



## Underutilize Vegetables and its Medicinal Property in Indian Contest: A review

Ratan Das<sup>1\*</sup>, Tapas Paul<sup>2</sup> and Rajen Chowdhury<sup>3</sup>

<sup>1</sup>Department of Horticulture and Postharvest Technology, Institute of Agriculture, Visva-Bharati, Sriniketan, WB, India

<sup>2</sup>Department of Genetics and Plant Breeding and Crop Physiology, Institute of Agriculture, Visva-Bharati, Sriniketan, WB, India

<sup>3</sup>Department of Biotechnology, CPMB&B, Tamil Nadu Agricultural University, India

\*Corresponding Author: Ratan Das, Department of Horticulture and Postharvest Technology, Institute of Agriculture, Visva-Bharati, Sriniketan, WB, India.

Received: June 26, 2019; Published: July 12, 2019

DOI: 10.31080/ASNH.2019.03.0370

### Abstract

Bharat has wide biodiversity of vegetable and many are not being cultivated commercially in spite of their rich medicinal and nutritive value. Underutilize vegetables pose both protective and curative properties. Crops like Wax gourd (*Benincasa hispida*), Drumstick (*Moringa oleifera*), Basella (*Basella Alba*, *Basella rubra*), Alligator weed (*Alternanthera philoxeroides*) etc. exhibit anti-inflammatory, anti-ulcer, anticonvulsant activities, anti-atherosclerotic, anti-inflammatory, anti-spasmodic, antihypertensive, anti-tumour, anti-oxidant, anti-pyretic, antiulcer, anti-epileptic etc. property. The chemical composition of the plant interacts with various pathways in the animal body by which it provides the therapeutic effect against various physiological and neurological diseases. Not only this, but it also prevents nephrotoxicity and oxidative impairments of the kidney induced by modern medicine. This review paper mainly emphasizes the medicinal value of few underutilize vegetable and its effect on the improvement of health.

**Keywords:** *Benincasa hispida*; *Moringa oleifera*; Property

### Introduction

The world population is increasing as never before within the limited natural resource. As a result, malnutrition and other health related issues are severe in the various pocket of the world as well as in Bharat. Essential people are suffering from chronic and life-style diseases. With the change of time, we filled our food bucked with very limited crops belonging to cereal and other crop groups, as a result, many important species are left out of priority (Frison, *et al.* 2006). Horticulture plays an important role in providing nutritional security to the human being. Among these vegetables is an important source of vitamins, nutrients, antioxidants. Some of them are also a rich source of medicinal components essentially under underutilize vegetables. However, they have been ignored for years. But in Bharat, traditional a good number of the underutilized crop species are used in different (Sathiyaraj and Kumuthakalavalli, 2014). Tribal peoples know the medicinal property of such a crop which carries flowered generation to generation. Such

vegetable crops viz. *Centella asiatica*, *Glinus oppositifolius*, *Leucas aspera*, *Trianthema portulacastrum*, *Enhydra fluctuans* etc. also being used day to day but they also use for therapeutic purpose (Pandey, *et al.* 2014). Moreover, some of the underutilized vegetables are reported to rich with anticancerous property (Rajsekaran, *et al.* 2014) haepatoprotective (Sharmila Banu, *et al.* 2009), antimicrobial (Doss, 2015; Srinivasan, *et al.* 2011), anti-inflammatory (Kaushik, *et al.* 2011) and many more. Many spices of Bharat include saffron, curcumin, pepper, zingiber, cinnamon etc. has been used for the treatment of hypercholesterolemic, cardiovascular disease, obesity, inflammation/metabolic disease, diabetes and Alzheimer's disease [1,2]. This review paper is mainly emphasizing the medicinal property of some underutilize vegetable.

### Drumstick (*Moringa oleifera*)

Fruit, leaves and flowers are edible for this crop. It is claimed that it is the most nutritious plant yet discovered (Khawaja, *et al.* 2010). It exhibit anti-inflammatory, anti-ulcer, anticonvulsant ac-

tivities, anti-atherosclerotic, anti-inflammatory, anti-spasmodic, antihypertensive, anti-tumour, anti-oxidant, anti-pyretic, anti-ulcer, anti-epileptic, diuretic, cholesterol lowering, renal and anti-diabetic, (Chumark., *et al.* 2008, Sharma *et al.* 2012). Drumstick is also effective to cure skin infections, anaemia, bronchitis, anxiety, asthma, chest congestion, blackheads, blood impurities, catarrh, cholera and many other illnesses (Khawaja., *et al.* 2010; Singh., *et al.* 2012). The leaf is very effective to maintain the high blood pressure. Consumption of high-fat diet (HFD) is become a part of daily life which induces nonalcoholic fatty liver disease (NAFLD) as a result different physiological complicity appear. But leaf of *Moringa oleifera* having the property to protected HFD-induced liver damage [3]. *Moringa* leaves also Prevent Hepatic Lipid Accumulation in the liver by affecting the affecting gene expression of hepatic lipids synthesis gene resulting in lower concentrations of cholesterol and triglycerides. This medicinal leaves are also reduce the inflammation in the liver [4].

#### Alligator weed (*Alternanthera philoxeroides*)

It is an aquatic plant with various medicinal property, this plant is a good source of calcium, potassium, iron, different sterol and also dietary fiber. It is used as leafy vegetables contains different chemical compound like oleanolic acid, 7 $\alpha$ -L-rhamnosyl-6-methoxy-luteolin, oleanolic acid-3-O- $\beta$ -D-glucoside, ribose and saponin components of rhamnose. Stem leaves contain alternanthin,  $\beta$ -sitosterol, stearic acid etc. (Tanveer., *et al.* 2013). It beloved to have anti-viral, antibacterial, and haepato-protective property. It is very helpful in, hematuria, cold and pyrexia, measles, coughing up blood encephalitis B, etc. this plant also used against venomous snake bite.

#### Basella (*Basella Alba*, *Basella rubra*)

Both the leaf and stem are edible and a good source of nutrient including A, C, B, Ca, Mg, Fe and antioxidants. It is two type Viz. *Basella Alba* which is green in nature and *Basella rubra* with purplish to pink veins (Cook, 2010). *Basella rubra* contain a good amount of anthocianin which believe to be a strong antioxidant [5]. The plant exhibit androgenic, anti-diabetic, anti-inflammatory, anti-microbial, antioxidant, anticancer, antiviral, CNS depressant, haepato protective (Gupta., *et al.* 2008 and Saleem., *et al.* 2001).

#### Elephant foot yam (*Amorphophallus campanulatus*)

Economical part of the crop is corm and it is widely used in ayurvedic medicine system for treating various human diseases

and disorder. The corms have antihelminthic and aphrodisiac property. However, it also useful in inflammations, haemorrhages, elephantiasis, haemorrhoids, amenorrhoea, dysentery, splenopathy, seminal weakness, fatigue, anaemia etc. (Jain., *et al.* 2009, Ramalingam., *et al.* 2010). The corms contain salviasperanol and amblyone which possess antibacterial, antifungal and cytotoxic activities (Anonymous 1985). Nevertheless, it is a remedy for asthma, rheumatism piles, abdominal disorders, and tumours (Kirtikar and Basu, 1989).

#### Water Cress (*Enhydra fluctuans*)

In Bharat, the *Enhydra fluctuans* is commonly known as Helench. This herb grows in marshland as well on water. The stem and the leaf is edible. The plant is rich in  $\beta$ -carotene and also contain a good amount of protein. The plant antidiabetic, antimicrobial, anti-inflammatory, antioxidant, anticancerous, haepatoprotective, neuroprotective and analgesic property for its rich therapeutic component like saponins, myricyl alcohol, kaurol, cholesterol, sitosterol, glucoside, stigmasterol, cholesterol, sitosterol, glucoside etc. the green Leaves of the plant have laxative property and also useful in liver disorders, skin and neurological issue (Sarma., *et al.* 2014).

#### Red amaranth (*Amaranthus cruentus*)

All part of this crop having therapeutic value. Roots when boiled with honey act as a laxative. The ash of the stems is also used for wound dressing [6]. Traditionally the heated leaves are used to manage tumours. It is helpful in constipation, fever, haemorrhage, anaemia, kidney problem (Mathur., *et al.* 2010 and Choudhury, 2012). The plant is good for diabetic patients and also used as a anti-snake venom. Antipyretic and antileprotic property also reported in this crop [7]. Appert from this, the plant provides various nutrients like iron, calcium, magnesium, niacin, riboflavin, phytin, tannin etc. along with many antioxidants which help the body to stay healthy (Fernand., *et al.* 2012).

#### Purslane (*Portulaca oleracea*)

Though in many parts of the country Purslane (*Portulaca oleracea* L.) considered as a weed but deserves special attention for its nutritional value and therapeutic content. Three types of purslane have been reported namely, the green, golden, and a large-leaved golden variety [8,9]. Leaf and stem are edible consumed as a vegetable in many pockets of Bharat. It contains various vitamins and minerals like riboflavin, niacin, and pyridoxine, potassium, magnesium, calcium, phosphorus, and iron. But essentially it contains

Omega-3 Fatty acid as a result of cholesterol and triglyceride levels lower down high density lipoprotein rises. It also helps to treat vascular diseases by decreasing the thickness of the blood [3]. Antioxidant such as GPx, GR, SOD, and GST are reported in the plant which helps to maintain glutathione homeostasis in tissues [10]. The plant is a potential cancer inhibitor as it contains a considerable amount of Vitamin C (ascorbic acid) and beta-carotene which have been reported to have antioxidant activity, because of their ability to neutralize free radicals [11].

#### Sweet gourd (*Momordica cochinchinensis*)

It is a dioecious plant and the fruit is edible. The sweet gourd is popular in North Eastern Bharat. The seed of the *M. cochinchinensis* has many therapeutic properties like relieving muscle pain, rheumatic pain, hemorrhoids, bruises etc. [12,13]. It also reported that *Momordica* possess antioxidant effects [14], improve the immune response (Xiao, *et al.* 2007), and anti-ulcer property [15]. In a recent study, it was observed that the seed is very effective to reduce the proliferation of human lung cancer cell [16] and also help to reduce the degeneration of kidney cells because of the presence of saponins [17].

#### Wax gourd (*Benincasa hispida*)

The Wax gourd is a underutilize vegetable in Bharat and mainly grown in some pocket of north-eastern Bharat. Tender and mature both kinds of fruit are edible. Mature fruits having a very long post-harvest life. The Fruits of the plant is very nutritious and have an endless medicinal property and used as a laxative, diuretic, aphrodisiac, cardiogenic, urinary calculi, blood disease, insanity, epilepsy, schizophrenia and many other psychologic disorders [18,19]. The *Benincasa hispida* fruits are rich in volatile oils, flavonoids, saccharides, glycosides, proteins, vitamins, carotenes, minerals,  $\beta$ -sitosterin and uronic acid [20-22].

Fruit of this plant also affect the central nervous. It inhibits MAO-A, and also interact with dopaminergic,  $\alpha$ 1- adrenergic, serotonergic, and GABAergic systems by which it expresses antidepressant-like activity [23]. The juice of the fruit helps to ride off the morphine addiction and manage the colchicines-induced rat model of Alzheimer's disease considerably [24,25]. The seed and the peel have anti-gastric ulcer and anthelmintic activity respectively [26,27]. Fruit rind extract (outer thick pericarp) has various effects on the renal system. The study revealed that the extract of Fruit rind increases the urinary volume, sodium and chloride excretion

and a decrease in the potassium excretion [19]. Apart from this, it prevented the paracetamol - induced nephrotoxicity and oxidative impairments of the kidney, reduced in kidney weight, blood urea, blood creatinine, urinary glucose etc. [28]. Interestingly, It possesses nephroprotective activity against mercury poisoning [29].

An antimicrobial effect of this plant was also reported against various pathogens like *B. subtilis*, *Micrococcus luteus*, *Candida albicans* etc. but was very effective against *Candida albicans* [30,31].

#### Tree bean (*Parkia roxburghii*)

It is a perennial tree and pods, as well as flowers, are edible. The fruits are popularly known as Yongchak in the North East Bharat. Pods of *P roxburghii* have the potential to manage various diseases like kidney disorder, urinary tract infection, diabetes, hypertension, headache etc [32,33]. Apart from these it also possesses anticancer [34], antioxidant [35] and antimutagenic [36] property. Antimicrobial effect of the pods extract was reported against various microorganisms [37].

#### Conclusion

Now a day's human population is facing various health issues, including lifestyle diseases, physiological and pathological. To overcome such health problem modern medicines are being used heavily which has its own side effect. Underutilize vegetables like Wax gourd (*Benincasa hispida*), Drumstick (*Moringa oleifera*), Bassella (*Basella Alba*, *Basella rubra*), Alligator weed (*Alternanthera philoxeroides*) etc. exhibit protective and curative property. Many of them even have the property to neutralize the side effect of the modern medicine. Hence, they should be popularized and our food bucket should be enriched with such crops. Encouragement for the systematic cultivation of such crop is required to overcome the health issue and also to boost the economy of the country.

#### Bibliography

1. Krishnaswamy K. "Traditional Indian Spices and Their Health Significance". *Asia Pacific Journal of Clinical Nutrition* 17.1 (2008): 265-268.
2. Martins IJ. "Indian Spices and Biotherapeutics in Health and Chronic Disease". *Health* 10.4 (2018): 374-380.
3. Das N., *et al.* "Moringaoleifera Lam. leaf extract prevents early liver injury and restores antioxidant status in mice fed with high-fat diet". *Indian Journal of Experimental Biology* 50.6 (2012): 404-412.

4. Manal MA., *et al.* "Moringa Leaves Prevent Hepatic Lipid Accumulation and Inflammation in Guinea Pigs by Reducing the Expression of Genes Involved in Lipid Metabolism". *International Journal of Molecular Sciences* 18.7 (2017): 1330.
5. Ferreira E Ozela., *et al.* "Stability of anthocyanin in spinach vine (*Basella rubra*) fruits". *Ciencia E Investigación Agraria* 34.2 (2007): 115-120.
6. Grubbens GJH and Denton OA. "Plant Resources of Tropical Africa 2. Vegetables. PROTA Foundation, Wageningen. Netherlands/Backhuys Publishers, Leiden, Netherlands/CTA, Wageningen, Netherlands (2004): 668.
7. Janet OA. "Nutritional value and utilization of amaranthus (*amaranthus* spp.) - a review". *Bayero Journal of Pure and Applied Sciences* 6.1 (2013): 136-143.
8. Simopoulos AP, "Evolutionary aspects of diet, essential fatty acids and cardiovascular disease". *European Heart Journal* 3 (2001): 8-21.
9. Siriamornpun S and Suttajit M. "Microchemical components and antioxidant activity of different morphological parts of thai wild purslane (*Portulaca oleracea*)". *Weed Science* 58.3 (2010): 182-188.
10. Md Kamal Uddin., *et al.* "Purslane Weed (*Portulaca oleracea*): A Prospective Plant Source of Nutrition, Omega-3 Fatty Acid, and Antioxidant Attributes". *The Scientific World Journal* 951019 (2014): 6.
11. Rifici VA and AK Khachadurian. "Dietary supplementation with vitamins C and E inhibits in vitro oxidation of lipoproteins". *Journal of the American College of Nutrition* 12.6 (1993): 631-637.
12. Gao XM. "Chinese Material Medica". Traditional Chinese. Materia Medica Press, Beijing (2005).
13. Tran XT., *et al.* "Effects of maturity on physicochemical properties of Gac fruit (*Momordica cochinchinensis* Spreng.)". *Food Science and Nutrition* 4.2 (2016): 305-314.
14. Tsoi AYK., *et al.* "Antioxidative effect of a chymotrypsin inhibitor from *Momordica cochinchinensis* (*Cucurbitaceae*) seeds in a primary rat hepatocyte culture". *Journal of Peptide Science* 11.10 (2005): 665-668.
15. Kang JM., *et al.* "Enhancement of gastric ulcer healing and angiogenesis by". *Clinical and Vaccine Immunology* 14 (2010): 1634-1639.
16. Jae Sik Yua., *et al.* "Antiproliferative effect of *Momordica cochinchinensis* seeds on human lung cancer cells and isolation of the major constituents". *Revista Brasileira de Farmacognosia* 27.3 (2017): 329-333.
17. Jung K., *et al.* "Protective effect and mechanism of action of saponins isolated from the seeds of gac (*Momordica cochinchinensis* Spreng.) against cisplatin-induced damage in LLC-PK1 kidney cells". *Bioorganic and Medicinal Chemistry Letters* 26.5 (2016): 1466-1470.
18. Blatter E., *et al.* "Indian Medicinal Plants". 2<sup>nd</sup> ed, Bishen Singh Mahendra Palsingh 2 (1975): 1126-1128.
19. Jayasree T., *et al.* "Evaluation of the Diuretic effect of the chloroform extract of the *Benincasa hispida* rind (Pericarp) Extract in Guinea-pigs". *Journal of Clinical and Diagnostic Research* 5.3 (2011): 578-582.
20. Nimbalkar SK., *et al.* "Anxiolytic evaluation of *Benincasa hispida* (Thunb) Cogn. fruit extracts". *International Journal of Pharmacy and Pharmaceutical Science Research* 1.3 (2011): 93-97.
21. Wu CM., *et al.* "Volatile compounds of the wax gourd (*Benincasa hispida*, Cogn) and a wax guard beverage". *Journal of Food Science* 52.1 (1987): 132-134.
22. Mandana B., *et al.* "Antioxidant activity of winter melon (*Benincasa hispida*) seeds using conventional soxhlet extraction technique". *International Food Research Journal* 19.1 (2012): 229-234.
23. Dhingra D and Joshi P. "Antidepressant-like activity of *Benincasa hispida* fruits in mice: Possible involvement of monoaminergic and GABAergic systems". *Journal of Pharmacology and Pharmacotherapeutics* 3.1 (2012): 60-61.
24. Ghosh K and Baghel MS. "A pharmacognostical and physicochemical study of *Benincasa hispida* with ayurvedic review". *International Journal of Research in Ayurveda and Pharmacy* 2.6 (2011): 1664-1668.
25. Roy C Ghosh TK and Guha D. "Dose dependent activity of *Benincasa hispida* in colchicines-induced experimental rat model of Alzheimer's disease". *International Journal of Pharmacology* 4.4 (2008): 237-244.
26. Rachchh MA and Jain SM. "Gastroprotective effect of *Benincasa hispida* fruit extract". *Indian Journal of Pharmacology* 40.6 (2008): 271-275.

27. Muley B., *et al.* "Phytochemical screening and anthelmintic potential of fruit peels of Benincasa hispida (curcubitaceae)". *International Journal of Herbal Drug Research* 4 (2012): 5-9.
28. Varghese HS., *et al.* "Nephroprotective activity of Benincasa hispida (Thunb.) Cogn. fruit extract against paracetamol induced nephrotoxicity in rats". *Research Journal of Pharmaceutical Biological and Chemical Sciences* 4.1 (2013): 322-332.
29. Mingyu D., *et al.* "A study on Benincasa hispida contents effective for protection of kidney". *Jiangsu Journal of Agricultural Sciences* 11.3 (1995): 46-52.
30. Tahir L., *et al.* "Antibacterial study on Benincasa hispida and Nigella sativa oil". *Journal of Pharmaceutical* 4.4 (2013): 121-122.
31. Natarajan D., *et al.* "Antimicrobial studies on methanolic extract of Benincasa hispida". *Ancient science of life* 22.3 (2003): 98-100.
32. Buring AB and Berg AJVD. "Freeze dried extract of parkia, preferably of Parkia speciosa beans for treatment of diseases such as diabetes mellitus type 2. US patent, PCT/EP2012/000662 (2013).
33. Samuel AJSJ., *et al.* "Ethnomedical survey of plants used by the Orang Asli in Kampung Bawong, Perak, West Malaysia". *Journal of Ethnobiology and Ethnomedicine* 6 (2010): 5.
34. Aisha AFA., *et al.* "Screening of antiangiogenic activity of some tropical plants by rat aorta ring assay". *International Journal of Pharmacology* 5.6 (2009): 370-376.
35. Ali MA., *et al.* "Antioxidant capacities of vegetables consumed in north east India assessed by three different in vitro assays". *International Journal of Research in Pharmaceutical Sciences* 2.2 (2011): 118-123.
36. Tangkanakul P., *et al.* "Antioxidant capacity and antimutagenicity of thermal processed Thai foods". *Japan Agricultural Research Quarterly* 45 (2011): 211-218.
37. Sakunpak A and Panichayupakaranant P. "Antibacterial activity of Thai edible plants against gastrointestinal pathogenic bacteria and isolation of a new broad spectrum antibacterial polyisoprenylated benzophenone, chamuangone". *Food Chemistry* 130.4 (2012): 826-831.

**Volume 3 Issue 8 August 2019**

**© All rights are reserved by Ratan Das., *et al.***