

Sr. No.	Products	Reference
3	pieces Ice-cream sundae	(1995) Rico-Pena and Torres (1990)
4	Meat, poultry products, seafoods	Baker et al. (1994)
5	Confectionery and cereals	Kestner and Fennama (1986)
6	Dried fruits, nuts, candy and cheese	Hernandez (1994), Baker et al. (1994)
7	Frozen fish	Hisara (1991)

Conclusion: Increased consumer demand for both higher quality and longer shelf life foods in combination with environmental calls for reduction of disposable non-biodegradable packaging

materials and improvement in packaging recyclables has led to increased interest in edible packaging research. Edible films and coatings by regulating water vapour, oxygen, carbon dioxide and lipid transfer in food systems, offer potential solutions to these problems also improve mechanical properties and control loss of volatile flavors and aromas. It can be anticipated that it has a great future in the area of food packaging. Research and Development effort is required to develop edible films and coatings that have good packaging performance besides being economical.

References

www.google.com
www.wikipedia.com

90. FOODS AND NUTRITION

Drumstick (*Moringa oleifera* Lamk.): A Health Beneficial Plant

Shankar Verma¹, T.C. Balai², Narendra Kumar³

¹Ph.D. Scholar, Department of Horticulture, College of Agriculture, J.A.U., Junagadh-362 001, Gujarat, ²Rajasthan College of Agriculture, M.P.U.A.T., Udaipur - 313 001, Rajasthan, ³Directorate of Groundnut Research, Ivnagar Road, Junagadh- 362 00

Introduction: Drumstick (*Moringa oleifera* Lamk.) is one of the most popular perennial vegetable grown in South India. It is commonly grown as a unique vegetable. Its fruits, leaves and flowers are equally useful. It is the most widely cultivated species of a monogeneric family- Moringaceae and its chromosome number are $2n=22$. The tree is indigenous to North-West India. Drumstick is grown for its nutrient rich tender, but full grown pods, leaves and flowers which are used for culinary preparations. Tender leaves and flowers are comparable to that of colocasia in vitamins and minerals and have great role for combating malnutrition of urban and rural masses (Gopalakrishnan, 2007). It popularly known as 'Ganigana', 'Mullakkai', 'Murrugi', 'Sahjan' and 'Muringa'. Drumstick roots are good substitute for horseradish. Its root, bark and seeds have many industrial uses.

Nutritional composition of drumstick: Its fruits are rich in Vitamin-C (120mg/100g), carotene (110mg), phosphorous (110mg) and minerals like magnesium (28mg), potassium (259mg), sulphur (137mg), chlorine (423mg) (Gopalakrishnan, 2007). Beside these nutrients it also contains folic acid, nicotinic acid, riboflavin, pyridoxine, ascorbic acid, beta carotene, alpha tocopherol and amino acid.

Health benefits of drumsticks: The drumstick is valued mainly for its tender pods, which are relished as vegetable but all parts like bark, root, fruit, flowers, leaves, seeds and even gum are of medicinal value.

1. Drumsticks are used in treatment of ascites,

- rheumatism and venomous bites as antiseptic and as cardiac and circulatory stimulants.
- Manually drumstick oil is filled in capsules and consumed which helps in improving immune system and helps whole body to be healthy.
- The root of drumstick are used in prescribed doses, is given in intermittent fevers, paralytic affections, epilepsy and hysteria and externally in palsy, chronic rheumatism and enlargement of spleen, dyspepsia and also in bites by rabid animals.
- Drumstick leaf extract mixed with lime juice can be used to reduce the pimples, black heads and skin related problems.
- The juice of the leaves or a compound spirit made of roots and orange peel with a little bruised nutmeg is useful in fainting fits, giddiness and nervous debility.
- Decoction or infusion of the root with addition of bruised mustard seeds is used in ascites and is also useful as a gargle in soreness of mouth and throat and pain in the gums due to dental caries.
- Drumsticks reduce diabetic level, improves digestion problem and makes gall bladder healthy.
- Its seeds are pungent and stimulant and their leaves are rich in vitamin A and C and are considered useful in catarrhal affections.
- A paste of the leaves is used as an external application on wounds. Wrapping of the leaves is useful in reducing glandular swellings.
- Its leaves are useful in curing cardiac diseases

- and reduces the chances of developing breast cancer.
11. Its flowers are used as stimulant, tonic, diuretic and cholagogue. They are useful in increasing the flow of bile.
 12. Its gum mixed with sesamum oil, is dropped into the ears in otalagia.
 13. The pods made into a soup are prescribed as a diet in sub-acute cases of enlarged liver and spleen, articular pains, tetanus, debility of nervous, paralysis, pustules, patches and leprosy.
 14. Curry made from the unripe pods acts as a preventive against intestinal worms.
 15. It is also of interest because of its production of compounds with antibiotic activity such as the glucosinolate 4 -alpha-L-rhamnosyloxy benzyl isothiocyanate.
 16. Drumstick extract can be reduces the intestine tumor or ulcer.
 17. Drumstick extract + flower consumed with milk with nut mug (jaifal) improve the function of ovaries and reduce the impotence and also help to improve the function of ovaries to release healthy eggs.
 18. Drumstick improves the vision of eye and also clears the toxins from the retina which increases the life of retina.
 19. Drum stick leaf extract help to make lungs strong removes the toxin from the lungs which are deposited because of cigarette smoking or heavy industry air pollution.
 20. When drum stick tree unfortunately gets dried or get destroyed its roots are collected and used in many herbs.

References

- Fahey, J. W. (2005). *Moringa oleifera: A review of the medical evidence for its nutritional, therapeutic and prophylactic properties, Trees for Life Journal*, part 1, 1-5.
- Fuglie, L. J. (2000). New uses of *Moringa* studied in Nicaragua. ECHO Development Notes.
- Gopalakrishnan, T. R. (2007). Vegetable crops. *Horticulture science series-4*. pp.315-319.
- Peter, K.V. (2007). Underutilized and Underexploited Horticultural Crops. Volume-2. pp.311-321.

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Health Benefits of Phytochemicals

¹Anitha. S, ¹Jayalaxmi Baddi and ²Kanchanashri B.

¹Ph.D. scholar, Dept. of Food Science and Nutrition, ²Ph.D. Scholar, Dept. of Agricultural Microbiology, UAS, GKVK, Bangalore

Introduction: "Phyto" is a Greek word that means plant and phytochemicals are usually related to plant pigments. So, fruits and vegetables that are bright colors - yellow, orange, red, green, blue, and purple - generally contain the most phytochemicals and the most nutrients. Benefit from all of the phytochemicals and nutrients found in plant foods by eating 5-9 servings of fruits and vegetables a day and eating more whole grains, soy and nuts. There are about 30,000 phytochemicals, among them 10,000 are present in food and many more phytochemicals continue to be discovered today. It is estimated that there may be more than 100s of phytochemicals in just one serving of vegetables, in contrast, supplements or pills contain large doses of only one or two phytochemicals. These isolated supplements have not proven to be effective or even safe.

What are phytochemicals?: (1) The power house natural chemicals inside the plants, which basically give the plant protection against disease and also have disease - preventing. (2) Chemicals found in plants that protect plants against bacteria, viruses, and fungi. (3) Non-nutritive plant chemicals that have protective or disease preventive properties in human are believed to have many health benefits. (4) Biologically active substances in plants that are responsible for giving them natural colour, flavour etc.

Types of phytochemicals: Phenolics, flavonoids,

catechins, epicatechins, lignans, tannins, flavonols, quercetin, isoflavones, genestein, diadzein, anthocyanidins, phytates, saponins, indoles, isothiocyanates, sulfaforaphane, allyl sulfides, carotenoids-carotenes, lycopene, betacarotes, lutein, phytoestrogen, melatonin, phytosterols

TABLE 1: Color Foods and Phytochemicals

Color Group	Phytochemicals	Fruits and Vegetables
Red	Lycopene, Phytoene, Phytofluene	Tomatoes, Vegetable Juices, Tomato Soup, Watermelon.
Green	Glucosinolates, Isothiocyanates, Indole-3Carbinol, Folic Acid	Broccoli, Brussels Sprouts, Cauliflower, Cabbage.
Green/Yellow	Lutein, Zeaxanthin	Spinach, Avocado, Green Beans, Green Peppers, Mustard Greens.
Orange/Yellow	Alpha & Beta Carotene, Beta-Cryptoxanthin	Carrots, Mangoes, Pumpkins, Apricots.
Red/Purple	Anthocyanins, Ellagic Acid, Flavonoids	Grapes and Grape Juice, Cherries, Red wine, Strawberries, Plums, Raisins.
White/Green	Allyl Sulfides	Garlic, Onion.