

## The Role of Indigenous Vegetables and Fruits in Improving Food and Nutrition Security

**Rondla Anitha ,Gottemukkula Bhavani and V.Rajendra kumar**

<sup>1</sup>Subject Matter Specialist (Home Science), ICAR-Youth for Action Krishi Vigyan Kendra, Mahabubnagar-I Madanapuram Mandal and Wanaparthy District Telangana - 509110

<sup>2</sup>Subject Matter Specialist (Agricultural Extension), ICAR-Youth for Action Krishi Vigyan Kendra, Mahabubnagar-I, Madanapuram Mandal and Wanaparthy District. Telangana -509110

<sup>3</sup>Senior scientist and Head, ICAR-Youth for Action Krishi Vigyan Kendra, Mahabubnagar-I, Madanapuram Mandal and Wanaparthy District. Telangana -509110

**ARTICLE ID: 50**

### **Introduction:**

The vital role that underutilized and wild plant species, particularly green leafy vegetables, can play in tackling food security, malnutrition, and health challenges, especially in the context of climate change and limited natural resources. Achieving the United Nations' Sustainable Development Goals (SDGs), such as "No Poverty," "Zero Hunger," and "Good Health and Well-being," is difficult if we rely solely on maximizing food production with existing resources. With natural resources increasingly strained and the impacts of climate change threatening agricultural output, there is an urgent need to increase food production by 70% by 2050 to meet the demands of a growing population. The cultivation of resilient, low-resource-intensive, and nutritionally rich crops, especially uncultivated and wild species, offers a promising path forward. These plants are rich in essential nutrients and have been an integral part of human diets for centuries, contributing to overall health and well-being. In particular, green leafy vegetables are affordable, nutrient-dense, and accessible to low-income populations, making them a valuable resource for improving nutrition and food security.

The World Health Organization (WHO) highlights the importance of consuming a variety of fruits and vegetables to prevent micronutrient deficiencies and reduce the risk of non-communicable diseases (NCDs). WHO recommends a daily intake of at least 400 grams of vegetables per person to combat diet-related chronic diseases. In addition to their nutritional benefits, wild edible plants enhance biodiversity, support local food systems, and provide income opportunities in rural and underdeveloped regions. Given India's rich biodiversity, with over 45,000 wild species, including 9,500 of ethnobotanical significance, there is significant

potential to harness these resources for sustainable food production. The domestication and use of wild and underutilized fruits, vegetables and green leafy vegetables can play a crucial role in promoting environmental sustainability, securing food supplies, and improving nutrition, particularly in regions with rich biodiversity like India. India is home to a diverse range of indigenous fruits and vegetables that have been cultivated and consumed for centuries. Here is a list of some indigenous fruits and vegetables found in various regions of India:

### List of Indigenous Fruits and Vegetables

Common Name	Botanical Name	Other Name
Jamun	( <i>Syzygium cumini</i> )	Also known as black plum, it's commonly found in tropical regions of India
Amla	( <i>Phyllanthus emblica</i> )	Also known as Indian gooseberry, it's rich in Vitamin C and is widely used in Ayurvedic medicine.
Ber	<i>Ziziphus mauritiana</i>	- Known as Indian jujube, it's a small fruit with a sweet and sour taste.
Tamarind	<i>Tamarindus indica</i>	A tropical fruit, its sour pulp is commonly used in Indian cuisine.
Jackfruit	<i>Artocarpus heterophyllus</i>	A large tropical fruit, it's used both as a fruit and a vegetable.
Bael	<i>Aegle marmelos</i>	Also known as wood apple, it's used in traditional Indian medicine and as a summer beverage.
Karonda - A small berry-like fruit, commonly used in pickles and preserves.	<i>Carissa carandas</i>	A small berry-like fruit, commonly used in pickles and preserves.
Custard Apple -	<i>Annona squamosa</i>	Also known as Sitaphal, it's a sweet, creamy fruit.


Kokum	<i>Garcinia indica</i>	A sour fruit used in coastal Indian cuisine, especially in the Western Ghats.
Starfruit	<i>Averrhoa carambola</i>	Also known as kamrakh, it's a tropical fruit with a sweet and sour flavor.
Karela	<i>Momordica charantia</i>	Also known as bitter gourd, it's a commonly used vegetable in Indian households.
Moringa	<i>Moringa oleifera</i>	-Known as drumstick, the pods, leaves, and flowers are used in various dishes.
Tinda	<i>Praecitrullus fistulosus</i>	Also called Indian round gourd, it's a common summer vegetable in North India.
Bhindi	<i>Abelmoschus esculentus</i>	-Known as okra or ladyfinger, it's widely grown across India.
Parwal -	<i>Trichosanthes dioica</i>	Also known as pointed gourd, it's a common vegetable in eastern India.
Bathua -	<i>Chenopodium album</i>	Known as pigweed or lamb's quarters, it's a leafy green vegetable rich in nutrients.
Elephant Foot Yam	<i>Amorphophallus paeoniifolius</i>	Known as Suran or Jimikand, it's a tuberous vegetable used in various regional dishes.
Pumpkin	<i>Cucurbita maxima</i>	Widely grown across India, pumpkin is used in both savory and sweet dishes.
Lotus Stem	<i>Nelumbo nucifera</i>	Known as Kamal Kakdi, it's commonly used in North Indian and Kashmiri cuisines.

Brinjal	Solanum melongena	Also known as eggplant or aubergine, it's a staple vegetable in many Indian dishes.
Amaranthus	Amaranthaceae	Also known as "Chaulai" or "Rajgira," these leaves are rich in iron, calcium, and vitamins A and C.
Drumstick leaves	Moringaolifera	Also known as "Moringa" or "Sahjan," these leaves are highly nutritious, rich in vitamins, minerals, and antioxidants.
Curry Leaves	Murraya koenigii	Commonly used in South Indian cooking, curry leaves are known for their aromatic flavor and health benefits.
Bathua	Chenopodium album	Also known as "Lamb's Quarters" or "Chenopodium," Bathua is a winter green, rich in vitamins A, C, and K, calcium, and iron

### Functional components of indigenous fruits and vegetables and their impact on human health.

Indigenous Vegetables and fruits are an important part of traditional diets in many cultures and have been recognized for their nutritional and medicinal properties. Here are some of the key functional components of IVFs and their impact on human health:

#### Nutritional Components

-  **Vitamins:** IVFs are rich in vitamins such as Vitamin A (in the form of beta-carotene), Vitamin C, and various B vitamins (e.g., folate). These vitamins are essential for immune function, skin health, and cellular metabolism.



- ✚ **Minerals:** They are also excellent sources of essential minerals like iron, calcium, magnesium, and potassium, which are vital for bone health, muscle function, and overall metabolic processes.
- ✚ **Dietary Fiber:** IVFs are high in dietary fiber, which is important for digestive health, helping to prevent constipation and reduce the risk of colon cancer.

### Bioactive Compounds

- ✚ **Phenolic Compounds:** IVFs contain phenolic compounds, which have antioxidant properties. These compounds can help neutralize free radicals, reducing oxidative stress and lowering the risk of chronic diseases such as heart disease and cancer.
- ✚ **Flavonoids:** These are another class of antioxidants found in ILVs that contribute to cardiovascular health, anti-inflammatory effects, and overall immune system support.
- ✚ **Glucosinolates:** Found in certain ILVs, particularly those from the Brassicaceae family, glucosinolates have been shown to have anti-carcinogenic properties.

### Health Benefits

- ✚ **Anti-inflammatory Properties:** Many ILVs contain compounds that have anti-inflammatory effects, which can help manage conditions such as arthritis and inflammatory bowel disease.
- ✚ **Anti-cancer Properties:** The antioxidants and glucosinolates in IVFs have been linked to reduced risks of certain cancers, including breast, prostate, and colon cancers.
- ✚ **Blood Sugar Regulation:** The high fiber content and specific phytochemicals in IVFs can help regulate blood sugar levels, making them beneficial for individuals with diabetes or at risk of developing it.
- ✚ **Cardiovascular Health:** The potassium, fiber, and antioxidant properties of IVFs contribute to lower blood pressure, improved cholesterol levels, and overall cardiovascular health.
- ✚ **Eye Health:** The high content of Vitamin A in IVFs is crucial for maintaining good vision and preventing conditions like night blindness.

Overall, indigenous fruits and vegetables offer a rich array of nutrients and bioactive compounds that can significantly contribute to human health, particularly in preventing and managing chronic diseases.

## **Influence of Processing Methods on the Nutritional and Functional Components of Indigenous Vegetables**

Indigenous vegetables and fruits are extremely perishable; they begin to lose their freshness as soon as they are harvested and keep doing so until they are eaten. When handled poorly, IVs are quickly damaged and types such as amaranth are very susceptible to wilting. The loss of moisture during handling and storage is one of the post-harvest issues that results in weight loss. Extending the shelf life of the IVs through processing is a crucial opportunity to prevent needless losses. Because IVs are mostly produced during the rainy season and their production is seasonal, storing them will guarantee that these vegetables are accessible all year round and should maintain a reasonable level of quality. The nutritional and functional components of indigenous fruits and vegetables are highly influenced by the processing methods they undergo. Processing can have both beneficial and detrimental effects on the nutrient content, bioavailability of nutrients, and functional properties (like antioxidant capacity) of these foods. Here's a breakdown of how different processing methods can impact these aspects:

### **Thermal Processing (Boiling, Steaming, Blanching)**

- ✚ **Nutrient Loss:** Thermal processing often leads to the loss of heat-sensitive nutrients like vitamin C, folate, and some B vitamins. For example, boiling can result in the leaching of water-soluble vitamins and minerals into the cooking water.
- ✚ **Retention of Nutrients:** Steaming generally retains more nutrients compared to boiling because it reduces direct contact with water.
- ✚ **Bioavailability:** Cooking can enhance the bioavailability of some nutrients, such as beta-carotene in carrots and other orange-colored vegetables, by breaking down cell walls and making these nutrients easier to absorb.
- ✚ **Functional Components:** Heat can reduce the antioxidant capacity of some vegetables (e.g., leafy greens) but may enhance it in others (e.g., tomatoes, due to increased lycopene availability).

### **Drying (Sun Drying, Dehydration)**

- ✚ **Nutrient Concentration:** Drying reduces the water content and concentrates nutrients like fiber and some minerals. However, it may cause the degradation of heat-sensitive vitamins, especially if done at high temperatures.

- ✚ **Functional Components:** The drying process can reduce the antioxidant activity due to the degradation of polyphenols and other sensitive compounds. Sun drying, in particular, may lead to the loss of these compounds due to prolonged exposure to light and oxygen.
- ✚ **Shelf-life Extension:** Drying extends the shelf life of fruits and vegetables, preserving them for longer periods without significant microbial spoilage.

### Pickling

- ✚ **Nutrient Retention:** Pickling generally preserves most of the nutrients, although some water-soluble vitamins may leach into the pickling solution.
- ✚ **Functional Components:** The acidic environment in pickling can help preserve antioxidants and other functional components, but it may also lead to the breakdown of sensitive vitamins.
- ✚ **Addition of Sodium:** One drawback is the potential increase in sodium content, which can be a concern for some individuals.

### Conclusion:

The role of Indigenous Fruits and Vegetables (IVFs) in enhancing food security, nutrition, and economic opportunities is indeed significant, yet often overlooked. Despite their potential, their cultivation, consumption, and indigenous knowledge about them are under threat due to several factors, including negative perceptions, lack of seeds, and poor post-harvest management. To address these challenges and promote the utilization of IVFs, several actions could be taken:

- ✚ **Education and Awareness:** Raise awareness among communities about the nutritional value and economic potential of IVFs. Educational campaigns can help change perceptions and encourage the integration of these foods into mainstream diets.
- ✚ **Seed Preservation and Distribution:** Establish seed banks and support seed distribution networks to ensure the availability and accessibility of IVF seeds, preventing the extinction of valuable species.
- ✚ **Post-Harvest Processing and Value Addition:** Develop and promote improved post-harvest handling and processing techniques to extend the shelf life of IVFs, reduce losses, and add value to the produce. This can include drying, canning, or creating value-added products like jams and preserves.



- ✚ **Promotion of Cultivation:** Encourage and support the cultivation of IVFs through agricultural extension services, training programs, and incentives for farmers. This can be linked with initiatives that support sustainable farming practices and biodiversity conservation.
- ✚ **Documentation and Dissemination of Indigenous Knowledge:** Preserve and disseminate indigenous knowledge related to the cultivation, preparation, and consumption of IVFs. This could be achieved through community workshops, written guides, or digital platforms that share traditional recipes and farming techniques.
- ✚ **Market Development:** Develop markets for IVFs, including promoting them in urban areas and integrating them into formal retail chains. This can help create demand and ensure that these foods are seen as valuable rather than as "poor man's meals."
- ✚ **Policy Support:** Advocate for policy changes that recognize the importance of IVFs in food security strategies, provide funding for research and development, and create supportive frameworks for smallholder farmers growing these crops. By implementing these measures, IVFs can be revitalized as a crucial component of food systems, contributing to improved nutrition, food security, and economic opportunities, especially in rural areas.