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Evaluation of Analgesic Activity of *Lagenaria Siceraria* in Albino Rats

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Abstract
Lagenaria siceraria plant belongs to Cucurbitaceae family. It is common names as lauki (Hindi) and bottle gourd (English). It is used as medicine for its cardio tonic, general tonic and diuretic properties.
The present study evaluated the analgesic activity of Lagenaria siceraria in comparison to diclofenac. 5 groups of rats with 6 rats in each group were taken.1st group of 6 rats was kept as control. 2nd group of 6 rats were fed with standard diclofenac. The Third, fourth and fifth groups of 6 rats each were taken as test groups and administered with the crude extract of LAGENARIA SICERARIA in doses of 100, 200 and 400mg/kg body weight. The Analgesic Activity was evaluated by Tail flick analgesiometer and Hot plate method. The results of this study shows that the aqueous extract of Lagenaria siceraria fruit extract has potent analgesic activity which was evident in both-pain models used in this study.
Keywords: *Lagenaria siceraria, analgesic activity, Swiss albino rats, aqueous extract of Lagenaria Siceraria (AELS) fruits, diclofenac (9 mg/kg)*

Introduction

The crude drugs being always available easily in abundance, comparatively cheaper, and have negligible side effects, they have been prescribed to patients of all age groups[1]. So the laboratories around the world are engaged in screening of plants for biological activities with good therapeutic potential.[2,3] Medicinal plants are important for pharmacological research and drug development [4,5,6]. So this study evaluates the analgesic activities of a medicinal plant known as *Lagenaria Siceraria, which* belongs to Cucurbitaceae family. [7,8,9]. *Lagenaria Siceraria*is commonly known as lauki (Hindi) and bottle gourd (English). It is used as medicine for its cardio tonic, general tonic and diuretic properties [10,11,12]. The fruit is also found to be useful as anti hepatotoxic, analgesic, anti-inflammatory, hypolipidemic, anti-hyperglycemic, immuno modulatory and antioxidant activities.[13,14,15] Analgesics are the drugs which reduce or eliminate the pain. Some studies were done on *Lagenaria siceraria worldwide*, but its effects are least explored in our country.

Materials and Methods

The Laboratory bred Swiss albino rats of either sex, weighing 175-220gm were taken for this

study, under standard laboratory conditions. The approval of the Institutional Animal Ethics Committee was taken for experimental protocol. Animals were maintained under the standard laboratory conditions in an animal house approved by Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA). The fruits of *Lagenaria siceraria* are air dried in shadow and finely powdered. The aqueous extract of *Lagenaria Siceraria* (AELS) fruits was extracted by Soxhlet extraction process. [6,16]. The Analgesic Activity was evaluated by Tail flick analgesiometer and Hot plate method . The Results were analyzed statistically by ANOVA test and p - value less than 0.05 was considered significant.

Methodology and Experimental Design.[11, 17,18]

Tail Flick Analgesiometer in rats (Radiant Heat Method)

In this test, 30 albino rats of either sex were used. They were divided into 5 groups of 6 animals each. The animal was kept in a small cage (restrainer) with an opening for the tail at rear wall. The proximal third of the tail was exposed to the radiation using analgesiometer. The response of animal by pulling the tail away or turning the head to-one side was noted. This response time is noted as reaction time and it is noted before administration of the test compound or the standard drug, the normal reaction time was determined. Group 1 (control) received normal saline and Group 2 (standard) received diclofenac (9 mg/kg) respectively. Group 3, 4, and 5 were given the aqueous extract of *LAGENARIA SICERARIA* (AELS) in dose of 100, 200 and 400 mg/kg respectively. Again the test was repeated and reaction time was noted in all the group of animals after 30, 60 and 120 minutes.

Hot Plate Method

In this test, 30 albino rats of either sex were used and they were divided into 5 groups of 6 Animals each. The hot plate temperature is controlled at 55° to 56°C. The animals were placed on the hot plate and the time until either licking or jumping occurs is recorded by the stop-watch. The latency is recorded before and after 20, 60 and 90min following oral administration of drug.

Results

Analgesic activity

Tail Flick Analgesiometer

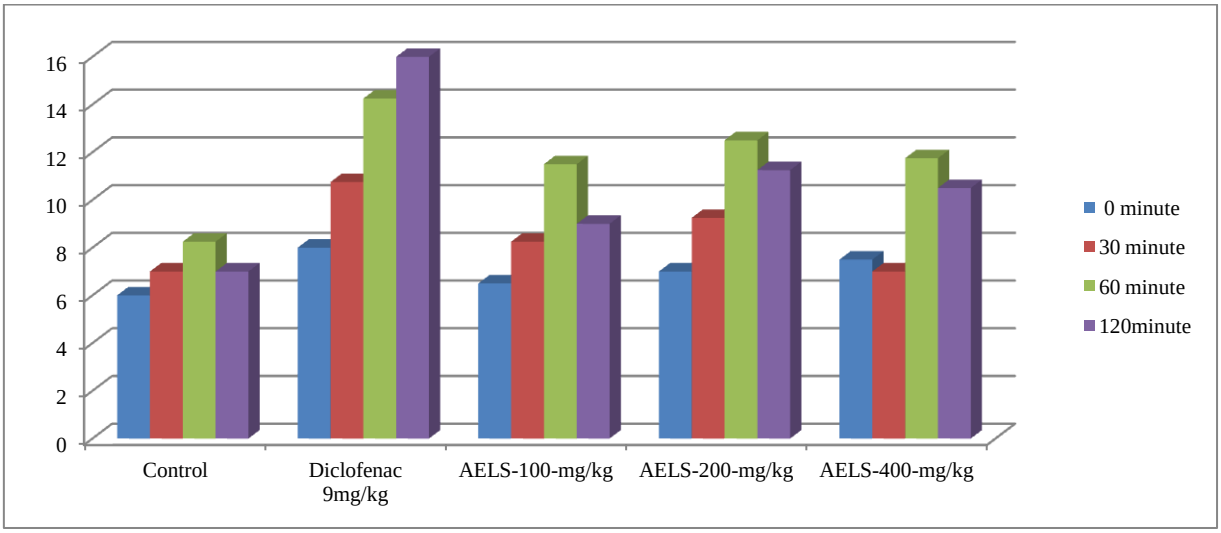
The reaction times after exposing the rat‘s tail to radiation using analgesiometer at Various time intervals are represented in table 1and figure1. The mean reaction time in all the groups before administration of drugs was found to be less than 9 sec. In standard group, post administration of diclofenac, the mean reaction time was increased to 10.75±0.47, 14.25±0.47and 16±1.08sec at 30, 60,120 minutes respectively. The mean reaction time also increased in the test groups treated with 100, 200 and 400 mg/kg of test extract. In test groups, post administration of 100mg/kg, the mean reaction time was increased to 8.25±0.25, 11.5±0.64 and 9±1.08 sec at 30, 60 and 120 minutes respectively. In test groups, post administration of 200mg/kg, the mean reaction time was increased to 9.25±0.47, 12.5±0.64, and 11.25±0.75 seconds at 30, 60 and 120 minutes respectively. In test groups, post administration Of 400mg/kg, the mean reaction time was increased to 7±0.40, 11.75±0.85, 10.5±0.64 seconds at 30, 60 and 120 minutes respectively. The maximum reaction time in the test group was 12.5±0.64sec seen with 200 mg/kg of extract at 60mins post administration.

Hotplate method

The reaction times after application of hotplate method to all the rats at various time intervals are represented in table 2 and figure 2. The mean reaction time in all the groups before administr-ation of drugs was found to be less than 6 sec. In standard groups, post administration of diclofenac, the mean reaction time was increased to 12.5±0.28, 13.25±0.62and 15±1.08sec at 20,60,90 minutes respectively. The mean reaction time also increased in the test groups treated with 100, 200 and 400 mg/kg of extract. In test groups, post administration of 100mg/kg, the mean reaction

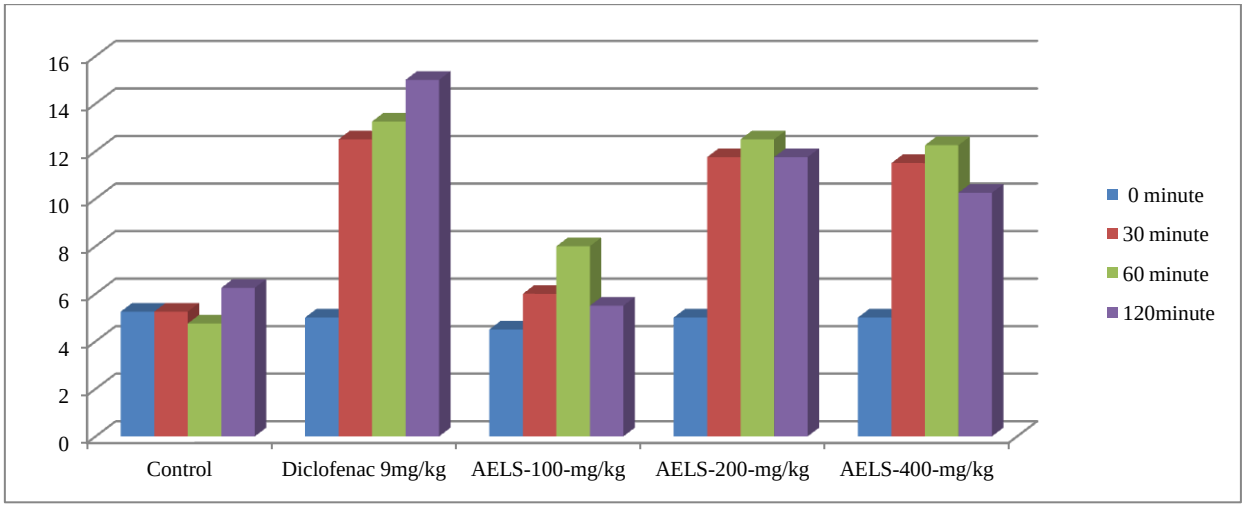
time was increased to 4.5±0.64, 6±0.40, 8±0.40, and 5.5±0.91 at 20, 60, 90 minutes respectively. In test groups, post administration of 200mg/kg, the mean reaction time was increased to 5±0.40, 11.75±0.47, 12.5±0.86, and 11.75±0.85 at 20, 60, 90 minutes respectively. In test groups, post administration Of 400mg/kg, the mean reaction time was increased to 5±0.40, 11.5±0.64, 12.25±1.03, and 10.25±0.62 at 20, 60,90 minutes respectively. The maximum reaction time in the test group was 12.5±0.86sec seen with 200 mg/kg of extract at 60mins post administration.

Figure-1: Reaction times in seconds bytail flick method:



AELS=Aqueous Extract of Lagenaria Siceraria

Figure-2 : Reaction times in seconds by hotplate method



AELS=Aqueous Extract of Lagenaria Siceraria

Table1- Reaction times in seconds at various time intervals by tail flick method:

Group	0 minute	30 minute	60 minute	120minute
Control	6±0.40	7±0.40	8.25±0.47	7±0.40
Diclofenac 9mg/kg	8±0.40*	10.75±0.47**	14.25±0.47**	16±1.08**
AELS-100-mg/kg	6.5±0.64	8.25±0.25*	11.5±0.64	9±1.08**
AELS-200mg/kg	7±0.40	9.25±0.47*	12.5±0.64**	11.25±0.75**
AELS-400mg/kg	7.5±0.64	7±0.40	11.75±0.85*	10.5±0.64**

AELS=Aqueous Extract of Lagenaria Siceraria,*=P<0.05= significant, **=P<0.001= Highly significant

Table 2- Reaction times in seconds at various time intervals hot plate method

Group	0 minute	20 minute	60 minute	90minute
Control	5.25±0.62	5.25±0.47	4.75±0.85	6.25±0.47
diclofenac	5±0.40	12.5±0.28**	13.25±0.62**	15±1.08**
AELS-100-mg/kg	4.5±0.64	6±0.40	8±0.40*	5.5±0.91
AELS-200mg/kg	5±0.40	11.75±0.47**	12.5±0.86**	11.75±0.85**
AELS-400mg/kg	5±0.40	11.5±0.64**	12.25±1.03*	10.25±0.62*

AELS=Aqueous Extract of Lagenaria Siceraria,*=p<0.05= significant, **=p<0.001= highly significant.

Discussion

The analgesic activity of aqueous extract of fruit of *Lagenaria siceraria* was evaluated using the tail flick method and, hot plate method in swiss albino rats.[8,9,10] The rats were evaluated for the pain threshold at a different interval of time up to 120 minutes. The aqueous extract shows a significant activity at 60 minutes. The results support the traditional use of this plant in some painful and inflammatory conditions. [11,12,13]

Tail Flick Analgesiometer

The mean reaction time of all the three test doses increased when compared with control group normal saline. The maximum reaction time in the test group was 12.5±0.64sec as seen with 200 mg/kg of extract at 60mins post administration as shown in the table 1. This test shows dose dependent increase in reaction time up to 60 minutes which is highly significant when compared to control group. The reaction time at 120 minutes decreased but it is also highly significant when compared with the control.

Hot plate method

The reaction times after application of hot plate method to all the rats at various time intervals are represented in table 2. The mean reaction time of all the three test doses increased when compared with control group normal saline. The maximum reaction time in the test group was 12.5 seconds as seen with 200 mg/kg of extract at 60mins post administration as shown in the table 2. This test shows dose dependent increase in reaction time up to 60 minutes which is highly significant when compared to control group. The reaction time at 90 minutes was decreased but it is also significant when compared with the control. The maximum reaction time in the test group was 12.5±0.86sec seen with 200 mg/kg of extract at 60mins post administration.

The mechanism of antinociceptive activity of AELS could be probably due to the blockade of the effect and release of endogenous substances that excite pain nerve endings similar to that of NSAIDs[14,15,19]. Thus, it indicates that AELS might exert antinociceptive activity by inhibition of the prostaglandins synthesis or action of the prostaglandins as shown by the reduction in the number of writhing in Acetic acid induced writhing test[14,15]. The Analgesic activity may be due to the presence of different chemical compounds like saponins, triterpenoids, flavonoids, alkaloids, steroids and glycoloids. The triterpenoids of AELS might be responsible for free radical scavenging, analgesic and anti-inflammatory activity. Thus, the extract of *Lagenaria siceraria* seeds and fruits can be employed as antioxidant, analgesic, anti-inflammatory agent for human body. [15]

The leaves of *Lagenaria siceraria* have been evaluated for the analgesic and the Central Nervous System (CNS) depressant activity [16].

Centrally mediated antinociception can be studied via the tail flick and hot plate tests. These tests selectively focus on the changes taking place above the level of spinal cord for antinociceptive action [20]. Peripherally mediated antinociception can be studied via the acetic acid induced abdominal constriction method. This method selectively focuses on changes taking place below the level of the spinal cord for antinociceptive action [17,18,20]. From the above results the fruit extract of *Lagenaria siceraria (*AELS*)* can be

used as an analgesic agent which will work by both central and peripheral pain mechanisms, [20]. But these results should be further evaluated in human beings for their therapeutic effect by further studies.

Conclusions and Summary

The results of this study shows that the aqueous extract of *Lagenaria siceraria (*AELS*)* fruit extract has potent analgesic activity which was evident in both pain models used in this study. The anti-nociceptive effect produced by the test drug in above said doses was less in comparison with that of the standard drug, diclofenac. Therefore, it can be said that the potency in relation to analgesic action is less than diclofenac. But these results should be further evaluated in human beings for their therapeutic use.

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