Lesser known edible fruits of Karbi Anglong district of Assam

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 Received: 03.04.2021/Accepted: 18.05.2021

ABSTRACT

Fruits are one of the prime sources of vitamins and nutrients for a healthy life. Likewise, many lesser known and minor fruits are present in this biodiversity still yet to explore. The present study has been carried out with an objective to explore, identify and document some of the wild edible fruit species consumed by rural masses of Karbi Anglong district of Assam. In this study, a total of 13 species belonging to 10 families have been recorded along with their scientific names, family, local names in Karbi and Dimasa, time of availability, taste, colour on maturity, seed number, flower colour, consumption and use of folk medicines. The study revealed that amongst all the fruits collected, most have an immense potential for use as medicines. These fruits can be the source of many future medicines but only after following several procedures and researches.

Keywords: Health; medicinal use; nutrition; traditional use; wild; edible; fruits

INTRODUCTION

The Karbi Anglong district is one of the three hill districts of Assam with dense tropical forest covered with hills and flat plains which is situated in the central part of Assam. It is consisted of undulating and hilly terrain with numerous rivers and streams. Karbi Anglong lies between 92° 50′ and 94° 25′ East longitude and 25° 05′ and 26° 15′ North latitude (Guha 2002). The Karbi (Mikir) belongs to the Mongoloid racial stock (Bey 2004) and is the major tribe in the Karbi Anglong district of Assam.

Besides the original Karbi tribes, there are also a large number of other tribal communities residing in the district. The Lalungs (Tiwas), Dimasa Kacharis, Rengmas Nagas, Kukis, Garos, Khasis and Shyams occupy various pockets of the district and maintain their own ethnic identity.

A large number of wild edible fruit species grow abundantly in their ambient vegetation and the rural masses largely use most of these fruits in their daily life as dietary supplement either fresh or eat cooked and also use them for medicinal purposes.

Most of these fruits are rich sources of vitamin, sugar, fibre, minerals and water. Apart from their traditional use as food, wild fruits are widely used in different formulations of Indian folk medicines, fodder and for performing rituals and other functions. They can also be used as remedy for various diseases. Consumption of these fruits reduces the risks from several diseases like diabetes, cancer, neurodegenerative ailments and coronary heart disease (Brahma et al 2013).

These lesser known fruits are hardy in nature, easy to grow and generate additional income to the farmers (Rathore 2001). A few works on various aspects of these underexploited fruit crops have also been carried out (Handique et al 1987, Kar and Borthakur 2007). However detail study on exploration, documentation and in situ conservation of these wild edible less known fruits is still lacking. The present investigations were carried out for exploring,

identification and documentation of some of the wild edible fruits of Karbi Anglong district of Assam along with their traditional use.

METHODOLOGY

The study was undertaken during 2018-19 and 2019-20 in different seasons by conducting field survey in different places viz Dhansiri village: Bhetagaon, Nepali Basti, Daujingphang, Daldali, Mesepdainya, Manja, Matipung, 7th Mile, Rongphar Basti of Karbi Anglong district, Assam. Local people and old folks were consulted to collect and gather the samples.

During each field visit, firstly the forests, areas with huge number of vegetation and hills were explored followed by collection of the specimens (immature fruits, mature fruits, flowers and leaves). Photographs of all the collected wild edible fruits were taken. After that all the specimens were shown to the local people who were well versed with folk medicines and their values. A total of 84 respondents above the age of 26 years with mean age 58 years from all the areas of Karbi Anglong were questioned and their demographic characteristics were recorded.

Among 84 respondents 65 per cent were males and 35 per cent were females. Of the males, 68.5 per cent were above 60 years of age, 19.5 per cent were between 40-60 years and rest were below 40 years. Among all the respondents, around 45 per cent were engaged in agriculture, 10 per cent in other jobs and rest were unemployed.

A pre-tested questionnaire was used for the collection of data such as local name, maturity period, taste and colour on maturity, seed number, flower colour, uses etc. The wild fruit plants were identified with the help of local people referring relevant scientific literature and in consultation with scientists of Assam University, Diphu, Assam and Assam Agricultural University, Jorhat, Assam.

RESULTS and DISCUSSION

During the study 13 wild edible species were collected (Table 1). These fruits were found to have immense medicinal properties. The fruits were used as raw or dried, paste, liquid, cooked form etc. Some of the fruits were made into pickles and preserved products.

Ingchum (*Antidesma acidum* Retz): It is also known as Mososa Mikhri in Dimasa (Plate 1). Its fruits are very tiny in size (6-8 mm) and are born in clusters. The fruit turns from reddish to dark maroon colour on maturity and is harvested during June-July. Fruits are eaten as raw and are slightly sweet to sour in taste having one seed.

The leaves are dried and consumed against dysentery and bile complaints. Young leaves are also used as vegetable or eaten in curries (Gardener et al 2000). The Ingchum fruits contain sufficient quantities of crude fibre (6.3 ± 0.00%), crude protein (14.50 ± 0.00%), total ash (11.33 ± 0.58%), starch 1.15 ± 0.01 g/100 g) and total sugar (11.65 ± 0.10 g/100 g) (Patil and Jadhav 2017).

Jamphong (*Artocarpus chama* Buch-Ham ex Wall): This is another popular fruit among the inhabitants of Karbi Anglong (Plate 2). In Dimasa, it is called as Lolam. The fruits are available in the month of May-July. The fruit is very similar to *Artocarpus heterophyllus* but a bit smaller in size. Fruits are dark yellow with brownish dots on the tip of the sharp spikes. Seeds are 1.5 cm in diameter and 7-8 in number. The fruit is sweet in taste. Ripe fruits are eaten.

The local people use the seed in curries and also as roasted or boiled sometimes for consumption. The fruit has been used for curing arthritis, diabetes and inflammation by the natives (Biswas et al 2018). The tree is sometimes utilized for timber purposes.

Dampejuk (*Baccaurea ramiflora* L): It is also known as Khusmai in Dimasa (Plate 3). The fruits are light yellow in colour and found to have watery to slightly sweet in taste. Fruits are harvested during July-August. The fruit turns to slightly yellowish to woody colour at maturity. The average length of the fruit is 2 cm having 2-3 seeds. Seeds are reddish brown in colour. The pulp is comparatively thinner and mostly sour in taste. Ripe fruits are eaten as raw. Eating more than small quantities may cause vomiting.

It is used as a treatment against constipation and stomach ache. The fruit contains protein 5.58 per cent, lipids 0.73 per cent, carbohydrate 51.9 per cent, fibre 20.4 per cent and ash 3.85 per cent (Sundriyal and Sundriyal 2004). The total soluble solids ware found to be 0.5°Brix. At the same time the reducing and non-reducing sugar along with total sugar are 2.68, 3.03

Plate 1. ***Antidesma acidum*** **Retz**

Plate 2. ***Artocarpus chama*** **Buch-Ham ex Wall**

Plate 3. ***Baccaurea ramiflora*** **L**

Plate 4. ***Citrus macroptera*** **M**

and 5.85 per cent respectively which are balanced with acidity of 1.9 per cent thus making the fruit neither too sour nor too sweet (Bhowmick 2010).

Hampur (*Citrus macroptera* M): It is one of the potential underutilized fruit species in the district (Plate 4). In Dimasa, it is known as Jamar. It is said to have a very good source of relief against various stomach disorders. Fruits are available during December-January. These are light yellow in colour, sour in taste having 4-6 seeds. They are preserved for many years in pickle form.

The farmers use the syrup of this fruit when they return from fields to lower down the body heat. It is also found to be effective against rheumatism and gastrocitis. The peel is sundried and used in the cooking of meat for tenderization. Fresh peels of *C macroptera* contain essential oils in the form of limonene, beta-caryophyllene and geranial as main compounds (Rana and Blazquez 2012). Essential oils are present in Hampur like monoterpenes (96.3%) among which are ß-pinene (33.3%), a-pinene (25.3%), *p*-cimene (17.6%), (E)-ocimene (6.7%), sabinene (4.8%), g-terpinene (3.1%) and limonene (2.4%) (Waikedre et al 2010).

Thoithesuri (*Cucumis melo inodorus* L): The Dimasas call it *Thaishrudi* (Plate 5). Fruits are harvested in the month of July-August. The fruit is having 20-25 seeds and eaten as raw when ripen. Taste is watery. It develops yellow colour on maturity. It looks like an egg of a hen.

The fruits can be used as a cooling light cleanser or moisturiser for the skin. They are also used as a first aid treatment for burns and abrasions (Allardice 1993). Seeds of melon contain 30.7 per cent lipids and 4.08 per cent ash content. Minerals like potassium (509.8 mg/100 g), magnesium (101.7 mg/100 g), calcium (55.39 mg/100 g) and sodium (41.17 mg/100g) are also present in the Thoithesuri (Bouazzaoui et al 2016).

Hanthar [*Hodgsonia macrocarpa* (Bl) Cogn]: This is another popular wild fruit of Karbi Anglong (Plate 6). Fruits are harvested during April-May and bitter in taste having mostly 5-6 seeds. The fruit is well known due to its rich medicinal values. It resembles a pumpkin. Inside the fruit, it has 5-6 kernels covered with a soft skin.

The soft portion is used in the bacterial and fungal infections in the skin and mainly in between the toes which are generally caused by worms. Tribal people use it as folk medicine in relief of itching sensation when the soft cover of this kernel is rubbed over the infected areas. Additionally the kernels are also good source of edible oil and are used while cooking fried items and curries in meals (Biswas et al 2018). The fruit contains 13.21 mg/100 g ascorbic acid and antioxidant activity of 2,717.46 µg/ml (Khomdram et al 2014).

Pramso (*Garcinia lancifolia* L): It is one of the rare wild fruit species of Karbi Anglong (Plate 7). In Dimasa language, it is popular in the name of Shushruthai. It is a nutritious fruit and rich in medicinal properties. January-February is the period of its availability. The fruit is very sour in taste and is used as dried slices or preserved as pickles. In the inner part there are 3-4 seeds which are enclosed by sour to sweet pulp. The fruit is ovoid in shape and light orange to red in colour. Ripe fruits are eaten alone when sweet; also eaten with chilli and salt in case the fruit is sour.

As per villagers it is very effective against diarrhoea. Juice of Pramso is used as refreshment drink in the summers and helps in proper digestion. Folks in the rural areas use the leaves and fruits for treating small pox by boiling it in water and then bathing the patient with this water. This is continued for three consecutive days (Jain 1981). The main component present in the *Garcinia* species is the hydroxycitric acid which is 2.45 per cent in leaves, 3.0-4.5 per cent in fresh fruits and 4.0-5.8 per cent in dry fruits (Parthasarathy et al 2013, Barua et al 2019). Additionally *G lancifolia* contains 46.99 mg/100 g ascorbic acid, 2.744 g/100 g total phenol and 12.44 µg/100 g carotenoid content. The total antioxidant activity has been found to be 7.46 per cent (Gogoi et al 2016).

Hanthu (*Gnetum gnemon* L): This wild fruit is also known as Mithar Pathai in Dimasa (Plate 8). The fruit is available in the month of April-May. It is consumed as snacks after frying the seeds which taste slightly salted to sweet. It looks similar to groundnut having one seed. It turns red in colour on maturity. The fruits and inflorescences are added to soups (Facciola 1998). It is consumed after removing the peel for proper digestion; leaves are cooked as vegetables. Seeds are fried and eaten having pleasant taste. The fruit is now in the state at extinct.

Plate 5. ***Cucumis melo inodorus*** **L**

Plate 6. ***Hodgsonia macrocarpa*** **(Bl) Cogn)**

Plate 7. ***Garcinia lancifolia*** **L**

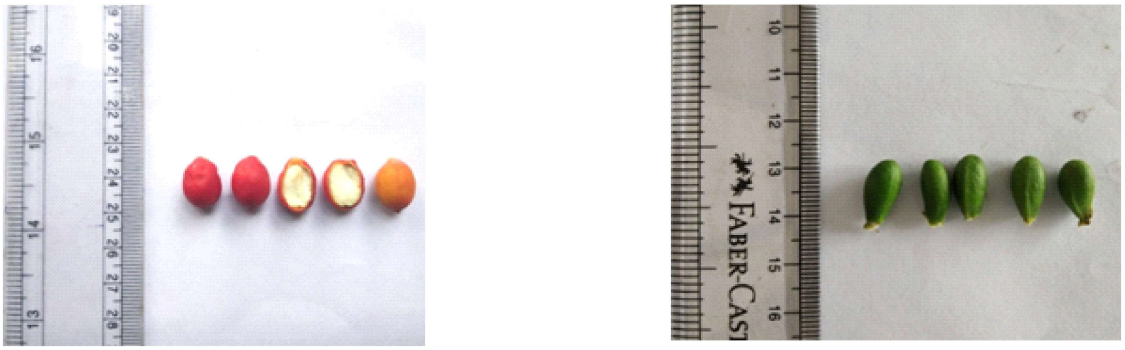

Plate 8. ***Gnetum gnemon*** **L**

Plate 9. ***Lepisanthes rubiginosa*** **(Roxb) Leenh**

On the occasion of Chojun and Peng traditional rituals, leaves of *G gnemon* are cooked with or without meat and offered to deities and this traditional ritual is called Thekar (Jain 1981). Its leaf extract has 3.027 per cent ash, 32.5884 per cent carbohydrates, 13.101 per cent fat and 17.96 per cent protein content. Moreover it also contains alkaloids, phenolic compounds, saponins and tannins which are useful in medical science (Mollejon and Gabane 2019).

Makhamsra [*Lepisanthes rubiginosa* (Roxb) Leenh]: It is a small grape like fruit found in the Dhansiri area of the East Karbi Anglong (Plate 9). Fruits are red to dark brown in colour and harvested during June-July. The fruit possesses only one seed and the pulp portion is very less. Fruits are eaten raw on maturity and young leaves are cooked and eaten as vegetables.

Leaves are used as decoction for treatment against fever and sometimes the seeds are also used for the same. The roots are effective against hooping cough when used after boiling (Mahapatra and Panda 2009). The leaf extract has potential antioxidant, analgesic, antihyperglycemic, neuropharmacological and antidiarrheal activity (Hasan et al 2017).

Hagrani cherry (*Muntingia calabura* L): This is one of the very uncommon fruits which is very small in size and very sweet and is harvested during June to August (Plate 10). It tastes similar to the taste of strawberry. It has numerous tiny seeds inside and has a pleasant flavour. It is used to flavour various traditional cuisines. The fruit length is hardly 1 cm.

The flower is mashed and rubbed in hands to use the juice of it on any cuts or wounds because it is believed to have antiseptic properties. The leaves are boiled in water and used against headache and first symptoms of cold (Patil and Jadhav 2017). The fruit is also found to have 77.83 per cent moisture, 15.20 per cent TSS and 3.35 g crude fibre and 1.8 g of ash per 100 g of fruit (Tamilselvi 2020).

Betkudi Pathai (*Passiflora foetida* L): It is a very interesting and rare fruit found in the Phuloni area of the district (Plate 11). The appearance of the fruit is very attractive. The fruit is a small globose-ball type which is covered and protected by a green netted structure all around the fruit. Inside the fruit there are 7-8 tiny juice vesicles which taste sweet. On maturity the colour turns into yellow to slight red. The fruits are sweet in taste and are available during October-December.

The plant is dried and used for treatment against colds and coughs after decoction. The leaves are crushed in water and the solution prepared is used to drink as an antidote against the snake bite or sometimes it is also used by smashing or rubbing the leaves in hand and then putting it on the wound of a snake bite (Subhadrabandhu 2001). The pulp portion of the fruits contains 67.48 ± 0.29 g moisture, 2.55 ± 0.05 g protein, 4.47 ± 0.08 lipids and 147.53 ± 0.02 g of calories in 100 g of the whole fruit (da Silva Filho et al 2019).

Ke-er Soprim (*Psidium* sp): The plant is attractive with dark red colour fruit with pink-red flesh (Plate 12). Flowers are pinkish purple. The fruit is sweet in taste having 15-20 seeds and harvested during February to March. Mature fruit is eaten raw when ripens. The leaf extract helps in relieving stomach ache or indigestion problems.

Siming (*Spondias pinnata* K): It is another rare fruit species found in the hills of Karbi Anglong (Plate 13). Fruits are brown with several longitudinal patches having one seed. Drinking water after consuming the fruits is reported to sweeten the mouth. Leaves are sour in taste and are used in the preparation of Chutneys. Deer is very fond of this fruit and hence it was used in hunting in ancient days. Tender fruits are sometimes cooked with fish.

The roots are used for regulating menstruation (Mohansundari et al 2007). The fruit of *S pinnata* possesses food energy 189-203 kcal/g, crude fat 12.23-12.54 per cent, crude fibre 3.13-4.03 per cent, total carbohydrate 23.54-16.30 per cent, sodium 1.38-0.96 per cent, calcium 0.93- 0.15 per cent, iron 1.5-1.3 per cent and copper 0.9-1.230 per cent.

Paste of the bark is found to show effective results when applied topically in the treatment of rheumatism and swollen joints (Mohansundari et al 2007). Siming contains 86.16 mg/100 g ascorbic acid content and 518.77 µg/ml antioxidant activity (Khomdram et al 2014).

Plate 10. ***Muntingia calabura*** **L**

Plate 11. ***Passiflora foetida*** **L**

Plate 12. ***Psidium*** **sp**

Plate 13. ***Spondias pinnata*** **K**

Table 1. Characteristics of some edible fruits of Karbi Anglong district, Assam

Scientific name	Family	Local name	Flower colour	Shelf-life (days)	Uses
Antidesma acidum Retz	Euphorbiaceae	Ingchum (K) Mososa Mikhri (D)	Purplish	4	Various plant parts used in treatment of dropsy, muscular pains, pneumonia, sores and the bites of rapid dogs
Artocarpus chama Buch-Ham ex Wall	Moraceae	Lolam (D) Phong (K)	Light green	5-6	Apart from folk medicine, very good source of timber
Baccaurea ramiflora L	Euphorbiaceae	Dampejuk (K) Khusmai (D)	Small white flowers	4-5	Fruits eaten as raw after peeling out the skin; effective against certain skin diseases
Citrus macroptera M	Rutaceae	Hampur (K) Jamar (D)	Small and white flowers	6	Useful for diabetic patients; helpful for washing out kidney stones through urine
Cucumis melo inodorus L	Cucurbitaceae	Thoithe suri (K) Thaishrudi (D)	Light to dark yellow	16	Eaten as raw or sometimes as vegetable in curries or dal
Garcinia lancifolia L	Clusiaceae	Pramso (K) Shushruthai (D)	Orange to reddish	5	Along with folk medicines and small pox treatment, possesses analgesic and anti-inflammatory activities
Gnetum gnemon L	Gnetaceae	Hanthu (K) Mithar Pathai (D)	White	Up to 3 days used raw but even after 3 days consumed after drying with dal and curries	Eaten as snacks after roasting with slight addition of salt; also used for ailments like dysentery and eye complications
Hodgsonia macrocarpa	Cucurbitaceae	Hanthar (K)	Light yellow	15-17	Burnt leaves used for wound healing; effective against constipation
Lepisanthes rubiginosa (Roxb) Leenh	Sapindaceae	Makhamsra (D)	Small, semi-opened and white in colour	3-4	Fruits eaten raw; good for treating cough
Muntingia calabura L	Muntingiaceae	Hagrani cherry (D)	Medium in size and faded white in colour	6	Fully ripened fruits eaten raw; rich in vitamin C
Passiflora foetida L	Passifloraceae	Betkudi Pathai (D)	White petals, purplish at the centre	2-3	Leaves used as ingredient in soups; used in treatment of intestinal and flatworm problems in children
Psidium sp	Myrtaceae	Ke-er Soprim (K)	Pinkish purple	4	Fruit eaten raw or prepared as jam, jelly etc
Spondias pinnata K	Anacardeaceae	Siming (K) Thaisudi (D)	Small, white in colour	3-4	Fruit used to prepare jam, jelly, pickle etc; helps in regulating menstruation

K= Karbi, D= Dimasa

CONCLUSION

The present study shows the vast potential of wild edible fruit species as food products that can meet the nutritional requirements of the people in the region. They have a great socio-economic significance because of their food and medicinal values. Fruit processing and medicinal industries of the region can be based on mass production of these fruits. The ethnic localities opined that the indigenous fruit wealth of the district is on the verge of extinction. Hence they need conservation, popularization and commercial cultivation that will enrich the fruit basket of the region.

ACKNOWLEDGEMENT

The authors are highly obliged to the local people of the study area who immensely helped throughout the study in collection of the specimens and giving all the valuable information. The authors are thankful to the local vendors namely Mridulal Langthasa, Nripen Baglary, Jirjar Hanse, Pirbi Tissopi, Larbeen Teronpi and all those who were either directly or indirectly connected with the study. The authors also acknowledge the kind help and support of Thaisring Diphusa, without whom the fruits could not have been collected so well and the study would not have been completed with desired information.

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