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PHTYOCHEMICAL SCREENING OF ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF CLERODENDRON SERRATUM

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Abstract:
The current study demonstrates the analgesic and anti-inflammatory activity of the aqueous extract of Clerodendron Serratum whole plant at two different doses i.e., 200mg/kg and 400mg/kg body weight when given orally. This study was conducted in wister albino rats in which paw edema was induced by carrageenin. This is compared with the standard drug Diclofenac which was given at a dose of 10mg/kg. In Swiss albino mice, the analgesic effect was evaluated using Eddy's hot plate method which was then compared with the standard Aspirin at 25mg/kg dose. The obtained results specify that there has been a notable anti-inflammatory action of Clerodendron Serratum when compared to Indomethacin and significant analgesic action when compared to Diclofenac. These results suggest the presence of anti-inflammatory and analgesic activities Clerodendron Serratum. So the extracts of this plant could be used in treating these symptoms.

***KEY WORDS**: Clerodendron Serratum, Anti-inflammatory, Analgesic, Diclofenac.*

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INTRODUCTION:

India is a home for thousands of medicinal plants that are used to cure lots of diseases and Ayurveda has been gaining much popularity these days in preparing medicines using these plant extracts. Many diseases like rheumatoid arthritis that cause inflammation have become a major concern around the world[1]. Synthetic drugs are being used to treat such conditions since a very long time but these are known to cause side effects on prolonged use[2], such as gastric ulcers and gastrointestinal bleeding[3]. As a result, there is a need to develop medications with lees side effects. Use of traditional Ayurveda in developing anti-inflammatory and analgesic medications has a long history. *Clerodendron Serratum* is an example of plant that can be used to treat these symptoms. The tender areal parts of this plants are used in Ayurveda in the management of inflammation and pain[4]. Although literatures reveal the properties and uses of *Clerodendron Serratum* in treating analgesia and inflammation[5,6,7], these are not yet scientifically evaluated[8,9]. This study particularly analyzes the anti-inflammatory and analgesic properties of the aqueous extract of *Clerodendron Serratum*

MATERIALS AND METHODS

COLLECTION AND AUTHENTICATION OF PLANT MATERIAL

The plant material i.e *Clerodendron Serratum* was collected in the month of August 2021 from Wonder Herbals Pvt Ltd, Vanastalipuram, Hyderabad, 500076, Andhra Pradesh. Around 1kg of plant was collected. The plant material was taxonomically identified by Dr S.K Mahmood, Department of Botony, Nizam University-Hyderabad and a specimen was deposited in their Herbarium against issue of Voucher no: 51236.

PREPARATION OF POWDER

The required amount of material was collected from *Clerodendron Serratum* plant and they were shade dried. Later they were made into a coarse powder with the help of a amechanical grinder. This powder was allowed to pass through sieve no.40 to remove the large particles and the obtained product was stored in an airtight container.

PREPARATION OF AQUEOUS EXTRACT

Maceration was the process used to prepare the aqueous extract. Required quantity of the powder (100g) was taken in a beaker along with 1000ml of distilled water which was macerated for a time period of 72 hours. During the maceration process, occasional stirring and warming were carried out[10]. After completion of 72 hours, the obtained solution was filtered using a muslin cloth and solvent was heated again to obtain a greenish-black color residue.

CHEMICALS REQUIRED

Carrageenan (1%w/v suspension) , Diclofenac (10 mg/kg)

INSTRUMENTS REQUIRED

Analgesiometer, Vernier calipers,Heating mantles

EXPERIMENTAL ANIMALS

Wister albino rats weighing 150 grams and Swiss albino mice weighing between 25-30 grams. These animals were grouped as required and placed in polyacrylic rat cages (2 animals in each cage). Maintenance of standard laboratory conditions was monitored which include temperature of 24-28°C, 12-hour light dark cycles, standard feed and boiled water ad libitum. The study was conducted following the NIH guidelines and ethical committee approval has been obtained prior to conducting the study.

ACUTE TOXIC STUDIES[12]

Acute toxicity studies were conducted up to the doses of 100-2000mg/kg of the obtained aqueous extract. during these toxicity studies, side effects like sedation, convulsions and death were not observed, but weight loss was noted.

ANTI-INFLAMMATORY ACTIVITY [13]

Wister albino rats were divided into 6 groups, each containing 6 animals (Head, Body, Tail, Head-Body, Body-Tail, Head-Tail). These rats weighed between 150-200 grams. After 48 hours, rats were subjected to inflammation by using 1%w/v suspension of Carrageenin. Post induction of inflammation in the rats, the aqueous extract of *Clerodendron Serratum* was given orally to the rats for the study of anti-inflammatory activity.

GROUP	DRUG GIVEN
GROUP I	SALINE (Control)
GROUP II	DICLOFENAC (Standard-10mg/kg)
GROUP III	LOW DOSE OF *Clerodendron Serratum* (200mg/kg)
GROUP IV	HIGH DOSE OF *Clerodendron Serratum* (400mg/kg)
GROUP V	LOW DOSE +DICLOFENAC
GROUP VI	HIGH DOSE+DICLOFENAC

The %inhibition of inflammation was studied in specified groups with time as follows.
Inflammation of paw was measured by Vernier Calipers in cm.

ANALGESIC ACTIVITY [14]

(Note: This experiment was conducted after a recovery period of 1 week)
Wister albino rats were divided into 6 groups, each containing 6 animals (Head, Body, Tail, Head-Body, Body-Tail, Head-Tail). These rats weighed between 150-200 grams. Both *Clerodendron Serratum* and Diclofenac (10mg/kg) were given orally. The analgesic activity was studied using Eddy's hot plate method which was maintained at 60°C.

GROUP	DRUG GIVEN
GROUP I	SALINE (Control)
GROUP II	DICLOFENAC (Standard-10mg/kg)
GROUP III	LOW DOSE OF *Clerodendron Serratum* (200mg/kg)
GROUP IV	HIGH DOSE OF *Clerodendron Serratum* (400mg/kg)
GROUP V	LOW DOSE +DICLOFENAC
GROUP VI	HIGH DOSE+DICLOFENAC

The analgesic activity with time was tabulated.

RESULTS AND DISCUSSION:

PHYTOCHEMICAL SCREENING[11,12]

Table 1: Data showing phytochemical screening of aqueous extract of *Clerodendron Serratum*

Carbohydrates	**Glycosides**	**alkaloids**	**Proteins**	**phytosteroids**	**Flavoids**	**Tannins**	**Saponins**
+	+	+	+	+	+	-	+

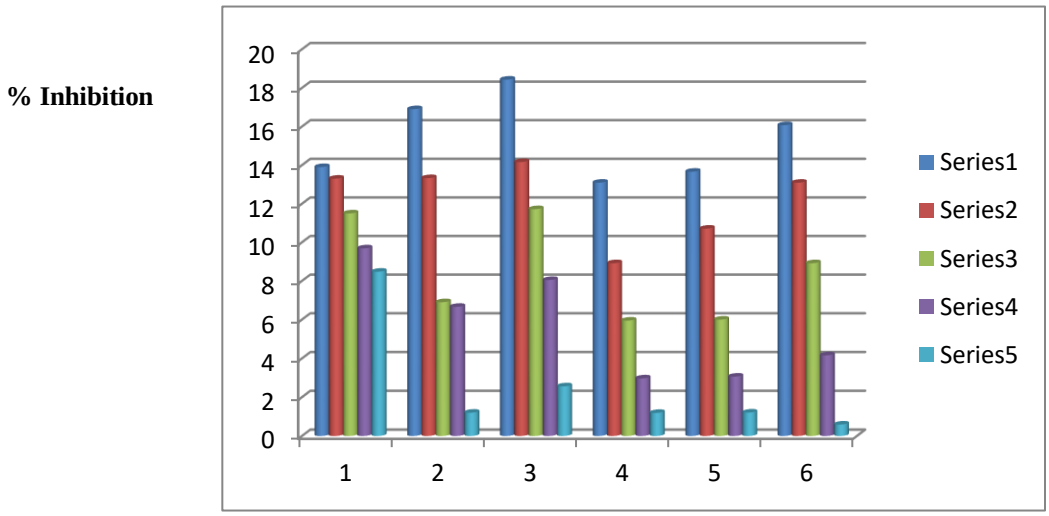
NOTE: + (Present); - (Absent)

Anti-inflammatory activity

%Inhibition of edema

Table2: Data showing %inhibition of edema in each group

Hours	GroupI	GroupII	GroupIII	GroupIV	GroupV	GroupVI
0HR	13.9	16.9	18.43	13.09	13.66	16.07
1HR	13.3	13.33	14.16	8.92	10.71	13.09
2HR	11.5	6.9	11.72	5.95	6	8.92
3HR	9.69	6.66	8.05	2.97	3.06	4.16
4HR	8.48	1.2	2.56	1.19	1.21	0.59



Graph 1: Graph showing %inhibition of edema in each group

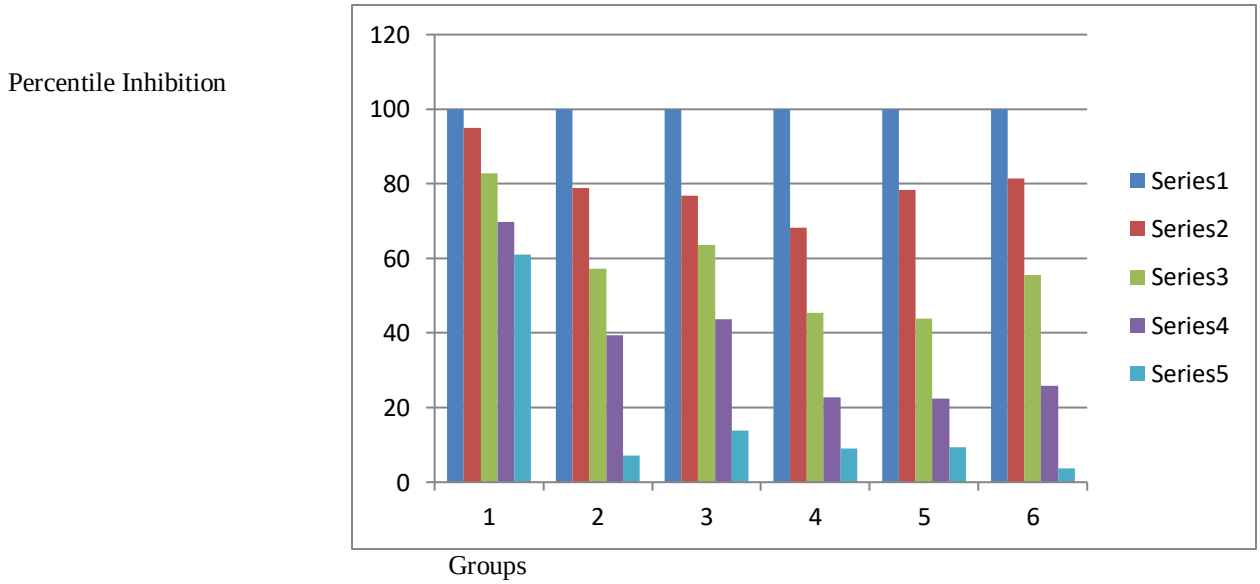
Note: Series = Hours

The graph depicts that groups 5 and 6 show more %inhibition of edema when compared to other groups. This infers the fact that *Clerodendron Serratum* shows better anti-inflammatory activity when compared to the standard drug Diclofenac. When these both are taken, it shows synergistic effects.

Percentile inhibition of Edema

Table3: Data showing percentile inhibition of edema.

Hours	Group I	Group II	Group III	Group IV	Group V	Group VI
0H	100	100	100	100	100	100
1H	95	78.87	76.83	68.14	78.4	81.45
2H	82.73	57.33	63.59	45.45	43.92	55.5
3H	69.71	39.4	43.67	22.68	22.4	25.88
4H	61	7.15	13.89	9.09	9.45	3.67



Graph 2: Graph showing percentile inhibition of edema.

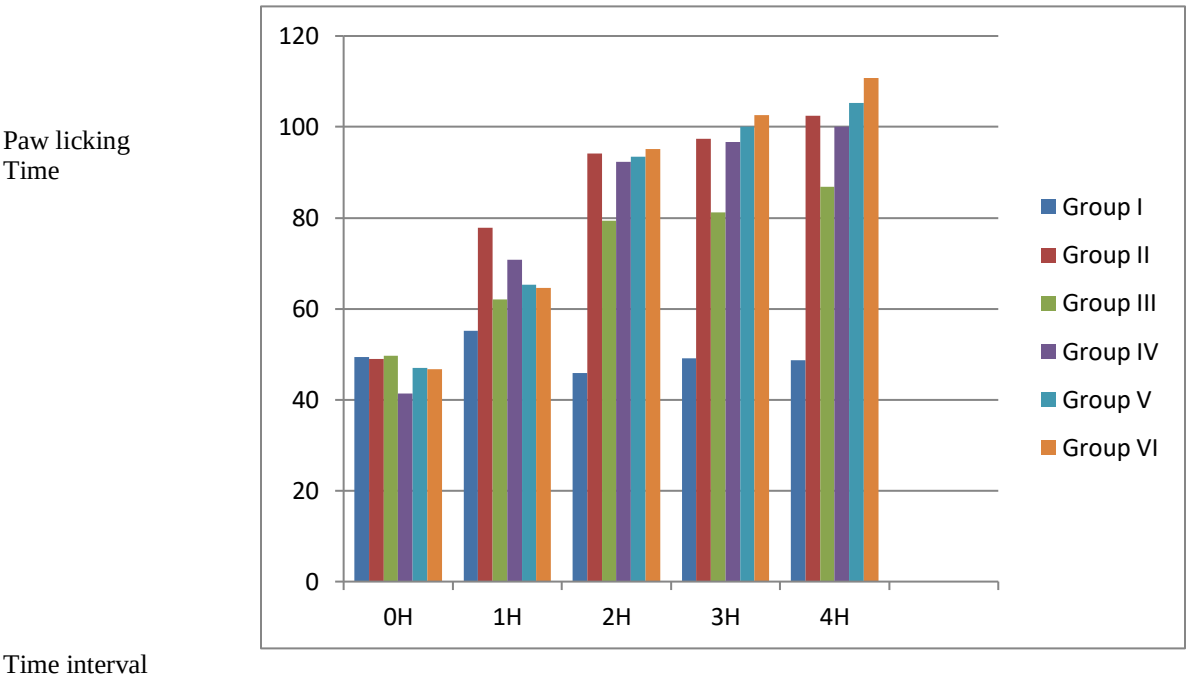
The graph depicts that groups 5 and 6 show more %inhibition of edema when compared to other groups. This infers the fact that *Clerodendron Serratum* shows better anti-inflammatory activity when compared to the standard drug Diclofenac. When these both are taken, it shows synergistic effects.

For Analgesic Activity

Table4: Data showing averages of time taken for paw licking.

Hours	Group I	Group II	Group III	Group IV	Group V	Group VI
0H	49.33	49	49.66	41.33	47	46.66
1H	55.16	77.83	62	70.83	65.33	64.66
2H	45.83	94.16	79.33	92.33	93.5	95.1
3H	49.16	97.33	81.16	96.66	100	102.66
4H	48.66	102.5	86.83	100	105.33	110.83

Note: Readings in seconds



Graph 3: Graph showing averages of time taken for paw licking

The above graph depicts the delay in paw licking time of groups 5 and 6 when compared to other groups. This infers that *Clerodendron Serratum* also acts as an analgesic agent.

CONCLUSION:

Delay in wound healing can be observed for people suffering from Diabetes mellitus which cause intensive pain and inflammation. So, several experiments are being carried out to treat diabetes and reduce the time period of wound healing in such cases. Among these experiments, traditional methods were also being followed with the use of plant extracts that possess medicinal values.

In this study, the screening of *Clerodendron Serratum* revealed the presence of various phytoconstituents that possess curative properties such as anti-inflammatory and analgesic activities. In-vivo studies on this plant extract were carried out on Wister albino rats and these studies confirmed that the aqueous extract of *Clerodendron Serratum* shows properties that reduce pain and inflammation which

were found to be dose-dependent. It was also observed that using the combination of *Clerodendron Serratum* and Diclofenac produced synergistic effects in controlling pain reducing inflammation.

Finally, this study concludes that the aqueous extract of *Clerodendron Serratum* showed both anti-inflammatory and analgesic activities. By this, we can say that it can be used in diabetic population in conditions of delayed wound healing.

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