

Luffa acutangula : An Overview

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■ **Abstract** : The fruits of *Luffa acutangula* (ridge gourd) which belonging to family Cucurbitaceae are grown, harvested before maturity and is very popular in Asia. Ridge gourd as whole, seeds and dried crusts are all used for medicinal purposes. It is a healthy food and contains good amount of fiber, vitamins and minerals including Vitamin B₂, Vitamin C, carotene, niacin, calcium, phosphorus, iron and small quantities of iodine and fluorine. It is reported to contain many phytochemicals such as flavonoids, saponins, luffangulin, saponin, oleanolic acid and cucurbitacin B. Ridge gourd peel, powder and its extracts showed slightly higher antioxygenic activity as compare to ridge gourd pulp powder and its extracts. This may be attributed to the presence of higher amounts of phenolics and flavonoids which have been reported as potential antioxidants. Ridge gourd and there peel have potential to act as a functional food and a source of useful drugs because of the presence of various phytochemical components. *L. acutangula* has been used extensively in Indian traditional system of medicines as diuretic, expectorant, laxative, purgative, hypoglycemic agent and bitter headache agent and bitter tonic. The present review work focused on its botanical characters, ethnobotanical uses, nutritional value, phytochemical constituents and medicinal properties of *L. acutangula*.

■ **Key words** : *Luffa acutangula*, Ridge gourd, Luffa acutangula peel, Torai, Nutritional value of Cucurbitaceae

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Ridge gourd is the fruit of a subtropical vine that belongs to the cucumber family and is native to central and eastern Asia, including the Indian subcontinent. The plant is quite hardy and easy to cultivate and is even grown indoors in regions with colder climates. Ridge gourd is popular as a vegetable in various regional cuisines in Asia, but the fruit is only edible before it ripens (Anitha and Miruthula, 2014 and Ananthalakshmi *et al.*, 2017). It is widely growing vegetative climber and found thorough out Indonesia. The fruits usually are taken as vegetables (Suryanti *et al.*, 2017). As it matures, the fruit

becomes increasingly fibrous, which makes it unfit for consumption, but great for use as a loofah or scrubber. The entire plant of *Luffa acutangula* is medicinally important and is used extensively in Indian traditional system of medicines (Anitha and Miruthula, 2014 and Ananthalakshmi *et al.*, 2017). It has different vernacular names in different languages like English (Ridge gourd, Angled luffa, Chinese okra, Dish-cloth gourd, Ribbed luffa, Silk gourd, Sinkwa towel sponge, Sinqwa melon, Vegetable sponge), Hindi (Jhimani, Karvitarui, Karvituri, Sankirah, Rantorai), Sanskrit (Gantali, Koshataki,

Ksweda, Mridangaphalika, Sutikta), Urdu (Turai), Kannada (Kahire, Kahi Heere, Naaga daali balli), Malayalam (Athanga), Marathi (Divali, Kadudodaki, Kadushirali, Kadaturai, Ranturai, Kadudod- ka, Dadudodaka), Telugu (Adavibira, Chedubira, Sendubirai, Verribira, Adivibeera, Verri beera, Chedu beera, Adavi beera, Chathi beera), Punjabi (Jhinga, Shirola), Tamil (Peerku, Itukari, Itukarikkoti, Kacappi, Kacappuppirkku, Kaccam, Kaippuppirkku, Karniti (Jyothi *et al.*, 2010).

Types :

There are two types of Koshataki (ridge gourd). One variety is bitter which is used for medicinal purpose and the second variety is non-bitter and used as vegetable all over the country. The classical ayurvedic texts have described these as Koshataki (wild variety and bitter) and Raja Koshataki (cultivated and used as vegetable). Koshataki is a climber growing all over India in the temperate climate. The non-bitter variety of Koshataki is used as vegetable and is cultivated all over the country (Prashanth).

Luffa acutangula fruits :

Luffa acutangula fruit include carbohydrates, carotene, fat, protein, phytin, amino acids, alanine, arginine, cystine, glutamic acid, glycine, hydroxyproline, leucine, serine, tryptophan and pipercolic acid. Its leaves and flowers contain flavonoids (Schilling and Heiser, 1981) and herb contains saponins and acutosides (Nagao *et al.*, 1991).

Luffa acutangula seeds :

Luffa acutangula seeds are an excellent agricultural product and its kernel have been found potentially rich in protein and fat (39 and 44 %) which are higher than those contained in many plant seeds. The fatty acid profile of *Luffa acutangula* seeds indicates that the glycerides of oleic and linoleic acid constitute 68 % of the total kernel oil. The seeds are found to be a good source of certain amino acids phosphorous, iron, and magnesium (Kamel Basil and Bernice, 1982). Oil is extracted from the seeds of ridge gourd and used in the treatment of skin diseases (Pullaiah, 2006).

Luffa acutangula peel :

Ridge gourd (*Luffa acutangula*) is consumed as a

vegetable after peeling off the skin which is a domestic waste. *Luffa acutangula* peel (LAP) was observed to be a good source of fibre (20.6 %) and minerals (7.7 %). Amino acid analysis revealed presence of the highest content of Carnosine followed by aspartic acid and amino adipic acid. Antioxidant activity of different extracts showed that ethyl acetate extract was more potent when compared to other solvent extractions. It exhibited a significant amount of phenolic acids like p-coumaric acid (68.64 mg/100 g of dry weight) followed by gallic acid (34.98 mg/100 g of dry weight), protocatechuic acid (30.52 mg/100 g of dry weight) in free form and ferulic acid (13.04 mg/100 g of dry weight) in bound form (Swetha and Muthukumar, 2016). Ridge gourd peel powder and its extracts showed slightly higher antioxygenic activity than ridge gourd pulp powder and their extracts. This may be attributed to the presence of higher amounts of phenolics and flavonoids which have been reported as potential antioxidants (Padmashree *et al.*, 2012).

Table 1: Proximate composition of <i>Luffa acutangula</i> peel	
Parameters (%)	Percentage (Dry matter)
Moisture content	12.40±0.23
Carbohydrate content	38.94±0.49
Protein content	14.26±0.17
Fat content	6.10±1.41
Fibre content	20.60±0.16
Ash content	7.70±0.45

Source: Swetha *et al.* (2016)

The total phenolics and flavonoids contents of methanol extract and soluble fractions of *Luffa acutangula* fruits are ranging from 18.7±0.11 to 105.1±0.08 mg GAE/g dw and 34.9±0.09 to 105.3±0.09 mg QE/g dw, respectively (Suryanti *et al.*, 2015).

Historical background :

The entire plant of *Luffa acutangula* is medicinally important and is used extensively in Indian traditional system of medicines. They play a significant role in providing primary health care services to rural people. They also serve as therapeutic agents as well as important raw materials for the manufacture of traditional and modern medicine. From Ayurveda point of view, ridge gourd increases vata (the impulse principle necessary to mobilize the function of the nervous system) and kapha (the body fluid principle which relates to mucous,

lubrication and the carrier of nutrients into the arterial system) and also it cools down and pacifies the dosha pitta (the energy principle which uses bile to direct digestion and hence metabolism into the venous system) in the body (Anitha and Miruthula, 2014). Ayurvedic medicines containing *Luffa acutangula*.

Patolamooladikashayam: It is an ayurvedic medicine in decoction form given for the treatment of skin disease, piles, jaundice, IBS, liver diseases.

Mahamanjishtadikashayam: An ayurvedic medicine in decoction form given to treat various skin diseases, gout, syphilis, ulcers and obesity (Prashanth).

Advantages :

Health benefits :

The ethnobotanical survey of the hilly areas in Maharashtra revealed that very fine powder of fruits of *L. acutangula* is used as a snuff to protect jaundice (Das and Basu, 1997). It is also used traditionally in insect bites by tribes of Western Maharashtra. A powder of the fruit is used for rubbing on the swollen hemorrhoids. Kernel of the seeds is soft smooth and an efficient remedy for dysentery while the juice of roasted young fruit is applied to cure headache (Dandge *et al.*, 2010). Ribbed gourd has diuretic properties; used as an expectorant, laxative and purgative; hypoglycemic agent, bitter tonic; used in the enlargement of spleen. The roots of ridge gourd added to milk or water is helpful in the removal of kidney stones. The roots of ridge gourd are added to cooled water, boiled and applied on skin in the swelling of the lymph glands. The leaves of the ridge gourd are useful in the treatment of dysentery. The leaves or juice of the ridge gourd are used as dressing in the diseases such as inflammation of spleen, ringworms, and piles and even in leprosy. Pounded leaves mixed with garlic are applied locally for a relief in leprosy. Ridge gourd is also an effective home remedy for the prevention of premature graying of hair. Ridge gourd is chopped in small pieces along with the ribbed skin and completely dried in the sun. Once the ridge gourd is fully dried, made into a powder and used to prevent the premature graying of hair (Pullaiah, 2006).

Weight loss :

The ridge gourd is low in saturated fats and cholesterol. Ridge gourds have a high content of water which makes the food with very less calories.

Constipation:

The cellulose fibres present in ridge gourd are used in the treatment of constipation and because of the high water content and cellulose are also effective in the treatment of piles.

Jaundice:

Ridge gourd juice is used to heal jaundice and to strengthen your immune system against any infection. The juice which is prepared by pounding the ridge gourd or the seed powder is useful in controlling jaundice. The dried fruits are powdered and used as snuff in the treatment of jaundice.

Bloods purification:

It helps in the purification, restoration and nourishment of the liver and is also helpful in the liver detoxification resulting due to alcohol intoxication.

Hypoglycemia:

Ridge gourd has certain peptides which are exactly like insulin, alkaloids and charantin chemicals which help in reducing the blood sugar and urine sugar levels.

Skin care:

The dried sponge gourd are traditionally used for bathing purpose which is useful for removing of dead cell from the skin also fighting off foot and body odor. For this ridge gourd is allowed to dry and mature on the vine and it can be harvested as a sponge. The ridge gourd having the properties of blood purification by which they are helpful against pimples and acne problems. The decoction of *Luffa acutangula* is given in a dose 10-20 ml to treat various skin diseases.

Immune system booster:

Juice of ridge gourd mixed with other healthy vegetables taken daily helps in strengthening the immune system and helps the body in fighting against any infections effectively (Manikandaselvi *et al.*, 2016).

Relief form eye problems:

It is high in beta-carotene which is good for enhancing eye sight.

Reduce Asthma:

The fruit juice is given in a dose of 10-15 ml to induce

emesis and reduce the symptoms of asthma.

Stomach problems:

Ridge gourd is boiled in two glasses of water and then added adequate salt. This mixture is taken twice daily, to kill stomach worms (Manikandaselvi *et al.*, 2016).

Wound healing :

The pulp of the ridge gourd is ground and applied on the wound to stop the bleeding (Manikandaselvi *et al.*, 2016).

Utilization of waste peel :

Ridge gourd (*Luffa acutangula*) is consumed as a vegetable after peeling off the skin which is a domestic waste. *Luffa acutangula* peel (LAP) was observed to be a good source of fibre (20.6 %) and minerals (7.7%). Presence of varied number of flavonols and phenolic acids which are known to possess therapeutic benefits indicates the potential of LAP to be used for the alleviation of many disorders (Swetha and Muthukumar, 2016).

Disadvantages :

Precaution must be taken for ridge gourd formulated medicine or any kind of their formulation of ridge gourd for giving to young children, old aged persons, during pregnancy and patients who is suffering from cardiac ailments and other systemic illness. Also the person who is suffering from Diarrhea, vomiting should not be take formulations containing ridge gourd. The wild variety of ridge gourd is not good for consume whereas the variety which is non-bitter is good for health.

Industrial application :

The plant of ridge gourd is the source of many nutritional value and therapeutically important chemical constituents. Hence every portion of this plant is useable for prevention many diseases. Some nutraceutical products could be developed from *Luffa acutangula* is very helpful for diseases. The peel of *Luffa acutangula* have many nutritional values so we can also utilize the waste of ridge gourd peel by extraction of them and make a beverage and in which we can also add another vegetable beverages. This beverage is very beneficial for health purpose and we include this beverage for daily diet. Also the leaves of ridge gourd are useful for

dysentery, so that the bioactive compounds could give some leads for new drug discovery to various chronic diseases.

Challenges :

Ridge gourd and there have full of nutritional value but at present date very less research work on them. The peel having potential to protect from many diseases, the biological activity of these compounds requires further investigation to understand their potential health benefits. Also, the ridge gourd are only used as a vegetable in our country so by making product development on them because of they also having seasonal vegetable so by product development we utilize them in offseason also. And also we aware the people about ridge gourd peel nutrition so they utilize them in home also.

Future prospects :

- Ridge gourd are plays a significant role in providing primary health care services to rural people.
- They also serve as therapeutic agents as well as important raw materials for the manufacture of traditional and modern medicine.
- Also we can develop the RTS beverages from ridge gourd or from there peel with mix another vegetables and fruits juice. Also we can a make instant soup by drying and grinding of ridge gourd peel or we can also add the grinded peel in other instant soup for value addition and for increasing their nutritional value.
- In early the ridge gourd used as a medicine for many diseases in rural area because the whole plant of ridge gourd having nutritional value so we can also made a medicine from.

Conclusion :

Ridge gourd peel contains a significant amount of fibre, essential and nonessential amino acids. Presence of varied number of flavonols and phenolic acids which are known to possess therapeutic benefits indicates the potential of ridge gourd peel to be used for the alleviation of many disorders. Ridge gourd has diuretic properties. It is used as a bitter tonic also expectorant and hypoglycemic. The soft pulp and skin of ridge gourd both are used in making various recipes, especially in south Indian cuisine. Chutneys made from the pulp and the peel of ridge gourd is known for their enormous health benefits. So basically the presence of compounds

possessing antioxygenic activity in pulp and peel of ridge gourd we utilize them in different ways. Ridge gourd peel had higher antioxygenic activity as compared to ridge gourd pulp which may be ascribed to their different phenolic and flavonoids compositions. Because of this nutritional value they have the higher potential value to fulfill the body requirement.

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■ REFERENCES

- Ananthalakshmi, R., Xavier Rajarathinam, S.R. and Mohammed Sadiq, A. (2017).** Preliminary phytochemical screening of aqueous extract of various parts of luffa acutangula (ridge gourd). *Internat. J. Latest Engg. and Mgmt. Res.*, **2(7)**: 01-04.
- Anitha, J. and Miruthula, S. (2014).** Traditional medicinal uses, phytochemical profile and pharmacological activities of *Luffa acutangula* Linn. *Internat. J. Pharmacol.*, **1(3)** : 174-83.
- Dandge, V.S., Rothe, S.P. and Pethe, A.S. (2010).** Antimicrobial activity and pharmacognostic study of *Luffa acutangula* Roxb var amara on some deuteromycetes fungi, *Internat. J. Sci. Inn. Discover*, **2(1)**: 191-196.
- Das, S. and Basu, P.S. (1997).** Effect of cephalixin on flowering fruit setting and development of *Luffa acutangula* Roxb. *Indian J. Plant Physiol.*, **2(1)**:18-20.
- Jyothi, V., Ambati, S. and Asha Jyothi, V. (2010).** The pharmacognostic, phytochemical and pharmacological profile of *Luffa acutangula*. *Internat. J. Pharm. Technol.*, **2(4)**:512-524.
- Kamel Basil, S. and Bernice, B. (1982).** Nutritional and oil characteristics of the seeds of angled *Luffa actangula*. *Food Chem.*, **9(4)**:277-282.
- Manikandaselvi, S., Vadivel, V. and Brindha, P. (2016).** Review on *Luffa actangula* L.: Ethnobotany, phytochemistry, Nutritional Value and Pharmacological Properties, *Curr. Pharmaceu. Rev. & Res.*, **7(3)**: 151-155.
- Nagao, T., Tanaka, R., Iwase, Y., Hanazono, H. and Okabe, H. (1991).** Studies on the constituents of *Luffa actangula*. ROXB structures of acutosides A-G oleanane type triterpene, saponins isolated from herb. *Chem. Pharm. Bull.*, **39(3)** : 599-606.
- Padmashree, A., Sharma, G.K., Semwal, A.D. and Bawa, A.S. (2012).** *In vitro* antioxygenic activity of ridge gourd (*Luffa acutangula*) pulp, peel and their extracts on peroxidation models. *American J. Plant Sci.*, **3**: 1413-1421.
- Prashanth, B.K. M.D (Ayu), Ph.D.**
- Pullaiah, T. (2006).** Encyclopedia of world medicinal plants, Vol 4, A.P. Regency Publications, New Delhi; pp. 1962-1964.
- Schilling, E.E. and Heiser, C.B. (1981).** Flavonoids and the systematics of *Luffa actangula*. *Biochem. Syst. Ecol.*, **9(4)**:263-265.
- Suryanti, V., Marliyana, S.D. and Wulandari, T. (2015).** Antioxidant activity, total phenolics and flavonoids contents of *Luffa acutangula* (L.) Roxb fruits. *J. Chemical & Pharmaceu. Res.*; **7(1)**:220-226.
- Suryanti, V., Marliyana, S.D. and Astuti, I.Y. (2017).** Chemical constituents of *Luffa acutangula* (L.) Roxb fruit. *Internat. Conference on Food Science and Eng*; 1.088-1757.
- Swetha, M.P. and Muthukumar, S.P. (2016).** Characterization of nutrients, amino acids, polyphenols and antioxidant activity of ridge gourd (*Luffa acutangula*) peel. *J. Food Sci. Technol.*, DOI 10.1007/s13197-016-2285-x.

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