



## An Update on the Ayurvedic Herb *Lagenaria siceraria*

Bindiya\*, Karunakar Hegde

Department of Pharmacology, Srinivas College of Pharmacy, Valachil, Farangipete Post, Mangalore- 574143, Karnataka, India.

\*Corresponding author's E-mail: [binduckul@gmail.com](mailto:binduckul@gmail.com)

Received: 07-03-2022; Revised: 22-05-2022; Accepted: 28-05-2022; Published on: 15-06-2022.

### ABSTRACT

*Lagenaria siceraria* has traditionally been used in the treatment of a variety of ailments in numerous nations. Herbal medications are a viable alternative to current synthetic treatments since they have few or no adverse effects and are deemed safe for humans. Several bioactive substances, including triterpenoids, sterols, cucurbitacins, flavones, and glycosides, have been identified from *Lagenaria siceraria*. Thiamine, riboflavin, niacin, and ascorbic acid are vitamins found in the edible component. Furthermore, bottle gourd is high in minerals such as calcium and phosphorus, as well as a strong source of dietary fibres. Despite this, bottle gourd can be used to treat conditions such as epilepsy and mental problems, and the fibres found in it can help reduce the risk of coronary heart disease. It is used as medicine in India, China, Europe, Brazil, and the Hawaiian Islands, among other places. This review attempts to acknowledge current phytochemical and pharmacological data about this well-known plant species and some interesting topics for future research on *Lagenaria siceraria*.

**Keywords:** Cucurbitaceae, *Lagenaria siceraria*, Pharmacological activity, Phytochemistry.

### QUICK RESPONSE CODE →

DOI:  
10.47583/ijpsrr.2022.v74i02.006



DOI link: <http://dx.doi.org/10.47583/ijpsrr.2022.v74i02.006>

### INTRODUCTION

Since ancient times, nature has been a source of therapeutic agents, and medicinal plants have formed the foundation of a vast range of traditional medicines used in diverse regions across the globe. Traditional medical systems have traditionally played a critical role in managing global healthcare demands. They still do so today, and they will continue to do so in the future. Herbal medicines are often believed to be safer and less harmful to the human body than synthetic drugs. As a result, scientists all over the world are screening plants for the biological activity that could be used as medicines.

Rigveda attributes medicinal plants to three yugas before the creation of animal life on Earth. This demonstrates the significance it placed on medicinal herbs. From the Samhitas to the Nighantus, Ayurvedic writings name and explain around 2000 plant species. However, among India's 4,635 ethnic tribes are one million folk healers who use an estimated 8000 or more therapeutic plant species. Their rural homes have few or no financial resources to purchase off-the-shelf medications for medical treatment. Such traditional remedies are the first line of defense against minor diseases. Standardization, recording, and conservation of medicinal plants are critical due to their economic and therapeutic value.

The key to developing ideal new medications from plants is to choose the proper scientific and systematic approach to the biological evaluation of plant products based on their use in traditional medicine. *Lagenaria siceraria* (LS) is one such plant (Family: Cucurbitaceae). Cucurbitaceae, generally known as the gourd, melon, or pumpkin family, is a medium-sized climbing plant family that comprises 122 genera and 940 species. It is represented in India by 94 species belonging to 31 genera. *Lagenaria siceraria*, commonly known as Bottle guard, Ghiya, and Lauki, is a wonderful fruit in nature that has all of the key ingredients required for proper and quality human health. It's one of the first plants to be domesticated on the planet and has a long, glorious history.

It is also high in carbohydrates, minerals, amino acids, and pectin, and it has the greatest quantity of choline, which is essential for brain function. In Ayurveda, it is regarded as a cardi tonic and general tonic. Sweet, diuretic, antipyretic, antibilious, liver tonic, vulnerary, and antiperiodic all are characteristics of the fruit. It can help with muscle discomfort and a dry cough. The seeds have fattening, cooling, anthelmintic, and brain tonic properties, and can be used to treat cough, fever, scorching urine, and earache. The oil can be used to treat headaches. The fruit's rind is useful for piles, and its ash is styptic and vulnerary.<sup>1-5</sup>

### Vernacular Names <sup>6</sup>

Sanskrit : Alaabu, Tumbi Ishavaaku

English : Bottle Gourd

Hindi : Lauki, Ghiya

Malayalam: Chorakka, Churan, Choraikka



Tamil : Shorakkai, Surai, Suraikkai

### Taxonomical Classification<sup>6</sup>

**Table 1:** Taxonomical classification of *Lagenaria siceraria*

<b>Kingdom</b>	Plantae
<b>Division</b>	Magnoliophyta
<b>Class</b>	Magnoliopsida
<b>Order</b>	Cucurbitales
<b>Family</b>	Cucurbitaceae
<b>Genus</b>	Lagenaria
<b>Species</b>	<i>L. siceraria</i>

### Habitat

The cultivated form of *L. siceraria* is said to have originated in Africa or Asia. *L. siceraria* is a common vegetable that may be grown virtually all year, especially in locations without frost. It may be grown in a variety of soil types, but it prefers heavily manured loams. When cultivated in a dry region, it needs a warm humid climate or a lot of watering. Seeds should be sown in nursery beds, and seedlings should be moved once they have produced 2-3 leaves. When an early crop is needed, seedling transplantation is used. In India, there are two crops: the summer crop is sown from the middle of October to the middle of March, and the later crop is sown from the beginning of March to the middle of July.<sup>6</sup>

### Botanical Description

**Stems:** Up to 5m long, prostrate or climbing stems are angular, ribbed, tough, brittle, and softly hairy. Cut stems discharge no sap.

**Leaves:** Long petioled, 5-lobed, cordate, pubescent, shortly and softly hairy, wide kidney- or heart-shaped in form, undivided, angular, or weakly 3–7 lobed, lobes rounded, margins shallowly toothed, crushed leaves nonaromatic. Tendrils separated into two. (Figure 1)



**Figure 1:** *Lagenaria siceraria* leaf

**Flowers:** Flowers are tiny to medium in size, with oval, 3-4 cm long petals. The calyx is typically as thick as it is long and green, mottled grey or white. Male blooms are often up to 7 cm in diameter, open in the evenings, and quickly fade. (Figure 2)



**Figure 2:** *Lagenaria siceraria* flower

**Fruits:** Vary greatly in shape and size, reaching up to 25-60 cm long when ripe, and are mostly bottle, mace, or club-shaped with a hard shell-like epicarp; many seeds are also present in the fruit. The outside surface is smooth and light green. (Figure 3).



**Figure 3:** *Lagenaria siceraria* fruit

**Seed:** The seeds are numerous, immersed in a spongy pulp, compressed, and have two flat face ridges, which might be uneven and rugose in some varieties.<sup>7</sup>

### PHYTOCHEMISTRY

The seeds contain steroidal moieties such as avenasterol, cholesterol, cholesterol, isofucasterol, stigmasterol, sitosterol, campesterol, spinasterol, and sugar moieties such as rhamnase, fructose, glucose, sucrose, raffinose, and saponin. Seed kernels are high in iron, potassium, sulfur, and magnesium, with copper being particularly abundant. They can be taken as a nutritional supplement.

Carbohydrates, protein, fat, fiber, mineral matter, calcium, and phosphorus are all found in sweet fruits. Iron, salt, and iodine are among the other mineral elements said to be present. Retinol is also present in the fruit. Leucines, phenylalanine, valine, tyrosine, alanine, threonine, glutamic acid, serine, aspartic acid, cystine, cysteine, arginine, and proline are among the amino acids found in the fruit. Thiamine, riboflavin, niacin, and ascorbic acid are all found in the edible section. Choline is present in it. Vitamin C, -carotene, vitamin B-complex, and pectin are all found in abundance in the fruit. 22-deoxocucurbitacin-d and 22-deoxoisocucurbitacin-d are two triterpenoids found in fruits. Crude protein, cellulose, and lignin are all found in the fruit skin.

Cucurbitacins B, D, and E, as well as the triterpene bryonolic acid, are found in the roots. Carbohydrates, phytosterols, saponins, phenolic compounds, tannins, proteins, amino acids, and flavonoids are all found in the leaves of *L. siceraria*.<sup>7,8</sup>

## PHARMACOLOGICAL ACTIVITY

### Anticancer activity

Using the Enrich' Ascites carcinoma model in mice, researchers tested the methanolic extract of *Lagenaria siceraria* aerial parts for anticancer activity and observed that it had substantial anticancer activity, which may be due to its cytotoxicity and antioxidant activity.<sup>9</sup>

### Cardioprotective activity

*L. siceraria* fruit powder was also found to have strong cardioprotective properties. When perfused with a normal ringer solution, an ethanolic extract of *L. siceraria* fruits increased the force of contraction and decreased the rate of contraction in isolated frog hearts.<sup>10</sup>

### Hepatoprotective activity

The ethanol extract of *L. siceraria* fruit was shown to have hepatoprotective effects. The ethanol fruit extract prevented the carbon tetrachloride-induced increase in serum glutamate oxaloacetate, serum glutamate pyruvate transaminase, alkaline phosphatase, and bilirubin levels, which resulted in a significant rise in thiobarbituric acid and a decrease in antioxidant enzymes: superoxide dismutase, catalase, and glutathione peroxidase administration of the fruit extract normalized these levels and also prevented lipid peroxidation.<sup>10</sup>

### Antihyperlipidemic activity

The soluble dietary fiber in *Lagenaria siceraria* fruits had a significant effect on lowering blood cholesterol, and pectin was shown to be the most prevalent component of the soluble fibers. Fruit extract was evaluated for antihyperlipidemic activity in triton-induced hyperlipidemic rats and hypolipidemic effect in normocholesterolemic rats. Oral administration of the extracts reduced total cholesterol, triglycerides, and low-density lipoprotein levels while significantly increasing high-density lipoprotein levels.<sup>11</sup>

### Analgesic and Anti-inflammatory activity

The ethanolic seed extract of *Lagenaria siceraria* exhibits persistent anti-inflammatory action by blocking leucocyte influx and raising LTB<sub>4</sub> levels. Ethanolic extract of seed has analgesic properties by reducing the production of free radicals.<sup>12</sup>

### Immunomodulatory activity

In rats, the immunomodulatory effects of the n-butanol-soluble and ethyl acetate-soluble fractions of successive methanolic extracts of the fruits were assessed. The delayed-type hypersensitivity reaction in rats was dramatically reduced when these fractions were given

orally. The number of white blood cells and lymphocytes has significantly increased.<sup>13</sup>

### Antimicrobial activity

The agar-well diffusion technique was used to test the antibacterial activity of methanolic extracts of *L. siceraria* leaves, seeds, and fruit flesh. The LS extract showed action against *Pseudomonas aeruginosa* and *Streptococcus pyogenes*, but not against clinical isolates of *S. aureus* and *E. coli*, according to the findings. Hence, for this reason, LS can be used to treat a variety of skin conditions.<sup>14</sup>

### Anti-diabetic activity

The methanolic extract of *Lagenaria siceraria* aerial parts for Antidiabetic activity using Streptozotocin-induced diabetic rats showed a significant reduction in blood sugar level and proved that the aerial part of the *Lagenaria siceraria* possesses potent Antihyperglycemic activity, which is probably due to its rich flavonoid and polyphenolic contents.<sup>15</sup>

### Anthelmintic activity

Methanol and benzene extracts of *Lagenaria siceraria* seeds were found to produce paralysis and death in *Pheretima Posthuma* worms at high concentrations, according to studies. The findings supported the traditional usage of *Lagenaria siceraria* seeds as an anthelmintic.<sup>16</sup>

### Diuretic activity

The diuretic activity was evaluated by vacuum dried juice extract and methanol extract of *Lagenaria siceraria* fruits. The excretion of electrolytes such as sodium, potassium, and chloride increased concentration-dependently in both LSJE and LSME. The increased diuretic potential of LSFE and LSME was statistically significant and equivalent to the conventional diuretic drug.<sup>17</sup>

### Antidepressant activity

In rats, methanolic extract of *Lagenaria siceraria* fruits was tested for antidepressant activity. The extract has antidepressant properties that are dose-dependent. The presence of flavonoids, triterpenoids, sterols, and saponins may be responsible for the activity.<sup>18</sup>

### Anti-stress activity

Anoxia tolerance and chronic cold restraint stress paradigms have been used to test the antistress activity of an ethanolic extract of *Lagenaria siceraria* in mice. The extract slowed the onset of clonic convulsions and reduced cold stress-induced alterations, implying that it has antistress and adaptogenic properties. Flavonoids, glycosides, saponins, triterpenescucurbitacins, and steroids were found to be active.<sup>19</sup>

## TRADITIONAL USES

*Lagenaria siceraria* has traditionally been used to treat a variety of ailments. The roots are emetic, purgative, and anti-inflammatory, and can be used to treat a variety of





ailments including constipation and inflammation. Bitter, cooling, emetic, purgative, expectorant, diuretic, and febrifuge are all properties of the leaves. Cough, bronchitis, asthma, fever, inflammations, leprosy, skin disorders, jaundice, rotting teeth, cephalgia, constipation, flatulence, and baldness are all conditions that they can help with. Flowers are soothing and beneficial in the treatment of ophthalmia and odontalgia. Refrigerating, emetic, purgative, anti-inflammatory, depurative, nervine tonic expectorant, diuretic, and febrifuge are all properties of the fruits. They can be used to treat a variety of ailments, including foot burning, cough, bronchitis, inflammation, skin illness, leprosy, and fever. Its fruits are also used for their cardioprotective, tonic, and aphrodisiac properties. Seeds have purgative, diuretic, brain tonic, dropsy, anthelmintic, and cooling properties, which is why they are used to treat headaches. Flowers are thought to be antidotes to poisons.<sup>20</sup>

### CONCLUSION

*Lagenaria siceraria* is a well-known plant in Indian medicine, and folk medicine believes it can help with heart and hepatic problems, ulcers, and other ailments. Plant components including leaves, fruit, bark and even seeds are utilized for a variety of uses. Chemically, *Lagenaria siceraria* includes flavonoids, saponins, triterpenes, and volatile principles, among other physiologically active phytoconstituents. It's also important in a variety of disorders for which there's plenty of scientific evidence and data. In essence, *Lagenaria siceraria* is a versatile medicinal plant.

### REFERENCES

- Ravishankar B, Shukla VJ. Indian systems of medicine: a brief profile. Afr J Tradit Complement Altern Med. 2007; 4(3):319-37.
- Williamson EM, Okpako DT, Evans FJ. Selection, Preparation, and Pharmacological Evaluation of Plant Material. John Wiley and Sons; 1996. vol 1 p. 1-3.
- Pullaiah T. The Encyclopedia of World Medicinal Plants. Regency publishers; 2006. vol 3 p. 1206-7.
- Renner SS, Pandey AK. The Cucurbitaceae of India: Accepted names, synonyms, geographic distribution, and information on images and DNA sequences. Phytokeys. 2013; 20:53-118
- Kirtikar KR, Basu BD. Indian Medicinal Plants. Dehradun: International Book distributors; 2005. p. 1116-7.
- Gorasiya HJ, Paranjape A, Murti K. Pharmacognostic and pharmacological profile of *Lagenaria siceraria* (Molina) Standley: A review. Pharmacologyonline. 2011; 3:317-24.
- Rahman AH. Bottle gourd (*Lagenaria siceraria*) is a vegetable for good health. Nat Prod Radiance. 2003; 2(5):249-50.
- The Wealth of India. A Dictionary of Indian raw materials and industrial products. Indian Med Gaz. 2004; 16-19.
- Saha P, Sen SK, Bala A, Mazumder UK, Haldar PK. Evaluation of Anticancer Activity of *Lagenaria siceraria* Aerial. Int J Cancer Res. 2011; 7(3):244-53.
- Deshpande JR, Choudhari AA, Mishra MR, Meghre VS, Wadodkar SG, Dorle AK. Beneficial effects of *Lagenaria siceraria* (Mol.) Standley fruit epicarp in animal models. Indian J Exp Biol. 2008; 46:234-42.
- Ghule BV, Ghante MH, Saoji AN, Yeole OG. Hypolipidemic and antihyperlipidemic effects of *Lagenaria siceraria* (Mol.) fruit extracts. Indian J Exp Biol. 2006; 44:905-9.
- Gill NS, Singh S, Arora R, Bali M. Evaluation of ethanolic seed extract of *Lagenaria siceraria* for their therapeutic potential. J Med Sci. 2012; 12(3):78-84
- Gangwal A, Parmar SK, Gupta GL, Rana AC, Sheth NR. Immunomodulatory effects of *Lagenaria siceraria* fruits in rats. Pharmacogn Mag. 2008; 4(16):234-8.
- Goji M, Asres K, Gameda N, Yirsaw KJ. Screening of the antimicrobial activities of some plants used traditionally in Ethiopia for the treatment of skin disorders. Ethiop Pharm J. 2006; 24:130-5.
- Saha P, Mazumder UK, Haldar PK, Sen SK, Naskar S. Antihyperglycemic activity of *Lagenaria siceraria* aerial parts on streptozotocin-induced diabetes in rats. Diabetol Croat. 2011; 40(2):49-60.
- Smita T, Rashmi T, Farooque PM, Daud PS. In-vitro anthelmintic activity of seed extract of *Lagenaria siceraria* (Molina) Standley fruit. J Pharm Res. 2009; 2(7):1194-5.
- Ghule BV, Ghante MH, Yeole PG, Saoji AN. Diuretic activity of *Lagenaria siceraria* fruit extracts in rats. Indian J Pharm Sci. 2007; 69(6):817-19.
- Prajapati R, Umbarkar R, Parmar S, Seth N. Antidepressant like activity of *Lagenaria siceraria* (Molina) standley fruits by evaluation of forced swim behavior in rats. Int J Nutr Pharmacol Neurol Dis. 2011; 1(2):152-6.
- Lakshmi BVS, Sudhakar M. Antistress activity of *Lagenaria siceraria* fruit extracts in different experimental models. J Pharm Res. 2011; 4(4):1013-5.
- Kumar D, Sharma C, Singh B, Singh D. Pharmacognostical, the phytochemical and pharmacological profile of natural remedy *Lagenaria siceraria* (Mol.) Standley: A review. Brit J Pharmaceut Res. 2015; 7(5):340-52.

**Source of Support:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**Conflict of Interest:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

For any question relates to this article, please reach us at: [globalresearchonline@rediffmail.com](mailto:globalresearchonline@rediffmail.com)  
New manuscripts for publication can be submitted at: [submit@globalresearchonline.net](mailto:submit@globalresearchonline.net) and [submit\\_ijpsrr@rediffmail.com](mailto:submit_ijpsrr@rediffmail.com)

