International Journal of Advance Research in Science and Engineering
Volume No. 13, Issue No. 05, May 2024
www.ijarse.com
IJARSE
ISSN 2319 - 8354

Comparative Study of Nutritional Richness in the Selected Wild Edible Fruits of Northern Kerala

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Abstract

For centuries, fruit crops have been integral to various cultures worldwide, with ethnic communities relying on a variety of wild food plants to fulfill their nutritional and dietary needs. Fruits play a significant role in human diets, offering great nutritional value and contributing meaningfully to well-being. Seasonal surpluses of perishable fruits are readily therapeutic benefits of these fruits, this investigation was undertaken. Selected wild edible fruits, including *Bridelia retusa*, *Diospyros peregrina*, *Flueggea leucopyros*, *Naringi crenulata*, and *Syzygium caryophyllatum*, were collected from different parts of northern Kerala at the ripened stage. Various factors were assessed similarly, including moisture, dry matter, carotenoids, and carbohydrates. Additionally, antioxidant enzymes such as superoxide dismutase, peroxidase, and catalase were thoroughly analyzed. Important metabolites like reducing sugar, starch, and soluble sugar were estimated using standard procedures. These five selected wild fruits are considered edible and are commonly used by rural people in Northern Kerala. available, particularly among wild edible fruits, which form a major part of the diet supplement for rural people. However, in specific locations, large quantities of agricultural produce go to waste during particular seasons due to factors such as ignorance and a lack of management skills in distribution, marketing, and storage. To raise awareness about the nutritional and

Key words: *Phytochemistry, wild edible fruits, proximate, antioxidants, peroxidase*

INTRODUCTION

Wild edible plants are essential component of biodiversity and for rural people their exploitation become an important livelihood strategy (Bandana & Debabrata, 2015). Hippocrates' 2500-year-old saying, "Food is medicine, and medicine is the food," emphasizes the importance of a proper diet in cured patients, as emphasized by Ayurveda. Fruits are essential for healthy aging and preventing chronic diseases like obesity, diabetes, and cancer. Edible wild fruits provide nutrient food supplements and antioxidant phytocompounds. Research on wild edible fruits, collected by locals from natural forests, aims to identify valuable, familiar fruits in certain areas or communities, generating side income for the poor. An important feature of higher plants is their capacity to synthesize a large number of organic chemicals, commonly called secondary metabolites. These compounds

provide health benefits for humans, protect from diseases and also contribute to the aroma, colour and Heber (2009).

Materials and Methods

Wild edible fruits from various parts of Northern Kerala were collected and preserved at the ripened and maturity stage. The species selected for the study includes *Brideliaretusa* (Euphorbiaceae),*Diospyros peregrina* (Ebenaceae), *Flueggea leucopyrus*(Phyllanthaceae), *Naringi crenulata* (Rutaceae) and *Syzygium caryophyllatum* (Myrtaceae). Healthy, disease-free fruits were chosen, and various parameters were assessed based on the standard protocols such as; moisture, dry matter (AOAC, 1990), reducing sugar, starch (Nelson, 1944), soluble sugar (Day, 1990), carotenoids (Kirk & Allen,1965), polyphenols (Folin & Denis, 1915), antioxidant enzymes such as catalase and peroxidase (Maehly, 1954), phytate (Reddy & Love, 1999) and oxalateand superoxide dismutase (Day & Underwood, 1986). To prevent the decomposition of chemical compounds, some fruits were dried in the shade and the dried material was powdered for further analysis.

Results and Discussion

Proximate analysis

The proximate analysis involved parameters such as moisture, dry matter, carotenoid, carbohydrates (reducing sugar, starch, and total sugar), and dry matter.

Table 1: Phytochemical analysis of five wild edible fruits

Name of the Plans	Moisture		Dry Matter		Carotenoid		Reducing Sugar		Starch		Total Sugar	
	M	R	M	R	M	R	M	R	M	R	M	R
Bridelia retusa	68 ±0.002	83.82 ±0.034	44 ±0.06	26.45 ±0.02	6.08±0.01	3.87 ±0.07	2.7 ±0.72	3.29 ±0.04	26.26 ±0.041	13.5± 0.063	5.2 ±0.03	6.29 ±0.2
Diospyros peregrina	82.77 ±0.092	86.8 ±0.042	35.5 ±0.02	29.3 ±0.03	5.9 ±0.06	3.6 ±0.03	4.23 ±0.04	16.08 ±0.01	10.6 ±0.02	10.3 ±0.011	20.04± 0.04	33.32 ±0.02
Flueggea leucopyrus	58 ±0.012	81.32 ±0.03	63 ±0.04	32.7 ±0.05	9.5±0.004	3.23 ±0.003	5.9 ±0.03	12.79 ±0.03	17.8 ±0.031	7.8 ±0.021	12.21 ±0.04	31.12 ±0.021

Naringi crenulata	61 ±0.03	82.7 ±0.02	38 ±0.07	32.7 ±0.01	2.8±0.01	2.8± 0.01	9.1 ±0.05	13.6 ±0.013	19.9 ±0.06	13.6 +0.045	22.11 ±0.02	28.9 ±0.024
Syzygium caryophyllatum	61±0.0 5	81.3 ±0.07	59 ±0.052	31.7 ±0.02	4.7 ±0.041	4.9 ±0.02	8.4 ±0.001	13.9 ±0.004	16.36 ±0.008	12.2 ±0.6	4.87 ±0.1	9.42±0.2

Table 2: Phytochemical analysis and antioxidant activities of five wild edible fruits

Name of the Plans	**Phytic acid**		**Oxalate**		**Catalase**		**Peroxidase**		**Superoxide dismutase**	
	M	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**
Bridelia retusa	0.93 ±0.08	0.73 ±0.08	2.33 ±0.4	1.9 ±0.26	0.0096 ±0.004	0.006 ±0.0003	0.0048± 0.0003	0.0058± 0.0003	0.00138±0.00012	0.0013 ±0.0002
Diospyros peregrina	0.99 ±0.04	0.8 ±0.3	2.6 ±0.16	1.3 ±0.17	0.06±0.0003	0.0055± 0.0003	0.004845± 0.000156	0.009845± 0.0003	0.00678± 0.0005	0.003± 023
Flueggea leucopyrus	0.67 ±0.06	0.42 ±0.01	2.31 ±0.20	0.87 ±0.2	0.0054± 0.00012	0.000875 ±0.0003	0.0032+± 0.0001	0.0061± 0.002	0.003267+±0.00029	0.00233 ±0.327
Naringi crenulata	0.89 ±0.08	0.98 ±0.05	0.91 ±0.05	0.79 ±0.06	0.0054± 0.0003	0.006276± 0.0004	0.000651± 0.000209	0.000732± 0.0004	0.0009 ±0.0002	0.0008 ± 0.0003
Syzygium Caryophyllatum	0.5±0.072	0.56 ±0.03	2.43 ±0.40	2.2± 0.12	0.0061± 0.00034	0.0055± 0.0067	0.001232± 0.000125	0.002434 ±0.00012	0.0022 ± 0.0003	0.000911± 0.0002

The moisture content was higher in the ripened fruit of *Diospyros peregrina* (86.8%) compared to that of *Bridelia retusa*, which showed a moisture content of 83.82%. *Naringi crenulata* and *Syzygium caryophyllatum* exhibited relatively high moisture content in their ripened fruits. *Diospyros peregrina* demonstrated the highest moisture content in mature fruits compared to the other four fruits. Ripened fruits of *Syzygium caryophyllatum* and mature fruits of *Flueggea leucopyrus* exhibited the minimum moisture content levels. (Table 1). *Flueggea leucopyrus* exhibited the maximum dry weight content, while the minimum content was present in the matured fruits of *Naringi crenulata*. Ripened fruits of *Flueggea leucopyrus* and *Naringi crenulata* showed higher dry matter

content, whereas the minimum level was observed in the ripened fruits of *Bridelia retusa* (Table 1). In addition to the dry matter, carotenoid, reducing sugar, starch and total sugar content also varying among the five fruits. Both maturity and ripened stages significantly varies the metabolite character (Table 2).Phytic acid, oxalate, catalase, peroxidase and superoxide dismutase activity of five fruit plants showed remarkable difference. *Diospyros peregrina* showed maximum in the case of phytic acid content whereas all other fruit shows minimum (Table 2). Oxalate content maximum in *Syzygium caryophyllatum*compared to other fruits.Catalase activity is maximum in *Bridelia retusa* whereas minimum in *Flueggea leucopyrus. Diospyros peregrina* showed highest peroxidase activity. Super oxidase dismutase activity is maximum in *Flueggea leucopyrus*(Table 2).

The study found that mature fruits have higher catalase and superoxide dismutase (SOD) activities, while ripened fruits have higher peroxidase activity. This was supported by previous studies by Huang *et al*. (2007) and Niranjana*et al*. (2009), who found a significant decrease in catalase activity between the young fruit and green fruit stages. However, the present study found all enzymatic antioxidants to be lower than previously studied.Wild fruits are delicious and nutritious, but excessive consumption can pose health risks. Antinutritional factors like phytic acid and oxalic acid inhibit protein digestion, growth, and absorption of iron and zinc.*Flueggea leucopyrus*had a higher phytate content (0.7±0.2%) among the five fruits, while *Diospyros peregrina* had a lower content (0.31±0.03%). Aberoumand and Deokule (2009) analyzed the nutritional values of *Cordiamyxa*Roxb, a wild edible plant from Iran and India, revealing 2.5mg/100g phytic acid.The study by Nkafamiya*et al.* (2007) found that oxalate content in seeds of wild plants like *Diospyros peregrina*, *Flueggea leucopyrus*, *Naringi crenulata*, *Syzygium caryophyllatum*is higher in mature fruit and lower in ripened fruit.Fruits of *Artocarpushirsutus* exhibited greater similarity to yellow cashew apple fruits. Fruits of *Grewia nervosa* and*Syzygiumcumini*contained same value of carotenoids asWhite sapotaandRed mombinrespectively (Moo-Huchin *et al*., 2017).The antinutrientcontent of fresh and dried fruit samples of *Citrulluslanatus* was analysed. Results indicated that the antinutrient components such as saponin, oxalate, phytate and tannin were identified in all samples but in insignificant amount only (Johnson *et al*., 2014).

Conclusion

The study area documented five wild edible fruit plants, and detailed phytochemical profiling was conducted in the present investigation. These five plants, namely *Diospyros peregrina*, *Flueggea leucopyrus*, *Naringi crenulata*, and *Syzygium caryophyllatum*, are rich in carbohydrates and antioxidant enzymes, making them valuable during famines and for disease prevention. Wild edible plants represent a valuable resource with significant potential for pharmacological research and applications. Their diverse array of bioactive compounds, cultural significance, and contributions to nutrition and traditional medicine make them an essential area of study for those interested in harnessing the potential of natural resources for human well-being.

Acknowledgements

The instrument supportis provided by the DST-FIST project is duly acknowledged.

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