Int.J.Curr.Microbiol.App.Sci (2020) Special Issue-11: 2989-2996

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Special Issue-11 pp. 2989-2996**
Journal homepage: http://www.ijcmas.com

Original Research Article

Nutritional and Medicinal Importance of under Utilized Fruits

Vinita Singh[1*], Monika Thakur[1] and Anant Kumar[2]

[1]Amity Institute of Food Technology, Amity University, Uttar Pradesh, India
[2]Department of Horticulture, KVK, Muradnagar, India
**Corresponding author*

A B S T R A C T

The underutilized fruit crops are those plant species, which are conventionally used for their food, fodder, fibre, oil and extensive medicinal properties. However, these species have under exploited potential to ensure food security, nutrition, health, income generation and environmental services. Major fruit crops like Mango, Banana, Papaya Litchi, Guava etc. are commercially cultivated fruit crop while the wild edible fruits are neither cultivated nor domesticated. Most of the underutilized indigenous fruit crops used as medicinal plants throughout India and popular in various indigenous system of medicine. The value added products of these fruits need focussed approach to catch the national and international markets. The present outline on these fruit crops is mainly directed on food, nutritional, and medicinal value of these minor fruits. In India the most common underutilized fruits are Bael (*Aegle marmelos*), Jamun (*Syzygium cumini*), Karonda (*Carissa carandas*) Ber (*Ziziphus mauritiana*), Lasora (*Cordia myxa L*), Phalsa (*Grawia subinaequalis*), etc. So, the review paper is primarily emphasizing on the nutritional, therapeutic and other values of these fruit crops.

Keywords

Blood pressure, Cholesterol level and fats, Vitamins, Minerals, Antioxidants

Introduction

India with diverse, but favourable agro climatic conditions produces a wide range of tropical and temperate fruits. Fruits are undoubtedly called as protective food as they are very rich sources of vitamins, minerals, antioxidants and phytochemicals. It contains a high range of water, ranging between 80 to 90 percent with a less amount of protein, fat, salt and sugar. They are prospective source of soluble dietary fiber. Besides as a part of well-balanced, regular diet and a healthy active lifestyle, a high intake of fruit and vegetables also helps in reducing the blood pressure, cholesterol level and fats from the body to maintain a healthy weight, as well as helps in smooth bowel movements and boosting the immune system. It's very high anti-oxidant property helps in removal of free radicals from the body, and thus provides protection against many chronic and infectious diseases (1). Major fruit crops like Mango, Banana, Papaya Litchi, Guava etc. are commercially cultivated and comprises 75 percent of total area under fruit cultivation while the wild edible fruits refer to species that are neither cultivated nor domesticated,

but it come from their wild natural habitat and used as one of the sources of food (2,3). Most of the underutilized indigenous fruit crops used as medicinal plants throughout India and popular in various indigenous system of medicine like Unani, Ayurveda and Homoeopathy. It was recognized that a high consumption of fruits and vegetables can help to prevent several non-communicable diseases such as cardiovascular diseases, the diabetes mellitus type -II and some cancer (4).

There are quite a large figure of indigenous and underutilized fruit crops, which are being used by the restricted inhabitants. In fact, these underutilized fruits are the only source of protective food to meet their vitamins and minerals requirements in their poor diet for the folks living in the villages.

In India the most common underutilized fruits are Jamun (*Syzygium cumini*), Bael (*Aegle marmelos*), Karonda (*Carissa carandas*), Ber (*Ziziphus mauritiana*), Lasora (*Cordia myxa L*), Phalsa (*Grawia subinaequalis*), etc. So, the review paper is primarily emphasizing on the nutritional, therapeutic and other values of these underutilized fruit crops.

Jamun

Jamun (*Syzygium cumini* skeels) is a significant well known indigenous underutilized fruit crop of commercial value in India, belongs to the family Myrtaceae,. It is also recognized as Ram jamun, Indian black cherry, black plum, etc. in different parts of the country. The tree is tall, evergreen, generally grown for shade in most of the states in neglected areas, forest niches, marshy lands as staggered trees, suitable for roadside plantations. The original home of jamun is India or the East Indies. It is also found in Thailand, Philippines, Madagascar and some other countries. The jamun has successfully been introduced into many other subtropical regions including Florida, California, Algeria, Israel, etc. The maximum figure of jamun trees are spread throughout the tropical and subtropical regions in India. It also scattered in the lower range of the Himalayas up to an altitude of 1,300 meters and in the Kumaon hills up to 1,600 meters. It is extensively grown in the larger parts of India from the Indo-Gangetic plains in North to Tamil Nadu in the South.

Importance of jamun fruit

Jamun fruits having very high nutritive value (5). Apart from minerals, sugars, and proteins, it is also a good source of iron. Jamun is considered as a medicinal plant for various conventional systems of medicine. It is said to be a boon for diabetic patient. It is very effective in the treatment of diarrhea, ulcers, inflammation, etc. It is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol and myrecetin. Fruits contain various kinds of anti-oxidant compounds, including flavonoids, phenolics, carotenoids and vitamins, which are all considered beneficial to human health, for reducing the risk of degenerative diseases by reduction of oxidative stress, and for the prevention of macromolecular oxidation (6).

Products of jamun fruit

Fruits of jamun are used for making numerous refreshing health drinks and products like jam, jelly, squash, preserves, and wine(7). It is also used for preparing, clear purple, attractive and excellent quality vinegar with mild flavor and a pleasant aroma. Juice of ripe jamun fruit is also used for making sauces as well as beverages. Fermented juice of jamun is also used for making brandy and distilled liquor.

Medicinal uses of jamun fruit

All parts of the tree and basically the seeds are used to treat a range of ailments, the most important being diabetes mellitus (8). The gallic acid and ellagic acid content present in seed plays an important role in conversion of starch into sugar which minimize blood glucose level (9). It is also effective in the treatment of inflammation, ulcers and diarrhea. Fruit pulp contains a very high anthocyanin content and can be a good source of natural food colourants for the food processing industries (10). The pigment is known for their strong antioxidant capacity and health-protecting effects and it also reduces the risk of various diseases (11). The leaves and bark are used for controlling blood pressure and bleeding gums. Seed powder of jamun able to reduces the sugar content in urine. Intake of Jamun is considered beneficial and cheaper way to control diabetes. The presence of glucoside in jamun, inhibits conversion of starch into glucose and thereby helps in reducing blood-sugar in the body. The seeds are used to treat a wide range of ailments, the most important being diabetes mellitus (12).

Jamun pulp lowers blood-sugar level in about 30 minutes, while it's seed lowers blood-sugar level in about 24 hours. Over a period of several weeks it can reduces the thirst associated with diabetes and decrease the quantity of urine output and in some cases it can help to reduce the use of insulin. Jamun seed has gastro-protective properties. In case of peptic ulcer, jamun is very effective as it helps in promotion of mucosal defensive factors and antioxidant status and decreasing lipid peroxidation. Jamun also has anti-cancer and anti-viral properties. Jamun fruit extract controls growth and increase apoptosis of breast cancer. However, jamun juice has carminative, mild astringent, stomachic, diuretic and provides a soothing effect on human digestive system. The seeds of jamun fruit is also have hypoglycemia, anti-inflammatory, antibacterial, anti-HIV and anti-diarrhoea effects (13). Fruit pulp contains very high amount of anthocyanin and can be a potential source of natural food colorants for the food processing industries (14). The pigment is known for their strong antioxidant capacity and health-protecting effects and reduces the risk of various diseases (15).

Bael

Bael (*Aegle marmelos*) is a significant member of Rutaceae family and native to India. It is one of the most important wonder tree species, used in various indigenous systems of medicine in India, China, Burma and Sri Lanka (16). CSIR reported it as only member of the monotypic genus Aegle (17).

Bael is moderate sized, aromatic tree, with 6.0 -7.5 m height and girth range between 90 to 120 cm, growing wild throughout the scattered forests niches of India. It is also recognized as Bengal quince, golden apple, Japanese bitter orange, stone apple, etc. It is also known as various names such as Kaitha, Maredu Pandu, Vilam Palam, Belada Hannu, Koovalam, Kothu, Koth Bel, etc.

Importance of bael fruit

Bael fruit contains 29.07g carbohydrates, 2.13 gm protein, 0.3g fat, 75mg ascorbic acid, 54.5mg carotene, 1.03mg riboflavin and minerals including calcium, phosphorus, iron (18). This fruit is considered one of the richest sources of riboflavin.

Products of bael fruit

The fruit is processed into various products viz. the green bael fruit slices are sundried for further use, pulp is converted to prepare

sherbet and syrup, marmalade prepared from its fruits is used to treat diarrhea and dysentery, fruits are also used for the preparation of powder, preserve, nectar and toffee (19).

Medicinal uses of bael fruit

Every parts of plant are cost-effective and have different medicinal values such as leaves, roots, seed, bark and fruit etc contain a large number of coumarins, alkaloids, sterols and essential oils, hence it possess analgesic, anti-inflammatory, antipyretic, anti-microfilaria, antifungal, hypoglycemic, antidyslipidemic, immunomodulatory, antiproliferative, wound healing, anti-fertility, and insecticidal abilities (20).

It's one of the prospective sources of Ayurvedic plants and been used in different ayurvedic medicines since long time for the treatment of specific disorders such as respiratory disorders, constipation, ulcer, diarrhoea, dysentery and many others. Marmelosin in fruit has therapeutically active factor of Bael fruit which is remedy of the stomach ailment.

The fresh leaf juice of bael fruit is very useful in doses of 8 to 16 gm with honey, as a mild laxative in fever and asthama. Fresh leaves and fruits are very useful as a remedy for the disease of beri-beri (21).

Karonda

Karonda (*Carissa carandas* L.) is a short stature evergreen shrub or tree belongs to the family Apocynaceae. It grows naturally in Western Ghats and Himalayas at elevations of 300 - 1800 meters, and found cultivated in wild in India, Malaysia, South Africa. In India, it grows on a limited scale in Bihar, West Bengal, Maharashtra, Karnataka etc. and cultivated in Uttar Pradesh, Rajasthan and Gujarat states of India. It is well suited to arid climate and is grown fine at higher temperature.

Importance of karonda fruit

The taste of karonda is sour and astringent but the nutritional quality is quite remarkable. They are very rich source of iron, B vitamins and vitamin C, which is efficiently flushing out the free radicals and are extremely valuable for treatment of anaemia. It also contains a good amount of protein, carbohydrates, fat, fibre and calcium.

Products of karonda fruit

Fruits of Karonda are used to prepare pickles, chutney, sauces, jelly, carissa cream or jellied salad. The dried fruits may act as a substitute for raisins (22, 23). During summer, ripe karonda fruit is used as a refreshing cooling drink because while cooking, it emits sticky latex, but it yields a rich red juice which becomes clear when it is cooled.

Medicinal uses of karonda fruit

Karonda fruits are used in many ayurvedic formulations due to their nutritional values. Unripe fruit serves as a good appetizer. The extract of root is used for chest pain and leavesare used for fever. Leaf extract can also be externally applied for treatment of leprosy. Two drops of plant oil is given with half cup of honey for controlling worms of minors (24).Moreover, it contains antioxidants such as flavonoids, alkaloids, tannins etc. which offer significant traits like analgesic, anti-inflammatory, antipyretic and cardiotonic. Traditionally karonda fruits are used for medicinal treatments of malaria, epilepsy, leprosy, nerve disorder, fever, relieve of pain, headache, and blood purifier (25). The major bioactive constituents, which impart medicinal value to the herb, are alkaloids,

flavonoids, saponins and large amounts of cardiac glycosides, triterpenoids, phenolic compounds and tannins. Fruits have also contain carisol, β-caryophyllene, carissone, carissic acid, carindone, carinol, ascorbic acid, lupeol, and β-sitosterol. These chemicals are very effective in the treatment of scabies, intestinal worms, pruritus, biliousness and also used as antiscorbutic, anthelmintic (26).

Ber

Ber (*Zyiziphus mauritiana*) is an evergreen, spiny small tree or shrub, native of Indo-China and India belongs to the family Rhamnaceae. The fruit is of variable shape as oval, oblong or round, and it's size can be vary as 2.5 to 6.25 cm long, depending upon the variety of the plant.

The flesh of fruit is white, crunchy and juicy with pleasant aroma. The skin is tight, thin, smooth and glossy. It is also known as Indian jujube, Indian plum, poor man's fruit, etc..

Importance of ber fruit

Ber fruits are great source of energy and easy to digest as it is rich in carbohydrates and dietary fibres, which help in curing constipation and essential for boosting metabolism. These fruits contain minerals like iron, zinc, potassium, phosphorus and manganese, which make it super-nutritious and combination of these minerals are required for maintaining healthy heart and regulating blood circulation in the body.

Products of ber fruit

Ber fruits are mainly eaten fresh and in dehydrated form (27). A choice of products are made from ber fruit like ber powder, ber candy, ber murabba, ber jam, ber preserve, ber pickle, ber beverages, ber wine, ber ready to serve (RTS) etc.

Medicinal uses of ber fruit

Iron helps in preventing anemia by increasing the haemoglobin level of blood. Dried fruits are a good source of calcium, phosphorous, that helps in developing and maintaining bone density. Fruits contain vitamin C and antioxidants which are known for reversing the effects of ageing. Antioxidants fights with free radicals and prevents cell damage and effect of aging. The whole fruit are full with antioxidants like flavonoids, phytochemicals, saponins etc. which have sedative qualities that helps in treating anxiety by calming nerves.

Lasora

Lasora (*Cordia myxa* L.) is also known as Gonda, or lehsua, belongs to the family Boraginaceae, that can be grown in moist and dry forests of India, except high hills and temperate climates. It is a medium sized, perennial tree with crooked stem. Lasora trees bears smooth, small cherry sized fruits in bunches from March to August.

Importance of lasora fruit

Fruits provide significant nutrients required for the human health as it is probable source of vitamins, minerals and fiber (28).

Other nutrients present in plants are: proteins, carbohydrates in the form of starch and free sugars, oils, ascorbic acid, minerals, and the antioxidant (29). Fruits are rich sources of natural antioxidants i.e. carotenoides, ascorbic acid, phenols etc. Lasora plant is considered as a multipurpose plant having association with nutrition, health and other diversified uses in curing some human ailments. (30). Lasora tree provides food (pickle and vegetable), fuel wood and timber, thus play an important role in the rural economy of arid regions(31).

Products of lasora fruit

Ripe fruits are eaten fresh, whereas, unripe fresh fruits are mostly used as vegetable and pickles, when availability of conventional vegetables is scarce (April - May).

Sometime fruits are also blanched and dehydrated to use it as vegetable for consumption during off season (32). The gummy crush obtained from ripe fruits is generally used to prepare glue.

Medicinal uses of lasora fruit

Various parts of the lasora tree are used both internally, and externally for medicinal purpose. The tree is used traditionally in the treatment of fever, dyspepsia, ulcers, ringworm, headache, diseases of lungs, and spleen, etc. The bark, leaves, fruits, and seeds have been reported to exhibit antidiabetic, antiulcer, anti-inflammatory, diuretic, immune-modulator, Laxative, antidote, astringents, analgesic, expectorant, etc. activities.

Phalsa

Phalsa (*Grewia subinaequalis*) is a large shrubby tree, reaching 15 - 16 feet, native to India and other parts of Southeast Asia, including Pakistan, Sri Lanka and Bangladesh. It belongs to the Tiliacae family, which is cultivated for its edible fruits in India and many other tropical countries.

It is also known as Indian Sherbet Berry. The ripe Phalsa is similar to grapes as it has thin layer of dark purple to black, having greenish white fleshy pulp over seeds with a sweet and sour taste, found in branched clusters. The fruit has a very short shelf life which restrict only for local marketing. It is mostly cultivated in the western and the northern states of India for commercial purpose.

Importance of phalsa fruit

The nutrient content of the fruit is significant with high moisture and water content. Consumption of this fruit fulfill the energy requirements as it is loaded with good amount of carbohydrates and calories in the form of simple sugars which are easily processed by the human body. Phalsa is a powerhouse of vitamins with ample amount of trace minerals. It contains abundant amount of Vitamin C. It has immense quantity of beneficial trace mineral iron, which is required for the synthesis of hemoglobin as needed to circulate blood between tissues and different organs of our body as well as helps in boosting the iron level to combat dizzines and fatigueness. The seed of phalsa contains 5 percent oil, which is bright yellow in colour and contains 65 % linoleic acid, and 11% stearic acid (33).

Products of phalsa fruit

Phalsa fruits are fresh only for a short duration after harvesting, so it must be consumed quickly. In India, during hot summer season, the ripe fruits are enjoyed either fresh in desserts, or processed into stimulating soft drinks like Sherbet, squash, RTS, etc.

Medicinal uses of phalsa fruit

Phalsa fruits work wonders in lowering down the high blood pressure to the normal range due to presence of benificial minerals like potassium and phosphorous. Furthermore, it also avert cardiac ailments of heart attack and heart functions, arrhythmia, atherosclerosis by preventing the deposition of fats in the blood stream and accumulation of cholesterol in blood vessels due to presence of anthocyanins, antioxidants and tannin. It infuses unripened fruits with anti-inflammatory traits and also helpful in

flushing free radicals from healthy cells. The antioxidant content is incredibly helpful in alleviating severe pain in bones, in stage of arthritis, osteoporosis and increase the movement of joints.

The underutilized fruit crops or minor fruits, discussed under the current investigations depicted that these underutilized fruits possesses great values both in medicinal as well as nutritional properties. They are the plant species that are conventionally used for their fruit, fiber, fodder, oil or therapeutic properties, but those group are considered under exploited prospective to ensure food security, nourishment, health, income generation and environmental services. These fruits also serves a potentiality in sustainable agriculture, despite the fact of having a wide level of adaptability with extensive level of tolerance, they can thrive well under unfavourable climatic circumstances. Underutilized plants only have local importance, but usually lack nationwide recognition. So, the research and development work for the cultivation of underutilized fruit crops must be given due considerations to encourage well-organized utilization of marketing systems for fresh fruits throughout surplus periods and processed produce can motivate the cultivation of these crops which can uplift the economy of the nation.

References

Kirtikar, K. R. and Basu, B., Indian Medicinal Plants, Vol I-IV (Bishen Singh Mahendra Pal Singh Dehradun), p, 830 (1984).

Beluhan S and Ranogajec A. "Chemical composition and nonvolatile components of Croatian wild edible mushrooms". Food Chemistr, 124 (2010): 1076-1082.

C. S. I. R., The wealth of India" National Institute of Science communication and Information Resources. I(A): 86 (1985).

Chandra, A. and Pareek, C. S., Lasora (*Cordia myxa* L.) a potential fruit crop in Jaisalmer district of western Rajasthan. Agric Sci Digest. 12(1): 11–12 (1992).

Chandra, A., Chandra, A. and Gupta, I. C., *Cordia myxa*. In: Arid fruit research. Scientific Publisher, Jodhpur Rajasthan, India. 302 (1994).

Chaudhary B and Mukhopadhyay K. "Syzygium cumini (L.) Skeels: A Potential Source of Nutraceuticals". International Journal of Pharmacy and Bio Sciences 2(2012): 46-53.).

Chaudhary, B. and Mukhopadhyay, K., Jamun (*Syzygium cumini* Skeels): A Potential Source of Nutraceuticals, International Journal of Pharmacy and Biosciences. 2: 46 - 53 (2012).

Cheema GS and Cheema BK. Farm Journal of Calcutta 12 (1971): 24.

Dar, A. I., Isolation and structural elucidation of the novel flavone glycoside from (*Feronia limonia* L), Journal of Pharmacy Research. 7: 697-704 (2013).

Dashora, L. K., Genetic resources of subtropical underutilized fruits: Proceedings of national seminar on tropical and subtropical fruits, Navsari Agricultural University, Navsari. 54-61 (2013).

Ganry J. "The nutritional value of fruits and vegetables". Fruits 61 (2006): 223-224.

Hasan MA. *et al.*,"Significance of minor fruits in health care". Proceeding of Botanicals in Integrated Health Care(2010): 162-166.

Kubola, J., Siriamornpun, S. and Meeso, N., Phytochemicals, vitamin c and sugar content of thai wild fruits. Food Chemistry. 126(3): 972-981 (2011).

Kumar, J., Chironji nut (*Buchanania lanzan*) processing, present practices and scope". Indian Journal of Traditional Knowledge. 11(1): 202-204 (2012).

Kumar, S. G., Free and bound phenolic antioxidants in amla (*Emblica officinalis*) and turmeric (*Curcuma longa*) Journal of Food Composition and Analysis. 19: 446-452(2006)

Mala, R., Nutrient content of important fruit trees from arid zone of Rajasthan., J Hortic For. 1(7): 103–108 (2009).

Morton JF. "Fruits of Warm Climates". Creative Resource Systems, Inc. Winterville, N.C., USA (1987): 503.

Morton, J. F., Phalsa, In: Fruits of warm climates. Morton, J., Miami, F. L., 276-277 (1987).

Nalawadi UG and Jayasheela N. Progressive Horticulture 7 (1975): 37 - 38.

Neeraj. "Bael (*Aegle marmelos*) Extraordinary Species of India: A Review". International Journal of Current Microbiology and applied sciences 6.3 (2017): 1870 - 1887.

Noomrio MH and Dahot MU. "Nutritive value of Eugenia jambosa fruit". Journal of Islamic Academy of Sciences 9 (1996): 9-12.).

Rahmatullah M. *et al.,* "A survey of Medicinal Plants in Two Areas of Dinajpur District, Bangladesh Including plants which can be used as Functional Foods". American-Eurasian Journal of Sustainable Agriculture3.4 (2009): 862-876.

Reshu, V. *et al.,* "Hidden Potential of Natural Herb Carissa Carandas (Karonda)". Research in Pharmacy and Health Sciences3.2 (2017): 294-302.

Sagrawat H., *et al.,* "Pharmacological Potential of Eugenia Jambolana: A Review". Pharmacogenesis Magazice 2 (2006): 96 - 104.

Sagrawat, H., Mann, A. and Kharya, M., Pharmacological potential of eugenia jamuna: A Review. Pharmacogenesis Magazine. 2: 96-104 (2006).

Singh Jashbir. *et al.,* "Sugar Profile, total phenolic and antioxidant potential of anthocyanins rich *Syzygium cumini* fruit". Natural Products: an Indian Journal 9.9 (2013): 350 - 354.

Singh, I. S., Minor fruits and their uses. Indian J Hortic. 58(1/2): 178–182 (2001).

Singh, J., Sugar Profile, total phenolic and antioxidant potential of anthocyanins rich *Syzygium cumini* fruit". Natural products: an Indian Journal. 9(9): 350-354 (2013).).

Spiller, G. A., Dietary fiber in prevention and treatment of disease. In: Spiller GA(Ed) CRC handbook of dietary fiber in human nutrition. CRC Press LLC, Washington, pp 363 –431 (2001).

Trivedi, P. C., Ethanomedicinal plants of India," Aavishkar publishers, Churna Rasta jaipur (Raj.), India. 71 (2007).

Urvashi N and Bhardwaj RL. "Medicinal, nutritional and economic security of tribals from underutilized fruits in Aravali region of district Sirohi, Rajasthan". Indian Journal of Traditional Knowledge4.3 (2015): 423-432.

Warrier, P., Nambiar, V., and Ramankutty, C., "Indian Medical Plants," 5: Orient Longman Ltd., Hyderabad, pp. 225-228 (1996).

Yogendra Singh and Prerak Bhatnagar, An Overview on Inherent Potential of Underutilized Fruits. Int. J. Pure App. Biosci. 7 (3): 86 - 103.