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Research Article

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Study of Analgesic Activity of Ethyl Acetate Extract of *Cleome gynandra*

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ABSTRACT

Cleome gynandra is an abundantly available species and grows as a weed in common barren land and in crop fields throughout India. This plant is having Immunomodulator, Antioxidant, Ant carcinogenic, Analgesic properties etc. The ethyl acetate extract was obtained by simple maceration method and the analgesic activity of whole plant of *cleome gynandra* (75, 100, 125 mg/Kg) was analyzed by writhing method using acetic acid as analgesic inducing agent. Diclofenac sodium (20mg/Kg) is used as a standard and mice are used as animal models. Results shown that the whole plant extract has flavonoids, tannins, saponins etc. and the group of animals were injected 75, 100, 125 mg/Kg intraperitoneally with plant extract has shown 80.87 % , 90.59, 91.73, and 93.84 % inhibition of wriths respectively than the standard 93.84 % and control groups. So, it can be concluded that the ethyl acetate extract of *Cleome gynandra* has the analgesic activity.

Keywords: *Cleome gynandra*, Analgesic, Algasia, Writhing method, Saponins, Alkaloids.

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1. Introduction

According to the World Health Organization, approximately 80% of the world's population currently uses herbal medicines directly as teas, decocts or extracts with easily accessible liquids such as water, milk, or alcohol. Drugs which are used presently for the management of pain and inflammatory conditions are either steroidal like corticosteroids or non steroidal like Aspirin. All of these drugs possess more or less side effects and toxic effects like renal failure, allergic reactions, hearing loss or they may increase the risk of hemorrhage by affecting platelet function. On the contrary many medicines of plant origin had been used since ages without any adverse effects. It is therefore essential that efforts should be made to introduce new medicinal plants to develop more effective and cheaper drugs [1].

Purified natural compounds from plants can serve as template for the synthesis of new generation of anti-inflammatory drugs with low toxicity and higher therapeutic value. Different inflammatory diseases are major cause of morbidity and mortality. Traditionally, pain has been divided into two classes like acute and chronic although severity and projected patient survival are other factors that must be considered in drug selection. Acute pain is self limiting in duration, and includes post-operative pain, pain of injury, and childbirth. Because pain of these types is expected to be short term, the long-term side effects of analgesic therapy may routinely be ignored [2].

Some classes of drugs, such as the narcotic agonist / antagonist drugs Bupronorphine, Nalbuphine and Pentazocine, and the selective COX-2 inhibitors Celecoxib and Rofecoxib represents advances in reduction of adverse effects, they are still not fully suitable for long-term management of severe pain. Generally, chronic pain management requires a combination of drug therapy, life style modification, and other treatment modalities. Preliminary phytochemical screening³⁻⁴ of the powdered leaf revealed the following compounds like carotenoids, cardiac glycosides, cyanogenic glycosides, flavonoids, saponins, triterpenes, sugars, tannins etc.

2. Experimental

Extraction of plant material

The whole plant of *Cleome gynandra* was collected in the month of January and dried in the shade⁵⁻⁷. The shade dried plant was powdered to get coarse powder. About 500g of dried and coarsely powdered material was extracted with ethyl acetate by simple maceration. The extraction was continued for 72 hr with occasional agitation. The extracts were filtered and concentrated to a dry mass by using vacuum distillation. A dark green residue (8 gms) was obtained. Resulted residue was used for the study.

Pharmacological Studies

Swiss albino mice (weighing 20-30 g) of both sexes were used for analgesic activity. All animals were kept under laboratory conditions at room temperature with 12 h light and dark cycles and were allowed free access to food and water.

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Analgesic activity

Mouse Writhing test

The mice were randomly divided into five groups of six animals each. Dose of 75, 100, and 125 mg/Kg of *C.gynandra* extract were administered to three groups control group received distilled water 10ml/Kg and Diclofenac sodium 20mg/kg respectively [8-9]. The numbers of writhes were counted for 15 min after acetic acid injection. The percentage inhibition was calculated using formula,

$$(N-Nt / N) \times 100$$

Where,

N = Average number of writhes in control group

Nt = Average number of writhes in test group

Group I: Control group (received 10 ml/Kg of distilled water)

Group II: Diclofenac sodium Diclofenac sodium (20 mg/Kg) standard intraperitoneally.

Group III: Treated with ethyl acetate extracts of *C.gynandra* extract (75 mg/Kg,i.p.)

Group IV: Treated with ethyl acetate extract of *C.gynandra* extract (100 mg/Kg,i.p)

Group V: Treated with ethyl acetate extracts of *C.gynandra* extract (125mg/Kg,i.p)

3. Results and Discussion

Preliminary phytochemical analysis

The results of preliminary phytochemical analysis [10-11] of ethyl acetate extract are shown in table. The ethyl acetate extract showed the presence of various phytochemical constituents like Carbohydrates, Phytosterols, Saponins, Tannins, Terpinoids, and Alkaloids were shown in table no.1.

Table 1: Data showing the phytochemical screening of whole plant extracts of *C.gynandra*.

S.No	Constituents	Ethyl acetate extract
1	Carbohydrates	+
2	Glycosides	+
3	Alkaloids	+
4	Phytosterols	+
5	Saponins	+
6	Fixed oils & Fats	-
7	Tannins	+
8	Proteins & Aminoacid	-
9	Flavonoids	+
10	Diterpinoids	+

+ Indicates Presence

- Indicates Absence

Analgesic Activity

The results of present study indicate the analgesic activity of *Cleome gynandra* ethyl acetate extract of whole plant

(75, 100, 125 mg/Kg) by writhing method and resultant data's were shown in table no.2 and figure 1,2 also.

Table 2: Analgesic Activity of *Cleome gynandra* ethyl acetate of whole plant extract (N=6)

S.No	Treatment	Dose (mg/Kg) i.p	Mean no. of wriths \pm SEM	% Inhibition of wriths
1	Control	-	61.7 \pm 6.15	0.5
2	Diclofenac sodium	50	11.8 \pm 2.7	93.84
3	Group I	75	5.8 \pm 0.4	80.87
4	Group II	100	5.1 \pm 0.4	90.59
5	Group III	125	3.8 \pm 0.2	91.73

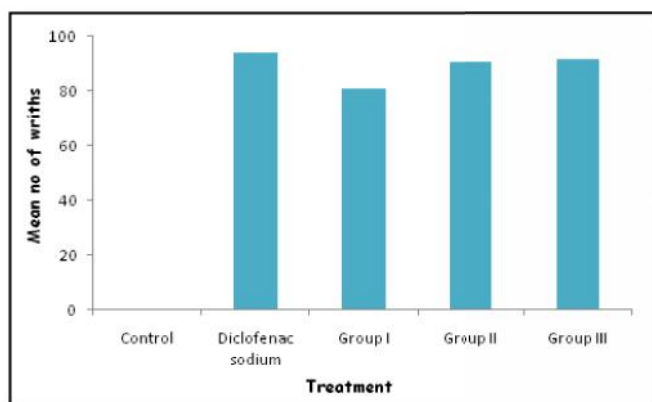


Figure 1: Mean no. of wriths of each treatment

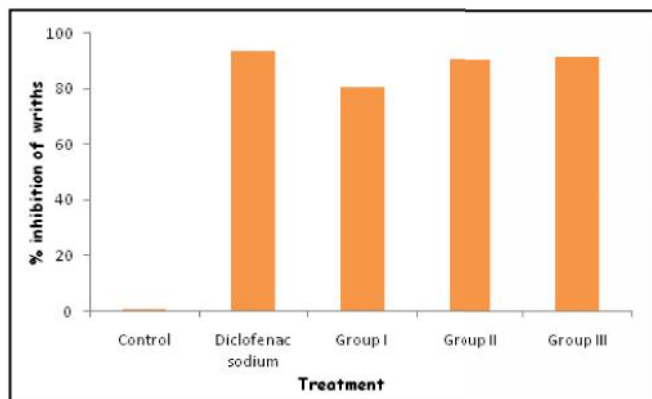


Figure 2: Inhibition of wriths by each treatment

The present investigation indicates that the test drug may possess properties like analgesic activity etc. Both extracts (100, 125mg/kg) showed the Analgesic activity when compared with control and analyzed when analyzed by ANOVA Comparison Test. On the basis of these findings, it may be inferred that *Cleome gynandra* is an effective agent for the Analgesic activity. The pharmacological studies carried out with reference to traditional uses of the

drug mentioned in Ayurveda to justify the claim. In discussion, this study provides evidences for the Analgesic activity of *Cleome gynandra*.

Cleome gynandra extracts at all doses significantly decreased the number of writhes with 11.8 writhes compared to the 61.7 writhes of control group, thus Diclofenac reduced the writhes by 93.84 %. The acetic acid induced writhing method is an effective method to evaluate peripherally active analgesics.

4. Conclusion

Herbal drugs are the option of treatment of disease which carries less side-effect and toxicity. Preliminary phytochemical studies revealed that the presence of phtyosterols, saponins, tannins, terpenoids, and alkaloids. Treatment with ethyl acetate extract of *Cleome gynandra* at the doses of 75, 100, 125 mg/Kg had showed significant Analgesic activity by writhing method. The results of present study indicate the ethyl acetate extracts of *Cleome gynandra* possesses Analgesic activity, which is in accordance with its ethno medical use. Analgesic effect of the extracts was demonstrated in the experimental models by writhing method using acetic acid, as increase in reaction time is generally considered as an important parameter of Analgesic activity. Thus, by above results we conclude that *Cleome gynandra* has Analgesic activity which partly contributes ethno medical use.

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