

Nutritional Assessment of Fruits of *Luffa acutangula* var. *amara*

Jadhav Santosh Jaysingrao¹, Chavan Niranjana Sunil²

^{1,2}Department of Botany, Shivaji University, Kolhapur, Maharashtra, India

Abstract: Cucurbits are well documented for their food value and medicinal potential. Many cucurbits have been scanned on this basis by researchers throughout the world. *Luffa acutangula* var. *amara* popularly known as 'kadu Dodaka' or 'kadu turai' in Marathi, is a member of cucurbitaceae growing along the coastline of Maharashtra and other states throughout India. It is exhaustively utilized for treating the diseases such as inflammation of joints, cataract, liver complaints etc. in folklore. Present piece of work focuses nutritional assessment of fruits of *Luffa acutangula* var. *amara*. The fruits having high moisture (94.6%), crude fiber (42.94%), vit.B₃ (3.1282mg/100gm) and calcium (99.78 mg/100gm) with other nutrients at remarkable level. The nutritional data is compared with documented values of cultivated *Luffa acutangula* and *Luffa cylindrica*. The results revealed that fruits having potent nutrition which can be utilized for clinical and food supplementary purposes.

Keywords: *Luffa acutangula* var. *amara*, moisture, crude fiber, food supplement

1. Introduction

In India large quantities of medicinal plants are extracted from wild to meet the increasing demand for raw material for domestic consumption and export. Food demands have been accelerated with the exponential human population growth resulting in marginal land resource availability for growing the food crops. According to FAO, there are about 840 million undernourished people in 1998-2000, of whom 799 million are in developing countries, 30 million in the countries in transition and 11 million in the industrialized countries [1]-[4]. Rapidly increasing knowledge on nutrition, medicine and plant biotechnology has dramatically changes the concepts about food, health and agriculture and brought in a revolution on them [5]

Luffa acutangula (L.) Roxb. var. *amara* (Roxb.) Clarke belonging to family Cucurbitaceae is an annual herb found in all parts of India, especially along the coastal lines of Maharashtra. [6]. *Luffa acutangula* var. *amara* is popularly known as 'Kadu Dodaka' or 'Kadu Turai' in Marathi. All the plant parts are strictly bitter. It is exhaustively utilized for treating the diseases such as inflammation of joints, cataract, liver complaints etc. in folklore.

The present study deals with nutritional analysis of fruits of *Luffa acutangula* var. *amara*. The nutritive value has its own importance Carbohydrates, proteins and fats play major roles and require in large amount while vitamins and minerals are in least quantity but much significant. Deficiencies of these nutrients can cause disorders. The need of nutrients can be fulfilled by additional food stuffs or supplements. To apprehend the situation, interests have been centralized on the exploitation, quantification and utilization of coastal plants as an alternative emergency food. Coastal environment having fewer land resources to the local communities to satisfy their food demands. [7] Therefore, in present study, fruits of *Luffa acutangula* var. *amara* were screened for their nutraceutical status.

2. Literature Survey

The family Cucurbitaceae comprises members that are cultivated throughout the world as a source of food, fiber and indigenous medicines [8]. The family consists of about 118 genera and about 825 species confined to large tropics and sub tropics. In India there are nearly 34 genera and 108 species of cucurbits of which 38 species are endemic [9]. There are about 90 genera and 700 species mainly employed as food [10]. Taxonomically, the family is better understood today with various approaches being undertaken for deducing species interrelationships. Cucurbits are well documented for their food value and medicinal potential. Many cucurbits have been studied on this basis by researchers throughout the world. Pumpkin, ash gourd, snake gourd, bitter melon, ridge gourd sponge gourd, musk melon, water melon and so many other cucurbits add taste as well as nutrition to day today diet. They are well familiar and comprises major source of food. *Wild member of family cucurbitaceae Luffa acutangula* var. *amara* is used as a laxative, carminative and as emetic. It is used to cure *Vata*, *Kapha*, liver complaints, leucoderma, piles etc. [11] It is used as a bitter tonic [12]. The methanolic and aqueous fruit extracts having significant antidiabetic activity. [13] Fruits can be source of fatty acids which are essential constituents of food [14]. *Luffa cylindrica* seed flour contains various phytochemicals which make important source of phytochemistry. Its rich source of amino acids and fats [15]. The seed oil of *Luffa amara* was analyzed by GLC, which proved presence of fatty acids, steroids, saponins, triterpenoids and flavonoids. [16]. Nutritional assessment of *Luffa acutangula* var. *amara* is not evaluated so far.

3. Problem Definition

The attempt is made to find out the nutraceutical value of fruits of *Luffa acutangula* var. *amara* by using standard protocols.

4. Materials and Methods

4.1 Plant Collection

Mature fresh fruits of *Luffa acutangula* var. *amara* were collected from village, Aachara in the Sindhudurga district of Maharashtra, India. The plant was authenticated at Department of Botany, Shivaji University, Kolhapur, (MS), India.

4.2 Sample Preparation

The fruits were washed under running water to remove adhered dust and other particles. Fruits are shade dried. Seeds are removed. Fruits were mechanically powdered and sieved. The material was air-dried and ground to a fine powder. Powder is stored in air-tight containers prior to further analysis.

4.3 Proximate Analysis

The moisture and ash content was determined by gravimetric method.

The crude fibre was calculated by acid-base digestion. Crude protein was determined by Macro-Kjeldahl method. Crude fat content was determined gravimetrically following Soxhlet Extraction with ether according to Official AOAC method (AOAC 963.15).

4.4 Mineral Analysis

Acid digestion was carried out by the method followed by Toth *et al* (1948). The mineral elements like Cu, Zn, Co, Fe, Ca, Mg, Mn etc. were analyzed by Atomic Absorption Spectrophotometer (AAS).

5. Results

Table 1: Component analysis of fruit of *Luffa acutangula* var. *amara*, major constituents (gm/100gm fruit powder).

Sr. no.	Constituents	Neutraceutical values
1	Moisture content	94.6%
2	Ash content	0.26%
3	Carbohydrates	3.86
4	Crude Protein content	0.46
5	Crude Fiber content	42.94
6	Fat content	0.1
7	Energy(Kcal/100gm)	18.18

Table 2: Component analysis of fruit of *Luffa acutangula* var. *amara*, minor constituents

Sr. No.	Constituents	Neutraceutical value
1	Vit.A (µg/100gm)	0.0001
2	Vit.B1 Thiamine (mg/100gm)	0.7692
3	Vit.B2 Riboflavin (mg/100gm)	0.2061
4	Vit.B3 Niacine (mg/100gm)	3.1282
5	Vit.C (mg/100gm)	0.083

Table 3: Mineral analysis of fruits of fruit of *Luffa acutangula* var. *amara*

Mineral element	Constituents(mg/100gm)
Cu	0.9
Fe	34.1
Mg	27.38
Mn	2.34
Ca	99.78
Zn	9.52

6. Results and Discussion

Nutritional assessment of fruits of *Luffa acutangula* var. *amara* strongly supports nutritional potential of fruits. The fruits can be the major source of moisture, crude fiber, vitamin B and Calcium. The fruits contain about 94.6% moisture and 42.94% crude fibers. While cultivated *Luffa acutangula* contain 95.2% and *Luffa cylindrica* contain 93.2% moisture [15]. Moisture of food is essential factor which plays important role in maintaining level of water in body and for many metabolic activities. Fruits show 42.94 gm/100gm. crude fiber. Crude fiber play vital role in preventing coronary diseases, obesity, diabetes and constipation. [17] The consumption of fibre lowers plasma cholesterol levels [18]. Fruits contain remarkable level of vitamin B group. It contains vit.B1 (Thiamine) 0.7692mg/100gm, Vit.B2 (Riboflavin) 0.2061 mg/100gm and Vit.B3 (Niacin) 3.1282 mg/100gm. these values are considerable as compare to cultivated varieties of *Luffa*. [15] Having enough niacin or vitamin B3, in the body is important for general good health. As a treatment, higher amounts of niacin can improve cholesterol levels and lower cardiovascular risks. Fruits contain 99.78 mg/100gm Calcium, which is important for bones. 27.38 mg/100gm Magnesium of fruits needed for more than 300 biochemical reactions in the body. It helps to maintain normal nerve and muscle function, supports a healthy immune system, keeps the heart beat steady, and helps bones remain strong. It also helps to regulate blood glucose level and aid in the production of energy and protein.

7. Conclusion

Fruits of *Luffa acutangula* var. *amara* are rich of various nutrients. Fruits are important source of Calcium, Iron and Magnesium which play vital role in biochemical metabolism, so can be used as source potent nutrients. Excessive moisture content, fiber content and vitamin B in fruits can be used as supplementary source. *Luffa acutangula* var. *amara* is potent source of nutrition as compared to cultivated varieties like *Luffa acutangula* and *Luffa cylindrica*.

8. Future Scope

Fruits of *Luffa acutangula* var. *amara* can be a part of food or fodder and can help to meet hunger. Bioingredients can be isolated or separately used in supplementary nutrition or medicinal system.

9. Abbreviations

AOAC: Association of Official Analytical Chemists

FAO: Food and Agricultural Organization

WHO: World Health Organization

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Author Profile



Jadhav S.J., Research student presently working on Bioprospecting of *Luffa acutangula* var. *amara* in Shivaji University, Kolhapur, (MS) India. Completed M.Sc. (Botany), B.Ed. working as teacher in Shri Ram Jr. College, Kolhapur, (MS), India. Presented over 8 National papers and published over 5 international papers on different aspects of *Luffa acutangula* var. *amara*.



Dr. (Prof.) Chavan N.S., Professor in Botany, Research guide, Shivaji University, Kolhapur (MS) India. Having P.G. teaching experience of 25 years, guided over 18 Ph.D. students, published 36 international, 45 national papers and 18 conference proceedings. Carried out over 15 different projects regarding conservation and management of wet land resources, conservations of wild cucurbits and mangroves. Life member of TEAK nature club, IWSA, Marathi Vigyan Parishad, Nature & Pollution Board, Nature, Environment & Pollution Technology. Executive body member of Mangrove Society of India: