

Nutrient composition of some wild edible fruits of Andaman and Nicobar Islands

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Abstract

Pulp of 28 wild fruits of Andaman and Nicobar Islands were analysed for their TSS (total soluble solids), acidity, ascorbic acid (vitamin 'C') and carotenoid content. The data showed that *Diospyros pyrrocarpa* (22.0%), *Artocarpus integrifolia* (21.0%) and *Annona reticulata* (21.0%) had high TSS. The fruits showed a wide range of acidity and low value (0.06%) was recorded in *Gnetum gnemon* and *Muntingia calabura* (0.16%). Higher total sugars were recorded in *Annona reticulata* (18.18%), *Diospyros pyrrocarpa* (18.18%) and *Muntingia calabura* (14.28%). Majority of these fruits were rich in ascorbic acid and highest value was recorded in *Artocarpus integrifolia* (176.00 mg/100g). Among the fruits studied, quite a good number were found exceptionally rich in carotenoids and higher value (1485.00mg/100g) was observed in *Artocarpus integrifolia* followed by *Artocarpus lakoocha* (501.41 mg/100g). The study revealed that these wild fruits are rich in vitamins and essential nutrients and thus, their proper utilization, exploitation and conservation is of utmost importance.

Key words : Wild fruits, acidity, sugars, ascorbic acid, carotenoids, Andaman, Nicobar

Introduction

Mankind is dependent upon plants for various aspects of life viz., food, energy, clothing, housing, medicines, aesthetics and local weather as well as global climatic patterns. Throughout history, man has used over 3000 species of plants for food, at least 150 of them have been domesticated and commercially cultivated, to some extent. Although, following the advent of agriculture, some wild fruits became domesticated, man has continued to utilize fruits of wild plants and trees (Singh, 1969). In general, indigenous fruits play an important role in diet, environment and contribute to the rural and tribal community. Considering the population explosion and at the same time a rapid shrinkage of cultivable land, forest-produce like minor fruits should be utilized for our day to day consumption. Moreover, many wild fruits possess laxative or other curative properties (Umashankar *et al.*, 1997). Wild fruits constitute one of the first human foods (Singh, 1969) because prior to organised agriculture, prehistoric man lived on wild fruits and berries.

The flora and fauna of Andaman and Nicobar Islands in India, are unique because of typical humid tropical climate and insular nature of their territory. It has a vast variety and diversity in tropical under-utilized fruit plants (Parkinson, 1932, Vasudeva Rao, 1986, Singh, 1997, Singh *et al.*, 1996), which play an important role in people's diet and contribute to the economy of local people. The identity, distribution and uses of edible fruits indigenous to these tropical Islands is well documented (Sreekumar *et al.*, 1996). However, information on their chemical composition for nutritional status is still limited (Singh *et al.*, 1998). This study was therefore undertaken to obtain basic data on nutritional composition of indigenous wild fruits of Andaman and Nicobar Islands.

Materials and methods

Samples of 28 fruit species were collected from interior forests areas of various islands. Fruits of the same type and common to the different islands were pooled and used as composite. For fruit species with an average weight of less than 50 g, 10-15 fruits were randomly selected and taken for extraction of juice/pulp for qualitative analysis. Fruits selected as above, were peeled out and the edible parts were removed carefully from the seed. In case of fruits in which edible portion is seeds, the fruit parts were mixed together using a mortar and pestle until a homogeneous sample was obtained. Collected fruits were analysed for nutritional constituents like TSS, titrable acidity, total sugars, ascorbic acid (vitamin C) and carotenoids. The total sugars, titrable acidity, ascorbic acid and carotenoid contents of fruit pulp/juice were determined volumetrically by standard methods (A.O.A.C., 1975 and Ranganna, 1986). Total soluble solids (TSS) were recorded with hand refractometer at 20°C and the results were expressed as °Brix. In each fruit species, at least 10 fruits were taken for study and mean values have been presented in Table 1.

Results and discussion

The data on the TSS, acidity, total sugars, ascorbic acid and carotenoids of fruits have been given in Table 1. The TSS contents varied largely (4.0 to 22.0 °Brix) but most values were between 8 to 20 °Brix. *Diospyros pyrrocarpa*, *Artocarpus integrifolia*, *Annona reticulata* were exceptionally found to have highest TSS i.e., 22.0, 21.0 and 21.0 °Brix, respectively. Singh *et al.* (1998) from India, reported some wild edible fruits having high TSS value. This work clearly indicates that TSS value for wild fruits of Andaman described are generally high. The data on titrable acidity of the wild fruits revealed that edible portion

Table 1. TSS, acidity, total sugars, ascorbic acid and carotenoid contents of wild fruits of Andamans

| Name of Fruit | Family | TSS (°Brix) | Acidity (%) | Total Sugar (%) | Ascorbic Acid (mg/100g) | Carotenoids (µ g/100g) |
|--------------------------------|---------------|----------------|----------------|--------------------|----------------------------|---------------------------|
| <i>Anona muricata</i> | Annonaceae | 13.00 | 2.01 | 10.00 | 48.00 | - |
| <i>Anona reticulata</i> | Annonaceae | 21.00 | 0.67 | 18.18 | 92.28 | 7.71 |
| <i>Anona squamosa</i> | Annonaceae | 10.25 | 0.50 | 9.09 | 24.68 | 30.85 |
| <i>Ardisia solanaceae</i> | Myrsinaceae | 6.50 | 1.67 | - | 85.71 | - |
| <i>Artocarpus integrifolia</i> | Moraceae | 21.00 | 3.18 | 17.50 | 176.00 | 1485.00 |
| <i>Artocarpus lakoocha</i> | Moraceae | 10.00 | 1.23 | 9.50 | 40.00 | 501.41 |
| <i>Atalantia monophylla</i> | Rutaceae | 16.00 | 0.38 | - | 12.90 | - |
| <i>Carissa carandas</i> | Caricaceae | 2.20 | 4.12 | - | 111.06 | 77.14 |
| <i>Diospyros melanoxylon</i> | Ebinaceae | 8.40 | 0.23 | 7.69 | 29.62 | - |
| <i>Diospyros pyrrocarpa</i> | Ebinaceae | 22.00 | 0.60 | 18.18 | 17.64 | - |
| <i>Ficus racemosa</i> | Moraceae | 6.50 | 0.46 | - | 40.00 | - |
| <i>Ficus retusa</i> | Moraceae | 9.50 | 0.26 | - | 20.00 | - |
| <i>Flacourtia ramontchi</i> | Flacoutiaceae | 7.00 | 4.89 | 4.40 | 38.45 | - |
| <i>Garcinia cowa</i> | Guttiferaeae | 9.00 | 3.42 | 7.51 | 11.42 | - |
| <i>Gnetum gnemon</i> | Gnetaceae | 6.00 | 0.06 | 5.00 | 30.00 | 77.05 |
| <i>Mangifera andamanica</i> | Anacardiaceae | 10.70 | 3.68 | 9.09 | 99.56 | - |
| <i>Muntigia calabura</i> | Deliaceae | 16.50 | 0.16 | 14.28 | 122.33 | - |
| <i>Nephelium lappaceum</i> | Sapindiaceae | 8.50 | 2.11 | 4.40 | 17.77 | 39.35 |
| <i>Salacia chinensis</i> | Celastraceae | 13.00 | 1.21 | 12.00 | 73.00 | 20.00 |
| <i>Spondias cytherea</i> | Anacardiaceae | 5.20 | 1.28 | 4.08 | 35.00 | 77.13 |
| <i>Spondias pinnata</i> | Anacardiaceae | 6.00 | 1.34 | 4.80 | 28.78 | 77.14 |
| <i>Syzygium cumini</i> | Myrtiaceae | 10.00 | 1.80 | 9.00 | 75.00 | - |
| <i>Syzygium claviflorum</i> | Myrtiaceae | 9.50 | 1.50 | 4.08 | 60.00 | 77.13 |
| <i>Syzygium jambolana</i> | Myrtiaceae | 8.00 | 1.74 | 7.30 | 60.00 | - |
| <i>Syzygium jambos</i> | Myrtiaceae | 1.00 | 1.01 | - | 12.12 | - |
| <i>Syzygium samaragense</i> | Myrtiaceae | 8.60 | 1.00 | 5.90 | 38.00 | 21.22 |
| <i>Uvaria andamanica</i> | Annonaceae | 7.50 | 1.81 | - | 114.00 | - |
| <i>Uvaria hamiltonii</i> | Annonaceae | 9.00 | 1.23 | - | 114.28 | - |

contains a wide range i.e., 0.067 to 4.89%. However, *Gnetum gnemon*, *Ficus retusa*, *Muntigia calabura*, *Annona squamosa*, *Disopyros melanoxylon*, *Annona reticulata* were found to have low acidity (<1.0%) whereas, *Carissa carandas*, *Flacourtia ramontchi*, *Mangifera andamanica*, *Artocarpus integrifolia* were found to have exceptionally high acidity (3.00-5.5%). Saka et al. (1992) reported that most of the wild fruits studied were highly acidic, which is not true in fruits described in this investigation.

The total sugar concentration of juice/pulp varied considerably from 4.08 to 18.8%. The highest level was found in *Annona reticulata* (18.18%), *Muntigia calabura* (14.28%), *Artocarpus integrifolia* (17.50%), *Diospyros pyrrocarpa* (18.18%), while lowest was recorded in *Spondias cytherea* (4.08%). In few species like *Carissa carandas*, *Ardisia solanaceae*, *Ficus retusa*, *Uvaria hamiltonii*, *Uvaria andamanica*, *Ficus racemosa*, *Atalantia monophylla* and *Syzygium jambos* etc., the total sugar was very low.

Majority of the wild fruits studied in these islands have shown good amount of ascorbic acid. It varied considerably from 12.12 to 176.00 mg/100g on a fresh weight basis and mostly ranged from 30-100 mg/100g. The highest level was found for *Artocarpus integrifolia* (176.00 mg/100g), *Muntigia calabura* (122.33 mg/100g), *Uvaria hamiltonii* (114.28 mg/100g), *Carissa carandas* (111.06mg/100g), *Mangifera andamanica* (99.56 mg/100g). Similarly, Saka et al. (1992) also reported some wild fruits which are rich in vitamin 'C' but there is very little

information on wild fruits of Andaman and Nicobar islands (Singh et al., 1998). In this investigation, noteworthy values of ascorbic acid content have been recorded. When comparing ascorbic content of these wild species with that of well established and domesticated fruits like papaya (14 mg/100g) and Pineapple (40 mg/100g), the indigenous species like *Artocarpus integrifolia*, *Muntigia glabra*, *Uvaria* spp., *Mangifera andamanica* etc. are found to be rich source of vitamin C, while rest of the fruits studied have comparable levels to those of exotic fruits. Except a few, large number of wild fruit species studied were found quite rich in carotenoids. The concentration of carotenoids varied from 7.71 to 1485.00 mg/100g. Majority of the values are in the range of 20-100 mg/100g. However, maximum value 1485.00 mg/100g was recorded in *Artocarpus integrifolia*, followed by *Artocarpus lakoocha* (501.41 mg/100g), *Carissa carandas* (77.14), *Spondias cytherea* (77.13), *Spondias pinnata* (77.14), *Syzygium claviflorum* (77.13), *Gnetum gnemon* (77.05 mg/100g). The *Artocarpus* species were found quite rich in carotenoids which is mostly due to its rich colour present in fruit pulp.

Since these wild fruits are comparatively rich in vitamins, minerals and other essential constituents, easily found in wild and can be grown with less efforts as well as production cost. Thus, their consumption should be encouraged and proper exploitation of these fruit species for making products like jams, jellies, candies etc. needs further attention and priority.

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