |
| *A. acidum* (500 mg/kg) | 3.57 ± 0.32 | 4.07 ± 0.19 | 4.4 ± 0.14** | 4.64 ± 0.17** | 4.68 ± 0.17** |

Each value represented in Mean± SEM, *p < 0.05, **p < 0.01, ***p < 0.001 in comparison with control group (one way ANOVA).
AAA – aqueous extract of leaves of *Antidesma acidum*

## RESULT

In carrageenan induced paw oedema test, AAA at 500 mg/kg dose level showed statistically significant decrease in the paw oedema during second phase of carrageenan induced inflammation. The reference standard Ibuprofen has significantly suppressed biphasic responses of carrageenan induced inflammation. The activity profile at 6$^{th}$ h was also similar in both AAA at 500 mg/kg and reference standard. This clearly shows presence of anti inflammatory activity in the test drug at a dose of 500 mg/kg. In hot plate analgesic test, AAA at dose of 500 mg/kg showed statistically significant increase in the reaction time at 2$^{nd}$, 3$^{rd}$ and 4$^{th}$ hour after drug administration, and reference standard Ibuprofen 100 mg/kg group showed statistically very significant increase in the reaction time at all the time interval after the drug administration.

## DISCUSSION

The analgesic activity was expressed as increase in the latency of reaction time after drug administration in relation to control, whereas the anti inflammatory activities as decrease in paw oedema. Acute inflammation conveniently described as vascular and cellular events, alteration in the microvasculature is the earliest response to tissue injury. These alterations include hemodynamic changes such as transient vasoconstriction, persistent progressive vasodilatation, followed by local hydrostatic pressure, stasis, leukocyte migration, and vascular changes in which accumulation of oedema fluid. In cellular events, phagocytises, that is engulfment solid particulate materials by cells, causes the inflammation[12]. Since the secondary phase of oedema is significantly suppressed it can be suggested that the observed anti-inflammatory of *A. acidum* may be due to suppression of formation and release of the inflammatory

mediators. The present study on aqueous extract of *A. acidum* suggested that this plant has significant analgesic and anti inflammatory properties, and it justifies the traditional use of this plant in the treatment of various types of pains and inflammation.

## CONCLUSION

The result suggests that the aqueous extract of leaves of plant *A. acidum* have significant analgesic and anti inflammatory activity and it justifies the traditional use of this plant in the treatment of various types of pains and inflammation. Scientific investigation is required to establish its analgesic and anti inflammatory property in other experimental models and clinical settings.

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