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An Overview on Underutilized Wild Edible Plants as a Source of Alternative Nutrition

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ABSTRACT- Ensuring a stable, hygienic, as well as nutritious food supplies for the poor and undernourished people of emerging economies is a serious concern today. Scarcity, high cost, and intermittent supply of healthy food have led to the hunt for an inexpensive or alternative source of excellent and nutritious food in relatively underdeveloped countries. Underutilized edible wild plants like Canavalia, Mucuna, Rhynchosia, Afzelia, Brachystegia, and Detarium, for instance, have been examined as well as proved to have high nutritional content. The number of plant species are healthy, and some have medicinal properties, as per existing studies. The usage of underutilized wild edible plants helps to combat hunger also improves rural health of the public. This study also looked at how underused wild edible plants may be exploited commercially as a source of nutritional supplements, novel food compositions, bio fortification, and product design.

KEYWORDS- Alternative, Nutritional Value, Potential Source, Underutilized, Wild Edible Plants.

I. INTRODUCTION

A shrinking number of plant species currently determines world food security and economic development. During history of mankind, 40-100,000 plant species have been used for food, clothing, housing, commercial, cultural, as well as medicinal purposes. Only a limited number of plants, however, are extensively utilized. Plant diversity is still underused. Plants that are underutilized contribute significantly to household food security and provide a method of survival amid droughts, famines, shocks, and hazards [1]. Because of their higher nutritional content, they may also be used to supplement nutritional needs. With the alarming rise in human population & depletion of natural habitat, it has become essential to investigate the possibilities for new plant resources to be used for food, fodder, energy, and industrial purposes[2].

Several underutilized organisms are nutrient-dense and very well to low-input agriculture. The extinction of such species might have an instant effect on impoverished people's food and nutrition stability. They have the potential to boost nutrition as well as prevent hidden hunger if they are used more often. Vitamin C levels are greater in several underutilized fruits and vegetables, for instance, as well as top player there are minor differences between commercially available species and varieties [3]. Plants have always played an important role in local cultures and customs [4]. Many underappreciated species serve an important role in preserving cultural variety related with dietary habits, care practices, religious rites, and social interactions [5]. Focusing attention on underutilized as well as ignored organisms is an effective way to promote a diversified and wholesome diet as well as combat micronutrient malnutrition, also known as "hidden hunger," as well as other nutritional deficiencies, particularly among rural populations and other vulnerable social circles in developing countries [6]. Local people have been using these species of plants for centuries, but due to a lack of local knowledge, their traditional applications are being lost. Many underused species may contribute significantly to a healthier diet for local populations[7].

II. DISCUSSION

A. Nutritional value of wild food plants that are underutilized

- At the Global Level

Onweluzo et al. studied the isolation and identification of proteins from four feerw-known subtropical legumes: Detarium microcarpum, Mucuna flagellipes, Afzelia africana, as well as Brachystegia eurycoma. High molecular weight globulins are more abundant in Detarium microcarpum and Mucuna flagellipes proteins. Albumin predominates in the protein composition of Afzelia africana beans. Sena et al. looked at the nutritive benefits of a variety of Niger famine plants. Researcher looked studied the nutritional composition of leaves from, Leptadenia hastate, Ceratotheca sesamoides, Moringa oleifera, Ziziphus mauritiana, Amaranthus viridis, Adansonia digitate, as well as Hibiscus sabdariffa [8].

The mineral content of six non-traditional leafy vegetables, Moringa oleifera, Adansonia digitata, Colocasia esculenta, Corchorus tridens, Cassia tora, and Amaranthus spinosus, was investigated by Barminas et al. In comparison to widely used Nigerian veggies, Amaranthus spinosus and Adansonia digitata have the greatest iron content. Freiberger et al. looked at the nutritional value of underused wild herbs in Nigerian cuisine. Chokeberry (Aronia melanocarpa), Cornelian cherry (Cornus mas), Barberrry (Berberis vulgaris), Scarlet firethorn (Pyracantha coccinea), Mayhaw

(Crataegus monogyna), Rowan berry (Sorbus aucuparia), Madlar (Mespilus germanica), Rose hips (Rosa canina), Sloe berry (Sorbus aucup (Prunus spinosa). Pugalenthi et al. investigated the nutritional potential of the underused legume Mucuna pruriens var. utilis, as well as the present status of its use as a food/feed for humans and animals around the globe[9].

Healthful Potential of Wild or Underutilized Legumes was researched by Bhat and Karim. Aberoumand looked on the nutritional & bioactive components of Alocasia indica, a food plant that is underutilized. In certain parts of Iran, the stem is eaten as a vegetable. Ng et al. investigated the nutritional value, phenolic components, and antioxidant potential of five underused wild vegetables: Limnophila aromaticoides, Ceratopteris thalictroides, Crassocephalum crepidioides, Etlingera elatior, and Monochoria vaginalis. When compared to marketed species, Brassica juncea, these wild greens have higher fibre (11.3 - 19.8 g / 100g) and ash (13.0 - 17.6 g / 100g) content. The seeds & oil of Chrysophyllum albidum were studied by Osamudiamen and Afolabi, who looked at the proximate composition, physicochemical characteristics, and mineral components[10].

1) On a national scale

Maikhuri investigated the nutritional content of several lesser-known wild food plants in North India, as well as their significance in tribal nutrition. Dendrocalamus hamiltonii, Angiopteris evecta, Calamus tenuis, Cyathea gigantea, Dioscorea bulbifera, Pinanga gracilis, Sphenoclea zeylanica, Alpinia malaccensis, as well as Wallichia densiflora were among the plants they analyzed. Dendrocalamus hamiltonii, Dioscorea bulbifera, and Cyathea gigantea are the most significant plants in their diet, according to them. Momordica bulbifera provided the most food energy (21.28 mj kg-1) while Wallichia densiflora provided the least (6.7 mj kg-1). In comparison to the other plants, Sphenoclea zeylanica was discovered to be abundant in all minerals[11].

Energy 302 kcal, protein 25.3 g, fat 3.3 g, fiber 9.5 g, carbohydrate 42.8 g, calcium 208 mg, phosphorus 569 mg, iron 12.5 mg, riboflavin 0.09 mg, and niacin 3.8 mg per 100 g are found in dried bamboo shoots. Duhan et al. investigated the nutritional value of various non-traditional Indian plant diets. They looked at the nutritional content of 13 non-traditional foods, such as fruits, leaves, and grains that are eaten in different regions of the Indian subcontinent. The protein content of Khejri (Prosopis cineraria) legumes, Pinju (Capparis decidua), and Kachri (Cucumis spp.) was high (15–18%). Kachri had a lot of fat (13 percent). Calcium was found in overflow in Bhakri (Tribulus terrestris), Gullar (Ficus glomerata), and Peehl (Salvadora oleoides). Gullar has multiple times the calcium content of wheat. Santhi (Boerhavia diffusa), Bhakri, Pinju, Khejri beans, as well as Lehsora (Cordia dichotoma) all have high phosphorus levels. Zinc was plentiful in Peepalbanti (Ficus religiosa) and Gullar, as well as iron and manganese in Santhi and Bhakri and Santhi. Pinju has significant levels of -carotene and vitamin C in addition to iron, zinc, and calcium. Boerhavia diffusa, on the other hand, had a lot of oxalic acid [12].

Rao studied the nutritional content of several lesser-known Andhra Pradesh oil seeds. Xanthium strumarium, Guizotia abyssinica, Nicotiana tabacum, and Allium cepa seeds were discovered to be high in protein and fat [13]. When compared to most frequently eaten Indian pulses, the seeds of lesser known pulses of the genera Canavalia and Mucuna had greater levels of crude protein, crude fat, and energy. They were a good source of minerals including sodium, potassium, and calcium. Bhargava et al. investigated the nutritional composition of various edible portions of seven bamboo species, including total carbs, proteins, vitamins C, and minerals. All out starch content was viewed as most prominent in the seed of Bambusa arundinacea (38.0%), proteins in the seeds of Dendrocalamus strictus (13.54%), and L-ascorbic acid in the seeds of Bambusa arundinacea (50mg/100g) among every consumable part [14].

Siddhuraju et al. examined the substance cosmetics and healthful properties of Mucuna pruriens seeds [15]. They found that ready seeds included 314.4 grams of unrefined protein, 51.6 grams of rough fiber, 67.3 grams of unrefined fat, 41.1 grams of debris, and 525.6 grams of carbs per kilogram. When compared to the most frequently eaten pulses, potassium, phosphorus, and calcium had greater amounts. The main storage proteins (22.7 g/100 g of seed flour) were globulins and albumins together [16]. Sankhala et al. investigated the lesser-known leaves eaten by tribals in the Udaipur area. Portulaca oleracea, Boerhavia diffusa, Commelina benghalensis, Amaranthus spp., Chenopodium album, Vigna catjang, Moringa oleifera, Cassia tora, and Trianthema monogyna leaves were analyzed for general structure, iron, calcium, - carotene, L-ascorbic acid, and oxalic corrosive substance [17].

Mucuna genus nutritional and pro potential was investigated by Kala and Mohan. When compared to most frequently eaten pulses, they discovered greater levels of protein content and crude lipid. The seed lipids had a more noteworthy grouping of palmitic and linoleic acids, as indicated by the unsaturated fat profiles [18]. The seed protein of Mucuna pruriens var. pruriens had more prominent measures of a few significant amino acids and was wealthy in regular assets like potassium, calcium, magnesium, phosphorus, iron, and manganese, as indicated by amino corrosive profiles. Absolute free phenolics, tannins, 3, 4-dihydroxyphenylalanine, phytic corrosive, hydrogen cyanide, trypsin inhibitor action, oligosaccharides, and phytohaemagglutinating movement were considered as hostile to dietary mixtures [14].

The dietary and antinutritional worth of 23 uncommon wild edibles was accounted for by Mohan and Kalidass. The general and mineral substance, starch, nutrients, in-vitro supplement edibility (IVPD), in-vitro starch dissolvability (IVSD), and antinutritional parts of these plants were totally inspected [19]. Kedrostis foetidissima tubers and Caralluma pauciflora stems have greater crude protein content. The iron content of all 23 wild edible plants seemed to be greater than the NRC/NAS recommended dietary allowances (RDA) for babies, children, and adults [20].

Nazarudeen investigated the nutritional content of several lesser-known fruits consumed by ethnic groups and locals [21]. They discovered 218 kinds of wild delicious fruit plants in Kerala's forests [22]. Ten wild edible fruits were chosen from a total of 218 for their nutritional content and compared to ten common cultivar fruits based on their unique quality and attractiveness[23].

The nutritional characteristics of Elaeagnus kologa, an underused edible and indigenous fruit plant in the Nilgiris of the Western Ghats, were investigated by Paulsamy et al. Vadivel and Pugalenthi [44] investigated the nutritional value, antinutritional chemicals, biological value, and protein content of dehulled seeds of Tamarindus indica, a tribal dietary legume that is underutilized. Murthy and Emmanuel researched the healthful and antinutritional attributes of Rhynchosia bracteata Benth, a wild vegetable that is underutilized [24]. They found that vegetables had more noteworthy degrees of unrefined protein, rough fat, debris, and nitrogen free extractives, representing 20.18, 6.16, 6.12, and 61.31 percent of absolute rough protein, unrefined fat, debris, and nitrogen free extractives, individually. Magnesium, iron, potassium, and phosphorus are plentiful in vegetables. Complete free phenols (3.76 percent), tannins (0.29 percent), L-DOPA (0.51 percent), hydrogen cyanide (0.066 percent), and phytic corrosive (0.18 percent) are antinutritional specialists found in shifting sums in vegetables. The sythesis, mineral profiles, nutrients, unsaturated fat profiles, amino corrosive profiles of seeds, protein absorbability, and antinutritional parts of the underutilized food vegetable Rhynchosia Cana, Rhynchosia filipes, Rhynchosia rufescens, and Rhynchosia suaveolens were examined. The crude protein content varied from 14.28 to 19.41%, crude lipid from 3.28 to 4.41 percent, total dietary fibre from 6.39 to 8.44 percent, ash from 2.80 to 3.50 percent, and carbohydrate from 60.29 to 72.51 percent. Using the relative importance (RI) method, Kunwar et al. investigated the relative significance of 49 underused plant species [25]. Plant species were classified into six groups depending on their consumption [26]. They discovered 22 plant species that featured in several usage categories, with the remainder being unknown[12].

Jain and Tiwari investigated the nutritional content of several traditional edible plants utilized by the Gond and Sahariya tribes of central India during times of food shortage. The general organization, mineral profile, nutrients, protein divisions, unsaturated fat profiles, and amino situations with absolute protein content, in vitro protein absorbability, and antnutritional ability of Mucuna are researched by Tresina and Mohan. Wholesome Potential of Five Undiscovered Wild Edible Food Plants from the Eastern Himalayan Biodiversity Hotspot Region was evaluated by Kalita et al. (India). Flautist pedicellatum C. DC (leaves), Gonostegia hirta (Blume ex Hassk.) Miq. (Leaves), Mussaenda roxburghii Hook.f (leaves), Solanum spirale Roxb. (Leaves and natural products), and Cyathea spinulosa Wall. Ex Hook. (substance part and delicate rachis) were explored in the East Siang Neighborhood of Arunachal Pradesh Northeast (Nutritional content of two underused wild edible fruits, Elaeagnus pyriformis and Spondias pinnata, was investigated by Khomdram et al. [23]

II. CONCLUSION

Underused wild edible plants have significant nutritional value, according to ongoing studies across the globe and the existing database. These plants were utilized to flavor, garnish, or enhance other meals in a variety of cuisines. These plant species used to be significant source of minerals and vitamins, but they are now less so. The majority of this ancient wisdom exists only in the minds of the old and is now in danger of extinction. This article aims to collect and distribute such information in order to aid in the preservation of cultural traditions and the advancement of study into food histories and new food sources. These crops should be studied extensively in order to overcome protein-energy deficiency, especially in poor countries. Modern processing techniques combined with traditional knowledge will undoubtedly offer a solid foundation for commercializing these plants for the development of novel foods (or biofortification), as well as for application in the pharmaceutical sector. Modern biotechnological techniques may be adequate to enable the development of transgenes with less anti - nutrients or toxicological components in underused natural food species. Still, there is a significant gap in our understanding of the real gene pool, as well as the evaluation of beneficial metabolites, phytochemicals, and other nutritional characteristics in these underused wild edible plant resources.

REFERENCES

[1] D. Kumar, I. Sarkar, V. Sriram, and S. S. Teotia, "Evaluating the seismic hazard to the National Capital (Delhi) Region, India, from moderate earthquakes using simulated accelerograms," *Nat. Hazards*, 2012, doi: 10.1007/s11069-011-9933-2.

[2] J. Salvi and K. Ss, "A Review : Underutilized Wild Edible Plants as a Potential Source of Alternative Nutrition .," *Int. J. Bot. Stud.*, 2016.

[3] P. Prakash *et al.*, "Documentation of commonly used ethnoveterinary medicines from wild plants of the high mountains in shimla district, himachal pradesh, india," *Horticulturae*, 2021, doi: 10.3390/horticulturae7100351.

[4] G. Awasthi *et al.*, "A review on nanotechnological interventions for plant growth and production," 2019, doi: 10.1016/j.matpr.2020.07.255.

[5] A. Gupta, P. Singh, N. Trivedi, K. K. Jha, S. Kumar, and B. Singh, "A review on pharmacognostical and pharmacological activities of plant nicandra physalodes," *Pharma Res.*, 2014.

[6] T. Singh, G. Awasthi, and Y. Tiwari, "Recruiting endophytic bacteria of wetland plants to phytoremediate organic pollutants," *International Journal of Environmental Science and Technology*. 2021, doi: 10.1007/s13762-021-03476-y.

[7] S. Shaheen, M. Ahmad, and N. Haroon, *Edible Wild Plants: An alternative approach to food security*. 2017.

[8] P. Kumar, Y. Ggsss, F. Jhirka, A. Kumar, M. Kumar, and R. Kishan, "Study of Underutilized Fruit Plants as Source of Food and Ethnomedicine in Ferozepur Jhirka," *Int. J. Agric. Sci.*, 2018.

[9] K. Sinha and V. Khare, "Nutritional and medicinal value of underutilized vegetable crops in India," *Int. J. Chem. Stud.*, 2018.

[10] S. Padulosi, D. M. Cawthorn, G. Meldrum, R. Flore, A. Halloran, and F. Mattei, "Leveraging neglected

and underutilized plant, fungi, and animal species for more nutrition sensitive and sustainable food systems," in *Encyclopedia of Food Security and Sustainability*, 2018.

[11] S. Shaheen, M. Ahmad, and N. Haroon, "Diversity of Edible Wild Plants: Global Perspectives," in *Edible Wild Plants: An alternative approach to food security*, 2017.

[12] J. Boedecker, C. Termote, A. E. Assogbadjo, P. Van Damme, and C. Lachat, "Dietary contribution of Wild Edible Plants to women's diets in the buffer zone around the Lama forest, Benin – an underutilized potential," *Food Secur.*, 2014, doi: 10.1007/s12571-014-0396-7.

[13] R. Khatoon, N. Jahan, S. Ahmad, and A. Shahzad, "In vitro evaluation of antifungal activity of aerial parts of medicinal plants Balanites aegyptiaca Del. and Spilanthes acmella Murr.," *J. Appl. Pharm. Sci.*, 2014, doi: 10.7324/JAPS.2014.40121.

[14] M. C. Kyriacou *et al.*, "Micro-scale vegetable production and the rise of microgreens," *Trends in Food Science and Technology*. 2016, doi: 10.1016/j.tifs.2016.09.005.

[15] S. Srivastava, P. Singh, K. K. Jha, G. Mishra, S. Srivastava, and R. L. Khosa, "Evaluation of anti-arthritic potential of the methanolic extract of the aerial parts of Costus speciosus," *J. Ayurveda Integr. Med.*, 2012, doi: 10.4103/0975-9476.104443.

[16] D. Gupta *et al.*, "A randomized controlled clinical trial of Ocimum sanctum and chlorhexidine mouthwash on dental plaque and gingival inflammation," *J. Ayurveda Integr. Med.*, 2014, doi: 10.4103/0975-9476.131727.

[17] A. Romojaro, P. Sanchez-Bel, M. Serrano, and M. T. Pretel, "Wild edible plants as potential antioxidants in vegetables oils," *J. Chem.*, 2013, doi: 10.1155/2013/457902.

[18] B. Singh, V. Gupta, P. Bansal, R. Singh, and D. Kumar, "Pharmacological potential of plant used as aphrodisiacs," *International Journal of Pharmaceutical Sciences Review and Research*. 2010.

[19] S. Sahu, D. B. Singh, K. K. Yadav, D. V. Rai, and R. Dixit, "Computational identification and functional annotation of miRNAs in medicinal plant Helianthus petiolaris," *Netw. Model. Anal. Heal. Informatics Bioinforma.*, 2013, doi: 10.1007/s13721-013-0044-8.

[20] M. Choudhary, Jayanand, and J. C. Padaria, "Transcriptional profiling in pearl millet (Pennisetum glaucum L.R. Br.) for identification of differentially expressed drought responsive genes," *Physiol. Mol. Biol. Plants*, 2015, doi: 10.1007/s12298-015-0287-1.

[21] A. Sharma, S. Sahu, P. Kumari, S. R. Gopi, R. Malhotra, and S. Biswas, "Genome-wide identification and functional annotation of miRNAs in anti-inflammatory plant and their cross-kingdom regulation in Homo sapiens," *J. Biomol. Struct. Dyn.*, 2017, doi: 10.1080/07391102.2016.1185381.

[22] S. Banerjee, S. S. Gill, B. H. Gawade, P. K. Jain, K. Subramaniam, and A. Sirohi, "Host delivered RNAi of two cuticle collagen genes, Mi-col-1 and Lemmi-5 hampers structure and fecundity in meloidogyne incognita," *Front. Plant Sci.*, 2018, doi: 10.3389/fpls.2017.02266.

[23] C. Termote, P. van Damme, and B. D. a. Djailo, "Eating from the wild: Turumbu indigenous knowledge on noncultivated edible plants, Tshopo district, DRCongo," *Ecol. Food Nutr.*, 2010, doi: 10.1080/03670241003766030.

[24] S. Ghosh and S. K. Rai, "Boerhavia diffusa: One plant with many functions," *Int. J. Green Pharm.*, 2018.

[25] M. D. Faisal Iqubal *et al.*, "Correlation of Malondialdehyde and Superoxide Dismutase in Smokers of North Indian Population," *Biochem. Cell. Arch.*, 2020, doi: 10.35124/bca.2020.20.1.47.

[26] S. Kumar, V. J. Kumar, and R. Singh, "Physico-chemical analysis and preliminary phytochemical screening of crude plant extracts of eclipta alba in district haridwar," *Rasayan J. Chem.*, 2020, doi: 10.31788/RJC.2020.1335911.