Review on Pharmacognostic and Pharmacological Action of *Lagenaria siceraria*

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***Abstract- Lagenaria siceraria*, often referred to as Bottle gourd, is classified under the class Magnoliopsida and the family Cucurbitaceae. It is a very nutritious fruit that encompasses all vital components needed for maintaining optimal health of humans. *Lagenaria siceraria* is a perennial vine plant with a rich historical background of traditional medicinal use in several nations, particularly in tropical and subtropical areas. The climber is well-known for its medicinal properties and has been used in treating several ailments including jaundice, diabetes, ulcer, piles, insanity, hypertension, congestive cardiac failure (CCF), and skin issues. The fruits have been extensively used in Ayurveda and other traditional treatments because to it has cardioprotective, cardiotonic, general tonic, diuretic, antidote, alternate purgative, and cooling effects. This substance is used for the purpose of alleviating pain, healing ulcers, reducing fever, treating chest cough, asthma, and other bronchial issues. It is particularly potent when ingested as syrup made from delicate fruits. Fruits are abundant in ascorbic acid, beta carotene, and serve as a valuable Vitamin B source complex. The seeds of *Lagenaria siceraria* are rich in amino acids, proteins, lignin, and iron. The herb *Lagenaria siceraria* has been used in several traditional medicinal systems to treat human illnesses and maladies.**

***Key Word: Lagnaria siceraria*, cucurbitaceae, Phytochemical properties, Pharmacological action.**

INTRODUCTION

The phrase “medicinal plant” is used for all those florae utilized for the treatment and control of specific illnesses and to maintain good health. These components form the core of the conventional medical system and serve as sources of treatment for over 3 billion individuals living in less developed nations, where reliance on medicinal plants is prevalent. Also the bioactive compounds found in medicinal plants are extracted and then artificially synthesized for commercial purposes. One notable family of plants Cucurbitaceae, is renowned for the wide array of biological functions exhibited by is diverse species. The plants exist often known as cucurbits and are mostly distributed inside tropical regions and sub-tropical areas worldwide [1,2,3]. *Lagenaria siceraria* generally referred to as bottle gourd, is a cultivated Cucurbitaceae family plant and is classified under the genus Lagenaria. This plant is often used for both culinary and medicinal purposes. *L. siceraria* is officially recognized in Ayurvedic Pharmacopoeia under the synonyms Doodhi, Lauki, and Kadoo. It is widely utilized in Ayurvedic medicine as a tonic and cardiac tonic. It is a very nutritious fruit provided by nature, providing all the necessary components for maintaining good health [4, 5]. The fruit is a very abundant rich in vitamin B complex and Choline, along with a substantial quantity containing vitamin C and beta-carotene. The fruit pulp is used both medicinally and as a source of nourishment. Additionally, it has been found that it contains Cucurbitacins, fibers, and polyphenol [6]. The pulp contains many Chemical compounds such sterols, terpenoids, flavonoids, and saponins [7]. Fruit is said to encompass triterpenoids Cucurbitacins B, D, G, H, and 22-deoxy cucurbitacin which are bitter compounds found in cucurbitaceae. Fruit juice includes the enzyme beta glycosidase-elastase [8,9].

The plant is readily accessible in India. This plant is an herbaceous plant that climbs or trails, characterized by its oblong or dumbbell-shaped fruits. Its aerial portions and fruits are often eaten vegetable. Historically, it has been used as a medicinal remedy within several regions including India, China, European countries, Brazil, and Hawaii islands; due to it is cardiovascular tonic, general tonic, and diuretic characteristics [10]. Lagenine is a kind of protein possessing ribosome-inactivating action. The substance was derived originating freeze-dried aqueous solutions of Lagenaria siceraria seeds. Lagenine has immunosuppressive, antifertility, and antiproliferative properties. Effects as well as anti-inflammatory properties [11].

Lagenaria siceraria seeds are also used to treat dropsy and worm infestation. The clear limpid oil, with a concentration of up to 45% is derived from the fully matured seeds. Seed oil use has been shown to reduce migraine-type symptoms. The primary cultivated variety of Lagenaria siceraria is believed to have originated from Africa and Asia, including Sri Lanka, Malaysia, South Africa, and Indonesia. The gourd veggies are cultivated on 4.05 lakh hectares globe. The

prominent states in India for bottle gourd cultivation include Uttar Pradesh, Punjab, Gujarat, Assam, Meghalaya, and Rajasthan. Bottle gourd produce exhibit a wide range of forms and sizes. Recently, bottle gourd has been used for the treatment of diabetes. [12, 13, 14, 15, 16].

Historical Background:

The bottle gourd is a kind of vegetable. Widely regarded as foremost valuable flora in antiquity and is said to be the inaugural plant to be farmed and tamed. The bottle gourd is a kind of vegetable widely domesticated crop found mostly in regions characterized by tropical and subtropical climates locations worldwide. It is thought to have come from indigenous inhabitants in the southern regions of Africa [17]. According to reports in 2004, there were stands of *Lagenaria siceraria* in Zimbabwe were identified as a source plant. The desiccated, more delicate-skinned produce of this evident indigenous Plant serves as a receptacle for water; however it is not capable of enduring the demands of extended expeditions [18].

Figure1. Lagenaria siceraria Fruit

Plant Profile

Table 1. Taxonomy of Lagenaria Siceraria Plant [19]

Kingdom	**Plantae**
Division	Magnoliophyta
Class	Magnoliopsida
Family	Cucurbitaceae
Genus	Lagenaria
Species	L. siceraria

Table 2. Vernacular names of Lagenaria siceraria Plant [20]

Regional Language	**Vernacular names**
Sanskrit	Katutumbi, Tumbi Ishavaaku, Tiktaalaabu, Alobu, Alaabu
Bengal	Loki, Laus, tumb
English	Bottle gourd
Malayalam	Churan, Tumburini, Choraikka, Tumburu, Piccura, Chorakka, cura
Kannada	Isugumbala, Tumbi
Hindi	Lauki, Ghiya
Gujarati	Dudi, Tumbadi
Telugu	Sorakaya, Anapakaya
Urdu	Ghiya, Lauki, Kadu
Tamil	Sorakkai,Surai, Sorakkai
Marathi	Phopla
Punjabi	Tumbi, Dani

Morphology

Lagenaria siceraria has an elongated morphology of 7.9-15.5 cm in length, characterized by a full border and parallel venation. The plant's apex is sharp, with a tough and tough exterior, a solid consistency, a deep green hue, an acrid flavor, and a distinctive odor. The leaves are uncomplex, measuring up to 400 mm in length and width, with long petioles. They are 5-lobed, cordate, pubescent, and covered in short, fine hairs. The leaves are broadly shaped like eggs,

kidneys, or hearts and are not split. Weakly 3 to 7 lobed, with rounded lobes and shallowly serrated edges. When crushed the leaves do not emit any perfume.

The leaf stalks can grow up to 300 mm in length and are thick, often hollow, and densely covered in hair. They also have two diminutive, lateral glands situated near the leaf's base. The tendrils bifurcate. The Flowers have stalks, with the stalks of female flowers being less than the male. They are solitary, unisexual, and located in the axil. The flowers are also monoecious, meaning they have both male and female reproductive parts. The petals are crisped and have a cream or white color with contrasting darker veins. They are light yellow toward the bottom and obovate in shape, reaching maximum of 45 millimeters length. The flowers bloom in the evenings but quickly wilt. The fruits are of considerable size and exhibit a range of shapes, including cylindrical, flask-shaped or globose narrowing above the center. They are meaty, compactly covered in hair and do not split apart when mature. Initially green, they become yellowish or light brown as they ripen. The pulp dries out during ripening, resulting in dense, rigid, empty structure. There are several seeds and found inside a soft, porous flesh. They are condensed and have two level crests on their surface. In some variations, the seeds may seem uneven and wrinkled [21].

Figure 2. *Lagenaria siceraria* Fruit

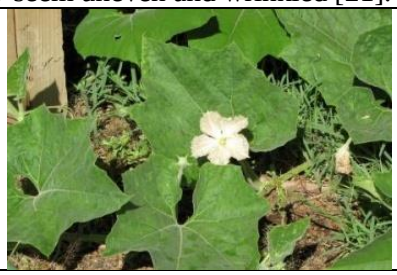

Figure 3. *Lagenaria siceraria* Leaves

Figure 4. *Lagenaria siceraria* Seeds

Traditional Uses:

The fruit is widely used as a therapeutic vegetables found in Asia and Africa to treat various diseases. The medicinal properties of this plant are derived from various components such as fruit, seed, leaf, and root [22].

The fruit pulp has several medicinal properties including this substance has emetic, sedative, purgative, diuretic, antibilious, and pectoral properties. The plant extracts have shown antibacterial properties. The juice derived from Lagenaria siceraria is a very effective treatment for cardiovascular issues, gastrointestinal and genitourinary ailments, as well as diabetes. The juice also has enhanced efficacy in treating insomnia, epilepsy, and other neurological disorders. Additionally, it aids in the dissolution of calculus (stones) inside the body [23].

The fruit of Lagenaria siceraria is very nutritious hydrating and mineral-rich source, and is considered to contain significant amounts of vitamins A, C, and B complex. Calabash is thought to promote hepatic homeostasis. Consuming gourd juice with lime juice may effectively alleviate the burning feeling in the urinary canal. It mitigates exhaustion and maintains your vitality, particularly in the summer season. It contains high levels of thiamine, vitamin C, zinc, iron, and magnesium, which contribute to enhancing general health. The stem bark and fruit rind have diuretic effects. The extract derived from the leaves of bottle gourd is beneficial for treating hair loss and may also assist in the prevention of tooth decay. Leaf juice is often used as a remedy for hair loss. The bottle gourd is highly regarded as an excellent meal for weight reduction due to its high water content of 96 percent and low calorie count of just 12 calories per 100g serving.

The extract derived from the fruit content is employed for its anti-inflammatory and analgesic properties [24, 25, 26].

Phytochemical Properties in Various Part of Plant

a. Fruits:

Analysis of the edible component of Lagenaria siceraria fruit showed that it includes 0.2% protein, 0.1% fat, 2.9% carbs, 96.3% moisture, 0.5% mineral matter, less than 0.01% phosphorus, and 0.02% calcium. According to reports, the following mineral elements are also detected. The numbers are per 100 g of the herb: iron 0.7 mg, sodium 11.0 mg, potassium 86.0 mg, and iodine 4.5 mcg/ kg. Fructose and glucose have been discovered as well. The fruit's amino acid content per gram is as follows: phenylalanine 0.9 mg, leucine 0.8 mg, valine 0.3 mg, tyrosine 0.4 mg, alanine 0.5 mg, glutamic acid 0.3 mg, serine 0.6 mg, aspartic acid 1.9 mg, cystine 0.6 mg, cysteine 0.3 mg, arginine 0.4 mg, proline 0.3 mg, and threonine 0.2 mg. Vitamin B-complex and Vitamin C (ascorbic acid) have also been discovered in the fruit contents [27].The bitter fruits produce a solid foam with a composition of 0.013% cucurbitacins B, D, G, and H, with cucurbitacin B being the predominant compound. The fruit contains aglycones, which are bitter constituents [28].

b. Seeds:

Reports indicate the presence of saponins in the seeds. The examination of the seed kernels revealed the following measurements. The composition of the substance is as follows: 30.72% protein, 8.3% carbs, 2.47% moisture, 52.54% oil, 4.43% ash, 1.58% fiber, 2.46% P2O3, and 0.11% CaO. The oil derived from seed kernels has a transparent and light

golden tint. 45% of the oil was obtained from mature seed kernels. The oil has the following characteristics: an iodine value of 126.6, a saponification equivalent of 301.7, 0.55% free fatty acids, and 0.68% unsaponified matter. The composition of free fatty acid components is as follows: 18.3% oleic acid, 64.1% linoleic acid, and 17.9% saturated fatty acids [27].

c. Leaves:

The leaves of this plant include cucurbitacin B, carbohydrates, phytosterols, saponins, phenolic compounds, tannins, proteins, amino acids, and flavonoids [29].

d. Root:

The roots of this plant species consist of cucurbitacins B, D, and E, as well as triterpene bryonolic acid [30].

Pharmacological Action of *Lagenaria siceraria*

a. Analgesic and anti-inflammatory activity:

Lagenaria siceraria is the scientific name for a plant species. The analgesic impact of stands for fruit juice extract (LSFJE) was investigated via the use of acetic acid produced agonizing and discomfort caused by formalin. The *Lagenaria siceraria* juice extract has anti-inflammatory activities opposed to several models of acute inflammation, including Ear edema generated by ethyl phenyl propionate, hind paw edema induced by carrageenan and arachidonic acid, and paw edema induced by albumin in rats. LSFJE produced noteworthy results [31].

b. Cardioprotective properties

The powdered fruit derived from *Lagenaria siceraria* as well exhibited notable heart-protective properties. The medication was evaluated for its effects on Doxorubicin-induced cardiotoxicity in rats. It was administered orally administered dosage 200mg/kg for a duration regarding 18 days. L.S. inhibits changes in the levels of natural antioxidants like superoxide dismutase and glutathione help prevent lipid peroxidation while also considerably decreasing indicators of heart damage such as CK-MB and LDH. In addition, the L.S powder also shown its ability to prevent ECG alterations and histological modifications caused by doxorubicin [32].

c. Antioxidant properties

Antioxidants derived the fruits of *Lagenaria siceraria* have been used extensively obtained. Presently, there is a growing focus on the commercial exploitation of plants as reservoirs of antioxidants for the purpose of improving health. There is a known inverse correlation between the occurrence of human diseases and the consumption of foods that are high in antioxidants. Reactive oxygen species (ROS) have been firmly established as playing a role in over one hundred disorders, including cardiovascular illness, cerebrovascular accident, atherosclerosis, malaria, acquired immunodeficiency syndrome (AIDS), diabetes, and cancer. Consequently, it is crucial for researchers actively search out organic origins of antioxidants. The observed benefits are attributed to being present of antioxidant chemical compounds, namely plant phenolics for example phenylpropanoids and flavonoids [33].

d. Diuretic activity

Diuretic function the water pill efficacy of the vacuum the fruit of Lagenaria siceraria was subjected to extraction utilizing both dry and methanol methods assessed. The diuretic activity was evaluated by quantifying various variables, including cumulative urine output and the levels of sodium, potassium, and chloride in the urine. It was observed that both obtain (administered orally at doses of 100-200 milligrams per kilogram resulted in increased urine volume and a rise that is depending on the dosage in the comparison of electrolyte excretion to the respective command group [26].

e. Anthelmintic activity

The efficacy of *L. siceraria* seeds as an anthelmintic against tapeworm (Hymenolepsis nana), pinworm (*Aspicularis tetraptera*) and earthworm (*Pheretima postuma*) infections in mice was assessed. The reference drug used was piperazine citrate at a dosage of 10 mg/ml, while .The control was distilled water. The seed extracts of *L. siceraria* in ethanol shown strong efficacy and resulted in the mortality of tapeworms [34].

CONCLUSION

Lagenaria siceraria, commonly the plant is often referred to as bottle gourd that is abundant in Asia and Africa. It is valued for its traditional medicinal properties and offers economic benefits to farmers engaged in sustainable agriculture. Additionally, it provides a safe and effective herbal dosage form with minimal or no side effects for healthcare purposes.

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