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PHYTOCHEMICAL SCREENING AND EVALUATION OF WOUND HEALING POTENTIAL OF ETHANOLIC SEEDS EXTRACT OF *LAGENARIA SICERARIA* (MOLINA) IN WISTAR RATS

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Keywords:

Lagenaria siceraria, Wound healing, Povidine iodine

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ABSTRACT: Background: The present study was carried out to evaluate the wound healing potential of seed extracts of *Lagenaria siceraria* in two different types of wound models in albino rat viz., incision and excision. The plant has been used traditionally for its cardio protective, cardio tonic, general tonic, aphrodisiac and acts as alternate purgative, diuretic. It all so cures pain, ulcers, fever, and used for pectoral cough, asthma and other bronchial disorders. The plant has been studied for their various pharmacological activities like antioxidant, cardioprotective, diuretic, hepatoprotective and anti-inflammatory activity. **Methodology and Results:** In the present investigation we have screened the ethanol, ethyl acetate, n-butanol and pet. ether extracts of the seeds of the plant. The plant contains various phytochemical constituents like saponin, triterpenoid, flavones, vitamin B and source of ascorbic acid in fruits. The result data compare with the standard drug povidine iodine ointment. The ethanolic extract at a dose of (250 mg/kg) possesses a significant increase in wound contraction and formation of scar in an excision wound model. **Conclusion:** The result of the present study indicates that ethanolic seeds extract of *L. siceraria* posses significant wound healing in excision and incision wound model and all so the presence of phytoconstituents like flavonoids, saponins, phenols either individually or combined may exhibit the synergistic effect towards the healing of wounds.

INTRODUCTION: Herbal medicine has become an integral part of standard health care. The World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some aspect of their primary healthcare [1]. Wound healing can be defined as a complex dynamic process that results in the results in the restoration of anatomic continuity and function. It is a finely orchestrated and overlapping sequence of events involving vascular response phase/hemostasis, inflammation, proliferation, maturation and remodeling [2, 3].

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Many ayurvedic herbal plants have a very important role in the treatment of the wound. Many Ayurvedic herbal plants have a very important role in the treatment of the wound. Nowadays herbal medicines are highly recommended for the treatment of diabetes in spite of the therapeutic options [4].

The fruit is extensively used as a medicinal vegetable in Asia and Africa for a variety of ailments. Alternative medicine is made from several components of this plant, including fruit, seed, leaf, and root [5]. In Ayurveda and other folk remedies, the plant's fruits had been noted to have possible therapeutic benefits. Traditional uses of fruit include cardioprotective, antidote, aphrodisiac, cardiotonic, diuretic, and general tonic properties [6]. Ascorbic acid, triterpenes, minerals, choline, amino

acids, vitamin B complex, triterpenoid cucurbitacins B, D, H, G, 22-deoxy cucurbitacin, β-glycosidedase-elasterase, flavonoids, sterols, and carbohydrates are all found in the edible part of the fruit [6]. Modern phytochemical screening methods showed the presence of triterpenoid cucurbitacins B, D, G, H [7, 8, 9]. Fucosterol, campesterol and flavone C-glycosides [10]. *L. siceraria* seeds are used in migraine type headache and pain and reported to contain saponins, essential fixed oils, and vitamins [11]. Lagenin- a novel ribosome inactivating protein has been isolated from the lyophilized water extract of seeds which is known to possess immunosuppressive, antitumor, antiviral, anti-proliferative and anti-HIV activities [12].

MATERIALS AND METHODS:

Plant Collection and Authentication: The fruits of *Lagenaria siceraria* were collected from a local herb market in Patrapur of Koraput district. (India) in the month of November 2025. It was identified, confirmed and authenticated by the Biju Patnaik Medicinal Plants Garden and Research Centre, Dr. M. S. Swami Nathan Research Foundation, Jeypore, Koraput (District), Orissa (Letter No. MJ/SS/P-807/25, dated 18.11.2025).

Preparation of Extracts: The coarse powder of *L. siceraria* seeds was taken in Soxhlet apparatus and extracted successively with ethanol, ethyl acetate, methanol and petroleum ether as solvent. A total amount of 350 g coarse powder was extracted with 700 ml of each solvent. For each solvent, 10 cycles were run to obtain a thick slurry. Each slurry was then concentrated under reduced pressure to obtain the crude extract. All crude extracts were kept in closed airtight containers under cool and dark place for further study [13, 14].

Phytochemical Investigation: The crude ethanol, ethyl acetate, n-butanol and petroleum ether extracts of the seeds of *L. siceraria* were subjected to preliminary phytochemical analysis in order to detect the presence of various groups of phytoconstituents by carrying out the chemical analysis [13, 14].

TABLE 1: PHYTOCHEMICAL SCREENING FOR THE DIFFERENT SOLVENT EXTRACTS OF *DALBERGIA SISSOO* LEAVES EXTRACTS PHYTOCHEMICALS

Carbohydrate	Flavonoids	Terpinoids	Tannins	Saponins	Phenols
Ethanol	++	++	++	++	- - +++
Ethyl-acetate	+	+ -	- ++		
n-butanol	++++++	+ -	- ++		
Petroleum ether	+	+++	-	++	

+++, strong; ++, moderately; +, poor presence, --, absence

Animal: Healthy adult Wister strain of albino rats weighing approximately 180 to 250 gm were used. They were housed in standard conditions of temperature (25 ± 2 °C), 12 h light per day cycle relative humidity of 45-55% in the animal house of Jeypore College of Pharmacy. They were fed with standard pellets of food and water. Animals were kept, and all operation on animals was done in aseptic condition.

Experimental Protocol: Animals were selected, weighed (25-30 g) and divided into three groups (n=6), namely control, standard drug, and one test groups belonging to *Lagenaria siceraria* seeds extract. The studies conducted were approved by the Institutional Ethical Committee (Regd.No:2246/PO/Re/s/CCSEA), Jeypore College of Pharmacy, Jeypore, Odisha according to prescribe guidelines of the Committee for Control and Supervision of Experiments on Animals (CPCSEA), Government of India.

Wound Healing Activity:

Wound Model:

Excision Wound: For the excision wound study, animals were divided into 5 groups of six rats in each group. Group-I served as control and applied with Vaseline, Group-II, Group-III, Group-IV and Group-V were treated with ethanol, ethyl acetate, methanol and petroleum ether extracts respectively. An impression was made on the dorsal thoracic central region 5mm away from the ears, by using a round seal of 2.5 cm diameter as described by Morton and Malone. The skin of the impressed area was excised to the full thickness to obtained area of about 500 mm^2 under light ether anaesthesia in aseptic condition. The animals were housed individually. All the extracts in simple ointment base (5% w/w) were applied on the wound once a day for 18 days starting from the day of wounding. The percentage wound closure was observed on 4th, 8th, 12th, 16th, 18th post wounding day.

Epithelization time (in days) and size of the scar area was noted.

Incision Wound: Incision wound model was performed according to Ehrlich and Hunt The animals were divided into 5 groups of six rats in each group, and kept in separate cage. Group-I served as control, received only 2% gum acacia suspension (1 ml/kg, p.o), ethanol, ethyl acetate, n-butanol and petroleum ether extracts (250 mg/kg) were given orally once a day to Group-II, III, IV and V respectively for 10 days. Under light ether anesthesia, the animals were secured to operation table in its natural position. Two paravertebral straight incisions of 6 cm each were made through the entire thickness of the skin, on either side of the vertebral column with help of sharp blade. Removal of the sutures was done on 8th post wounding day. Tensile strength was determined on both wounds by continuous constant water flow technique of Lee [15, 16].

Statistical Analysis: The results are reported as Mean ± SE. Statistical analysis was done using ANOVA (Tukey-Multiple Comparison Test). When probability (p) was less than 0.05 was considered as significant [17].

TABLE 2: EFFECT OF EXTRACTS OF ON THE BREAKING STRENGTH IN INCISION WOUND

Sl. no.	Group	Breaking strength
1	Control	243.14 ± 21.05
2	petroleum ether	321.11 ± 10.31
3	ethyl acetate	336.22 ± 11.41
4	methanol	341.14 ±143.33
5	ethanol	418.56 ± 14.21*

Values are mean ± SE (n=6)* p<0.05 vs control.

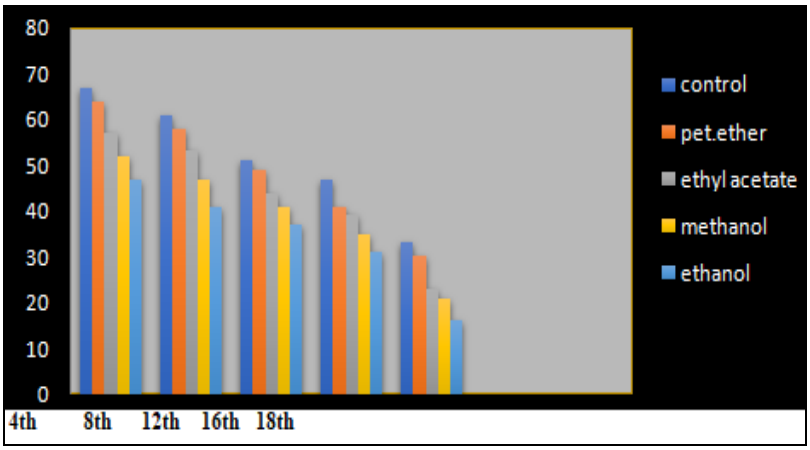

FIG. 1: EFFECT OF DIFFERENT SEED EXTRACTS OF *LAGENARIA SICERARIA* ON EXCISION WOUND MODEL

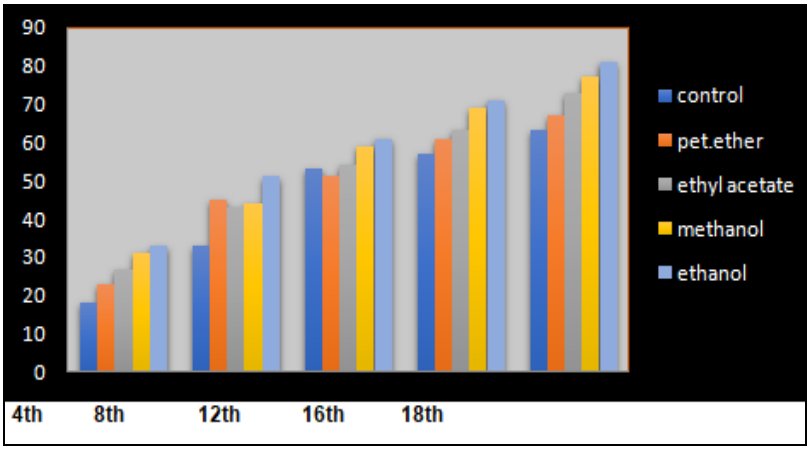

FIG. 2: EFFECT OF DIFFERENTC SEED EXTRACTS OF *LAGENARIA SICERARIA* ON EXCISION WOUND MODEL

RESULTS AND DISCUSSION: The preliminary phytochemical screening showed that the different solvent extracts of *Lagenaria siceraria* seeds contain carbohydrate, flavonoids, terpenoids, phenolic compound and saponin. Glycoside and tannins are absent. In the study using excision wound model, animals treated with ethanol extract of showed significant decrease in epithelization

period as evidenced by shorter period for fall of eschar as compared to control Group($p<0.05$) **Fig. 1.** The extract also facilitated the increase in rate of wound contraction than control group. The petroleum ether extract treated animal (Group-II) showed wound contraction by 63.23%. The ethyl acetate extract treated animals (Group-III) showed wound contraction by 71.31%.

The methanol extract treated animal (Group-IV) showed wound contraction by 76.22%. The ethanol extract treated animal (Group-V) showed wound contraction by 81.33% as compared with the control (Group-I) by 63.21% in all the extract **Fig. 2.**

The result of present study reveals that ethanolic seeds extract of *Lagenaria siceraria* possess a prominent prohealing activity in incision wound model. This was demonstrated by significant increase in the skin tensile strength in methanol extract treated groups ($p<0.05$) on 10th post wounding day are presented in **Table 1.**

In the study using excision wound model, animals treated with ethanol extract *Lagenaria siceraria* seeds showed a significant decrease in an epithelization period as evidenced by shorter period for fall of eschar as compared to control group (p The extract also facilitated the increase in the rate of wound contraction than the control group.

The ethanol extract showed wound contraction by 81.33% as compared with the control (Group-I) by 67.24%. The result of the present study reveals that ethanolic seeds extract of *Lagenaria siceraria* possess a prominent pro-healing activity in an incision wound model. This was demonstrated by a significant increase in the skin tensile strength in methanol extract treated groups (p on 10th post-wounding day are presented in **Table 2.**

CONCLUSION: The results of the present study suggest that local application and systemic administration of ethanol extract of the seeds of *Lagenaria siceraria* has shown significant wound healing activity in excision and incision wound models the wound healing property of *L. siceraria* seeds has been attributed to its antimicrobial effects. The presence of phytoconstituents like flavonoids, saponins, phenols either individually or combined may exhibit the synergistic effect towards the healing of wounds.

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CONFLICT OF INTEREST: Nil

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