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Research Article

**PHTYOCEMICAL SCREENING OF ANTI-INFLAMMATORY
AND ANALGESIC ACTIVITIES OF DESMODIUM
GANGETIUM****Ch. Madhu*, Kontheti Mahesh Pavan, Vamaraju Upajna**Avanathi Institute of Pharmaceutical Sciences, Cherukupally, Vizianagaram,
Andhra Pradesh, 531162.**Article Received: June 2021****Accepted: June 2021****Published: July 2021****Abstract:**

The current study demonstrates the analgesic and anti-inflammatory activity of the aqueous extract of Desmodium gangetium 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 Desmodium gangetium when compared to Indomethacin and significant analgesic action when compared to Diclofenac. These results suggest the presence of anti-inflammatory and analgesic activities in Desmodium gangetium. So the extracts of this plant could be used in treating these symptoms.

KEY WORDS: Desmodium gangetium, 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 world¹. Synthetic drugs are being used to treat such conditions since a very long time but these are known to cause side effects on prolonged use², such as gastric ulcers and gastrointestinal bleeding³. As a result, there is a need to develop medications with less side effects. Use of traditional Ayurveda in developing anti-inflammatory and analgesic medications has a long history. *Desmodium gangeticum* 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 pain⁴. Although literatures reveal the properties and uses of *Desmodium gangeticum* 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 *Desmodium gangeticum*.

MATERIALS AND METHODS:**COLLECTION AND AUTHENTICATION OF PLANT MATERIAL**

The plant material i.e *Desmodium gangeticum* was collected in the month of August 2011 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 *Desmodium gangeticum* plant and they were shade dried. Later they were made into a coarse powder with the help of a mechanical 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 out¹⁰. 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

Analgesimeter, 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 *Desmodium gangeticum* 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 DESMODIUM GANGETIUM (200mg/kg)
GROUP IV	HIGH DOSE OF DESMODIUM GANGETIUM (400mg/kg)
GROUP V	LOW DOSE +DICLOFENAC

GROUP VI	HIGH DOSE+DICLOFENAC
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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 *Desmodium gangetium* 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 DESMODIUM GANGETIUM (200mg/kg)
GROUP IV	HIGH DOSE OF DESMODIUM GANGETIUM (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 *Desmodium gangetium*

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

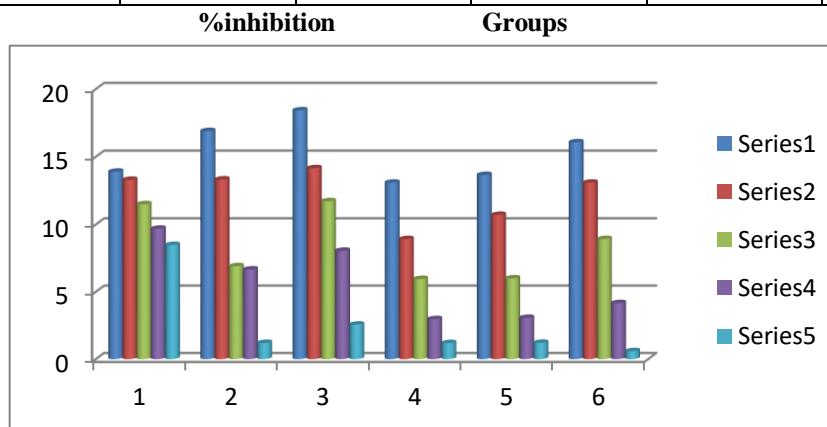
NOTE: + (Present); - (Absent)

Anti-inflammatory activity

% Inhibition of edema

Table2: Data showing %inhibition of edema in each group

Hours	Group I	Group II	Group III	Group IV	Group V	Group VI
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



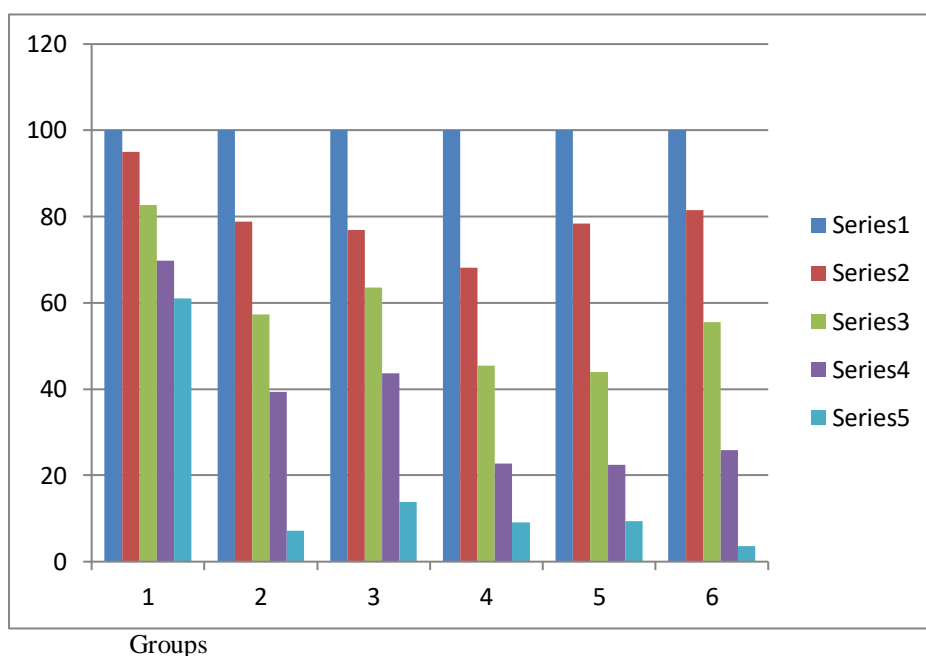
Graph 1: Graph showing %inhibition of edema in each group**Note: Series = Hours**

The graph depicts that groups 5 and 6 show more %inhibition of edema when compared to other groups. This infers the fact that *Desmodium gangetium* 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

Percentile Inhibition

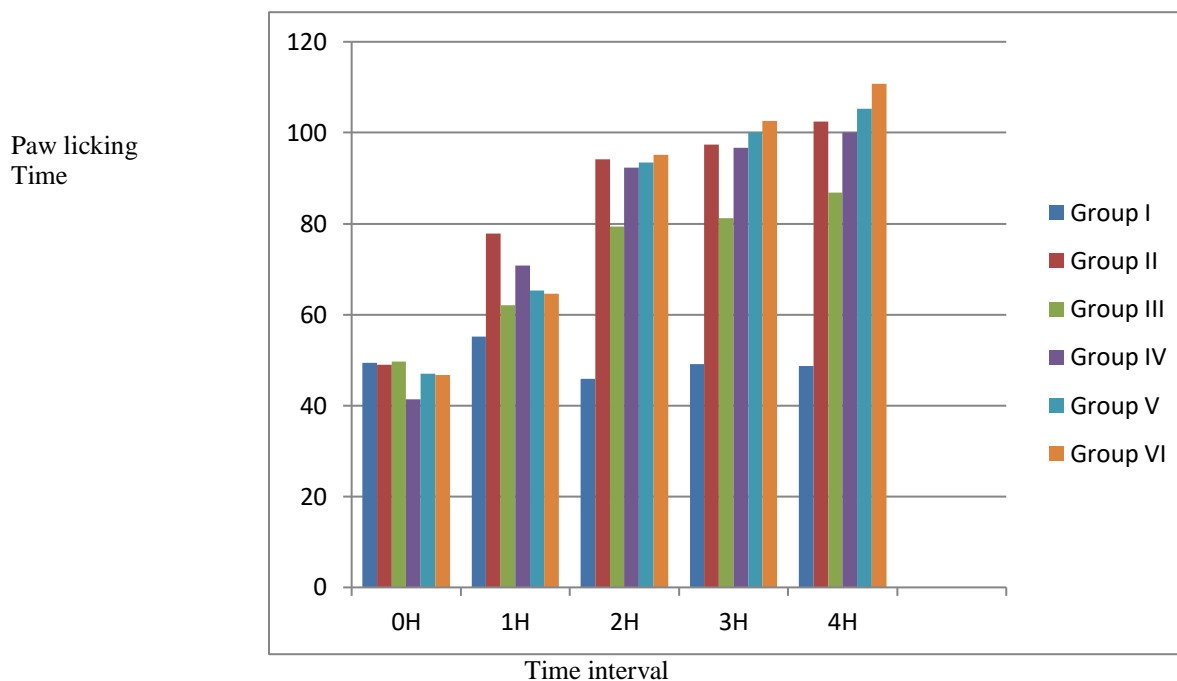
**Graph 2: Graph showing percentile inhibition of edema.**

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

For Analgesic Activity**Table 4: 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 *Desmodium gangetium* 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 *Desmodium gangetium* 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 *Desmodium gangetium* shows properties that reduce pain and inflammation which were found to be dose-dependent. It was also observed that using the combination of *Desmodium gangetium* and Diclofenac produced synergistic effects in controlling pain reducing inflammation.

Finally, this study concludes that the aqueous extract of *Desmodium gangetium* 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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