

Short communication

Minor fruits of Arunachal Pradesh and their role in ethno-medicines

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ABSTRACT

Arunachal Pradesh is one of the richest reservoirs of genetic variability and diversity of underutilised fruits which exist in plant types, morphological and physiological variations or reactions to diseases and pests. It is bestowed with the most congenial climatic conditions for the production of minor fruit crops. There are vast untapped lands of different kinds which are fit for supporting cultivation of minor fruit crops. Such lands can easily be put to use for growing such crops in order to diversify the present day agriculture. The increase in area and production of these fruit crops will not only provide nutritional security, it can provide many fold employment.

Key words: Arunachal Pradesh, Underutilised fruits, Diversity

Arunachal Pradesh is the land of raising sun and one of the most fascinating state of the Eastern Himalayas which is situated between latitude of 26° 30' to 29° 28' North and longitude of 91° 25' to 97° 24' East. Its unique location in the Indian subcontinent has been blessed with wide range of agro-climatic conditions, phyto-geographical, topography and high precipitation. Thus, it possesses enormous biological diversity and formed an important part of the 'Biodiversity hot spot' in the world, one of the 25 global biodiversity hotspots (Myers *et al.*, 2000). Therefore, the region is considered to be a store house and reservoir of wild genetic resources, particularly of underutilized fruit crops occurring wildy in the forest and in almost every backyard.. Arunachal Pradesh is rich in diversity of minor fruits in wild and semi wild condition which are yet to be exploited. These minor fruit crops play a major role in meeting the nutritional and ethno medicinal need of the tribal population of Arunachal Pradesh since time immemorial. In addition, they are also used for colour, flavour and other health benefits. However, the lack of awareness averted the proper utilization of these potential fruit crops. These fruits have medicinal properties to cure various gastrointestinal disorders, respiratory problems; cardiovascular compliance, muscular illness, bone diseases, gynaecological problem, cancers, snake bite, allergy and malaria etc. (Hazarika *et al.*, 2012). This indigenous system of treatment based on such fruits is still an integral part of social and cultural ethnic of the tribal. The traditional knowledge of the local people has been transferred from generation to generation without proper technological interventions. Therefore, there are chances of eroding of knowledge unless documentation is carried out. Thus, the main objective of this work is to highlight the diversity of underutilised fruits and their ethno medicinal uses.

Minor fruits of Arunachal Pradesh

The definition of minor fruit crops or underutilised fruit crops is difficult as it is somewhat location specific. In general, those fruits which have lesser demand in the market, which are grown to a limited extent and are not in commercial plantations are considered as minor fruit crops. Differentiation between the major or minor fruits find limitation if attempt to be done on a global basis. For example, jackfruit is regarded as the most important fruit in Bangladesh while it is regarded as a minor fruit crop in some western countries. If area and production are considered to be the criteria, difference may be observed even in the same country as well. Apart from natural suitability, other conditions may also be

responsible to occupy large area by a fruit crop in a given locality.

The state of Arunachal Pradesh is having the largest geographical area among the states of North East and characterized by hilly terrain, variability in slope and altitude, land tenure system with rich. The agriculture production system in the region is mostly rainfed, monocropped and at subsistence level. The climatic condition in the state is diverse which varies from temperate to sub-tropical and tropical. The diverse agro-climatic conditions, varied soil types and abundance of rainfall offer immense scope for cultivation of different types of horticultural crops including minor fruits. Arunachal Pradesh has four horticultural zone based on its altitude which has been presented in Table 1.

Table 1: Horticultural zone of Arunachal Pradesh

| Sl. No | Horticultural zone | Common horticultural crops |
|--------|---|--|
| 1 | Foot hills and valley (170-915 metres altitude) | Mandarin, acid lime, Assam Lemon, Aonla, Pineapple, Jackfruit, Papaya, Beans, Cucurbits, Potato. |
| 2 | Mid hills (915-1803 metres altitude) | Peach, Plum, Apricot, Pear, Pomegranate, Grapes, Low chilling Apple, Persimon, Kiwi, Off season vegetables, Potato |
| 3 | High hills (above 1803 metres altitude) | Apple, Cherry, Walnut, Chestnut, Kiwi, Off season vegetables |
| 4 | Rain shadow areas below 40 inches annual rainfall with wide range of chilling requirement and temperature | Apple, Pear, Plum, Peach, Almond, Walnut etc. |

The state has rich diversity of different minor fruit crops. Some important underutilized fruits are Garcinia, Rambutan, Longan, Bael, Aonla, Ber, Jamun, Pomegranate, Fig, Tamarind, Passion fruit, Persimmon, Carambola, *Delinia* (Chalta), Jackfruit etc and their potentialities are discussed below.

Rambutan (*Nephelium lappaceum*): The rambutan or hairy litchi belongs to Sapindaceae family is a delicious fruit common in Arunachal Pradesh. The white semi-translucent, sub-acid sweet flavored aril is the edible flesh of the fruit. Root decoction for fevers. Leaves are used for politicking. Bark used as astringent for tongue maladies. Fruit used for dysentery and as warm carminative in dyspepsis. Fruit decoction used for diarrhea.

Aonla (*Embllica officinalis* Gaertn. Syn. *Phyllanthus emblica* L.): It belongs to family Euphorbiaceae and considered as one of the oldest minor fruits of India. Various types are grown wild in Arunachal Pradesh. The tree is hardy, prolific bearer and a suitable choice for arid regions of India. Aonla fruit is a rich source of vitamin C (500-600 mg/100 g). It also contains proteins and different minerals like calcium, phosphorus and iron. The high vitamin C concentration of fruit makes its wide use in Ayurvedic medicine. The fruit contains kaempferol, quercetin and rutin. The fruits are diuretic and laxative. They are useful in the disorders associated with the digestive system and are also prescribed in the treatment of jaundice and coughs. Aonla is one of the three ingredients of the famous *ayurvedic* preparation, *tripphala*, which is given to treat chronic dysentery, biliousness and other disorders. The plant is considered to be an effective antiseptic for cleaning wounds and it is also one of the many plant palliatives for snakebite and scorpion-stinging.

Ber (*Ziziphus mauritiana* Lam.): The Indian jujube or ber, known as king of arid zone fruits is belongs to family Rhamnaceae. The ber is an ideal fruit tree for arid and semi-arid regions in tropical and subtropical climate where most of the fruit crops cannot be grown either due to lack of irrigation facilities or adverse climate and soil condition. Fruits are used as an ingredient in the preparation of 'Joshanda' (An Ayurvedic medicine used in chest trouble). The fruits are laxative and invigorating. The leaves are used to treat conjunctivitis. The bark is used for the treatment of diarrhea. Root decoction is used in fever and its powder is applied to ulcers and old wounds.

Longan (*Dimocarpus longan* Lour.): Longan is a subtropical fruit of Sapindaceae family. Longan can be eaten fresh, dried or quick frozen. The fruit can be peeled, pitted and canned. The juice of most cultivars is sufficiently sweet for processing without addition of sugar. The flesh of the fruit is administered as a stomachic, febrifuge and vermifuge, and is regarded as an antidote for poison. A decoction of the dried flesh is taken as a tonic and treatment for insomnia and neurasthenic neurosis. Dried flowers are used for medicinal purposes. The seeds are administered to counteract heavy sweating and the pulverized kernel, which contains saponin, tannin and fat, serves as astyptic.

Jamun (*Syzygium cuminii*): Jamun is found in abundance in Arunachal Pradesh. The jamun belongs to Myrtaceae family. The ripe fruit is delicious as dessert. The ripe fruit is very useful in curing diarrhoea and diabetes. It is stomachic, carminative and diuretic, apart from having cooling and digestive properties which help to cure diabetes, diarrhoea, and dysentery. Recent studies have shown that it markedly lowers blood pressure. The seed powder of jamun reduces the quantity of sugar in urine very quickly and permanently. The berry is known for its hypoglycemic (lowering blood sugar) properties. The seed is used in various alternative healing methods in Unani, Ayurveda and Chinese medicine for digestive ailments. The leaves and bark are used for gingivitis and controlling blood pressure.

Bael (*Aegle marmelos* Correa): Bael belonging to family Rutaceae. It is known for its high medicinal and nutritional properties. Almost every part of the bael tree is used. The fruit is very rich in sugar, riboflavin (vitamin B₂) and minerals. The ripe fruit is a tonic, restorative, laxative and good for heart and brain. The mature fruit is astringent, digestive and stomachic, and is usually prescribed for diarrhoea and dysentery. Ripe bael fruit could be used as an excellent laxative. A decoction made out of the root and bark of bael tree is used in treating fever. The bael root could also prove a useful home remedy for getting rid of ear problems.

Phalsa (*Grewia subinaequalis* D.C.): The Phalsa plant belongs to the family Tiliaceae. The edible part

of fruit varies from 69 to 93% of its fresh weight. Ripe phalsa fruits are sub-acidic and good source of vitamin A and C and are fair sources of phosphorus and iron. The popularity of phalsa fruit is due to its attractive colour ranging from crimson-red to dark purple and its pleasing taste. The ripe fruits are used for making refreshing drink in summer having cooling effect. Several beverage like nectar, concentrate, squash and crushed phalsa are packed in glass bottles remain acceptable for up to 8 months in cool storage. The shoots of the plants after pruning can be utilized either for making baskets or supporting vegetable crops.

Fig (*Ficus carica* L.): Fruits are laxative and are rich in protein digestive enzymes. It is also effective in the treatment of piles, constipation, asthma, corns, and chronic cough. It is an excellent tonic for weak people who suffer cracks in lips, tongue and mouth.

Tamarind: Tamarind, *Tamarindus indica* L. (syns. *T. occidentalis* Gaertn.; *T. officinalis* Hook.), belongs to the family Leguminosae. Its pulp is useful in treating fevers. Pulp of the ripe fruit is useful in the treatment of bilious vomiting, flatulence and indigestion. It is also beneficial in constipation. An infusion of the pulp prepared by softening it in water is particularly useful for loss of appetite and lack of inclination for food intake. The tender leaves of tamarind tree are an effective remedy for treating burns. Its leaves prevent oedema and help in the growth of healthy, normal skin. The oils keep the affected part well protected against moisture and entry of harmful germs.

Passion fruit (*Passiflora* spp.): The passion fruit, belonging to the family *Passifloraceae* is an important fruit crop grown in the world having economic value. The juice but mainly the leaves of passion fruit contain the alkaloids, which has blood pressure lowering, sedative and antispasmodic action. The flower of passion fruit has a mild sedative and can help to induce sleep. Passion flower has been used in the treatment of nervous and easily excited children, bronchial asthma, insomnia, nervous gastrointestinal disorders and menopausal problems. Passion flower is sometimes used as a mild hallucinogen.

Persimmon (*Diospyros kaki* Thunb.): Persimmons belong to the family "*Ebenaceae*". Perhaps most important is the use of the fruit as an astringent for treating sores in the throat and mouth. They also used that quality of the fruit to treat hemorrhoids, and they chewed the bark to treat heartburn. Truly, persimmon fruit has lot of medicinal properties. The calyx of the persimmon fruit where it is connected to the branch of the tree can be used to make a calyx tea. Drinking calyx tea is good for stopping hiccup, and is also good for bed-wetting. For bee sting, paste a grinded astringent persimmon is very effective.

Carambola (*Averrhoa carambola* Linn): Carombola belonging to the family Oxalidaceae. Carambola contains a relatively high oxalic acid and sour in taste which makes it little commercial value for consumption as a fresh fruit. However, new sweet-flavored cultivars with a low oxalic acid concentration are rapidly becoming popular. Fruits are important sources of minerals like potassium, iron, calcium, sodium and phosphorus. The ripe fruit is digestible, tonic and strengthening. The juice of fruit, when used as eye drop, is also considered to be useful for vision. The leaves are antipruritic, antipyretic and anthelmintic. They are useful in scabies, various types of poisoning, pruritus, intermittent fevers and intestinal worms. These fruit also allay thirst. The ripe fruit said to be a good remedy for bleedings piles, particularly the internal one. The dried fruit is given in some parts of India in fevers.

Delinia (*Dillenia indica*): Elephant apple belongs to the family Dilleniaceae; is a large, knobby fruit with acidic flavoured. Fruits are consumed as tonic and laxative. The fruit juice is mixed with sugar and used as a cooling beverage in fevers and as a cough mixture. Green fruits are very effective against rheumatism.

Durian (*Durio zibethinus* Murr.): Durian belongs to the family Bombacaceae, is one of the popular seasonal fruit in South East Asia. It is popular because of its taste and strong odour. The fruit is usually consumed fresh, but it can be processed into paste, or the flesh can be frozen or powdered or added into other products such as ice cream, cakes and confectionery, seeds roasted and eaten.

Karonda (*Carissa carandas* L.): It belongs to family Apocynaceae. Karonda is an evergreen, spiny small tree belongs to Apocynaceae family. The karonda is a non-traditional fruit crop. Ripe fruits are sub-acidic to sweet in taste with peculiar aroma. The fruits may be eaten as a dessert when ripe or used in the preparation of fruit products such as jelly, squash and chutney. The dried fruits may become a substitute for raisins. The unripe fruits yield milky white latex which can also be used in preparing chewing gum and rubber. Fruits can also be used in dyeing and tanning industries. Karonda fruit is considered to be antiscorbutic. Root extracts are used in lumbago, chest complains and venereal diseases.

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