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POTENTIAL PHARMACOLOGICAL APPLICATIONS OF *LAGENARIA SICERARIA* (MOLINA) STANDL LEAVES: A REVIEW

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Abstract: *Lagenaria siceraria* Molina standl, commonly frequently referred to as bottle gourd, is a versatile plant species that has been traditionally used for its edible and medicinal properties across various cultures. While much attention has been given to its leaves, they have emerged as a valuable resource in recent years due to their phytochemical composition and various pharmacological activities. This review aims to provide a comprehensive overview of the phytochemical constituents and pharmacological properties of L. siceraria leaves. The phytochemical analysis of L. siceraria leaves has revealed the presence of various bioactive compounds including flavonoids, phenolics, terpenoids, and alkaloids, among others. These constituents contribute to the antioxidant, anti-inflammatory, antimicrobial, antiallergic, antihyperlipidemic, antiasthmatic and antinociceptive activities demonstrated by L. siceraria leaf extracts in numerous in vivo and in vitro studies. Additionally, the leaves exhibit potential anticancer properties through various mechanisms including apoptosis induction and inhibition of metastasis. Moreover, L. siceraria leaves possess promising nutraceutical potential due to their high nutritional value, including significant levels of vitamins, minerals, and dietary fibres. The consumption of L. siceraria leaf-based products or extracts may offer various health benefits such as improved weight loss, cardiovascular health etc.

IndexTerms **– Lagenaria siceraria , phytochemical analysis, pharmacological properties, nutraceuticals potential.**

I. INTRODUCTION

Lagenaria siceraria Molina standl is also referred to as bottle gourd and calabash (1)**.** *Lagenaria siceraria* has been officially recognized in the Ayurvedic Pharmacopoeia of India(2). *Lagenaria siceraria* belongs to the Cucurbitaceae family, subfamily Cucurbitaceae subfamily and Benincaseae tribe. *Lagenaria siceraria* (Molina) Standley is the predominant cultivar among the species of siceraria. Within this species, two morphologically distinct subspecies have been identified: *Lagenaria siceraria* subspecies *asiatica* and *Lagenaria siceraria* subspecies *siceraria* (3)**.**The Cucurbitaceae family is also referred to as the pumpkin, melon, or gourd family. There are 825 species and 118 genera in this family, most of which are found in the world's warmer climates. The Lagenaria species is the most widely used plant in the Cucurbitaceae family. The *Lagenaria siceraria* is a member of the Lagenaria genus , which gets its name from the Latin word Lagena, which means “Bottle” (4).

The bottle gourd, classified as an herbaceous annual plant, exhibits a sprawling or branched growth pattern. The stems of the plant, characterised by gland-tipped joints, are covered with fine hairs, lending them a velvety pubescent appearance. Tendrils are consistently present, and the leaves are arranged alternately, displaying variability. The roots, smooth and spherical with a white to pale cream coloration, possess a cross-sectional structure. While the taproot may extend up to 80 cm in depth, the bulk of the root system proliferates within the top layer of soil. Cross-pollination is notably advantageous due to the monoecious nature of *Lagenaria siceraria* flowers, wherein separate male and female blooms occur on distinct axes of the same plant. The seeds of the bottle gourd are flat and generally exhibit a rectangular to narrow trapezoidal shape, ranging in colour from pale to dark brown, situated within the fruit itself**.** As the fruit of the bottle gourd matures and desiccates, it undergoes a transition in colour from green to a pale brown hue. The diversity of bottle gourds encompasses various forms, shapes, and types, each yielding fruits that differ in size and morphology. Some manifest as large and spherical, while others exhibit an elongated, slender neck. Depending on the specific cultivar, the fruits can vary in length from 150 to 1000 mm. Bottle-shaped variants with paper pulp typically belong to the yellowish-green spectrum (5)**.**The fruit shape characteristics, including the difference between a wide base with a distinct handle and a narrow base with an indistinct handle, as well as the degree of bulge in the elongated handle i.e bilobate shape, were assessed quantitatively(6)**.**

This botanical specimen presents itself as a trailing or pubescent herb, distinguished by fruits that resemble bottles or dumbbells. Revered for its versatility, both its fruits and aerial parts are widely utilised as culinary ingredients and in traditional remedies across numerous nations, including Brazil, Hawaii, Europe, China, India, and beyond(7)**.** The fruits are conventionally employed for their cardioprotective, cardiotonic, general tonic, diuretic, aphrodisiac, antidotal properties against specific poisons and

scorpion stings, alternative purgative, and cooling effects (8)**.** Fruits contain calcium, phosphorus carbohydrate, protein, fat (ether extract), fibres, mineral matter (9)**.**

The fruit serves multiple roles including acting as an antioxidant, laxative, diuretic, and hepatoprotective agent. Additionally, it has hypolipidemic properties, stimulates the central nervous system, and functions as an anthelmintic, antihypertensive, immunosuppressive, and analgesic. Furthermore, it is adaptogenic and demonstrates free radical scavenging activity (10)**.**

The seeds function as agents with cardiotonic and liver tonic qualities, and possess anti-inflammatory, diuretic, and analgesic properties. They also exhibit antioxidant activity. Notably, Legenin, a ribosome-inactivating protein (RIP) isolated from the seeds, demonstrates antitumor, anti-HIV, anti-proliferative, and immune-protective attributes. Additionally, the seeds contain steroidal compounds such as avenasterol, codisterol, elesterol, iso fucosterol, stigmasterol, sitosterol, campesterol, and spinasterol (9)**.** The seed exhibits diuretic and anthelmintic properties and is utilised to alleviate inflammation and pain. Furthermore, it is employed in the treatment of conditions such as boils, tooth and gum pain, diabetes mellitus, cough, fever, and various skin ailments (11)**.**

The leaves are employed in the treatment of conditions such as jaundice, diabetes, ulcers, piles, colitis, insanity, hypertension, congestive cardiac failure, and various skin diseases. They contain constituents including cucurbitacin B, carbohydrates, phytosterols, saponins, phenolic compounds, tannins, proteins, amino acids, and flavonoids **(**(12).

The flower is utilised for its antianxiety, antidepressant, diuretic,cardioprotective, analgesic, anti-inflammatory, antimicrobial, cytotoxic, antihyperlipidemic,anthelmintic, antihyperglycemic, antihepatotoxic,anticancer, hepatoprotective, immunomodulatory, anti-urolithiatic, antistress, antiulcer and antioxidant properties (13)**.** The flower is utilised as an antidote for poisoning(12)**.**

Five other species of Lagenaria are as follows:

- Lagenaria breviflora
- Lagenaria rufa
- Lagenaria sphaerica
- Lagenaria abyssinica
- Lagenaria guineensis (14)

Indian varieties of lagenaria siceraria Molina standl are as follows:

- Kashi kiran
- Kashi kirti
- Kashi kundal
- Kashi ganga
- Hybrid kashi bihar (5)**.**

II. TAXONOMICAL CLASSIFICATION

Table 1: Taxonomical classification

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

III. SYNONYMS

Table 2: Synonyms

Hindi	Lauki
English	Bottle gourd
Sanskrit	Alaabu
Marathi	Kadoo
Tamil	Tamil
Gujarati	Dudhi or tumbadi
Bengali	Laus,Lokitumbi
Malayalam	Churakka Urdu
Punjabi	Tumbi, Dani
Kannad	Tumbi, Isugumbala
Urdu	Ghiya,Lauki
Telugu	Sorakaya, Anapakaya

IV. MORPHOLOGY

Lagenaria siceraria fruit are large, cylindrical and flask shape about 7.5-15.6 cm long dark green colour, bitter taste and characteristic odour. The flowers are creamy white in colour with darker veins, pale yellow at the base, obviate, and can reach

up to 45 mm in length. *Lagenaria siceraria* leaves are simple, measuring up to 400 mm in length and 400 mm in width. They are long petioled, five lobed, cordate, pubescent with slightly hairy, and broadly shaped like an egg, kidney, or heart. The lobes are rounded, the margins are shallowly serrated, and the crushed leaves are not scented. Leaves are 300 mm long, thick, frequently hollow, heavily hairy leaf stalks with two tiny lateral glands positioned near the base of the leaf. (15).Based on genotype leaves had different shape. Out of 31 genotype, 6 genotype had the oblong, 1 cordate, 7 ovate,8 orbicular,1 obviate and 8 reniform shaped leaves. The genotypes were categorized based on leaf length into three groups: small (<15cm), medium(15-20cm), and large(>20m). 9 genotypes were classified into the small leaf category, 21 genotypes into the medium leaf category, and 1 genotype into the large leaf category. Yetisir et al. (2008) and Mladenovic et al. (2012) reported leaf blade lengths ranging from 14.49 to 23.01 cm, while Leo et al. (2014) and Mashilo et al. (2016) observed leaf lengths varying from 12.81 to 22.5 cm. The genotypes were classified based on leaf width into three groups: narrow ((<0.15m), medium (0.15-0.20m), and broad (>0.20 m). Among the 31 genotypes, 1 was identified as narrow-leaved, 14 as medium-leaved, and 16 as broad-leaves. Mashilo et al. (2016) reported leaf widths ranging from 16.53 to 31.1 cm. Based on the nature of leaf pubescence, 21 genotypes were classified as having soft pubescence and 10 as having hard pubescence. In contrast, Yetisir et al. (2008) categorized leaf pubescence into small, medium, and large.Regarding leaf blade shape, 29 genotypes exhibited three lobes, two genotypes had 5 lobes, and no genotypes displayed seven-lobed leaves. In contrast, Mladenovic et al. (2012) recorded leaf blade characteristics in bottle gourd, including handle length (5-17 cm), leaf blade width (17.89-30.13 cm), and leaf blade length (14.49-23.01 cm)(16)**.**

Fig no.1: Different parts *Lagenaria siceraria* Molina standl plant

V. CULTIVATION AND COLLECTION

Bottle gourds are found in Ethiopia, India, and Moluccas country. North India in Dehradun the humid forest and the coastal regions of Malabar (North Kerala) have been identified as the centre of origin. The bottle gourd is a herbaceous plant that grows annually. *Lagenaria siceraria* is widely cultivated from near sea level up to elevations of 2500 metres in tropical regions. Particularly in locations with rough terrain and around rivers, it is frequently discovered escaping. It grows in grasslands, flat land, gentle slopes, mountainous ridges, riverbanks, dry riverbeds, riverside thickets, and alluvial sandy soil. Along roadside areas, in rural areas close to villages, secondary forests, and disturbed sites are also frequent locations for it. Because L. siceraria can withstand dry and arid circumstances, it is suited to tropical wet and moist climates. As a result, it can be found growing in dry regions, arid fields, and dry dense vegetation. This vegetable is cultivated all over worldwide like India, Africa, China, America, and a few Caribbean nations. Around 16.5 million tons of bottle gourds were produced worldwide in 2012, mostly in China and India. In India, two crops tend to be raised: a summer crop from mid-October to mid-March and a later crop from early March to mid-July. When an early crop is sought, seedling transplantation is used. For the first harvest, round fruit varieties are often shown, and for the second, bottle-shaped varieties (17)**.**

The utilisation of bottle gourd has been progressively increasing owing to its purported health advantages, notably within tropical and subtropical regions. It is imperative to implement appropriate breeding protocols aimed at producing superior genotypes possessing desired characteristics prioritising market-driven quality and high yield in cultivation, a requisite for achieving success in these areas (18)**.**

Fig.no.2: *Lagenaria siceraria* Molina standl cultivation

VI. PHYTOCONSTITUENTS

The leaves of the L. siceraria leaf are rich in following phytoconstituents:

- Cucurbitacin B
- Carbohydrates
- Phytosterols
- Saponins
- Phenolic compounds
- Tannins
- Proteins
- Amino acids
- Flavonoids
- Alkaloids (17).

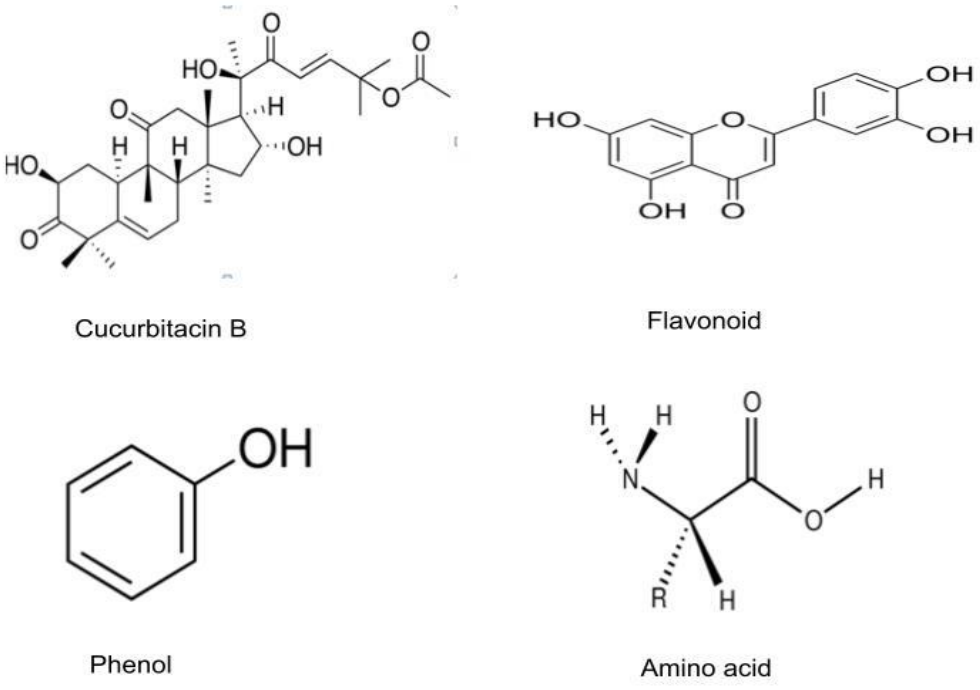

Fig no. 3: Structure of phytoconstituents

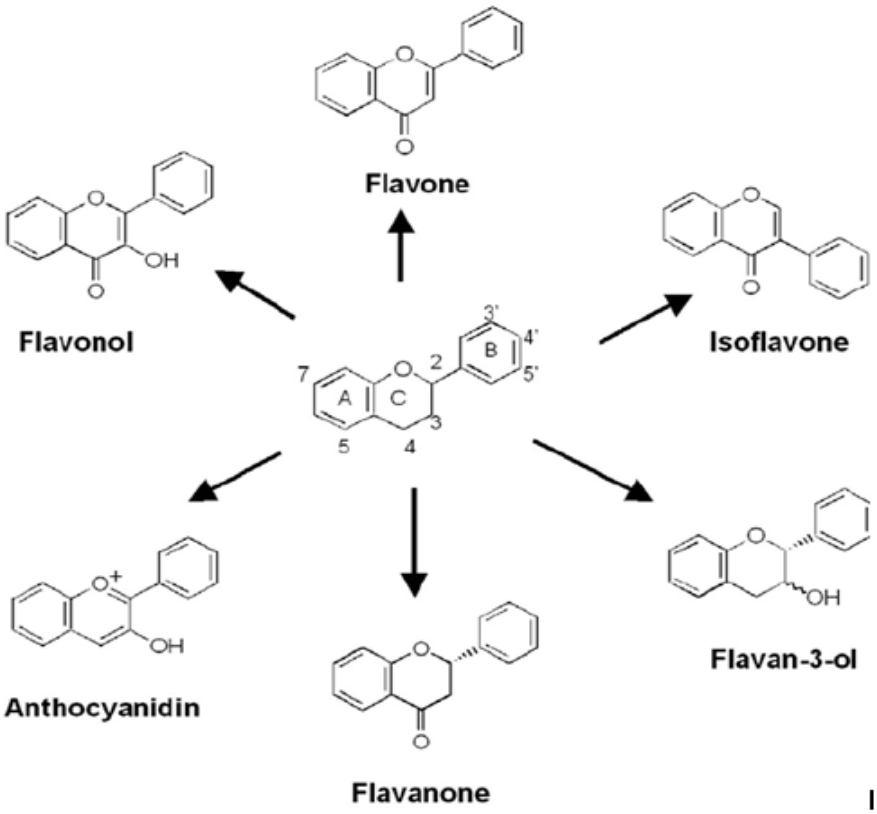

Fig no. 4 Basic structure of flavonoids

VII. MINERAL EVALUATION

The mineral contents in bottle gourd fresh and dry leaves were estimated, revealing the presence of eleven elements with diverse quantities. These elements occur in the range of high, moderate, and low amounts depending on the particular part of the plant and element type. Bottle gourd leaves were found to be comparatively high, suggesting that they are a good source of nutrients (19)**.**

The nutrients names and quantity are listed below(20)**:**

Table 3: Minerals present in fresh & dry leaves

Element	Fresh Leaves		Dry leaves	
	%-ppm	mg/100 g	%-ppm	mg/100 g
Calcium	0.164 %	163.808	4 %	4000
Potassium	0.188 %	188.379	4.6 %	4600
Phosphorus	0.018 %	17.609	0.43 %	430
Iron	0.005 %	4.505	0.11 %	110
Sodium	0.004 %	3.686	0.09 %	90
Magnesium	0.030 %	29.895	0.73 %	730
Maganese	3.477 ppm	0.348	84.9 ppm	8.49
Selinum	0.016 ppm	00.0016	0.38 ppm	0.038
Zinc	3.448 ppm	0.345	84.2 ppm	8.42
Copper	2.158 ppm	0.216	52.7 ppm	5.27
Copper	2.158 ppm	0.216	52.7 ppm	5.27

Table 4: Amino acids present in fresh & dry leaves:

Name of amino acids	Fresh leaves (%)	Dry leaves (%)
Asparic Acid	0.078	1.90
Serine	0.034	0.84
Proline	0.045	1.09
Glutamic acid	0.096	2.35
Therionine	0.044	1.08
Glycine	0.053	1.30
Alanine	0.049	1.20
Methionine	0.016	0.39
Isoleucine	0.047	1.15
Leucine	0.066	1.61

Phenylalanine	0.050	1.22
Tyrosine	0.038	0.92
Histidine	0.020	0.50
Valine	0.038	0.92
Argnine	0.049	1.19
Cysteine	0.014	0.33
Lysine	0.051	1.25
Whole content	**0.788**	**19.24**

Table 5: Phenol present in fresh & dry leaves

Name of Phenolic compound	Fresh leaves (%)	Dry leaves (%)
Gallic acid	0.325425	0.395523
Pyrogallol	1.35375	4.974984
3-HydroxyTyrosol	29.88518	137.6077
Protocatechuic acid	1.750678	27.01080
Chlorogenic acid	2.370382	5.061764
Catechin	2.896425	82.92647
Catechol	2.249159	4.223113
P-OH benzoic acid	1.204092	8.574009
Caffeic acid	0.109141	1.578913
Vanillic acid	1.110788	1.250836
P-Coumaric acid	0.111596	3.609774
Ferulic acid	1.918197	12.04241
Isoferulic acid	0.600955	2.982975
Ellagic acid	0.960424	14.22925
Salicylic acid	1.138767	8.741998
Coumaric acid	0.026619	0.200779
Oleuropein	6.172524	16.20500
Benzoic acid	4.539336	8.84159
3,4,5-trimethoxyCinnamic acid	0.233234	1.232966
Cinnamic acid	0.016557	0.077680
Coumarin	0.076786	0.793893

Table 6: Flavonoids compound present in fresh & dried leaves

Name of flavones	Fresh leaves	Dry leaves
Naringin	5.220319	137.7926
Hesperidin	19.68636	115.9560
Rutin	3.713592	22.98165
Quercetrin	1.731798	8.572887
Naringenin	0.079589	0.273550
Hesperetin	0.413692	2.829390
Apigenin	0.045917	0.373958
Kaempferol	0.117249	1.152218
Quercetin	0.086941	0.768288
Isorhamnetin	3.262088	22.13231

Table 7: Isoflavonoid compound present in fresh & dry leaves

Name of Isoflavone	Fresh leaves	Dry leaves
Daidzein	6.571985	21.81892
Isoformononetin	0.120756	1.533818
Genistein	0.470885	1.997426
Biochanin	0.015700	0.153938

VIII. ETHANOPHARMACOLOGICAL USES

Lagenaria siceraria Molina standl leaves are most commonly used are following:

1. Alternative purgative
2. Skin irritation
3. Tumour
4. Baldness
5. Headache

6. Jaundice
7. Diabetes
8. Ulcer
9. Piles
10. Colitis
11. Insanity
12. Hypertension
13. Congestive heart failure

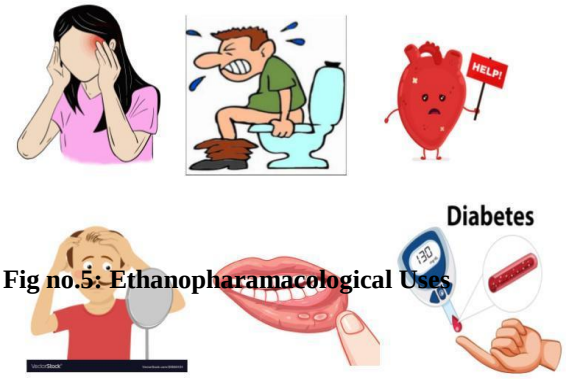

Fig no.5: Ethanopharamacological Uses

PHARAMACOLOGICAL USES

3.1 Anti-asthmatic and anti-allergic

The Lagenaria siceraria leaf aqueous extract used to assess anti-asthmatic and anti-allergic activity utilising several animals, including guinea pigs induced to bronchoconstriction by histamine and acetylcholine, rats induced to degranulate mast cells by compound 48/80, and mice induced to exhibit paw edema. Intraperitoneal administration of leaf extract of lagenaria siceraria at doses of 150 and 300 mg/kg resulted in significant and dose-dependent bronchodilatory effects. Furthermore, lagenaria siceraria leaf extract demonstrated a substantial reduction in compound 48/80-induced mast cell degradation at concentrations of 10µg/ml, 20µg/ml, and 30µg/ml. To assess its anti-inflammatory effect, leaf extract of lagenaria siceraria was administered at doses of 50mg/kg, 75 mg/kg, and 100 mg/kg (Intraperitoneal administration) in rats with paw edema caused by compound 48/80. These findings provide evidence supporting the effectiveness of Lagenaria siceraria leaves in the treatment of asthmatic conditions (21).

3.2 Antioxidant Activity

Employing in vitro antioxidant models, the Lagenaria siceraria leaves methanolic extract has been examined for its ability to scavenge free radicals. The activity of the DPPH (1,1-diphenyl-2-picrylhydrazyl) assay and the H2O2 (hydroxyl and hydrogen peroxide) radical scavenging assay were used to evaluate the antioxidant capacity. It showed an important connection in each of these investigations between the extract's concentrations and the percentage of free radical inhibition. It was also shown that the extract had a high phenolic content (99.09±0.10 µg/mg). These findings unmistakably showed that methanolic extract of lagenaria siceraria leaves may be a useful natural antioxidant that is efficient in reducing diseases triggered by free radicals (22).

3.3 Anti-Hyperlipidemic activity

In this study aqueous leaves extract of L.S. had potential activity on hyperlipidemia. They carried out this study on hyperlipidemic wistar albino rats using oral route for drug administration. The rats on a high-cholesterol diet (HCD) were administered an Lagenaria siceraria leaves aqueous extract orally at doses of 200 and 400 mg/kg. Serum lipid levels were examined after eight weeks of medication to determine any potential anti-hyperlipidemic action. Atorvastatin (10 mg/kg p.o) was used as standard medicine. The research results demonstrated that the Lagenaria siceraria leaves aqueous extract notably ($P<0.01$) lowered the levels of atherogenic index serum (AIS), low-density lipoprotein cholesterol (LDLC), very low-density lipoprotein cholesterol (VLDLC), and total cholesterol (TC). A noteworthy ($P<0.01$) rise in HDLC, or high-density lipoprotein cholesterol, was also shown by the data. Our evaluation of the research suggests that the AELS possesses a noteworthy ability to prevent hyperlipidemia activity(23).

3.4 Anti-inflammatory and antinociceptive

The goal of the current investigation was to assess the anti-inflammatory and antinociceptive properties of Lagenaria siceraria aerial parts methanol extract (MELS) at 200 and 400 mg/kg body weight. Antinociceptive action was evaluated in mice using hot plate, tail immersion, and acetic acid-induced writhing response. Both acute and chronic inflammatory models, including carrageenan, dextran, and histamine-induced rat paw oedema, were used to investigate the anti-inflammatory potential. The extract displayed a strong antinociceptive effect. Rat paw oedema was dose-dependently reduced by methanolic extract of lagenaria siceraria of the aerial part in models of acute inflammation. A daily dose of 400 mg/kg of the extract markedly reduced the formation of granulomas in the chronic inflammatory model. As a result, the Lagenaria siceraria aerial part extract showed strong anti-inflammatory and antinociceptive activities (7).

3.5 Anti-allergic activity

In this study methanol was used for extraction of dried L.S. leaves. Via soxhlet extraction, 500 gm of leaves were extracted into a methanolic extract that obtained 16.70% (w/w) of dry extract. Exsanguinations killed the Wistar rats. As a negative control, the mesentery pieces were spread out and exposed to 1µg/ml of compound 48/80 for ten minutes. For ten minutes, mesenteries treated with standard ketotifen or methanolic extract Lagenaria siceraria at varying concentrations were challenged with 1µg/ml of compound 48/80. Under a microscope, the percentage of degranulated mast cells was measured on mesentery pieces stained with 0.1% toluidine blue solution. The protection provided by methanolic extract and ketotifen was then determined. In an alternative approach, the Compound 48/80 (0.3µg in 0.05ml) was applied subcutaneously to the albino's mice right hind paw's plantar area. In rat mesenteries, compound 48/80 triggered mast cell degradation, and the methanolic extract of Lagenaria siceraria leaves showed major dosage dependent (10-30 µg/ml) anti allergenic efficacy against it. Whenever LSM was administered at a dose of 100 mg/kg, mice's paw edema triggered by compound 48/80 was greatly reduced (24).

3.6 Antimicrobial activity

Antimicrobial activity of ethanolic extract of L.S. leaves using the agar- well diffusion method and broth dilution method. Results revealed L.S. ethanolic extract to show more activity against *E. coli* than *S. aureus* and *B. subtilis*. The extract had strong activity against on gram negative bacteria *E. coli* 20, 24 and 25mm inhibitory zones for 30, 40 and 50 mg/ well respectively. The extract shows low activity against gram positive bacteria *S. aureus* and *B. subtilis* than *E.coli* at concentration 30,40 and 50 mg/well.The lowest concentration was 10 mg/ml in opposition to S. aureus, and was equal concentration on *E. coli* and *B. subtilis* (20 mg/ml) called as MIC.Based on these results, bottle gourd leaf extract was added to beef sausage at varying concentrations (1%, 2%, and 4%), and the sausage was then kept at -20°C for 90 days to examine the impact on the sausage's quality. In comparison to control samples, the sausage treated with bottle-gourd leaf extract showed excellent durability against oxidation. Additionally, it was noted that the treated sausage's microbial load was lower than control. Ultimately, it became clear that the extract from bottle gourd leaves contributes to the decrease in microorganisms and their natural antioxidant content, which extends the sausage's shelf life (25)**.**

3.7 Anticancer activity

They evaluate the anticancer activity using the Ehrlich's Ascites Carcinoma (EAC) model in mice. Following the inoculation of EAC cells into mice, a nine-day treatment regimen was administered with varying doses of methanolic extract of lagenaria siceraria leaves (200 and 400 mg/kg-1), alongside the standard medication, 5-fluorouracil (20 mg kg-1). Tumour growth response, encompassing parameters such as increase in life span, haematological indices, biochemical markers, and tissue antioxidant levels, was assessed to gauge treatment efficacy. The findings of the experiment revealed potent anticancer activity associated with L. siceraria, potentially attributable to its cytotoxic properties.This was demonstrated by observed changes in tumour growth dynamics and the resulting impact on survival duration. Moreover, haematological and biochemical analyses provided insights into the physiological response to treatment, further corroborating the anticancer efficacy of MELS(26)**.**

3.8 Anthelmintic activity:

The methanolic extract of *Lagenaria siceraria* aerial parts was investigated using the soxhlet method. The study aimed to evaluate the anthelmintic properties of methanolic extract of Lagenaria siceraria aerial parts against Pheretima posthuma. A comprehensive phytochemical analysis conducted through GC-MS investigation identified 59 components in the Lagenaria siceraria extract. In comparison with the gold standard medication, albendazole, MEALS demonstrated notable anthelmintic effects. The paralysis time of Pheretima posthuma decreased from 4.76 to 2.17 minutes, and the death time decreased from 5.87 to 1.96 minutes with increasing concentrations of MEALS. Specifically, MEALS exhibited paralysis times ranging from 4.76 to 2.17 minutes and death times ranging from 6.18 to 2.34 minutes. These results indicate that the aerial parts of Lagenaria siceraria (MEALS) possess significant anthelmintic properties, likely attributed to the presence of various physiologically active phytoconstituents (27)**.**

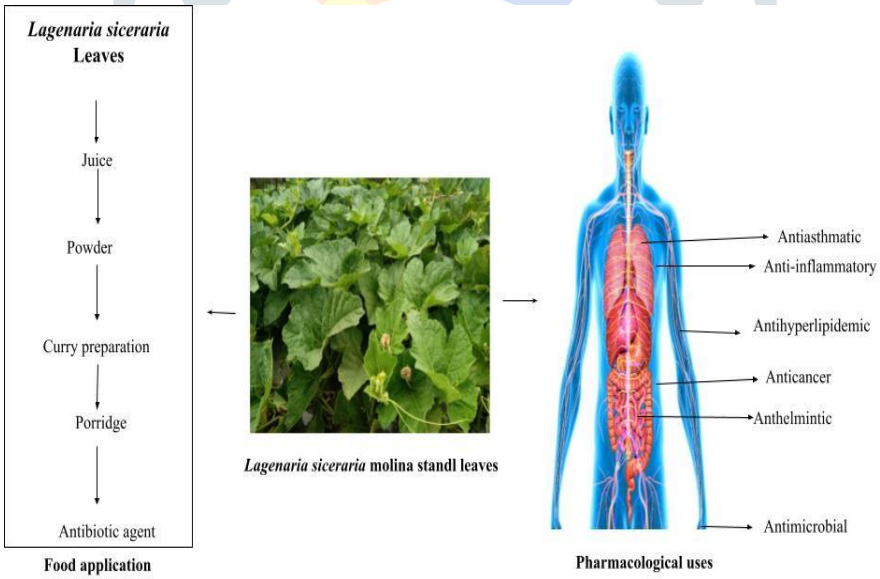

Fig no.6: Pharmacological Uses

Table 8: *Lagenaria siceraria* leaves activities in different-different extract

S.no.	Plant part	Extract	Activity	References
1.	Leaves	Acetone	Antimicrobial	(25)
2.	Leaves	Ethanol	Antimicrobial	(25)
3.	Leaves	Ethanol	Antioxidant	(25)
4.	Leaves	Methanol	Antioxidant	(25)

5.	Leaves	Methanol	Anti-inflammatory	(7))
6.	Leaves	Methanol	Anti-allergic	(24)
7.	Leaves	Methanol	Anti-cancer	(26)
8.	Leaves	Methanol	Anthelmintic	(27)
9.	Leaves	Aqueous	Metal chelating and phosphomolybdenum	(25)
10.	Leaves	Aqueous	Antiasthmatic	(21)
11.	Leaves	Aqueous	Antihyperlipidemic	(23)

CONCLUSION

The exploration of the traditional and therapeutic uses of Lagenaria siceraria Molina Standl leaves, alongside an investigation into its phytochemical composition, warrants further attention. This review underscores the pharmacologica potential inherent in this plant, offering insights to optimise its therapeutic efficacy. A comprehensive assessment, integrating both exploitation and exploration methodologies, is essential to uncovering promising avenues for future research and the development of effective therapeutic agents.

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