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Review Article

Study Of Biological Effect And Chemical Constituent Of Bottle Gourd Preparation Of Bottle Gourd Juice

Patil Ravindrasing*, Tushar Ambhore, Hariom Chankhore, Sagar kale, Dr. Vinod Chaware, Dr. Shivshankar mhaske

Satyajeet college of pharmacy mehkar.

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ABSTRACT

Lagenaria siceraria (bottle gourd). Rich in nutrients and bioactive compounds such as flavonoids, saponins, and triterpenoids, the plant exhibits a wide range of pharmacological activities. These include antimicrobial, antidiabetic, cardioprotective, antioxidant, antihypertensive, anti-inflammatory, antiulcer, hepatoprotective, analgesic, and anticancer properties. Various studies have validated its traditional use in managing metabolic disorders, inflammation, infections, and oxidative stress. Despite its benefits, caution is advised due to potential toxicity from bitter variants containing cucurbitacins. Overall, the document emphasizes bottle gourd's potential as a natural therapeutic agent and its application in functional foods and nutraceuticals. Bottle gourd (Lagenaria siceraria), coriander (Coriandrum sativum), tulsi (Ocimum sanctum), and pudina (Mentha spp.). Each herb is evaluated for its traditional uses, biological effects, advantages, and precautions. Bottle gourd supports digestion, heart health, and diabetes management; coriander has antioxidant, anti-inflammatory, and detoxifying effects; tulsi acts as an adaptogen with antimicrobial and immunomodulatory benefits; and pudina aids in digestion and respiratory relief. A herbal juice preparation combining all four ingredients is described, offering a natural and holistic health supplement. The document highlights the value of these herbs in daily wellness and traditional medicine while acknowledging potential side effects with overuse or sensitivity.

INTRODUCTION

The limited availability of animal-based protein sources, along with the high costs associated with common plant proteins, has driven research toward exploring the nutritional potential of lesser-known and underutilized legumes and oilseeds (Enujigha & Akanbi, 2005). Among these,

***Corresponding Author:** Patil Ravindrasing
Address: *Satyajeet college of pharmacy mehkar.*
Email ✉: ravindrasingrajput2191@gmail.com
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members of the Cucurbitaceae family are of interest due to their seeds being rich sources of both protein and oil. Previous studies have shown that dehulled cucurbit seeds can contain up to 50% oil and 35% protein (Madaan & Lal, 1984; Martin, 1984). One such underutilized plant is the bottle gourd (Lagenaria siceraria), which grows widely across tropical and subtropical regions. Thought to have originated in Africa, it is locally referred to as "Luddai" in Hausa. The plant features a long, hairy, brittle stem that can extend up to 9 meters, and broad, soft leaves measuring up to 40 centimeters in length and width. The fruit is typically large and varies in shape from sub-globose to cylindrical, often flask-shaped with a characteristic narrowing at the midpoint. It transitions in color from green to yellow or pale brown as it matures. When fully ripe, the pulp dries out, leaving a durable, hollow shell containing seeds embedded in a soft, spongy tissue. These seeds range from 7 to 20 mm in length and may show variation in surface texture and ridge patterns (Osagie & Eka, 1998; Kochler, 1981). The plant thrives in sandy or loamy soils and can be cultivated either as a ground cover or as a climbing vine, the latter requiring fruit support during maturation. In Nigeria, bottle gourd is commonly cultivated in the Sudan savanna, particularly in Zamfara State, where it serves as a cash crop. The hard shell of the fruit is often repurposed as a container or musical instrument, while the seeds are used in cooking as a soup thickener similar to "egusi" and as a source of edible oil (Maigandi & Ngang, 2002).uldana. Bottle gourd (*Lagenaria siceraria*), also known as lauki or calabash, contains several bioactive compounds that contribute to its health benefits, including the prevention and management of diabetes and hypertension.

Saponins These phytochemicals have **hypoglycemic** (blood sugar-lowering) and **antihypertensive** properties.They help improve insulin sensitivity and reduce blood pressure by acting as vasodilators.

Flavonoids These are potent **antioxidants** that reduce oxidative stress, a factor in both diabetes and hypertension. They help improve endothelial function and reduce inflammation.

Dietary Fiber Bottle gourd is rich in **soluble fiber**, which slows glucose absorption and improves blood sugar control. Fiber also helps reduce blood cholesterol levels, which supports heart health and lowers hypertension risk.

Cucurbitacins (in trace amounts) These compounds have shown potential in controlling blood sugar in some studies, though they can be toxic in high concentrations. Bottled gourd with a bitter taste may contain harmful levels of cucurbitacins and should be avoided.

Minerals like Potassium and Magnesium Potassium helps lower blood pressure by counteracting sodium. Magnesium plays a role in glucose metabolism and blood pressure regulation.

To study the traditional and Ayurvedic uses of bottle gourd in natural medicine. To analyze the nutritional and phytochemical constituents of bottle gourd contributing to its medicinal value. To examine the potential health benefits of bottle gourd in managing conditions like diabetes, hypertension, obesity, and gastrointestinal disorders. To investigate any adverse effects or toxicity associated with improper consumption. To increase awareness about the therapeutic potential of bottle gourd among students and the local community.

1. Description

2.1 Chemical Components and Therapeutic Applications

Different parts of the bottle gourd plant have been traditionally used for medicinal purposes across various cultures. The juice extracted from its leaves is commonly applied to treat baldness, while its flowers serve as a natural antidote. Other plant parts are known for their diuretic properties. Ethnobotanical information about the fruit of Lagenaria siceraria is illustrated in related figures. In a study conducted by Ghule et al. (2003), a range of compounds including amino acids, proteins, glycosides, and notably high levels of lysine were identified through phytochemical investigations. Bottle gourd is recognized as a rich source of nutrients such as B vitamins, pectin, dietary fiber, vitamin C, and beta-carotene.

Fig : 1 bottle gourd fruit

Fig 2 : structure of seed

Protein, amino acids (Ogunbusola et al. 2010). And min-Erals (Mali and Bodhankar 2010). Bottle gourd (Lagenaria siceraria) is a nutritious vegetable with several bioactive phytochemicals that contribute to its medicinal properties. The following table summarizes the major phytochemicals found in bottle gourd and their associated biological effects:

Table 1

Phytochemical	Biological Effects
Flavonoids (e.g., Apigenin, Quercetin)	Antioxidant, anti-inflammatory, hepatoprotective
Saponins	Cholesterol-lowering, hepatoprotective, immunomodulatory
Triterpenoids (e.g., Lagenin)	Anti-inflammatory, anticancer, liver cell regeneration
Cucurbitacins (trace amounts)	Detoxifying in low doses, cytotoxic to cancer cells, stimulate liver enzymes
Phenolic acids (e.g., Caffeic acid)	Antioxidant, anti-aging, anti-diabetic
Polysaccharides (Dietary Fiber)	Gut detox, supports digestion and microbiota
Sterols	Hypolipidemic (lipid-lowering), hormonal balance

2.2 Pharmacological activities

2. 2. 1. Antimicrobial activity

Nalwade et al. (2013) have discussed on the antimicrobial property of silver nanoparticles against two different strains Klebsiella pneumoniae NCIM 2719 and Clostridium acetobutylicum. The authors reported that Ag NPs from bottle gourd showed a high toxicity against these bacteria. Sood et al. (2012) reported on the

antimicrobial property of seed extracts from Cucurbitaceae family, Momordica charantia (karella), Cucumis sativa (cucumber), Praecitrullus fistulosus (tinda), C. pepo (kaddu), L. siceraria (loki). The results revealed that the seed extracts were very effective against Serratia marcescens, Escherichia coli, Streptococcus thermophilus, Fusarium oxysporum and Trichoderma reesei. Further the n-hexane extract of L. siceraria was investigated for the antimicrobial activity which showed the decrease in the microbial growth on E. coli (17.25 mm) and Salmonella typhi (17.80 mm). Also, the results revealed that there was no significant inhibition against Vibrio cholera, Bacillus cereus, Bacillus subtilis, and Staphylococcus aureus (Sen et al. 2014). In 2014, Menpara et al. (2014) concluded that the solvent extracts of L. siceraria showed good inhibition against an array of bacteria and fungi.

2.2.2 Antidiabetic activity :

From the literature, it was found that the patient with diabetes mellitus has a higher risk of cardiovascular disease. They suggested that the extracts from the L. siceraria (bottle gourd) may have the therapeutic role in the treatment of diabetes. In 2013, Charu et al. (2013) evaluated the potency of bottle gourd juice in curing diabetes and dyslipidaemia. Their studies involved the administration of freshly prepared bottle gourd juice to 100 volunteers on an empty stomach for 90 days. The kidney and liver functions were monitored during the course of administration of bottle gourd juice. As a result, it was observed that there is a significant reduction in the blood glucose and cholesterol level. The authors finally concluded that L. siceraria juice can be used as an alternative and adjunctive treatment in disorders associated with carbohydrate and lipid metabolism.The L. siceraria pulp and seed extracts stimulate the changes in the functional state of pancreatic 13 cells and at the same time the capability of secretion of insulin with decrease in blood glucose level (Bhattacharya and Das 2012). This study clearly indicates the significance of pulp and seed extract of L. siceraria as an antidiabetic and supports the traditional usage to prevent diabetic complications. In literature, Teugwa et al. (2013) surveyed the role of Cucurbita moschata, L. siceraria and Cucumeropsis mannii seeds on anti-hyperglycaemic activity. Based on the results obtained, authors concluded that L. siceraria could serve as an antidiabetic agent. The methanolic extracts of L. siceraria were screened for chronic and acute toxicity in mice. The findings revealed that the aerial parts of the L. siceraria can decrease the glucose level without toxicity (Saha et al. 2011).

Fig 3 pharmacological activity of bottle gourd

1.2.3. Anti-Hyperlipidaemic and Cardioprotective Activities

Research has shown that methanolic extracts of *Lagenaria siceraria* exhibit promising cardiotonic and lipid-lowering properties in animal models with hyperlipidaemia. Over a 30-day period, treated rats displayed a gradual reduction in lipid levels. Additionally, the extract appeared to promote bile salt excretion, contributing to its lipid-lowering effect (Ghule et al., 2009). Further investigations by Mali and Bodhankar (2010) demonstrated the cardioprotective potential of *L. siceraria* fruit powder in rats subjected to isoprenaline-induced cardiac toxicity. Prolonged use of the fruit powder led to a noticeable reduction in tachycardia and systolic blood pressure. Similarly, Upaganlawar and Balaraman (2011) reported that pre-treatment with *L. siceraria* mitigated the harmful effects of isoprenaline, possibly due to its antioxidant and anti-inflammatory properties. Singh et al. (2012) explored the protective effects of a hydroalcoholic extract of *L. siceraria* against doxorubicin-induced cardiotoxicity in Wistar rats. The study reported improvements in key cardiac biomarkers, such as glutathione, catalase, and lipid peroxidation levels, alongside histopathological improvements. These findings suggest that the extract may play a significant role in reducing cardiac damage.

1.2.4. Antioxidant Activity

Plants are a vital source of natural antioxidants, which are essential for protecting the body against oxidative stress and related diseases, especially since humans cannot synthesize antioxidants endogenously. *L. siceraria* has been identified as a potent antioxidant source. For instance, Satvir et al. (2012) found that its ethanolic seed extract possessed strong antioxidant activity, indicating its potential use as a natural supplement. Agrawal and Katare (2015) highlighted that *L. siceraria* contains a high concentration of flavonoids and flavanols, compounds known to enhance antioxidant defenses. They suggested administering the extract at a dose of 200 mL per day in a fasting state for optimal effect. Chanda et al. (2015) further noted that the acetone extract of the plant has therapeutic applications, particularly in preventing cancer and cardiovascular diseases, underscoring its importance in the food and health industries as a means to combat oxidative stress. The L. siceraria seeds were extracted with ethyl acetate, water and n-butanol. The authors have

screened for the phytochemicals present in the seed extracts. The results showed the presence of different class of compounds such as flavonoids, carotenoids, vitamin C, tannins and vitamin E in ethyl acetate, water and n-butanol extracts. Further, the extracts were checked for the free radical assays such as superoxide assay, reducing power, MTT reduction and lipid peroxidation inhibition assay. The results revealed that the phytochemicals have the potency to scavenge the radicals and it can be considered as a source of natural antioxidants for food and nutraceutical products (Mohan et al. 2012, Antia et al. 2015). The ethanolic fruit extract of L. siceraria were investigated for the antioxidant mechanism (Vijayakumar et al. 2010) and resulted that the fruit does not only play a vital role as an antioxidant but it also plays a higher role in curing mitochondrial damage. He proved that the oral administration of ethanolic extract of L. siceraria fruits significantly prevented almost all the enzymes of isoproterenol-induced heart failure and improved myocardial injury. Their results demonstrated elevated oxidative stress and antioxidant dysfunction in isoproterenol-treated rats. The radical scavenger not only helps as antioxidants but also in the formation of tumour by various oxidative agents which were further confirmed successfully (Mayakrishnan et al. 2012). Sharma et al. (2013) studied the methanolic extract of L. siceraria leaves (MELS) by antioxidant models in in vitro conditions. The antioxidant potential was identified using the activity of hydroxyl and hydrogen peroxide (H2O2) radical scavenging and 1,1-diphenyl-2-picryl hydrazyl (DPPH) assay.Finally, the authors resulted that a high percentage of free radical inhibition was found which was due to the high phenolic content. Kalpna et al. (2011) evaluated the antioxidant potential of seven fruits and vegetables peels. The results showed that the crude extracts of Mangifera indica and L. siceraria peel also act as a as a potential source of natural antioxidants which can be used in the prevention of diseases caused by free radicals.

1.2.5. Antihypertensive Activity

In a study by Mali and Bodhankar (2010), long-term administration of *Lagenaria siceraria* fruit powder to rats with dexamethasone-induced hypertension showed a significant reduction in blood pressure, indicating the fruit's potential antihypertensive effects.

1.2.6. Anti-Inflammatory Activity

Gill et al. (2012) evaluated the ethanolic seed extract of *L. siceraria* and found it exhibited notable antioxidant, anti-inflammatory, and analgesic properties. These results suggest its therapeutic relevance in managing inflammation and pain. Further research by Mali et al. (2012) reported that both the fruit powder of *L. siceraria* and nitro-L-arginine methyl ester (a compound derived from the plant) were effective in lowering hypertension in rats. However, while the methyl ester was associated with myocardial inflammation and tissue damage, *L. siceraria*-treated rats showed no such adverse effects. This points to the plant's potential cardioprotective effects. The presence of flavonoids such as vitexin, orientin, and isoorientin may contribute to its anti-inflammatory and protective actions on cardiac tissues.

1.2.3. Anthelmintic Activity

According to Kumar and Partap (2012), methanolic extracts from *L. siceraria* leaves demonstrated strong anthelmintic activity against the Indian earthworm *Pheretima posthuma*. The effectiveness of the extract compared favorably with standard pharmaceutical treatments, highlighting its potential as a natural antiparasitic agent.

1.2.4. Antiulcer Activity

With changing lifestyles and dietary habits, the incidence of gastric ulcers has risen significantly. While conventional synthetic and semi-synthetic drugs are available for treatment, many are associated with side effects when evaluated in clinical settings. As an alternative, *Lagenaria siceraria* has shown potential in managing ulceration. According to Avinash et al. (2011), this plant possesses notable antiulcer activity, indicating its potential as a natural remedy.

1.2.5. Hepatoprotective and Lung-Protective Activity

Yetisir et al. (2012) studied the effects of *L. siceraria* fruit juice in rats suffering from oleic acid-induced acute lung injury. Their investigation included biochemical analysis of key oxidative stress markers like superoxide dismutase, glutathione peroxidase, catalase, malondialdehyde, and carbonyl content. Histological observations using both light and electron microscopy revealed that treatment with the fruit juice reduced inflammatory cytokines (e.g., TNF-α, IL-10, IL-16) and oxidative damage in serum. Structural improvements in lung tissue were also noted, suggesting a protective effect of the fruit on pulmonary health.

1.2.6. Analgesic Activity

The analgesic properties of *L. siceraria* were demonstrated by Adedapo et al. (2013), who tested the plant's leaf extract in rats and mice. Using models such as carrageenan- and histamine-induced paw edema, acetic acid writhing, and the formalin test, they observed a significant reduction in inflammation and pain behaviors. These findings point to the plant's potential as a natural analgesic agent.

1.2.3. Anticancer Activity

Cancer continues to be a global health concern, and *L. siceraria* has been explored for its anticancer potential. Thakkar et al. (2013) evaluated the methanolic extract of the plant in the AMES mutagenicity assay, where it exhibited significant antimutagenic effects against strains TA98 and TA100. In another study, Killedar et al. (2012) investigated the phytochemical components responsible for inhibiting tumor growth. They isolated specific polysaccharides including methyl-α-D-galacturonate and β-D-galactose, confirmed by NMR analysis. These compounds were then tested on human breast cancer cells (MCF-7), where they showed promising anticancer activity found the reduction in cytotoxicity level were already reported by Ghosh et al. (2009). Not only the fruit parts, the flower parts of L.siceraria also helps in reduction of cancer cells. Senet al. (2013) has investigated the hexane extract of flowers and checked against the tumour in brine shrimp. The n-hexane extract showed diminishing of tumour cells in shrimp

1. AIM AND OBJECTIVES

3.1 AIM : Study of Biological effect and chemical constituent of bottle gourd : preparation of bottle gourd juice

Objectives:

1. The fruits, leaves, stem, seeds and oil of Lagenaria siceraria are traditionally used in the treatment of jaundice, diabetes, ulcer, piles, colitis, insanity, hypertension, congestive cardiac failure, and skin diseases. The fruit pulp is used as an emetic, sedative, purgative, cooling, diuretic, antibilious, and pectoral. The flowers are an antidote to poison.
2. The stem bark and rind of the fruit are diuretic.
3. The seed is vermifuge.

4. Extracts of the plant have shown antibiotic activity.
5. Leaf juice is widely used for baldness.
6. LS juice is an excellent remedy for heart problems, digestive and urinary disorders, and in diabetes. LS juice prevents excessive loss of sodium, satiating thirst, and giving a cooling effect.
7. Probably, the bitter principle found in the wild bottle gourds is responsible for the purgative property.
8. Crushed leaves are used for baldness and applied on the head for the headache.
9. Leaves are also used as alternative purgative.
10. Fruit of Lagenaria siceraria is rich source of water and minerals and are believed to possess vitamin A, C and B complex.
11. Bottle gourd is believed to help the liver function in a balanced fashion.
12. The juice from the leaves help cure jaundice and the juice from the gourd helps reduce graying of hair.
13. The gourd juice helps treat burning sensation in the urinary passage if consumed with lime juice.
14. It reduces fatigue and keeps you fresh, especially during summer.
15. It helps fight constipation, as it is fiber rich. Because of its fiber and low fat content, Ayurveda highly recommends this food for diabetic patients and young children.
16. Ayurveda also recommends the juice of this gourd in the treatment of acidity, indigestion and ulcers as it serves as an alkaline mixture. Indian traditional medicine claims that bottle gourd acts as a nerve tonic and can help improve obsessive compulsive disorder (OCD). This claim has been confirmed by a study published in the journal Pharmacognosy Research where the investigators found that the plant possesses anti-compulsive (anti OCD) activity although they are not certain about the mechanism of action of this plant.
17. Bottle gourd is also considered one of the best weight loss foods since it is 96 percent water and provides just 12 calories per 100g of serving.
18. It is rich in, thiamin, vitamin C, zinc, iron and magnesium thus helping in improving overall health.
19. The juice from bottle gourd leaf helps in curing baldness and aids in preventing tooth decay.

4. MATERIAL AND METHOD :

4. 1. Bottle Gourd (Lagenaria siceraria)

4.1.1. Family and Synonyms

- **Botanical Family:** *Cucurbitaceae* (the gourd or squash family)
- **Synonyms:**
  - Scientific synonym: *Lagenaria vulgaris*
  - Common names:
    - Calabash
    - White-flowered gourd
    - Lauki (Hindi)
    - Doodhi (Marathi, Gujarati)
    - Sorakaya (Telugu)

- Chorakaa (Malayalam)
- Suraikkai (Tamil)

4.1.2. Biological Effects / Medicinal Uses

- **Nutritional value:** Rich in water (about 92%), low in calories; contains vitamin C, K, calcium, and dietary fiber.
- **Medicinal Properties:**
  - Diuretic (promotes urination)
  - Cardioprotective (supports heart health)
  - Antioxidant
  - Mild laxative
  - Hypolipidemic (may reduce cholesterol)
  - Used traditionally to aid digestion and manage conditions like diabetes and hypertension

Note: Bitter bottle gourd (due to cucurbitacins) is toxic and can cause serious gastrointestinal issues.

4.1.3. Geographical Source / Distribution

- **Native to:** Africa (initial domestication likely occurred there)
- **Widely cultivated in:**
  - India
  - China
  - Southeast Asia
  - Tropical Africa
  - Central and South America
  - Mediterranean regions

4.1.4. Advantages:

1. **Nutritional Benefits:**
   - High in water content (hydrating)
   - Low in calories (aids in weight management)
   - Contains vitamin C, potassium, calcium, and dietary fiber
2. **Digestive Aid:**
   - Helps with digestion and prevents constipation
   - Traditionally used to soothe stomach problems
3. **Heart Health:**
   - Lowers blood pressure and cholesterol
   - Rich in antioxidants, which protect the heart
4. **Diuretic Effect:**
   - Promotes urine production, which helps detoxify the body
5. **Cooling Effect:**

Considered to cool the body, especially beneficial in summer

6. **Supports Diabetes Management:**
   - Low glycemic index; may help control blood sugar

4.1.5. Disadvantages:

1. **Toxicity Risk:**
   - Bitter bottle gourd contains **cucurbitacins**, which are toxic and can cause:
     - Vomiting
     - Diarrhea
     - Abdominal pain
     - Even death in rare severe cases

2. **Short Shelf Life:**

- Spoils quickly, especially in warm and humid conditions

3. **Allergic Reactions (rare):**

- Some people may experience allergic symptoms like itching or rashes

4. **Overconsumption Effects:**

- Excess intake may cause bloating or indigestion.

4.2 Coriander (Coriandrum sativum)

4.2.1. Botanical Classification:

- **Family:** *Apiaceae* (also known as Umbelliferae – the carrot or parsley family)
- **Genus:** *Coriandrum*
- **Species:** *C. sativum*
- **Common Names:**
  - **English:** Coriander, Cilantro (leaves), Chinese parsley
  - **Hindi:** Dhania
  - **Spanish:** Cilantro
  - **Tamil:** Kothamalli
  - **Telugu:** Kottimeera

4.2.2. Plant Parts Used:

- **Leaves:** Used as herb (fresh or dried)
- **Seeds:** Used as spice (whole or ground)
- **Roots:** Used in Southeast Asian cuisine

4.2.3. Nutritional and Medicinal Properties:

Nutritional Value:

- Rich in vitamin A, C, and K
- Contains calcium, magnesium, and iron
- Contains dietary fiber and antioxidants

Medicinal / Biological Effects:

- **Digestive aid:** Stimulates appetite and digestion
- **Antioxidant:** Protects against free radicals
- **Antimicrobial:** Inhibits growth of certain bacteria and fungi
- **Anti-inflammatory:** Reduces inflammation in the body
- **Cholesterol-lowering:** May reduce LDL and increase HDL
- **Anti-diabetic:** Helps regulate blood sugar levels
- **Detoxification:** Aids in the removal of heavy metals (chelating agent)

4.2.4. Geographical Distribution:

- **Origin:** Mediterranean and Middle Eastern regions
- **Widely Cultivated In:**
  - India (major producer)
  - China

- Egypt
- Morocco
- Southern Europe
- North and South America

4.2.5. Advantages:

- Culinary versatility (seeds, leaves, roots all used)
- Rich in antioxidants and micronutrients
- Supports digestive and cardiovascular health
- Natural preservative properties

4.2.6 Disadvantages / Cautions:

- **Allergy risk:** Rare, but some individuals may be allergic
- **Taste preference:** Some people find the leaves taste soapy due to a genetic trait (OR6A2 gene sensitivity)
- **Photosensitivity:** Rare reports of skin reaction when exposed to sun after handling

4.3. Tulsi (Ocimum sanctum / Ocimum tenuiflorum)

4.3.1. Botanical Classification:

- **Common Name:** Tulsi, Holy Basil
- **Botanical Name:** *Ocimum sanctum* or *Ocimum tenuiflorum*
- **Family:** *Lamiaceae* (mint family)
- **Other Names:**
  - Sanskrit: Tulasi
  - Hindi: तुलसी (Tulsi)
  - Tamil: Thulasi
  - Telugu: Tulasi
  - English: Holy Basil

4.3.2. Types of Tulsi:

- **Rama Tulsi (Green Tulsi):** Light green leaves, milder taste
- **Krishna Tulsi (Shyama Tulsi):** Dark green or purplish leaves, stronger aroma
- **Vana Tulsi:** Wild variety, found in forests, less commonly cultivated

4.3.3. Parts Used:

- **Leaves:** Most commonly used (fresh or dried)
- **Seeds and Roots:** Sometimes used in traditional remedies
- **Essential Oil:** Extracted from leaves for medicinal and aromatic purposes

4.3.4. Medicinal / Biological Properties:

- **Adaptogen:** Helps body resist stress
- **Antioxidant:** Protects against free radical damage
- **Anti-inflammatory:** Reduces inflammation

- **Antimicrobial:** Fights bacteria, viruses, and fungi
- **Immunomodulatory:** Boosts immunity
- **Antipyretic:** Reduces fever
- **Anti-diabetic:** Helps control blood sugar
- **Cardioprotective:** Supports heart health

4.3.5.Traditional Uses (Ayurveda & Folk Medicine):

- Treats coughs, colds, and respiratory issues
- Aids digestion and relieves bloating
- Used in skin care for acne and infections
- Tulsi tea used as a daily tonic for wellness

4.3.6.Nutritional Value (per 100g of fresh leaves):

- Vitamin A, C, and K
- Calcium, Iron, Magnesium
- Contains essential oils: eugenol, camphene, and carvacrol

4.3.7. Geographical Distribution:

- **Native To:** Indian subcontinent
- **Widely Grown In:**
  - India (in almost every household)
  - Nepal, Sri Lanka
  - Southeast Asia
  - Grown globally in tropical and subtropical climates

4.3.8. Advantages:

- Natural remedy for many ailments
- Easy to grow at home
- Boosts immunity and respiratory health
- Sacred and culturally significant

4.3.9. Disadvantages / Precautions:

- **Fertility effects (in animals):** Some studies show anti-fertility effects; not fully confirmed in humans
- **Blood thinning:** May enhance effects of anticoagulant medications
- **Pregnancy caution:** High doses not recommended during pregnancy

4.4 Pudina (Mentha spp.)

4 4. 1. Botanical Classification:

- **Common Name:** Pudina, Mint
- **Botanical Name:** *Mentha* species (commonly *Mentha arvensis*, *Mentha piperita*, *Mentha spicata*)
- **Family:** *Lamiaceae* (Mint family)
- **Other Names:**
- English: Mint
  - Hindi: Pudina

- Tamil: Pudhina
- Telugu: Pudina
- Bengali: Pudina pata

4.4.2. Common Species:

- **Mentha arvensis** – Field mint (most common in India)
- **Mentha piperita** – Peppermint
- **Mentha spicata** – Spearmint

4.4.3. Parts Used:

- **Leaves:** Fresh or dried (for culinary and medicinal uses)
- **Essential Oil:** Extracted for flavoring and medicine

4.4.4. Medicinal / Biological Properties:

- **Digestive aid:** Stimulates bile and digestive enzymes
- **Carminative:** Reduces gas and bloating
- **Antimicrobial:** Effective against bacteria and fungi
- **Analgesic and cooling effect:** Soothes headaches and minor pains
- **Anti-inflammatory:** Used for skin and oral conditions
- **Respiratory relief:** Helps relieve cold, cough, and congestion
- **Antioxidant:** Fights oxidative stress

4.4.5. Nutritional Value (per 100g of fresh leaves):

- Rich in Vitamin A, C, and B-complex
- Minerals: Calcium, Iron, Potassium, Magnesium
- Contains menthol and other volatile oils

4.4.6. Uses:

Medicinal:

- Tea for digestion and headache relief
- Oil for muscle pain and respiratory issues
- Skin applications for acne and itching

4.4.7. Geographical Distribution:

- **Native To:** Europe and Asia
- **Widely Grown In:**
  - India (Uttar Pradesh is a major producer)
  - USA, China, Japan
  - Europe and Middle East

4.4.8. Advantages:

- Easily grown at home
- Excellent digestive and cooling herb
- Antiseptic and anti-inflammatory uses
- Used in both Ayurvedic and Unani medicine

4.4. 9. Disadvantages / Cautions:

- **Menthol sensitivity:** May cause irritation or allergic reactions in sensitive individuals
- **Overuse of oil:** Excess can cause mouth sores or nausea
- **Not recommended for infants:** Strong menthol vapors can affect breathing

5. PREPARATION METHOD AND INGREDIENTS

5.1. Ingredients:

Ingredients	Quantity WT.
Bottle gourd	150gm
Mentha leaves	3 gm
Corrindar leaves	5 gm
Tulsi leaves	2 gm
Leman juice	5 ml
Black salt	1 gm
Water	100 ml

5.2 METHOD AND PREPARATION STEPS:

1. Wash all ingredients thoroughly under running water. Weighing 150 gm bottle gourd.
2. Peel and chop the bottle gourd into small cubes.
3. (Optional) Boil the bottle gourd cubes for 2-3 minutes to make them easier to digest. Let cool.
4. In a blender, add the boiled bottle gourd, 2 gm tulsi, 3 gm menth , 5 gm coriander leaves, and 100 ml water.
5. Blend until smooth.
6. (Optional) Strain the juice using a fine mesh or cloth.
7. Add 5 ml lemon juice and 1 gm black salt. Stir well.
8. Serve immediately on an empty stomach for maximum benefits.

5.3. Guidelines for consumption of bottle gourd : juiceThe selection of bottle gourd is very important for consumption. Few bottle gourds are bitter in taste which may lead to death. The bottle gourd juice should not be mixed with any other juices due to synergetic effect (Habib-ur-Rahaman 2003).

6. RESULT AND DISCUSSION:

1. Bottle gourd show the therapeutic effect after daily 100 days to 120 days consumption of bottle gourd juice.
2. Bottle gourd control diabetes, hypertension, microbial activity and anthelmetic cardioprotective disease.
3. Bottle gourd juice use in empty stomach.

7. CONCLUSION:

medicinal and therapeutic potential of Lagenaria siceraria (bottle gourd). It concludes that bottle gourd is a nutrient-rich vegetable possessing a wide range of pharmacological properties due to its diverse phytochemical composition. These properties include: Antimicrobial Antidiabetic Anti-hyperlipidaemic and cardioprotective Antioxidant Antihypertensive Anti-inflammatory Anthelmintic (anti-parasitic) Antiulcer Hepatoprotective and lung-protective Analgesic Anticancer. Traditional uses and modern therapeutic applications, highlighting bottle gourd's potential as a natural, safe, and effective remedy for managing chronic diseases and improving general health. The extensive pharmacological validation encourages its continued exploration for use in nutraceutical and pharmaceutical products. The combination of bottle gourd, tulsi leaves, mentha leaves, corrindar leaves herbs in a single drink leverages their synergistic health-promoting effects, especially when consumed fresh and on an empty stomach. However, users must be aware of potential allergic reactions, toxicity from bitter bottle gourd, and specific cautions related to high doses or certain health conditions.

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