

Genetic Diversity of Underutilized Fruits: Key Role In Environmental Sustainability

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Abstract:

The tribal inhabitants of Western Ghats, Maharashtra and North Eastern States of India were traditionally reliant on non-timber forest products and favoured local fruit species like tamarind (*Tamarindus indica*), jackfruit (*Artocarpus heterophyllus*), Indian gooseberry (*Emblica officinalis*), ber (*Zizyphus mauritiana*), etc., instead of arable food crops apart from mango and cashew, for establishing agri-horti-forestry for their livelihoods. Innumerable wild species of *Citrus*, *Musa*, *Pyrus* and *Malus* were also prevalent in the North Eastern regions and these species were rendered “Underutilized” by the fact that even though they are locally abundant, and their current use is linked to their economic potential. These species were immensely constructive by surviving harsh agro-climatic conditions, and can be established on degraded lands, which are presently being underutilized either due to poor soil fertility or moisture scarcity. Reinforcement of their domestication through standardization of cultivation practices, facilitation for supply of planting material and increasing the demands for the produce by exploring their uses, creation of awareness among consumers and establishing a good distribution network are also crucial for attaining sustainability.

Keywords: sustainable, temperate, tropical, underutilized fruits.

Introduction:

Over 300 species of fruits, including temperate, subtropical and tropical, are growing in the country. The important fruit crops grown commercially in India are mango, banana, *Citrus*, guava, grape, pineapple, papaya, sapota, litchi and apple which comprise more than 75 percent of total area under fruit cultivation. Among the pome fruits, in addition to cultivated fruits like apple and pear, a wide range of wild, temperate pome fruits occur in the Indian Himalayas. A few percentages of these fruits are commercially grown, while most of the others are given less importance nor traded widely and rendered them as underutilized

fruit crops. The several less-known fruit species which have the potential for commercial exploitation are yet to be utilized to their potential. Most of the indigenous fruits are underutilized. They are rich in vitamin, minerals, and nutrients and have medicinal potential. These fruits have lack of genetic material, loss of germplasm collection and traditional knowledge, lack of knowledge on uses, have constraints and opportunities, limited income generation, market, commercialization and demand limitations, lack of research and development activities and weak national capacities and lack of links across conservation and production. Their adoption on a commercial scale, with crop improvement, standardization of cultural practices and popularization in diverse farming systems are warranted to achieve stability in farm production and food security

Genetic diversity and their significance:

Aonla:

Aonla is a deciduous fruiting plant grown in many states of India. Amla is the most concentrated form of vitamin C (500-600mg/100g) found in the plant kingdom, and when the whole fruit is used rather than an active ingredient, the vitamin C is easily assimilated by the human body and has been found to have great antioxidant properties. The nutritional values of aonla are numerous and is recommended to be included as part of the daily diet. The fruit is the richest source of vitamin C and is a diuretic, aperient and laxative. It cures insomnia, scurvy, constipation, used as a cooling agent to reduce the effects of sun strokes. It is also useful for haemorrhage, leucorrhoea and discharge of blood from uterus. As an anti-oxidant, it prevents premature ageing. Aonla stimulate the isolated group of cells that secrete the hormone insulin.



Fig. 1. Underutilized Fruits like, Aonla, Bael, Pomegranate and Jackfruit etc.

Bael:

It is native to India and Pakistan and spread throughout South-East Asia. This fruit is also commonly found in the hilly regions of India. Bael fruits consist of moisture (61.5%),



protein (1.8%), fat (0.3%), minerals (1.7%), fibre (2.9%) and carbohydrates (31.8%) per 100g of edible portion. Its vitamin and mineral contents include calcium, phosphorus, iron, carotene, thiamine, riboflavin, niacin and vitamin C. The bael tree is one of the most useful medicinal plants. The fruit is used as ayurvedic remedy against diarrhea, dryness of the eye and common cold. The fruit's medicinal value is very high when it just begins to ripen. The fruit is aromatic, cooling and laxative. It arrests secretion or bleeding. It is also useful in preventing scurvy and strengthens the stomach and promotes its actions. The unripe fruit is good for digestion and is perhaps the most effective remedy for chronic diarrhoea and dysentery where there is no fever. Best results are obtained by the use of dried bael or its powder. Beverages prepared from bael have great healing properties on account of its mucilage content.

Pomegranate:

It is a native of Middle East and in ancient Greek mythology, it is known as the “fruit of the dead”. A ripe pomegranate fruit contributes about 105 calories and 25g of sugar. It contains potassium, carbohydrates, protein, fat, fibre and other vitamins and minerals. Pomegranate juice is remarkably rich in antioxidants viz. poly phenols, tannins and anthocyanins, thereby acting as scavengers and prevents DNA damage. Pomegranate can be used for the treatment of cancers of the lung, prostate and breast. Pomegranate hull and/or root extract are used both orally and intra-vaginally in preventing fertility, abortion and to ameliorate assorted gynaecological problems. Due to its astringent properties it is also beneficial for diarrhoea and dysentery.

Jackfruit:

Jackfruit is native to India and important fruit crop of humid tropical and near-tropical climatic regions. Apart from being used as a table fruit, jack is a popular fruit for making pickles, sweets and thin round papad, canned jackfruit pieces, syrup, jam, jelly and candy. The fruit contains carbohydrate, protein, fibre, fat, calcium, phosphorus, iron, carotene, thiamine, riboflavin, niacin and vitamin C in various concentrations. Almost all parts of the plant viz., bark, roots, leaves and fruit has medicinal properties. The ash of jackfruit leaves, burned with corn and coconut shells, is used alone or mixed with coconut oil to heal ulcers. It also helps one get over the influence of alcohol. The starch from the seeds is used to relieve biliousness. The roasted seeds are said to be an aphrodisiac. Jackfruit also

provides a good amount of potassium to lower the high blood pressure and promote a healthy cardiovascular system.

Wood apple:

It is originated in India and belongs to the family Rutaceae. It is a hardy upright tree, producing nutritive acidic fruit and the pulp is eaten raw with or without sugar. The pulp contains 18.1% carbohydrate, 7.1% protein, 3.7% fat, 5.0% fibre and 1.9% mineral matter. The pulp is a rich source of calcium, phosphorus, iron and vitamins like carotene, riboflavin, niacin, thiamine and vitamin C. It is also used for making chutneys, jam, jelly and squash. The fruit is used as a liver and cardiac tonic, and when unripe, for easing diarrhoea and dysentery.



Fig. 2. Underutilized Fruits like, Custard apple, Jamun and Ber etc.

Jamun:

It is an important indigenous fruit of commercial value in the country. It belongs to the family Myrtaceae. The tree is ideally suited for windbreak and roadside plantations. Fruits contains carbohydrate, protein, iron, calcium, phosphorus, fat and fibre. It is taken as a dessert fruit and is also used in making beverages, squash, jam, jelly and wine. It is used in blood purification, diabetes, diarrhoea, eczema and as an antidote for strychnine poisoning. It is stomachic, carminative and diuretic and lowers the blood pressure. The jamun seed powder reduces the sugar content in urine.

Ber:

It belongs to the family Rhamnaceae and it is an ideal fruit tree for arid and semi-arid regions in tropical and subtropical climate. Fruits are greenish yellow to reddish brown and it has a high amount of vitamin C (85-95mg per 100g). More vitamin C was found in the fruit flesh near the seed rather than near the skin of the fruit. The fruits can also be used for making several products like chutney, dried ber, murabba, jelly, etc.

Wines can also be prepared from the fruits. The decoction from root and bark is good for dysentery and diarrhoea and leaf decoction is useful as gargle in sore throat and in bleeding gums. The seed kernels are aphrodisiac. Fig was an important food crop in ancient civilization. It is a highly nutritious fruit consisting of 84% pulp and 16% skin. Besides, the fruit also contains protein, calcium, iron, vitamin A and thiamine at varying concentrations. Figs are consumed as fresh or dried, preserved, candied or canned. Fresh figs are nutritious and used as dessert or for making jam, jelly, pudding, cakes, etc. The fruit is valued for its laxative property. It is applied for boils and other skin infections. The latex is used to coagulate milk and leaves are used medicinally as diuretic, demulcent, emollient and anthelmintic properties.



Fig. 3. Underutilized Fruits like, Fig, Tamarind, Karonda etc.

Karonda:

The fruit belongs to the family Apocynaceae. Fruits, sour and astringent in taste, are a very rich in iron contains a good amount of vitamin C. They also contain protein, carbohydrates, fat, fibre and calcium. The ripened fruits may be eaten as dessert or used for the preparation of jelly, sauce, carissa cream or jellied salad. Unripe fruits are used for making pickles, sauces and chutney. The dried fruits may act as a substitute for raisins. The wine prepared from ripe fruits contains about 14.5 to 15% alcohol and is very much liked by wine fanciers. Fruits can also be used in dyeing and tanning industries. Karonda fruit is considered to be antiscorbutic and is also very useful in curing anaemia, stomach ache and is anthelmintic. Root extracts are used in lumbago, chest complains and venereal diseases.

Pummelo:

Pummelo native to Malaysia and Polynesia belongs to the family Rutaceae and also known as “Shaddock” and locally called “Jambura”. Fruits are sweet and moderately juicy. Two types, viz. white fleshed and red or pink fleshed are available in India and cultivars are

named accordingly. The fruits are eaten fresh or processed into juice. Pummelo fruit is also an excellent source of vitamin A, B and C.

Tamarind:

Tamarind native to Tropical Africa and belongs to the family Fabaceae. It is an excellent tree for social forestry and agro forestry and highly suitable for wastelands due to its multi ferrous uses and capacity to withstand adverse agro-climatic conditions. The pulp has low water content and high levels of proteins, carbohydrates and minerals and pulp is also having souring agent for squashes, chutney, beverages, etc. The fruit is used in the Indian medicine as a refrigerant, carminative, antiscorbutic and laxative and is also prescribed for bilious disorders. The active constituents present are furunone, phenyl acetaldehyde and tartaric acid. The products of the seeds are used mostly for manufacture of sizing powders.

Passion fruit

Passion fruit native to tropical America and it produces fruits with unique flavour and aroma for fresh eating and processing as well. Passion fruits are good source of provitamin A, ascorbic acid, riboflavin and niacin and have a high mineral content. The pulp is added to fruit salads, ice-cream or fruit juice and other processed products include juices, jelly, jam, squash, etc.



Fig. 4. Underutilized Fruit Pasiionfruit.

Conclusion:

Though minor fruits are popularly known as 'less known fruits' these fruits have great values both in nutritional and medicinal properties. However, in spite of rich germplasm existing in India, development of standard varieties were limited. Having a wide degree of adaptability with high degree of tolerance, they can thrive well under adverse climatic and edaphic conditions. These fruits also serve a potentiality in sustainable agriculture. Hence, research and development work, farmers awareness and feasibility for cultivation of these less known fruits are to be given due consideration.

References:

- Diengngan S, Hasan MA. Genetic diversity of underutilized fruits in india for environmental sustainability. *Adv Plants Agric Res.*2015;2(7):299-303
- Goh SH, Soepadmo E, Chang P, et al. Proc Fifth Asian Symposium on medicinal plants and spices, *Seol Korea.* 1984;5:473–483.
- Hasan MA, Singh SR, Majhi D, et al. Significance of minor fruits in health care. *Proc Botanicals in Integrated Health Care.* 2010. p. 162–166.
- Jochle W. Biology and pathology of reproduction in Greek mythology. *Contraception.*1971;4:1–13.
- Mavlyanov SM, Islambekov SY, Karimdzhanov AK, et al. Polyphenols of pomegranate peels show marked anti–tumor and anti–viral action. *Chem Net Compounds.* 1997;33:98–99.
- Mitra SK, Pathak PK, Chakraborty I. Potential underutilized tropical fruits of India. *Acta Hort.* 2010;864:61–67.