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NUTRITIONAL ANALYSIS OF WILD EDIBLE FRUITS FROM BODA AND KOLLI HILLS, TAMIL NADU

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ABSTRACT

Wild edible plants play a vital role in human diet. The Present study was to carry out the nutritional values of a selected fifteen wild edible fruits collected from Boda and Kolli hills of Eastern Ghats, Tamil Nadu. The nutritional value was analyzed in term of Protein by Lowry's method, Lipid by Bligh and Dyer, Carbohydrate, Ash content, crude fibre and Moisture content were analyzed by using Association of Official Analytical Chemists (A.O.A.C) methods. The result shows high values of Protein, Carbohydrate and Lipid content in the wild edible fruits, the high Energy value obtained in *Phoenix loureirii* (265.26 ± 0.002), *Syzygium cumini* (247.91 ± 1.6) and *Carissa spinarum* (237.3 ± 0.002), therefore they were identified as promising species for promotion as backyard planting especially farming systems affliction from loss of crop, shortage of food and various chronic diseases. This parameter also helps to found valuable pharmacological drugs for various severe disorders.

KEYWORDS

Proximate analysis, Wild edible fruits, Nutritional values and Pharmacological drugs.

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INTRODUCTION

Wild edible fruits play a major essential in food diet supplying the body with nutrients and protein¹. In developing country like India, village people traditionally harvest wide range of wild edible fruits because of its aroma, taste, various cultural event, food shortage etc. According to food and Agricultural Organization² report that, more ever billion numbers of people are thought to use wild food in their diet. Both Kolli hills and Boda hills

alone support more than 5000 species of green plants, which is 75% of them gain medicinal properties. Fruits are truly nature gift because they provide many nutrients that are essential for the health and maintenance of our bodies³⁻⁵. Fruits serve as sources of vitamins and minerals hence, they also become significant when the functions of these vitamins and minerals, are being considered in the body. Also, some of these fruits are used in folk medicine to cured some diseases⁶⁻⁹. Fruit have fibre content which helps to recurred severe stomach problem and cancer^{10,11}. They are commonly consumed fresh, but some fruit can also be eaten in a dried state. Almost all dried and fresh fruits provide essential nutrients and having high potential in health protective secondary metabolites compounds that help to reduce its risk of various chronic diseases. The secondary metabolites compounds have their ability to use as therapeutic drugs for humans and living thing. Such compounds, along with their similarities can also act as intermediates to produce useful drugs¹². All fifteen fruits are collected from Boda and Kolli hills in small quantity from wild plants which is specifically for consumption. By Detering the nutritional value of selected edible fruits taken from Kolli and Boda hills will helps the consumers to make it as a regular practice for a diet. The present study is the estimation of nutritional value such as, protein, carbohydrates, lipid, moisture, ash, crude fibre and energy value were analyzed and documented for further studies.

MATERIAL AND METHODS

Study area

The Present study area is Boda and Kolli Hills, Eastern Ghats, Tamil Nadu. In field trip different areas were visited in Boda hills and Kolli hills. After the field visit, fifteen edible fruits are taken for the nutritional analysis.

Sample collection

Fifteen wild edible fruits that are widely consumed in rural areas in Boda and Kolli hills, Eastern Ghats, Tamil Nadu, India. Mainly in the forest fringe villages and known for its good taste (Table No.1). A general account of the selected edible fruits such as *Coccinia indica*, *Carissa carandas*, *Carissa*

spinarum, *Ficus benghalensis*, *Ficus religiosa*, *Hugonia mystax*, *Limonia acidissima*, *Morinda pubescens*, *Murraya koenigii*, *Phoenix loureirii*, *Pithecellobium dulce*, *Phyllanthus emblica*, *Syzygium cumini*, *Zizyphus mauritiana* and *Zizyphus oenoplia* are taken as a experimental wild edible fruits from study area. These fruits are confirmed in Botanical Survey of India, Coimbatore, Tamil Nadu, India.

Sample preparation

The samples were thoroughly washed with tap water. The fresh and dried edible portion of each sample was cut into tiny piece and crushed by using clean Mortar and Pestle, the grounded samples were stored in a labelled air tight container and placed in the refrigerator at 4°C and used immediately for subsequent analysis.

Proximate Analysis

Determination of protein content by Folin-lowry's Method¹³, Determination of Total Lipid¹⁴, Determination of Carbohydrate, Lipid crude fibre, ash content, Moisture content by A.O.A.C methods¹⁵.

Determination of nutritive value

The total energy value in kcal/100g was estimated by using the method described by Jain and Sharma¹⁶, as shown below:

Nutritive value = 4 x percentage of protein + 9 x percentage of fat + 4x percentage of carbohydrate.

Statistical analysis

Proximate analysis of plant sample was carried out thrice for each parameter and the mean, standard deviations were calculated. The results are expressed as mean \pm standard deviation (SD).

RESULTS AND DISCUSSION

Wild edible fruits are important source of nutrition, vitamins and minerals. However, as a result of the changes in climates, pollution, wild plants are in danger of disappearing and this may have harmful consequences on the nutritional status of the rural population¹⁷. Wild edible fruits constitute source of nutrients to the rural population^{18,19}, hence knowledge about their composition and nutrient potentials is very important. About fifteen wild edible fruits were collected from the both Hills and the fruits are taken freshly for the nutritional

analysis. The detail of the selected fifteen fruits is mentioned in the Table No.1. The nutritional profile of fruit has shown its potential health benefits such as moisture, ash and carbohydrate values obtained for fifteen fruits (Table No.2) were within the stated literature, while the values obtained for crude protein, lipid, and fibre were higher than those reported in reviewed literature²⁰⁻²². The observed variation in result might have changed from reviewed literature due to changes in geographic, climatic and seasonal variations. The results show some fruits were very high in moisture content and this may emphasize its high susceptibility to microbial infections. High moisture content characterizes the freshness of a fruit since fruits kept for some time tend to lose moisture²³. The moisture content varied for the different fruits. The high moisture content is observed among fifteen edible fruits. The fruits such as *Ficus benghalensis* (57.6 ± 0.2), *Syzygium cumini* (53 ± 1.0) and *coccinia indica* (52.7 ± 0.4) have the high moisture content. The moisture content of any food is an index of its water activity and it is used as a measure of stability and the susceptibility to microbial contamination²⁴. The high moisture content leads to for rapid deterioration of these fruits if unprocessed for long after harvesting. Crude fibre has been reported to reduce blood cholesterol level, risk of cardiovascular disease and cancer²⁵. The recommended Daily Allowance (RDA) for fibre is 18 to 35g^{24,25}. The fruit such as *Ficus religiosa* (8.2 ± 0.6), *Carissa carandas* (6.6 ± 0.2), and *Pithecellobium dulce* (6.5 ± 0.35) has an inadequate to meet in daily fibre requirements of the body. The Ash content is an index of mineral present in all plant sample²⁶. The high ash content of plant such as *Carissa carandas* (9.5 ± 0.4), *Phyllanthus emblica* (8.3 ± 0.15) and *Morinda pubescens* (8.1 ± 0.14). The nutritive value is compared to some common fruits in earlier report. Nutritive profile was found to be higher when compared to an earlier report²⁷⁻³⁰. The protein content was range upto 0.27 to 11.43 percent in selected plant. Each fruits have protein content. The high level protein content was present in *Murraya*

koengigii (12.7 ± 0.2), *Morinda pubescens* (11.5 ± 0.25) and *Phoenix loureirii* (10.57 ± 0.35). The protein rich which helps in building block of cells. The Recommended Dietary Allowance (RDA) for children, adult males, adult females, pregnant women and lactating mothers are 28, 63, 50, 60 and 65 g of protein²⁵. The carbohydrates serve as sources of energy for consumers hence the Carbohydrate is an important nutrition. The high content carbohydrates fruits are *Syzygium cumini* (56.1 ± 0.59), *Carissa spinarium* (55.8 ± 0.36) and *Phoenix loureirii* (55.77 ± 0.6). Lipid level was very low in each fruits³¹. The lowest level of the lipid present in *Carissa spinarium* (0.018 ± 0.001), *Phoenix loureirii* (0.02 ± 0.008) and *Hugnoia mystax* (0.08 ± 0.01). The some fruits has high energy values obtained for crude protein, lipids and Carbohydrates where as some are lower. These observed differences might be from geographic and climatic variation in the areas of study²⁹.

The energy value was high in all fruits range from 140 to 265Kcal per 100gm⁻¹ (Table No.2, Figure No.1). The energy yield of the fruit indicates that the fruit partly contributes to an adult's energy requirement which is pegged at 10, 201 kcal/day^{2,32}. To meet the daily energy needs, consumers should eat other high energy foods in addition to fruits such as *Phoenix loureirii* (265.26 ± 0.002), *Syzygium cumini* (247.91 ± 1.6) and *Carissa spinarium*, (237.3 ± 0.002). These results concluded that these plants are good source of carbohydrates, nutrients and some extent proteins.

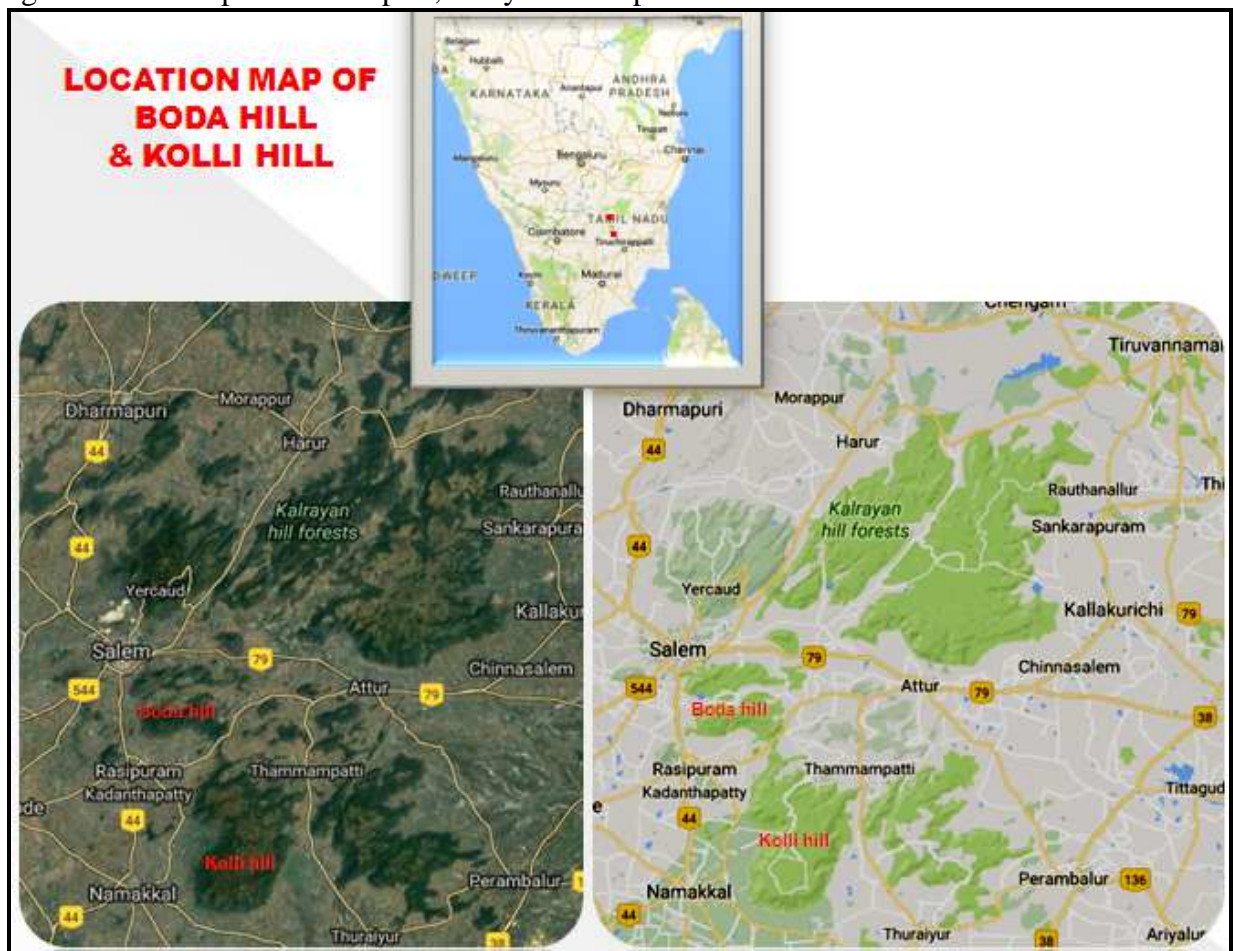
Table No.1: Selected edible Fruits and its Medicinal properties

S.No	Botanical name	Family	Medicinal properties
1	<i>Coccinia indica</i> Wight and Arn	Cucurbitaceae	Analgesic, antipyretic, anti-inflammatory, antimicrobial, antiulcer, antidiabetic, antioxidant, hypoglycemic, hepatoprotective, antimalarial, antidyslipidemic, anticancer, antitussive, mutagenic
2	<i>Carissa carandas</i> L.	Apocynaceae	Diarrhea, stomachic, anorexia, intermittent fever, mouth ulcer and sore throat, syphilitic pain, burning sensation, scabies, and epilepsy
3	<i>Carissa spinarum</i> L.	Apocynaceae	liver disease, epileptic disease, microbial disease, cytotoxic, viral diseases
4	<i>Ficus benghalensis</i> L.	Moraceae.	medicine for respiratory disorders and certain skin disease
5	<i>Ficus religiosa</i> L.	Moraceae.	antiulcer, antibacterial, antidiabetic, in the treatment of gonorrhea and skin diseases
6	<i>Hugonia mystax</i> L.	Linaceae	rheumatism and biological activities like antimicrobial
7	<i>Limonia acidissima</i> L.	Rutaceae	Fruits are refrigerant, stomachic, stimulant, astringent, aphrodisiac, diuretic, cardiotonic, tonic to liver and lungs, cures cough, hiccup and good for asthma, consumption, tumours, ophthalmia and leucorrhoea
8	<i>Morinda pubescens</i> J.E. Smith.	Rubiaceae	Cancer, cardiovascular, neurodegenerative, inflammatory and alzheimer's diseases.
9	<i>Murraya koenigii</i> L. Sprang.	Rutaceae	antidiabetic and antiobesity dietary supplement.
10	<i>Phoenix loureirii</i> Kunth	Arecaceae	antibacterial, anti-inflammatory, febrifuge
11	<i>Pithecellobium dulce</i> (Roxb. Benth.	Leguminosae	Considered abortifacient, anodyne, astringent, larvicidal, antibacterial, anti-inflammatory, febrifuge, antidiabetic.
12	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Fever, cough and asthma
13	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Diabetes
14	<i>Zizyphus mauritiana</i> Lam.	Rhamnaceae	Astringent, diaphoretic and fever, piles and wound
15	<i>Zizyphus oenoplia</i> (L) Mill.	Rhamnaceae	Wound and pills used for stomachache

Table No.2: Proximate analysis of selected edible fruits

S.No	Botanical name	Energy value Kcal per 100gm ⁻¹	Protein %	Carbohyd rate %	Lipid %	Ash %	Moisture %	Crude Fibre %
1	<i>Coccinia indica</i>	143.2±0.07	1.5 ±0.02	34.05±0.25	0.13±0.01	7.5±0.15	52.7±0.4	4.5±0.2
2	<i>Carissa carandas</i>	221.7±0.011	4.6 ±0.11	50.41±0.34	0.17±0.02	9.4±0.25	28±0.1	6.6±0.11
3	<i>Carissa spinarum</i>	237.3±0.002	3.5±0.1	55.8±0.36	0.018±0.001	4.6±0.30	30.8±0.05	4.5±0.3
4	<i>Ficus benghalensis</i>	127.75±0.030	8.24±0.11	23.43±0.15	0.15±0.02	5.13±0.15	57.6±0.2	5.5±0.2
5	<i>Ficus religiosa</i>	185.02±0.3	8.46±0.05	37.45±0.2	0.18±0.01	4.5±0.25	37.47±0.1	8.2±0.2
6	<i>Hugnoia mystax</i>	216.28±0.01	2.5±0.2	51.39±2.6	0.08±0.01	6.7±0.2	34±2.5	5.2±0.1
7	<i>Limonia acidissima</i>	160.7±0.02	10.19±0.01	29.4±2.2	0.21±0.02	4.5±0.2	45.7±2.1	2.8±0.15
8	<i>Morinda pubescens</i>	204.2±0.1	11.5±0.1	39.32±0.2	0.18±0.01	8.1±0.15	34.5±0.1	6.4±0.1
9	<i>Murraya koenigii</i>	217.04±0.01	12.7±0.2	41.2±1.3	0.16±0.025	6.3±0.5	35.87±1.3	3.73±0.7
10	<i>Phoenix loureirii</i>	265.26±0.02	10.57±0.35	55.77±0.6	0.02±0.01	6.7±0.25	21.6±0.3	5.4±0.15
11	<i>Pithecellobium dulce</i>	160.78±0.02	10.47±0.2	29.44±2.8	0.14±0.015	7.7±0.2	45.7±2.10	6.5±0.35
12	<i>Phyllanthus emblica</i>	205.04± 0.01	2.8±0.1	48.1±0.66	0.16±0.01	8.3±0.15	34.5±0.2	6.1±0.2
13	<i>Syzygium cumini</i>	247.91±1.6	5.55±0.02	56.1 ±0.59	0.15±0.02	5.6±0.3	28.2±0.1	4.4±0.15
14	<i>Zizyphus mauritiana</i>	147.85±0.02	2.8±0.15	33.92±0.8	0.15±0.02	5.5±0.2	53±1.0	4.7±0.1
15	<i>Zizyphus oenoplia</i>	211.7±0.2	3.6±0.1	49.47±0.04	0.13±0.02	4.26±0.2	39.3±0.30	3.6±0.3

n = average of three independent samples, analyzed in triplicate



Location map of Boda and Kolli Hills

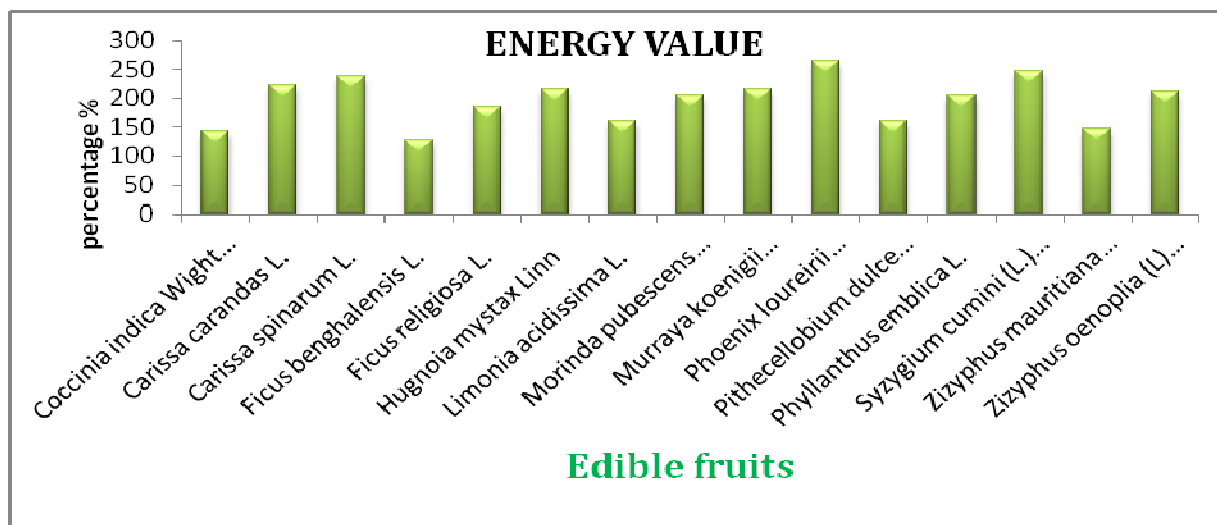


Figure No.1: Energy value of edible fruits

CONCLUSION

The present evaluation of various biochemical parameters will be helpful while standardizing the drug for its various pharmacological potentials and to find out the adulteration in natural valuable drug at the time of consumption for desire pharmacological effect.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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