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ANNALS OF
Molecular and Genetic Medicine
OPEN ACCESS JOURNAL

DOI: https://dx.doi.org/10.17352/amgm

Review Article

Nutritional and Medicinal Contribution of Wild Fruit Plants in Ethiopia

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Received: 04 July, 2024
Accepted: 13 July, 2024
Published: 15 July, 2024

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Keywords: Wild fruits; Nutrition; Medicinal values; Malnutrition

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Abstract

Wild fruit plants are used by rural populations around the world, including Ethiopia, as supplemental foods to improve dietary diversity. Because wild fruits are inexpensive and widely accessible in rural regions, they can help prevent hunger or malnutrition and ensure food diversity. This review aims to give a summary of the most recent research on the nutritional value and potential medical benefits of wild fruits for rural households. Antioxidant-rich naturally-occurring compounds found in wild fruits help to reduce non-communicable diseases. These days, non-communicable diseases like cancer, chronic respiratory conditions, obesity, diabetes, and cardiovascular diseases are the world's biggest health problems. These plants, which are grown widely throughout nearly all of Ethiopia, offer a number of health and nutritional benefits. Many ethnic groups use these fruits as a seasonal or emergency food source, which helps to reduce food insecurity.

Introduction

Malnutrition is inadequate, excessive, or unbalanced consumption of energy and/or nutrients. Certain types of malnutrition, such as childhood stunting, adult obesity, and micronutrient deficiencies, can be more likely in those who experience moderate food insecurity. In the worst-case scenario, those who are severely food insecure have gone days without eating or have run out of food. People who frequently worry or fear that they won't have access to enough safe, cheap, and nourishing food are said to be experiencing food insecurity [1]. It is a widespread issue that can arise from a lack of funds to purchase better foods or from the difficulty in finding healthier options. Malnutrition continues as the leading public health problem at the early stages of life in the world [2]. Bremner [3] reported that 31% of Africans lived under food insecurity across the continent. Comparably, thousands of Ethiopian children suffered from both acute and severe malnutrition, and 10% of the country's population experienced chronic food insecurity CSAE and ICF International [4]. Ethiopia has some of the worst and most widespread rates of malnutrition in sub-Saharan Africa [5]. According to the CSAE [6], the prevalence of stunting and underweight in rural children was 27% and 42%, respectively, but in urban children it was 13% and 24%. Wild fruits have a lot of promise to provide as a dietary supplement and safety net during times of food scarcity in many sub-Saharan African nations. Still, not enough research has been done to determine their actual contribution to food security. An important strategy to reduce household food insecurity is the collection of natural forest resources such as wild fruits [7]. There are numerous varieties of nutrient-dense wild fruits in Ethiopia, such as African-born *Cordia Africana* (wanza), Syzygium guineense (*myrtaceae)* known as water berry (dokima), *Mimusops kummel*, often known as eshe, (*Ximenia Americana*) enkoy, (*Carissa plum*) agam, (*Abyssinian rose)* kega, (*wild key-apple*) koshem, (*prickly pear*) qwelqwal bäläs, (*Psidium guajava*) guava, (*Ficus sycomorus*) shola or bamba, (*Grewia ferruginea*) lenkwata etc. Ethiopia's rural communities possess extensive knowledge about wild fruits, and the use of these wild fruits remains a fundamental aspect of the nation's many

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cultures. Orally transmitted from generation to generation, traditional knowledge about the uses of wild food plants has been preserved. Nonetheless, not enough research has been done on how the native people in the study area use wild fruits.

Potential contributions of wild fruits to food security

In Ethiopia, various ethnic groups utilize wild fruits as additional food sources. However, when compared to domesticated plant food sources, wild plant foods are frequently neglected. Indigenous people are familiar with the methods for gathering and preparing wild fruits, which are easily accessible in their native environments [8]. All of these plants are grown in large amounts in Ethiopia's northwest, and rural residents can also use them to some extent as food. They provide minerals like sodium, potassium, magnesium, iron, calcium, zinc, nickel, and phosphorus; vitamins such as vitamin B, vitamin C, and Vitamin D; fiber and protein [9].

Health benefits of wild fruits

Wild fruits contain phenols, which are known to provide physiological benefits such as antioxidant, anti-inflammatory, anti-carcinogenic, and anti-parasitic properties. Additionally, this plant contains anthraquinones, which are well-known for their potent antimalarial properties and are used to treat malaria and diarrhoea, etc [10] and fruit extract has been shown to be active against various types of the bacteria that cause diarrhoea [11,12] and to lower blood pressure [13]. The main health issues in the globe are non-communicable diseases like cancer, chronic respiratory disorders, obesity, diabetes, and cardiovascular diseases. Numerous academic sources demonstrate these fruits include naturally occurring chemicals with antioxidant properties that aid in the prevention of non-communicable diseases. Even though these wild fruits are cultivated in large quantities in northern parts of Ethiopia, and have numerous health and nutritional advantages, people cannot utilize them as food spatially in urban areas. Northwestern Ethiopia boasts a unique natural environment rich in biodiversity, fostering various wild fruit-bearing plants like *Cordia Africana, Mimusops Kummel, and Syzygium Guieense*. These fruits have been an integral part of local diets and traditional healing practices, and are known to play a crucial role in combating oxidative stress, a contributing factor to chronic diseases, including cancer and diabetes.

Wild fruits toxicity

Fruit is a great way to get fiber, vitamins, and antioxidants. However, eating a diet high in fruit can lead to severe health issues and dietary shortages. For instance, a diet high in fruit is low in protein and may cause blood sugar to increase. Because of this, a fruitarian diet is inappropriate for a diabetic. A doctor should be consulted first by anyone thinking about going on a fruit diet. Since fruit does not offer the variety of nutrients that the body needs, most medical specialists will not advise a fruit diet over the long term [14]. Toxins in the fruit can cause severely low blood sugar when consumed before they are mature. If a person already has low blood sugar or is malnourished, the toxins can cause a variety of issues, including fever, encephalopathy, and even death [15].

Methodology

A literature search was conducted using the "Web of Science" database, which produced the following findings in its core collection when WFs in all domains were looked up: the earliest published document dates from 1998, and the final one was published in 2024. After more investigation, it was discovered that these manuscripts dealt with several subspecies of WFs, from a total of 37 publications, 31 pertaining to the nutritional and health contributions of (*Cordia africana Lam., Syzygium guineense (Willd.) DC, Ximenia americana L., Carissa spinarum L., Rosa abyssinica L., Dovyalis abyssinica (A.Rich.) Warb, Euphorbia abyssinica J. F. Gmel., Psidium guajava, Ficus sur Forssk., Ficus sycomorus L., Grewia ferruginea Hochst. ex A. Rich., Euclea racemosa, Ficus ovata Vahl., Mimusops kummel Bruce ex A.DC and Opuntia ficus-indica (L.) Mill.*) and 6 publications related to food security and malnutrition, and 12 publications on the health benefits of each of the different WFs (Table 1). Review limitations include a paucity of research on the ability to improve local populations' well-being, encourage biodiversity protection, create economic possibilities, and leverage indigenous medical and nutritional knowledge.

Conclusion

Ethiopians make considerable use of wild fruits, although there is little information available on their traditional knowledge of these plants in the ethnobotanical literature. The research on Ethiopian WFs that is now available only covers around 5% of the country's districts, therefore further ethnobotanical studies that focus on the unexplored areas of the nation are required. To further utilize potential food sources, it is imperative to conduct applied research on the ecological distribution, nutritional analysis, toxicity, germplasm collecting, promotion, and domestication of WFs—getting ideas from other countries' experiences. The wild fruits of Ethiopia provided additional food and nourishment. This has also provided households with an opportunity to profit from local trade and use them directly as food, which exacerbates problems with animal production and raises their value as a source of food security. The significance of this review is to summarize or generate baseline information on the nutritional value and potential medical benefits of wild fruits for rural households.

Future direction

The phytochemical composition of these wild fruits, their therapeutic potential as antioxidants, their potential as anti-cancer and anti-diabetic agents, their economic benefits, the traditional uses of these fruits in local communities, and the promotion of their sustainable cultivation and harvesting for the benefit of local communities and biodiversity conservation are the areas of focus for scientists. They will also be analyzing the processing and preservation of wild fruits.

Author contributions

Each author has their own contributions to this review article and the lists are according to their roles during the work.

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Table 1: List of common wild fruit plants with their nutritional and medicinal values, Ethiopia.

S.N	The botanical name of the plant	Family	Common name	Nutritional value	Medicinal value	References
1	*Cordia africana* Lam.	Boraginaceae	Wanza	vitamin A, vitamin C, protein, Fe, Ca, Mg, K, Cu, etc	For inflammation-related conditions and infectious diseases.	[16,17]
2	*Syzygium guineense* (Willd.) DC	Myrtaceae	Dokima	essential oils, polyphenols	effective against hypertension, diabetes mellitus, and cancer	[18,19]
3	*Ximenia americana* L.	Olacaceae	Enkoy	palmitic acid, elaidic acid, vitamin C, protein, fat, Na, Ca, Mg, K, and P.	used to treat constipation and 'entil siwerd' (tonsillitis)	[20,21]
4	*Carissa spinarum* L.	Apocynaceae	Agam	Vitamin C, minerals, phenolics, antioxidants, flavonoids, and other biofunctional compounds.	Used to treat ulcers, and muscle cramps, to stop bleeding after delivery, and to treat worm infestations in wounded animals and anaplasmosis.	[22,23]
5	*Rosa abyssinica* L.	Rosaceae	Kega	rich in Fe, Zn, K and Ca	Alleviate fatigue or tension.	[24,25]
6	*Dovyalis abyssinica* (A.Rich.) Warb	Flacourtiaceae	Koshem	rich in carbohydrates and crude fibre	have medical properties with alleged effects on gonorrhoea, bilharzia, stomach ache, and fever	[26,27]
7	*Euphorbia abyssinica* J. F. Gmel.	Euphorbiaceae	Qulqwal	vitamin C, vitamin B6, Ca, Mg and fibre	antioxidant and venereal diseases	[28]
8	*Psidium guajava*		Guava (Zeytina)	Protein, fat, carbohydrate, crude fibre, and calories.	treatment of gastrointestinal diseases	[29,30]
9	*Ficus sur* Forssk.	Moraceae	Shola	Vitamin A, calcium, iron, and copper.	Treatment of anaemia, skin disorders, and sexually transmitted diseases.	[31,32]
10	*Ficus sycomorus* L.	Moraceae	Bamba	Vitamin A, calcium, iron, and copper.	Treatment of anaemia, skin, and sexually transmitted diseases.	[31,32]
11	*Grewia ferruginea* Hochst. ex A. Rich.	Tiliaceae	Lenkwata	phenolics and flavonol	Anti-diabetic, anti-inflammatory, and antimicrobial activity.	[33]
12	*Euclea racemosa*	Ebenaceae	Dedeho	protein content and fibre	Antimalarial, antidiabetic, anticancer, antimicrobial, and antioxidant properties.	[9,34]
13	*Ficus ovata* Vahl.	Moraceae	Warka	Protein, fat, fibre, Carbohydrate, and ascorbic acid.	Gastrointestinal, respiratory, inflammatory, and cardiovascular disorders.	[35,36]
14	*Mimusops kummel* Bruce ex A.DC	Sapotaceae	Eshe	Protein, P, carbohydrate, fat, and fibre	used to treat amoeba	[37]
15	*Opuntia ficus-indica* (L.) Mill.	Cactaceae	Gambora	vitamin C, ascorbic acid and Mg.	used to treat diarrhea, fever, high blood pressure, prostatitis, rheumatism, stomachache, tumors, warts, allergies, etc.	[38,39]

Conceptualization; Nibret Mekonen.

Investigation; Nibret Mekonen and Hailu Reta.

Methodology: Nibret Mekonen and Hailu Reta

Supervision: Nibret Mekonen.

Writing – manuscript: Nibret Mekonen.

Writing – review and editing: Nibret Mekonen

Acknowledgment

The Ethiopian Institute of Agricultural Research's Directorate of Food Science and Nutrition Research has provided financial assistance for this project. The author wishes to convey their heartfelt gratitude for their assistance and contribution to the completion of this review.

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