

SCREENING OF *LAGENARIA SICERARIA* FRUITS FOR THEIR ANALGESIC ACTIVITY

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The present study was taken to give the scientific validation of folklore medicinal use of *Lagenaria siceraria*. The analgesic activity of methanolic and aqueous extract of fruit of *Lagenaria siceraria* was evaluated using the tail immersion method in rats. The rats were evaluated for the pain threshold at a different interval of time up to 180 minutes. The methanolic extract shows a moderate activity at 180 min (3.97 ± 0.013) while aqueous extract shows a significant activity at 180 min (5.81 ± 0.006). The results support the traditional use of this plant in some painful and inflammatory conditions.

Key words: *Lagenaria siceraria*, Analgesic, Tail immersion method.

INTRODUCTION

Lagenaria siceraria (Molina) Standley syn. *L. leucantha* Rusby; *L. vulgaris* Ser. (Family: Cucurbitaceae) is commonly known as Bottle gourd, an excellent fruit in the nature having a composition of all the essential constituents that are required for normal and good health of humans (A.S.H. Rahman, 2003). *L. siceraria* fruits are traditionally used for their cardioprotective, cardiogenic, general tonic, aphrodisiac and act as alternate purgative, diuretic (V.V. Shivarajan, 1996; K.R. Kirtikar, 2001). They also cure pain, ulcers, fever, and are used for pectoral cough, asthma and other bronchial disorders (V.V. Shivarajan, 1996). The fruits are edible and considered as a good source of vitamin C, β -carotene, vitamin B-complex, pectin and also contain highest choline level – a lipotropic factor (A.S.H. Rahman, 2003; J.A. Duke, 1999; R.N. Chopra, 1992). Modern phytochemical screening methods showed the presence of triterpenoid cucurbitacins B, D, G, H (J.A. Duke, 1999; W.C. Evans, 1996; S. Sonja, 2000) fucosterol, campesterol (A. Shirwaikar, 1996) and flavone C-glycosides (M.K. Baranowska, 1994). *L. siceraria* seeds are used in migraine type headache and pain and are reported to contain saponins, essential fixed oils, vitamins (A.S.H. Rahman, 2003; R.N. Chopra, 1992). Lagenin – a novel ribosome inactivating protein has been isolated from the lyophilized water extract of seeds which is

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known to possess immunosuppressive, antitumour, antiviral, antiproliferative and anti-HIV activities (H.X. Wang, 2000).

The purpose of the present study was, therefore, to evaluate the analgesic effect of the *L. siceraria* fruit extract using the tail immersion method of pain in rats. The extract was also studied for its acute toxicity effects and preliminary phytochemical screening.

MATERIALS AND METHODS

Collection of plant material. The fruits of *Lagenaria siceraria* were collected from the local area of Bardoli, India and were authenticated by the botanist. The voucher specimen was kept in the college museum.

Extraction of fruits. The shade dried fruits of *Lagenaria siceraria* were reduced to fine powder (# 40 size mesh) and around 200 g of powder was subjected to successive hot continuous extraction (soxhlet) with methanol. Finally the drug was macerated with chloroform water. After the effective extraction, the solvents were distilled off, the extract was then concentrated on water bath and the extract obtained with each solvent will be preserved.

Animal selection. Albino rats of either sex weighing 150 to 200 g were selected for the experiment. They were employed for assessing analgesic activity. Rats were divided into four groups, each group having six animals. The bedding material of the cages was changed every day.

Materials. Extract used:

- a) Methanol extract of *Lagenaria siceraria*,
- b) Aqueous extract of *Lagenaria siceraria*,
- c) Standard: Pentazocin. (FORTWIN, Ranbaxy, India).

Dose selection

- a) Methanol extract of *Lagenaria siceraria* (200 mg/kg b.wt),
- b) Aqueous extract of *Lagenaria siceraria* (200 mg/kg b.wt),
- c) Control: 5 ml/kg of 5% gum acacia (p.o.),
- d) Standard: Pentazocin 5 mg/kg body weight (i.p.).

Methods. The analgesic responses of the given samples of extracts were evaluated using the Tail immersion method (Chandrashekar KS, 2002) using an analgesiometer. In this method the rats were divided into four groups (each group containing six animals). The first group was served as control and received 5% acacia solution only (5ml/kg bd wt, orally), the second group of animals was served as standard and administered standard drug Pentazocin (5 mg/kg bd wt., i.p.). The animals of remaining groups were treated with different extracts. The analgesic responses of the fruit extracts were evaluated using the tail immersion method. In this procedure the albino rats were weighed and marked. They are placed into individual restraining cages leaving the tail hanging out freely. The animals are allowed to adapt to the cages for 30 min before testing. The lowest 5 cm portion of the tail is marked. This part of the tail is immersed in a cup of

freshly filled water of exactly 55 °C. Within a few seconds the rat reacts by withdrawing the tail. The standard, test and control doses were injected to the animals and the reaction time was noted at 0, 30, 60, 90, 120 and 180 minutes.

All data were expressed as Mean $\pm$ SEM and analyzed statistically by using Dunnett's *t*-test. A difference was considered significant at P value less than 0.05.

The results have been shown in Table 1 and Fig. 1.

Table 1

Analgesic activity of various extracts of *Lagenaria siceraria*

Crt. no.	GROUP	0 min	30 mins	60 mins	90 mins	120 min	180 min
		MEAN $\pm$ SEM					
1	Control	1.49 $\pm$ 0.012	1.47 $\pm$ 0.023	1.48 $\pm$ 0.015	1.43 $\pm$ 0.020	1.85 $\pm$ 0.019	2.78 $\pm$ 0.031
2	Standard	1.71 $\pm$ 0.030	1.83 $\pm$ 0.020	2.11 $\pm$ 0.017	2.39 $\pm$ 0.026	3.26 $\pm$ 0.006	5.73 $\pm$ 0.071
3	Methanol extract of LS	1.30 $\pm$ 0.017	1.49 $\pm$ 0.016	1.82 $\pm$ 0.017	2.30 $\pm$ 0.014	3.11 $\pm$ 0.016	3.97 $\pm$ 0.013
4	Aqueous extract of LS	1.18 $\pm$ 0.009	1.55 $\pm$ 0.011	1.92 $\pm$ 0.020	2.88 $\pm$ 0.018	3.93 $\pm$ 0.013	5.81 $\pm$ 0.006

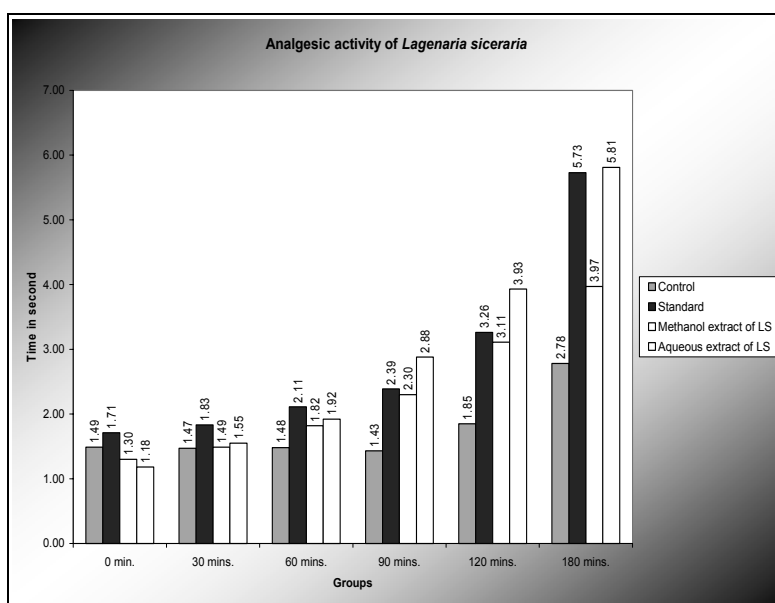


Fig. 1. Analgesic activity of *Lagenaria siceraria*.

RESULTS AND DISCUSSION

This present study was carried out to assess the validity of the folkloric use of this plant in the management of pain threshold. Both *in-vivo* and *in-vitro* methods are available for the evaluation of analgesic agents but among the *in-vivo* methods the tail immersion method is believed to be one of the most reliable and also the most widely used.

From the results obtained it is concluded that an aqueous extract of *Lagenaria siceraria* and a methanolic extract of *Lagenaria siceraria* show a moderate activity, while after 90 min an aqueous extract of *Lagenaria siceraria* shows a significant activity while in case of a methanolic extract of *Lagenaria siceraria* it shows a moderate analgesic activity. Still it is a preliminary study that requires the molecular level study to find out the responsible chemical constituent for the analgesic effect.

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