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Processing potential and importance to humans of bottle gourd (*L. siceraria*)

Shefali Chaudhary[1], Shweta Verma[2], and Dr. Aastik Jha[3]

Introduction

Bottle gourd (*Langenaria siceraria*), a vigorous annual climbing vine with large leaves belongs to *Cucurbitaceae* family and known as Calabash, Doodhi, and Lauki in different parts of India. The bottle gourd is also known in other places as white flowered gourd, trumpet gourd, calebassier, courage bouteille (French) cojombro, cuiro amargo (Spanish); upo, talayag, gucuzzi, zucca melon (Philippines). India, Sri Lanka, South Africa, Indonesia and Malaysia are the major bottle gourd producing countries in the world. Bottle gourd can be a tree or fence creeper, or it can grow on the ground like most other members of the pumpkin family. It is annual and dies at the end of each growing season.

Bottle gourd is an annual herbaceous plant with a prostrate or branching type growth habit. The vine stems are softly pubescent with jointed, gland-tipped hairs. The leaves are alternate and variable, and tendrils are almost always present. The roots are white to pale cream, smooth and circular in cross-section. The taproot can penetrate down up to 80 cm, but the bulk of the root system spreads out and inhabits the topsoil. Flowers of *L. siceraria* are monoecious in nature, where solitary male and female flowers are found on different plant axis of the same plant, thus cross pollination is highly favorable. The fruit is green at first, but becomes pale brown when it ripens and dries out. There are many forms, shapes, and

Shefali Chaudhary[1], Shweta Verma[2]and Dr. Aastik Jha[3]
[1,2] Ph. D. -Vegetable Science
[3]Associate Professor, Department of Horticulture
Acharya Narendra Dev University of Agriculture & Technology, Kumarganj, Ayodhya

varieties of gourds each producing a different-shaped and sized fruit, from small and round to large some with an elongated, narrow neck. The length of the fruit varies from 150 to 1000 mm depending upon its variety. Bottle gourd fruits having the shape of a bottle are yellowish green with whiter pulp. The seeds of bottle gourd are flat, more or less rectangular to narrow trapezial, whitish to dark brown at the distal end. They develop inside the fruit and show great diversity in shape an.

A. Processing Potential

1. Chemical Composition

Bottle gourd fruit has higher edible edible index (94.17 %) and lower waste index (5.83 %) proves its importance for processing. The fruit rich in nutrients and is available at a cheaper rate. Bottle gourd fruit contains about 96% moisture and is rich in vitamins, minerals, antioxidants and dietary fibers. The fruit is also a good source of vitamin B complex and choline along with fair amounts of vitamin C. Bottle gourd contains 1.6% choline on a dry weight basis. Choline is a precursor to acetylcholine, a chemical used to transfer nerve impulses and hence, it is believed to have neurological effects. Use of vegetables as nutritional food and their role in human health

Table 1: Chemical/bio-chemical constituents of bottle gourd (*L. siceraria*) fruit

S. No	Constituents	Dry weight basis g/100g
1	Moisture	94.5
2	Protein	1.20
3	Fats	0.20
4	Carbohydrates	3.75
5	Fiber	0.70
6	Ash	0.50
7	Energy (kCal)	15.0

Table 2: Mineral contents of bottle gourd (*L. siceraria*) fruit

S. No.	Minerals (mg/100g dry weight basis)	Bottle Gourd	
		With Peel	Without Peel
1	Calcium	80.20	52.78
2	Iron	11.87	2.33
3	Phosphorus	240.33	187.33
4	Potassium	3320.00	3356.67
5	Zinc	3.77	3.47
6	Magnesium	162.33	146.33
7	Copper	0.19	0.24
8	Sodium	27.88	36.68
9	Manganese	0.26	0.31

was studied. Among the vegetables included in daily diet, the bottle gourd was analyzed for its proximate composition, vitamin and mineral.

Peeled and unpeeled samples of bottle gourd *(L. siceraria) was* analyzed for the carbohydrate, dietary fiber constituents and mineral content (**Table 2**). Higher amount of dietary fiber was found in unpeeled one, while carbohydrates were higher in peeled sample. Minerals such as calcium, phosphorus, iron, zinc and magnesium were higher in unpeeled sample while potassium, copper, sodium and manganese were higher in peeled sample.

2. Medicinal Properties and Uses

Bottle gourd has long been an important component of indigenous herbal medicine, particularly in Asia. The bottle gourd juice has been used to treat acidity, indigestion and ulcers. It cures pain, fever and is used for pectoral-cough, asthma and other bronchial disorders. The fruits are traditionally used as a nutritive entity having cardioprotective, cardiotonic, general tonic, diuretic, aphrodisiac, antidote to certain poisons, alternative purgative, and cooling effects. It is also considered to be beneficial in insanity, epilepsy and other nervous diseases. It has anti-hyperlipidemic activity. A glass of bottle gourd juice taken daily is also considered to prevent premature graying of hair. Immature bottle gourd fruits are consumed in a number of ways. Tender fruits are widely used as vegetable. They are added to curries and moist flesh is also used to make glaze for cakes. The bottle gourds are used for preparing juice, pickles, chutney, and making sweets. Kofta is the most popular vegetable curry preparation in India

3. Health Facts

Bottle gourd as a vegetable for good health and is used as curative for mental health disorders. Among cucurbits, the bottle gourd is the only plant which contains the highest choline level along with required metabolites/metabolic precursor for brain function. It was emphasized that these fruits have high therapeutic values and must be consumed as daily nutrition. He studied 35 Gujarat earthquake victims, suffering from mental disorders like depression, stress and manic disorders. Victims were treated with shade dried gourd powder capsules and result was extremely significant. The bottle gourd fruits are rich potential source of bioactive molecules many of which probably serve as chemical defenses against infection or predation. Various ethano pharmacological applications of bottle gourd (*L. siceraria*).

Uses of bottle gourd

Bottle gourd, *Lagenaria siceraria* (Molina) Standley is a multipurpose vegetable of the Cucurbitaceae family. It is native to Africa and India. Its tender fruits are consumed as fresh vegetables, whereas the

dried fruits are used for storage jars, containers, bowls, musical instruments, and fishing floats. It is a low-calorie vegetable rich in vitamins and minerals and has cardiotonic, aphrodisiac, hepatoprotective, anti-inflammatory, and expectorant properties. Pulp of the fruit is used for treating conditions like stomach acidity, indigestion, ulcers, hair disorders, diabetes, hypertension and liver ailments. Its seed oil and seed poultice for treating throat infections. Plants of this gourd are used as rootstock for watermelons and pollens in the breeding of seedless watermelons.