

Therapeutic Potential and Chemical Composition of Bottle Gourd-A Review

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ABSTRACT: *Bottle gourd is the most important and generally grown vegetable in the world, which provides good health and prevents us from cardiovascular disorders. The fresh vegetable skin is flat and light green in colour. Two varieties of bottle gourd are mostly used round and long shaped. The purpose of this review is to figure out the potential medicinal uses and chemical composition of bottle gourd.*

KEY WORDS: bottle gourd, medicinal importance, chemical composition

INTRODUCTION

Botanical classification of bottle gourd: The botanical name of bottle gourd is *Lagenaria siceraria*. It belongs to the well-known kingdom: Plantae. Its sub-kingdom is Tracheobionta, super division: Spermatophyta, class: Magnoliopsida, order: Cucurbitales, family: Cucurbitaceae and genus is *Lagenaria*.

The family Cucurbitaceae: Bottle gourd belongs to the family Cucurbitaceae. This is also known as gourd, pumpkin and melon family. In all over the world, bottle gourd plants are distributed in warmer regions. The family contains about 825 species and 118 genera.

The genus *Lagenaria*: Bottle gourd belongs to the genus *Lagenaria*. The word of *Lagenaria* is derived from lagena means bottle. This is widely distributed in the forest of Ethiopia, India and Molucca. Its binomial name is *Lagenaria siceraria*.

Medicinal Importance

The several medicinal uses of bottle gourd are below:

- The seeds of bottle gourd are accepted to contain anticancer operators and solutions for gastrointestinal infections.
- Bottle gourd is accepted to have non-enzymatic and enzymatic antioxidant properties against the development of ROS in the cells (Hamissou et al., 2013).
- Maximum level of vitamin C in bottle gourd is essential to remove dryness and wrinkles in our body. Vitamin C protects us from cancer causing agents that involved causing aging as well as reduces the heart stroke problem.
- It also treats diabetes. Zinc in bottle gourd adjusts the level of insulin that maintains the level of glucose and cure diabetes.

- It cleans the liver from toxic substances that decrease the chance of liver problems.
- Zinc in bottle gourd is helpful to produce hormones. It enhances the concentration of testosterone hormone in women.
- Bottle gourd juice is used to treat the jaundice as well as for weight loose.
- Bottle gourd makes our immune system strong that prevents us from colds and infections.

World Distribution

Bottle gourd is a critical vegetable developed in tropical and sub-tropical areas of Africa, India, China and a few Caribbean nations. It was difficult to know the origin of bottle gourd where it first harvested but this vegetable is widely cultivated in all over the world. This vegetable is also cultivated in Europe, America and Asia. In 2012, the world production of bottle gourd was approximately 16.5 million tons with China and India.

Cultivation in Pakistan

Bottle gourd is cultivated in warm climate and it's commonly called as 'lauki' in Pakistan. Pakistan is the major country to produce bottle gourd. It has a good opportunity to cultivate the bottle gourd in different areas. Pakistan export different varieties of bottle gourd in Asian countries, which are cultivated in different cities of Pakistan (Fig. 1). It cultivates in different shapes but commonly used in long and round shape. Major cultivated areas are Sahiwal and Faisalabad of Punjab that provide huge amount of bottle gourd. Quetta is the main production area of Balochistan province. In KPK, It is cultivated in Mardan and Swat. Mirpur Khas is the major bottle gourd production area of Sindh.

CHEMICAL COMPOSITION

It contains the wide range of chemical components such as minerals, vitamins, flavone-C glycosides, fatty acids and omega-3.

Minerals: Bottle gourd contains a rich source of minerals including iron, potassium, magnesium, and zinc. These minerals help to improve our health while the sufficient level of zinc is necessary to maintain blood pressure and hormones level. Zinc is also required to perform the normal cell functions in our body. It was observed that each cup of bottle gourd juice contains approximately 1.8 milligram of zinc. Bottle gourd shows the maximum level of potassium that required maintaining the blood pressure of hypertension patients (Sakshi, 2015).

Vitamins: It contains the highest level of vitamins including vitamins C, A and B-complex. Vitamin C maintains the blood cholesterol level and brain functions. This vitamin is essential to prevent the body cells and DNA. It is analyzed that 26 milligram of vitamin C is present in one cup of bottle gourd juice (Sakshi, 2015).

Flavone-C glycosides: This vegetable contains a flavone-C glycoside. It is basically a water-soluble polysaccharide observed in flesh. Flavone-C glycoside is mainly composed of β -D-galactose, 3-O-acetyl methyl- α -D-galacturonate and methyl- α -D-galacturonate, present in the

ratio of 1:1:1. This polysaccharide shows the cytotoxicity, and protects from adenocarcinoma cell line.

Fatty acids: Bottle gourd seeds oil contains four main types of fatty acids. These fatty acids are steric, linolenic, palmitic and oleic acids. The oil is the main source of antioxidants. Linolenic acid is required to control the cancer, heart and diabetic problems (Sakshi, 2015).

Omega-3: The seeds of bottle gourd contain oil that provides omega-3. It is basically a monounsaturated fatty acid. This oil is essential for maintaining the energy level in human body. Omega-3 present in oil of bottle gourd juice maintains the brain functions. It also important for balance the overall human body functions.

COMPOSITIONAL STUDIES OF BOTTLE GOURD

Phenolic and antioxidant evaluation: Anita et al., (2015) reported the antioxidant potential of seed extracts of *Lagenaria siceraria* (short-hybrid bottle gourd), contained phenolics in Nigeria. The extract of short hybrid bottle gourd contains potential amount of total phenolic, total flavonoid, vitamin C and carotenoids contents. The results indicated that the aqueous extract contained the maximum level of tannins. The extract of n-butanol observed the highest amount of vitamin E. Extract of methanol showed the greater antioxidant activity, phenolic and flavonoid compounds. The results concluded that bottle gourd seeds are the important source of antioxidant agents that used in the treatment of many cures and in medicines.

Agarwal and Katare, (2015) studied total flavonoid compound, phenolic content and antioxidant activity of vacuum dried extract of *L. siceraria* in India. Bottle gourd was dried on vacuum distillation process and finally obtained the dry mass, which was used for the study of total flavonoid, phenolic and antioxidant compounds. Antioxidants capacity was determined by using DPPH radical scavenging assay. IC₅₀ values showed the flavonoid, phenolic, ascorbic acid and antioxidant activity of *Lagenaria siceraria*. The results are compared with pulp powder (PP) and whole bottle gourd powder (WBGP). WBGP contained maximum amount of antioxidants than PP, which indicates that bottle gourd as well as it's by products are beneficial for healthy life. Essien et al., (2015) determined antioxidant activity and total polyphenols of seed oils of four bottle gourd cultivars in Nigeria. The results recommended that the bottle gourd seeds oil is the actual source of nutrients and health benefits to the consumers.

Sharma et al., (2013) observed antioxidant activity of *Lagenaria siceraria* leaves in India. Different assays like hydroxyl and hydrogen peroxide radical scavenging, and DPPH radical scavenging assays were used to evaluate the antioxidant activity. Result indicated significant correlation between concentration of extract and percentage inhibition of antioxidants, which is necessary for many types of diseases.

Aslam and Najam, (2013) evaluated the phytochemical, pharmacognostical and medicinal properties of *Lagenaria siceraria* herbs in Karachi (Pakistan). The research proved that the bottle gourd contains antibacterial, antifungal, anti-inflammatory, antibiotic, anti-allergic, free radical scavenging and memory increasing ability.

Deore et al., (2009) evaluated the total phenolic content and antioxidant activity of *Lagenaria siceraria* in Maharashtra state (India). The antioxidants in bottle gourd determined through four assays including hydrogen peroxide, thiocyanate, reducing power and DPPH radical scavenging assays. Ethanolic extract of this plant showed effective antioxidant activity in four assays, suggesting that the bottle gourd is the effective source of antioxidants.

Deshpande et al., (2007) was determined the radical scavenging activity of *Lagenaria siceraria* (Mol.) in Maharashtra (India). This vegetable is mostly used just because of their antioxidant activity in different extracts. The extracts made from three parts of bottle gourd epicarp, mesocarp and flesh containing seeds. Acetone extract of bottle gourd epicarp showed the highest antioxidant activity by using DPPH assay.

CONCLUSION

Bottle gourd belongs to family Cucurbitaceae. It is extensively consumed as vegetable all over the world. Regarding the literature, bottle gourd contains sufficient amount of useful bioactive secondary metabolites including fatty acids, omega-3 and flavonoid contents for healthy life. However, there is a need of these bioactive compounds from bottle gourd as an alternative to medicines with no harmful effects. It could be a possible and natural mode of treatment for multiple diseases.

References

1. Hamissou M; Smith AC; Carter Jr RE & Triplett II JK; 2013, Antioxidative properties of bitter melon (*Momordica charantia*) and zucchini (*Cucurbita pepo*), Emirates Journal of Food and Agriculture 25: 641-647.
2. Sakshi M; 2015, An overview on *Lagenaria siceraria* (bottle gourd), Journal of Biomedical and Pharmaceutical Research 4(3): 4-10.
3. Anita BS; Essien EE & Udoh BI; 2015, Antioxidant capacity of phenolic from seed extracts of *Lagenaria siceraria* (short-hybrid bottle gourd), European Journal of Medicinal Plants 9(1): 1-9.
4. Agarwal S & Katare C; 2015, Antioxidant activity, total phenolic compounds and flavonoids content of vacuum dried extract of *L. siceraria*, Global Journal of Multidisciplinary Studies 4(6): 302-308.
5. Essien EE; Antia BS & Peter NS; 2015, *Lagenaria siceraria* (Molina) standley. Total polyphenolic and antioxidant activity of seed oils of bottle gourd cultivars, World Journal of Pharmaceutical Research 4(6): 274-285.
6. Sharma NK; Yadav P; Singh HK & Shrivastava AK; 2013, Invitro antioxidant activity of *Lagenaria siceraria* leaves, Malaysian Journal of Pharmaceutical Sciences 11(1): 1-11.

7. Aslam M & Najam R; 2013, A review of pharmacognostical, phytochemical and pharmacological properties of *Lagenaria siceraria*: A miracle herb, International Journal of Biomedical and Advance Research 4(5): 267-274.
8. Deore SL; Khadabadi SS; Patel QR; Deshmukh SP; Jaju MS; Junghare NR; Wane TP & Jain RG; 2009, In vitro antioxidant activity and quantitative estimation of phenolic content of *Lagenaria siceraria*, Rasayan Journal of Chemistry 2(1): 129-132.
9. Deshpande JR; Mishra MR; Meghre VS; Wadodkhar SG & Dorle AK; 2007), Free radical scavenging activity of *Lagenaria siceraria* (Mol.) Standl. Fruit, Natural Product Radiance 6(2): 127-130.

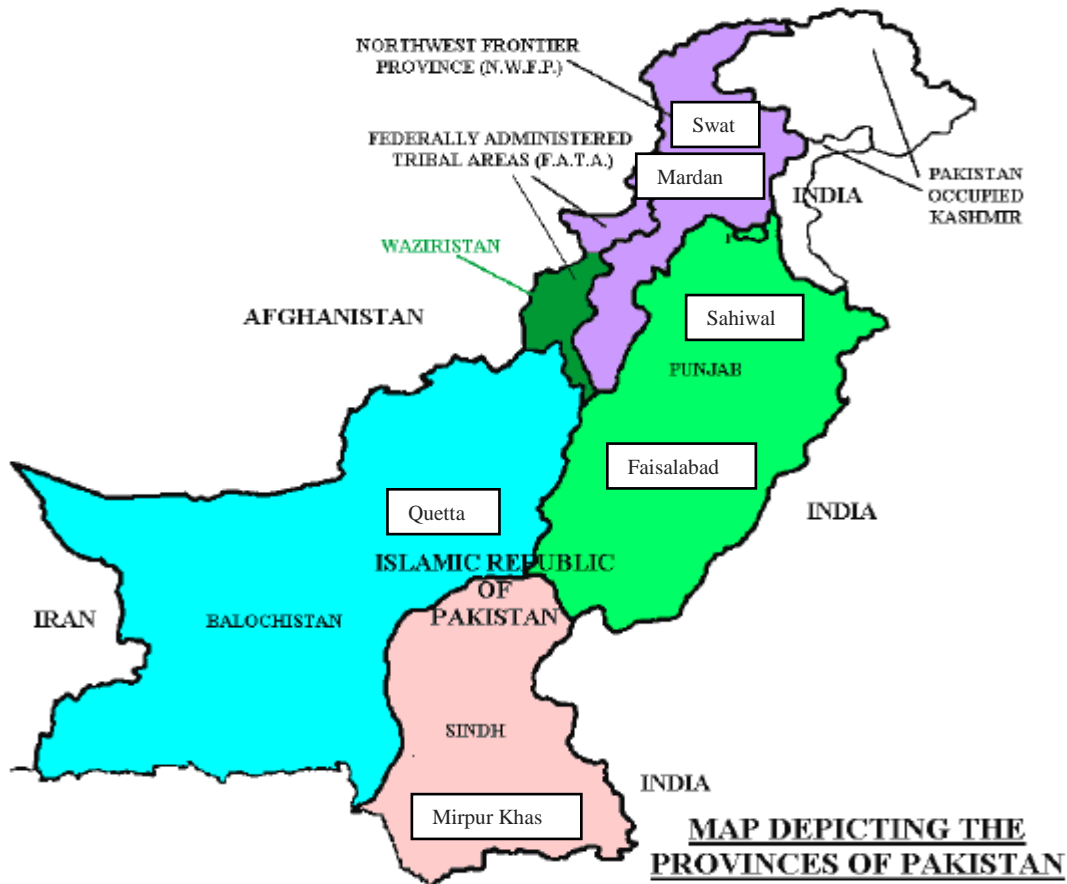


Fig. 1. Map represents the different cultivated areas of bottle gourd in Pakistan.