

Less Known Aquatic Vegetables of Northeast Region: A Potential for Future Nutrition

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Underutilized aquatic vegetables refer to plant species that grow in aquatic or semi-aquatic environments and have the potential to be used as food but are not extensively cultivated or consumed. These plants can provide variability and sustainability to a diet, and they are frequently rich in nutrients. The underutilization of these aquatic vegetables could be due to various reasons, including limited awareness of their nutritional benefits, lack of culinary tradition, or challenges in cultivation and harvesting. These vegetables often have not received much attention in terms of research, development, or promotion compared to mainstream crops. Exploring and promoting the consumption of underutilized aquatic vegetables can contribute to diversifying diets, enhancing food security, and promoting sustainable agricultural practices. Examples of underutilized aquatic vegetables may include various types of water plants, algae, and other aquatic vegetation that have sufficient intake of nutrients for human consumption. Some of these plants may be rich in vitamins, minerals, and other beneficial compounds. Promoting underutilized aquatic vegetables is essential for various reasons. Firstly, these vegetables provide diverse nutritional profiles that supplement diets with a wide range of vitamins, minerals, and health-promoting components. Secondly, cultivating aquatic vegetables utilizes water resources efficiently, reducing pressure on land and promoting sustainable farming practices. Enhancing the range of our food sources makes us greater resilience, especially in regions where traditional crops might face hardships. From economic point of view, commercializing these crops creates new income streams for farmers and entrepreneurs, fostering local economic development. Moreover, popularizing underutilized aquatic vegetables contributes to the preservation and sustainable use of diverse plant species, supporting biodiversity. Aquatic vegetables can also contribute to water purification, ecosystem health, and environmental conservation. Promoting these

vegetables helps preserve traditional culinary practices, ensuring the continuation of local food cultures. Certain aquatic vegetables might be more tolerant of environmental stresses, making them a dependable food source in areas susceptible to climate change.

A brief information of the popularly consumed underutilized aquatic vegetables in Northeast region of India; Manipur, Arunachal Pradesh, Meghalaya, Nagaland, Mizoram, Tripura and Sikkim are mentioned below.

Prickly Water Lily



Fig. 1: Makhana fruit

The major aquatic cash crop, Makhana or gorgon nut or fox nut (*Euryale ferox* Salisb.), is farmed mostly in eastern India. It belongs to the family Nymphaeaceae producing vibrant purple blooms. Prickly spikes cover the surface of

the leaves. The edible black nuts are popularly known as Thangjing in Manipur is consumed as raw, boiled, roasted and used in making chutneys (eromba and thangjing metpa). Typically, it grows in low-lying areas, lakes, ponds, and other stagnant bodies of water. It is rich in carbohydrates (76.9%), protein (9.7%), phosphorous (0.9%), minerals (0.5%), fat (0.1%), Calcium (0.02%) and Iron (0.0014%). Both the raw and popped nuts have high calorific value of 362 and 328 kcal/100g respectively. Amino acids such as glutamine, cystine, methionine, and arginine having anti-aging property is present in high proportions in Makhana. It is used as a remedy for sickness like digestive, reproductive, stomachache and diabetes. It is available from October-November. For low-income

groups, its cultivation can bring in additional money which also has a huge scope of earning through



processing.

Fig 2: Makhana plant in pond

Manchurian Wild Rice



Fig 3: Wild rice tied in bundles

A well-liked vegetable in China, *Zizania latifolia* (Griseb.) Turcz. ex Stapf is a member of the Poaceae family. It is a special byproduct that is devoured like a vegetable that has been produced by a fungal parasite and plant host. This perennial wet grass flourishes in swampy paddocks, roadside ditches, stagnant ponds, and riverbanks. In Manipur, it's described by the native term, kambong and the community's favorite wintertime dish. The infected gall forming culms of the plant are consumed raw or cooked. For the Brown-antlered deer acknowledged locally as Sangai, *Z. latifolia* is an integral source of nourishment food. After being charred, roasted, stir-fried in oil with potatoes, or teamed with cooked rice, it is devoured. It is loaded with fat, dietary fibers, vitamins, proteins, and

carbohydrates. Ca, K, Na, Mg, Cu, Zn, As, phenolics, and flavonoids are plentiful in black smut. In pharmaceuticals, it is used as a remedy for dyspepsia, and its syrup is used to treat burn injuries, colds or flu, and coughs as well. It is accessible from January throughout April, during the fall to spring season.

Water Lily

In several communities in the northeastern region of India, families often raise the wild aquatic plant *Nymphaea rubra* Roxb. ex-Andrews in their backyard ponds. Being part to the Nymphaeaceae family, often referred to as "water lily." After being



Fig 4: Starchy rhizome

roasted or steam-cooked, the rhizome (locally called lemphu) is eaten, and it has a starchy, potato-like flavor. There is an immense amount of total carbohydrates (63.14%) in the rhizome along with protein, fat and fibre. The tender

leaves, flower peduncles and seeds are also consumable. Numerous cosmetic items also contain the flower extract. Rhizome powder has been utilized for piles, loose stool, and dyspepsia. The majority of nymphaea plants are very nutrient-dense and have considerable medicinal value. The flower is almost available throughout the year. This plant may be a dependable source of protein owing to the substantial amount of protein it contains.

Water Chestnut



Fig 5: Water chestnut Plant (Heikakyeli)

Water chestnut (*Trapa natans* L) is also known as singhara is one of aquatic vegetable of the family Trapaceae. The genus *Trapa* is an aquatic herb which is distributed in Central and South -East Europe and Temperate and Tropical Asia. The nutrient-rich waters of lakes, ponds, ditches, and streams are home to a variety of aquatic plant species, including water chestnut.

Water chesnut is a floating herb aquatic plant with two types of leaves: undivided floating leaves carried in a rosette at the water's surface, and finely divided feather-like submerged leaves borne along the



Fig 6: Fruit (Heikak)

length of the stem. The floating leaves are rhomboid, fan-shaped, toothed along the edges, 2-6.5 cm in diameter, longer than wide, denticulate, denate, serrate, or incised along the entire base, apex acute, crimson, and thickly hairy or villous below. Anthocyanin pigments are mostly responsible for the red color of stems, the undersides of leaves, and bulbs. It can be consumed both raw and cooked. Fresh water kernels have the following composition: 81% moisture, 7.2% total soluble solids, 0.36% crude lipids, 1.87 % total proteins, and 5.6% total sugars. In Manipuri, Heikak refers to the fruit and Heikakyeli to the plant. The inhabitants of Manipur eat the fruit, leaves, and all other parts as well. It can be consumed both raw and cooked. The fruits are used `to make liniments that are applied to sunburns, sores, and rheumatism.

Water Mimosa

Water Mimosa (*Neptunia oleracea* L.) is an aquatic vegetable of the family Leguminosae which is also known as puff, small leaf sensitive plant, dwarf sensitive plant, neptunia. It is called 'Eshing ekaithabi' in Manipuri. It is a little aquatic or creeping herb that either floats by producing spongy aerenchyma around the stem or grows prostrate along the water's edge. It thrives near slow-moving waterways but likes lakes,

agricultural dams, ponds, and swamps. Tender shoots and leaves are eaten as vegetables. It is eaten both raw and cooked. It can be consumed by making stir fry,



Fig 7: Water Mimosa plant

salad. The nutritional composition of young shoots of water mimosa are as follows: 84 % moisture, 6.4 % protein, 0.8% carbohydrates, 1.8% fibre. The plant is used for the treating fever by applying the infusion of the whole plant, it is also used for the treatment of sores on tongue. It is available during the month of June-August.

Lotus



Fig 8: Lotus flower

Lotus (*Nelumbo nucifera* G) is a member of the family Nelumbonaceae. In Indian traditions, it is regarded as one of the auspicious flowers. In temples, it is used as an adornment and an offering. The pods are also used as an offering to God during festivals. *Nelumbo nucifera* is found in a variety of shallow wetland environments, such as floodplains, ponds, lakes, pools, lagoons, marshes, swamps, and the backwaters of reservoirs, in mild temperate to tropical

climates. Fresh lotus rhizomes have the following nutritional value: 83% moisture, 2.7% crude protein, 1.56% reducing sugar, and 0.80% fibre. It is known for its hypoglycaemic, antipyretic, anti-



Fig 9: Lotus Pod

diarrhoea, anti-bacterial and anti-fungal activity. The entire plant such as young, unopened leaves, rhizomes, and pods are all consumed. Salad (Singju) is made from the opened delicate leaves. Rhizomes are consumed both in raw and cooked form. The pods are available in the month of June-July.

Conclusion

Popularizing underutilized aquatic vegetables will address the nutritional, environmental, economic, and cultural dimensions, contributing to a more

sustainable and resilient food system in the Northeast region.

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