Pharmacophore 2014, Vol. 5 (2), 325-330 USA CODEN: PHARM7 ISSN 2229-5402

Pharmacophore

(An International Research Journal)

Available online at http://www.pharmacophorejournal.com/

Original Research Paper

ANALGESIC, ANTI-INFLAMMATORY AND ANTIULCEROGENIC ACTIVITY OF SEED EXTRACT OF *LAGENARIA SICERARIA* (MOLINA) STANDLEY FRUIT

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ABSTRACT

Lagenaria siceraria (Cucurbitaceae) is traditionally used as an analgesic and anti-inflammatory agent. Since time immemorial the fruit is used as diuretic, cardio-tonic, cardio-protective, nutritive agent, antipyretic, used in coughs, as an antidote to certain poisons and for scorpion sting. The possible analgesic and anti-inflammatory properties of *Lagenaria siceraria* seeds are investigated for the first time experimentally. Most of the anti-inflammatory drugs are anti ulcerogenic. So, the antiulcerogenic property is also studied. The effect of the petroleum ether extract of seeds of *Lagenaria siceraria* was evaluated in experimental models of pain and inflammation. Analgesic activity was evaluated using hot plate method and acetic acid induced writhing method. Anti-inflammatory activity was studied using carrageenan induced rat paw edema method. The seed extract at 200 & 400 mg/ml showed significant decrease in acetic acid writhing in mice with a maximum of 32 % at 200 mg/ml & 58 % at 400 mg/ml. The anti-inflammatory effects observed with the extract were comparable to that of standard. There was significant anti-ulcerogenic property. The present study indicates that the petroleum ether extract of *Lagenaria siceraria* exhibit significant analgesic, anti-inflammatory and antiulcerogenic activity and thus have great potential as a source for natural health product.

Keywords: Analgesic, Anti-inflammatory, Anti-ulcerogenic, Lagenaria siceraria.

INTRODUCTION

The plant, *Lagenaria siceraria* (Mol.) Standl. (Family: Cucurbitaceae), known as bottle gourd, is a common fruit vegetable used throughout India. It is a large pubescent, climbing or trailing herb, either wild or cultivated.[1] Since time immemorial the fruit is used as diuretic, cardio-tonic, cardio-protective and nutritive agent.[2] The fruit is sweet, diuretic, antipyretic, anti-bilious.[3] Fruit pulp is employed as an adjunct to purgatives and also as an ingredient in various confections, used in coughs and as an antidote to certain poisons and for scorpion sting.[4] *Lagenaria siceraria* fruit has been reported to possess antioxidant activity, hypolipidemic and antihyperlipidemic effects in normo cholesterolemic and triton-induced hyperlipidemic rats.[5,6] HPLC analysis of methanolic extract from plant shows the presence of flavone-C glycosides. Lagenin, a novel protein has been isolated from lyophilized extract of seeds.[7,8] In folklore medicine, seeds which yield a oil is used as an application for headache.[3] Seeds are used to lessen inflammation in unani medicine.[3] Seeds are used in dropsy. Considering the above

traditional uses, it was decided to study the analgesic and anti-inflammatory activities of seed extract of *Lagenaria siceraria*. Most of the anti inflammatory drugs are anti ulcerogenic. So in the present study, anti ulcerogenic property of *Lagenaria siceraria* is also recorded.

MATERIALS AND METHODS

Plant Collection and Authentication

L. siceraria fruits were collected from the local farms of Ahmednagar District, Maharashtra, in the month of February-March. The plant material was taxonomically identified by Botanical Survey of India, Pune and voucher specimen was retained in herbarium of BSI, Pune for future reference. The collected seeds were air-dried under the shade in laboratory for 7-12 days. After complete drying, seeds were powdered and extracted thoroughly with light petroleum ether (40-60 °C) in a Soxhlet extractor to yield clear oil. On preliminary phytochemical screening, the petroleum ether extract showed positive for the presence of saponins, triterpenoids and glycosides.

Animals

Healthy male Albino Wistar rats weighing between 150-200 g, Albino mice (20-25 g) of either sex were maintained in our animal house facility under standard animal house conditions and used for anti-inflammatory and analgesic activities respectively. CPCSEA guidelines were adhered to during the maintenance and experiment. Experimental protocol was submitted to Institutional Animal Ethics Committee and approval was taken.

Acute Toxicity Studies

An acute Toxicity study was carried out for PEELS (Petroleum Ether Extract of *Lagenaria Siceraria*) following OECD guidelines (Series on testing and assessment No.24, 2001). Overnight fasted, healthy Wistar Albino rats (n=3) were administered orally the PEELS in the dose of 2000 mg/kg body weight and observed continuously for 4 h. No visible change was observed in any test animal and all animals survived beyond 24 h.

Analgesic Activity

Hot Plate Method

The prescreened Swiss Albino mice (Reaction time: 2-4 sec) were divided into four groups of six animals each as follows: control, standard (Pentazocin 5 mg/kg), PEELS 200 mg/kg and PEELS 400 mg/kg. The delay in reaction time (Hind paw licking/Jumping response) of animals when placed on hot plate maintained at 55 $\pm$ 0.1 °C (Eddy's analgesiometer, INCO) was recorded at 0, 30 min, 1, 2, 3 h and tabulated. A cut-off reaction time was fixed at 15 sec to avoid damage to the paws (Gerhard H.V *et. al*, 1997).

Acetic Acid Induced Writhing

Swiss Albino mice were assigned into four groups control, standard (Aspirin 100 mg/kg), PEELS 200 mg/kg and PEELS 400 mg/kg. Writhing was induced after 30 min by intraperitoneal injection of 0.1 ml of 0.6 % acetic acid. The number of writhes was counted for 30 min immediately after acetic acid injection in all animals. Percentage protection was calculated for all groups (Nathan E B, 1953).

Anti Inflammatory Activity

PEELS was evaluated for anti-inflammatory activity by carageenan induced rat paw edema method (Wintel C A, *et. al* 1962; Turner R A, 1965). Male albino Wistar rats (150-200g) were randomly distributed into 4 groups of 6 animals each. First group served as a control, second group served as the standard (received Indomethacin 30 mg/kg, *po*) while the third and fourth group received 200 mg/kg, 400 mg.kg body weight of PEELS respectively. After 1 h 0.1 ml of 1% w/v suspension of carageenan was injected into the sub plantar region of left hind paw to all four groups. The paw volumes were measured using plathysmometer every hour till 6 h after carageenan injection, and mean increase in paw volumes were noted.

Anti-Ulcerogenic Activity

Animals of four groups containing six rats in each were fasted for 16 h. Control, Diclofenac sodium (10 mg/kg), PEELS 200 mg/kg, PEELS 400 mg/kg were orally administered. Animals were sacrificed 4h after the administration of the drug the stomachs were removed and cut along the

lesser curvature, and the scores according to the scale given were recorded. The following scale was used: 0=no lesion, 2= severe lesions, 3= very severe lesions, 4= mucosa full of lesions. In the second model, the above said procedure was followed after administering the respective drugs orally for 7 days (Cashin *e.t al,* 1997; Santos, 2004)

Statistical Analysis

The difference in rat paw volume at different time intervals and ulcer scores were analyzed for statistical significance by performing one-way ANOVA followed by Mewmans-Keul multiple comparison test. $p < 0.05$ implies significance.

RESULTS AND DISCUSSION

In the analgesic activity by hot plate (figure 1) method no satisfactory results were obtained. In the analgesic activity on acetic acid induced writhing (figure 2) PEELS at a concentration of 400 mg/kg showed excellent results by giving 57 % inhibition as compared with the standard Diclofenac sodium, which gave a 72 % reduction. In the carrageenan induced rat paw edema test(table 1) for acute inflammation, the extract of *Lagenaria siceraria* in doses of 200 mg/Kg and 400 mg/Kg body weight showed 71.85 % & 67.3 % inhibition of edema respectively at the end of 6 hrs.

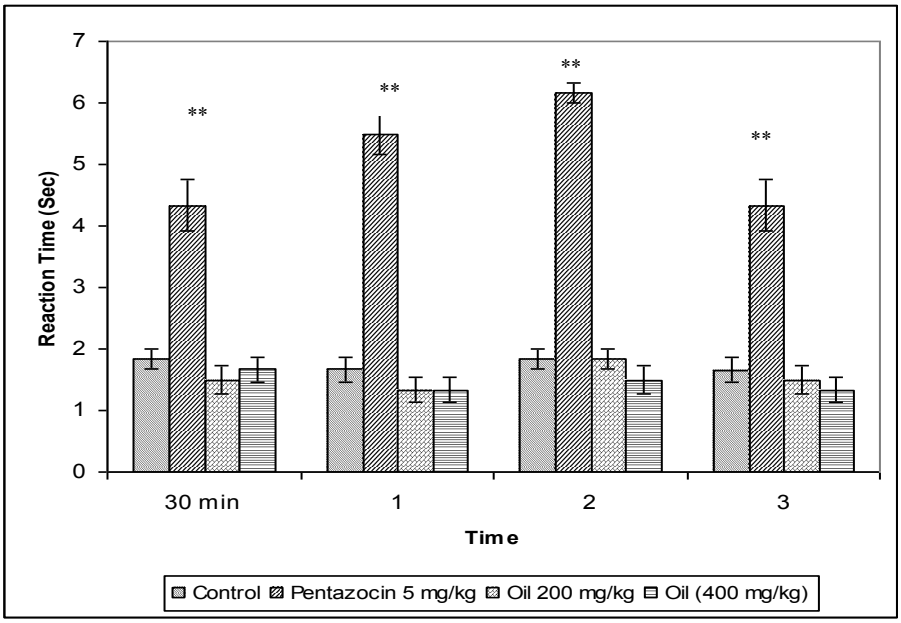
Anti-ulcerogenic activity on rats (table 2) by studying effect on lesser curvature of the stomach showed no drastic lesions as compared with the control.

CONCLUSION

Thus it is concluded that the PEELS shows a central analgesic activity as observed in the acetic acid induced writhing and no central analgesic activity as observed in hot plate method. PEELS possesses anti-inflammatory activity and shows anti-ulcerogenic property, which can be considered as a beneficial effect as compared to the other anti-inflammatory drugs like Indomethacin. The presence of chemical constituents like sterols and saponins can be attributed for the aforesaid activity. Thus the traditional use of *Lagenaria siceraria* seed oil in delirium is confirmed scientifically. Further it is needed to isolate and characterize the active compounds present in Petroleum ether extract of *Lagenaria siceraria* seed.

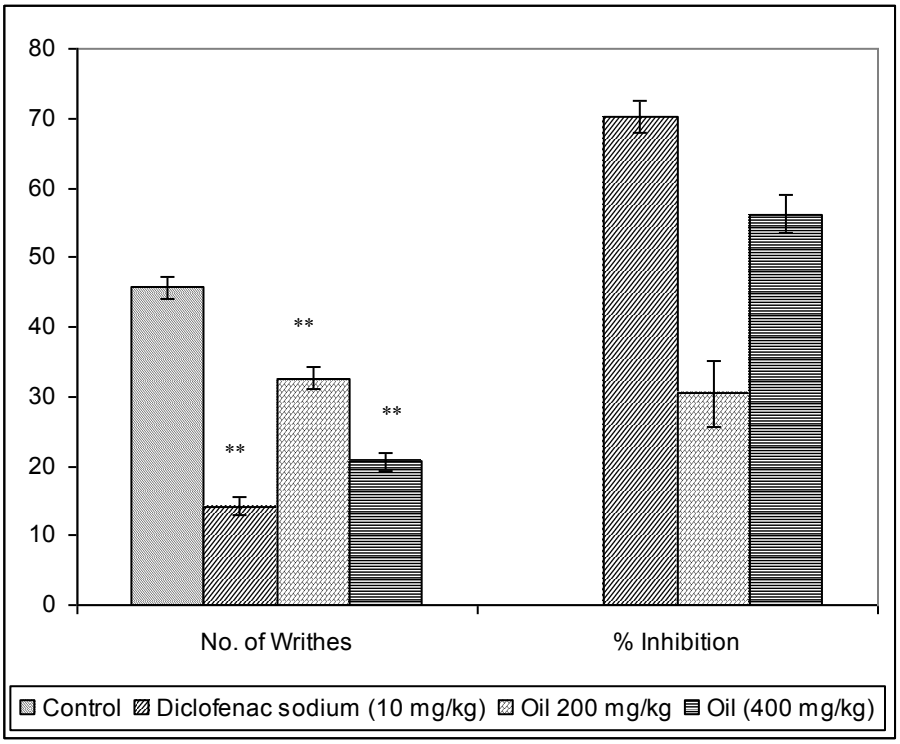
ACKNOWLEDGEMENT

The authors acknowledge the facilities provided by M.C.E. Society's Allana College of Pharmacy, Pune and Jawaharlal Nehru Technical University, Hyderabad.



Values are expressed as mean ± SEM, n= 6;
**p<0.01 when compared to control.
ANOVA followed by Dunnet's 't' test.

Figure 1: Analgesic activity of *Lagenaria siceraria* seed oil by Hot plate Method



Values are expressed as mean ± SEM, n= 6
**p<0.01 when compared to control.
ANOVA followed by Dunnet's 't' test.

Figuere 2: Analgesic activity of *Lagenaria siceraria* seed oil on acetic acid induced writhing

Table 1: Anti-Inflammatory activity of *Lagenaria siceraria* seed oil by Carageenan induced rat paw edema method

Group	1 h	2 h	3 h	4 h	5 h	6h
Control	7.34 ± 0.166	7.40 ± 0.152	7.78 ± 0.130	7.52 ± 0.104	7.36 ± 0.064	7.28 ± 0.052
Indomethacin (30 mg/kg)	6.98 ± 0.018	6.76 ± 0.166**	6.40 ± 0.232**	5.10 ± 0.108**	4.68 ± 0.116**	4.22 ± 0.028
PEELS# Oil (200 mg/kg)	7.34 ± 0.052	7.41 ± 0.046	7.22 ± 0.032*	6.68 ± 0.114**	5.68 ± 0.114**	5.32 ± 0.070**
PEELS Oil (400 mg/kg)	7.32 ± 0.062	7.42 ± 0.062	7.00 ± 0.060**	6.14 ± 0.082**	5.58 ± 0.156**	4.90 ± 0.170**

Values are expressed as mean ± SEM, n= 6
*p<0.05, **p<0.01 when compared to control.
ANOVA followed by Dunnet's 't' test.
#Petroleum Ether Extract of *Lagenaria siceraria*

Table 2: Anti-ulcerogenic activity of *Lagenaria siceraria* seed oil

Parameter	Control	Indomethacin (30 mg/kg)	PEELS (200 mg/kg)	PEELS (400 mg/kg)
Ulcer Score (4 h)	1.26 ± 0.008	4.52 ± 0.074**	1.26 ± 0.008	1.30 ± 0.030
Ulcer Score (7 days)	1.25 ± 0.004	4.62 ± 0.022**	1.26 ± 0.016	1.32 ± 0.02

Values are expressed as mean ± SEM, n= 6
**p<0.01 when compared to control.
ANOVA followed by Dunnet's 't'

REFERENCES

1. (1966), "***Wealth of India (Raw Materials) Anonymous***", Vol. 6, Council of Science and Industrial Research, New Delhi, 16-19.
2. (1986), "***The Useful Plants of India. Anonymous***", Council of Science and Industrial Research, New Delhi, 248
3. Kirtikar K.R. ,Basu B.D, *Indian Medicinal Plants*.(Oriental Enterprises, Dehradun); 2001, 1116-1119
4. Nadakarni, K M and Nadakarni, AK (1992), "***Indian Materia Medica***", Vol. 1, Popular Prakashan, Mumbai, 1992, 721-723
5. Jiwjinda, S; Santisopasn, V; Murakam, A; Kim, OK; Kim, HW and Ohigashi, H (2002), "Suppressive effects of edible Thai plants on super oxide and NO generation", ***Asian Pac J Cancer Prevention***,3,215-23.
6. Ghule, BV; Ghante, MH; Saoji, AN and Yeole, PG (2006), "Hypolipidemic and antihyperlidemic effects of Lagenaria siceraria Stand. fruit extracts", ***Indian J Exp Biol***, 44, 905-9.
7. Baranoswka, KM and Cisowski, W (1994), "HPLC determination of flavone-C glycosides in some species of Cucurbitaceae family", ***J Chromatography***, 675, 240-3.
8. Wang, HX and Ng, TB (2000), "Lagenin-a novel ribosome inactivating protein with ribonucleaolytic activity from bottle gourd (Lagenaria siceraria)", ***Life Sci*** , 67, 2631-8.
9. (2001), Organisation for economic co-operation and development "Guidance document on acute oral toxicity testing", Series on testing and assessment No.24, OECD Environment, Health And Safety Publications, Paris.
10. Gerhard, HV and Wolfgang, HV (1997), "*Drug Discovery and Evaluation*", Springer-Verlang, Germany, 382.
11. Nathan, EB and Dorothy, L (1953), "Synthetic analgesics: II Dithienybutenyl and dithienylbutylamines", ***J. Pharmacol.Exp.Ther***, 107, 385-393
12. Wintel, CA; Risley, EA and Nuss, GW (1962), "Carrageenan-induced edemain hind paw of the rat as an assay for anti-inflammatory drugs", ***Proc. Soc. Exp. Bio. Med***, 111, 545-547.
13. Turner, RA (1965), "***Screening Methods in Pharmacology***",Academic Press, New York,158.
14. Cashin, CH and Dawson, Kitchen EA (1997), "The pharmacology of benoxaprofen (2-(4(chlorophenyl)-alpha-methyl-5-benzoxazole acetic acid),LRCL 3794,a new compound with anti-inflammatory actiovity apparently unrelated to inhibition of prostaglandin synthesis", ***J. Pharm. Pharmacol***, 29, 330-6
15. Santos, LH; Feres, CA; Melo, FH; Coelho, MM; Nothen, Berg; SM, Oga S

and Tagliati, CA (2004), "Anti-inflamatory, antinoniceptive and ulcerogenic activity of a zinc-diclofenac complex in rats", ***Braz J. Med. Biol. Research***, 37, 1205-1213.

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Cite This Article: Thube, Smita and MJ, Patil (2014), "Analgesic, Anti-Inflammatory and Antiulcerogenic Activity of Seed Extract of Lagenaria Siceraria (Molina) Standley Fruit", ***Pharmacophore***, Vol. 5 (2), 325-330.