

Nutritional Scope and Value addition of under-utilized Vegetables of Kashmir Valley

Aayat Hamid¹, Dr. Renu Khedkar² and Dr. Haroon Naik³

Amity Institute of Food Technology Amity institute of Food Technology SKUAST Kashmir
E-mail: ¹aayathamid20gmail.com, ²rdkhedkar@amity.edu, ³haroonnaik@gmail.com

Abstract—Vegetables are the inevitable part of the human diet and play a key role in the nutritional security by supplying essential nutrients. Over the years new practices of cultivating vegetables have resulted in less production and vulnerable to diseases. That in turn indicated a slow threat to global food security. However, the alternative to such growing problems is the utilization of underutilized vegetables; The vegetable crops which are neither grown commercially on large scale nor traded widely. The reason that such vegetables are not being utilized sufficiently could be lack of awareness of their nutritional value, lack of farming techniques, and information about their edibility etc. There is an earnest need to concentrate on research efforts in diversification and popularization of such underutilized vegetable crops. This can be achieved through developing suitable processing, value addition and marketing strategies for these underutilized vegetables by processing them into various products as explained in the paper.

The present study highlights some of the underutilized vegetables of Kashmir and their nutritional value. Moreover it underlines the added value of the indigenous underutilized vegetables. There is a need to aware farmers regarding the growing capabilities of underutilized vegetables at motivate them to cultivate at larger scale.

Keywords: Underutilized, Micronutrients, Value Addition.

1.1 Introduction

The world is witnessing an enormous growth of population and there is a constant threat to global food security. The world population may increase to nine billion in 2050 (Godfray et al., 2010). There is a persistent precariousness of agricultural losses due to climate change resulting in unexpected floods, scarcity of water resources and so forth. Therefore it is incumbent to cultivate those species that have better adaptability to survive in the climatic crisis (Ashraf et al, 2018). Underutilized crops have the capacity to survive and adapt in any climatic conditions.

The crops, which are neither grown commercially on large scale nor traded widely, may be termed as underutilized crops. Underutilized crops are lesser-known plant species in terms of marketing and research, but well adapted to marginal and stress conditions. The popularity of these horticultural crops varies from crop to crop and locality to locality, which however, can be enhanced to a greater extent through publicity. Since, the underutilized horticultural crops have a long history of consumption, the local people are aware about their nutritional and medicinal properties. They owe the potential to nourish the ever increasing human population. Many of these plant species are found resilient, adaptive and tolerant to adverse climatic conditions, although they can be raised at lower management costs even on poor marginal lands. They have remained underutilized due to lack of awareness. Kashmir region, being rich in plant diversity, has a significant population of underutilized vegetables. However, they don't attract much attention because largely their economical and nutritional value has been undervalued. The World Health Organization (WHO) recommends a daily intake of more than 400g of vegetables per person to protect against diet related chronic diseases (WHO, 2011). Some prominent underutilized vegetables like Hand, Lotus Stem, ShajeKanetc. embedded with vitamins, minerals, fiber and phyto-chemicals are one of the most suitable options to address the problem of nutritional security. They are categorically paramount sources of micronutrients, such as pro-vitamins A, B6, C, and E and folacin, iron, and magnesium. This paper endeavors to study the potential of some underutilized vegetables of Kashmir valley. The leaves, seeds, flowers, rhizomes and fruit of many indigenous plants enrich the staple diet of the local populace.

1.2 Scope of underutilized vegetables

Vegetables are the key component of balanced human diet and also the main drivers in achieving global nutritional security by providing nutrients, vitamins and minerals (Jena, 2018). The common vegetables grown in Kashmir are sometimes nearly impossible to purchase for people of lower income groups and hence they rely mostly on cheaper legumes. In order to fulfill their nutritional requirement or "hidden hunger" the best solution for this is cultivation of underutilized vegetables so that

requirements can be met. Besides being nutritionally rich it can improve the attention of the poor and does not need a particular attention as it has stability to different ecosystems. The world over information showed the treasure of underutilized crop vegetables is present by exploring which poverty alleviation and food security can be achieved (Ashraf et al., 2018). Furthermore, in Kashmir underutilized vegetables can be benefactors in the hour of need because of the harsh winter as these crops have better adaptability to difficult environments. A list of some underutilized vegetables of Kashmir is given in the Table 1, which provides some information about their local name, botanical name, family and edible part.

Table 1: Underutilized vegetables of Kashmir

	Local name	Botanical name	Family	Edible parts
	Abej	Rumexacetosa L	Polygonaceae	Leaves, apical shoots
	Batt gull/ Gul	Plantago major L./ Plantagolanceolata L	Plantaginaceae	Whole plant in tender stage and later only leaves
	Nunner	Portulacaoleraceae	Portulacaceae	Whole tender plant, dried for offseason use
	Fuddneh	Menthaarvensis	Laminaceae	Leaves in chutney and with other vegetables, dried leaf powder
	Handiposh/Sazehand	Cinchoriumitybus L.	Asteraceae	Whole tender plant with immature flowers
	Janglifudneh	Menthalongifolia	Laminaceae	Leaves
	Lesseh	Amaranthuscaudatus L	Amaranthaceae	Whole tender herb, dried for offseason
	Madaanhandh	Taraxacumofficinalis W.	Asteraceae	Whole green plant, dried for use in winter
	Nunner	Portulacaoleraceae	Portulacaceae	Whole tender plant, dried for offseason use
	Nickhakh	Stellariamedica	Caryophyllaceae	Whole plant at tender stage
	Sustchsal	Malvaneglecta L,	Malvaceae	Leaves of all growing stages in fresh and dried form
	Sazaposh	Athaearosa	Malvaceae	Whole plant in tender stage
	Wasthakh	Amaranthus spp.	Amaranthaceae	Tender leaves in early growth
	Kralmond	Capsella bursa-pastoris (L.) Medic	Brassicaceae	Leaves
	Brimposh / Nilofer	Nymphaea alba Linn.	Nymphaeaceae	Rhizomes
	Khur	Nymphoides peltatum Kuntz.	Menyanthaceae	Petiole
	Marzanjosh / Wanbabur	Origanum normale Don.	Lamiaceae.	Leaves & topes cut prior to blooming
	Leaves & topes cut prior to blooming	Plantagolanceolata Linn	Plantaginaceae	Tender leaves
	Krich	Rosa moschata Hern.	Rosaceae	Fruits, Young shoots
	Tsoktsin	Rumexacetosa Linn	Polygonaceae	Leaves
	Petz	Typha angustata Bory & Chaub	Typhaceae	Rhizome
	Endrani	Polygonum aviculare Linn	Polygonaceae	Tender leaves
	Saranugun	Phytolacca acinosa Roxb.	Phytolaccaceae	Tender leaves
	Cholmori	Oxalis acetosella Linn	Oxalidaceae	Leaves
	Nagbabur	Nasturtium officinale R. Br	Brassicaceae	Leaves

Source: International Journal of Current Agricultural Science - Vol.1, Issue, 1, pp.015-018, December, 2011

1.2 Nutritional Value of some specific Underutilized vegetables of Kashmir Region

Most of the underutilized vegetables are rich source of nutrients. They contain proactive nutrients like antioxidants, fibers, vitamins, minerals and folic acid. A person on average needs a daily diet which should provide 2800 calories, 55 g protein, 450 mg Ca, 20 mg Fe, 50 mg vitamin C, 100 mg folic acid, 1.0 mg vitamin B, 1.4 mg thiamine, 3000 mg Beta carotene, 19mg niacin, 5mg vitamin D etc. (Ashraf et al., 2016). Sheela et al., (2004) suggested that these vegetables; underutilized vegetables contain the important source of nutritional dietary components. They have immense potential of contributing to certain places of food production as they have the ability to adapt and thrive in harsh conditions and are resistant to pests and pathogens. They are

generally low in energy and dry matter content, but immensely important as source of protective nutrients, especially vitamins, mineral and phytochemicals (Pandey et al, 2014). Proximate nutritional analysis of some underutilized vegetables found in tribal areas are found that they are rich in essential amino acids and minerals. Leafy vegetables like *Laminum album* used by tribals of Gurez valley of Kashmir are very rich in minerals (20.4 per cent) and proteins (26%). Similarly high protein sources of some useful chemicals are discovered from some plants. For example seeds of *Cicer soongaricum*, a wild plant of Ladakh area, contain high protein and phospholipids. It also contains 1% lecithin, as is present in soybean, offering scope for its commercial exploitation for pharmaceuticals, cosmetics and food industries (Pandey et al., 2014). Table 2, highlights the nutritional value of some underutilized vegetables of Kashmir.

Table 2 Nutritional composition of some specific underutilized vegetables of Kashmir region

Name of Vegetable	Moisture (g)	Protein (g)	Fat (g)	Carbohydrates (g)	Minerals (g)	Energy (Kcal)	Crude Fibre	Calcium mg	Iron mg
Lotus Stem(dry)	9.5	4.1	1.3	51.4	8.7	234	25.0	405	60.06
KnolKhol	92.7	1.1	0.2	3.8	0.7	21	1.5	20	1.54
Coriander Leaves	86.3	3.3	0.6	6.3	2.3	44	1.2	184	1.42
Fenugreek Leaves	86.1	4.4	0.9	6.0	1.5	49	1.1	395	1.93
Garden Cress	82.3	5.8	1.0	8.7	2.2	67	-	360	28.6

Source: Nutritive Value of Indian Foods by C.Gopalan et al, 2007

1.3 Indigenous Edible Underutilized vegetables of Kashmir

Some known edible underutilized vegetables that are commonly consumed in every Kashmiri household are summarized in Table 3, Figure 1, 2 and 3, with their botanical names, family name and edible part.

Table 3: Indigenous Edible Underutilized vegetables of Kashmir

Local Name	Botanical Name	Family	Edible Part
Hand	<i>Taraxacum officinale</i> Weber	Asteraceae	Leaves
Nadru	<i>Nelumbo nucifera</i>	Nelumbonaceae	Stem
ShajeKan	<i>Geopora arenicola</i>	Pyronemataceae	Cup

1.3.1 Hand (*Taraxacum officinale* Weber)

Locally known as *Hand* is agronomically complex. The species *Taraxacum officinale* WEBER WIGG originates from Europe, and is found generally in cool highlands or temperate or sub temperate zones. In Kashmir it grows wildly in meadows and on river banks and known as Hand in Kashmir. It is used for medicinal purposes and is believed to cure GI tract infections there. As a interminable weed, dandelion produces a stout taproot with an average length of 15- 30 cm. Even if dandelion is cut below soil surface, the remaining roots are able to procreate new plants. On average, each plant develops 5 to 10 flowers containing brown, conical fruits with a hairy pappus, which allows seeds to be distributed by wind. The roots of *Hand* contain carbohydrates (e.g. inulin), carotenoids (e.g. lutein), fatty acids (e.g. myristic acid), minerals, sugars (e.g. glucose, fructose, and sucrose), choline vitamins, mucilage, and pectin. Besides it's used as a coffee substitute and flavor enhancer in drinks, the leaf extracts are known to be effective against obesity and cardiovascular disease (Wirngo et al., 2016). It is dried often to consume in winters and adds different flavor to certain cuisines of Kashmir.



Figure 1: Hand (*TaraxacumOfficinale* Weber)

1.3.2 Nadru (*NelumboNucifera*)

Commonly known as *Nadru*. It has an earthy, fibrous flavour, that is quite unlike any other vegetable. Lotus root/*Nadru* produces several rhizomes in a single growing season with average length of 10–20 cm each. Actually, similar with other wetland vegetable (corm, tuber, and bulbs), rhizome is a kind of underground stems, and work as storage organs. These are storage boxes for food that provide the plants with the energy for growth, blooming, and completing their lifespan. The products of lotus root such as fresh, salted and boiled rhizomes, lotus root starch, drinks, teas, and lotus seeds are very popular in the daily diet because of its richness in nutrients including starch, proteins, vitamins, and mineral substances (cheng et al., 2013). It is reported that the extract of lotus rhizome exhibits high antioxidative capacity (Hu and Skisbsted, 2002). The main antioxidative compositions in lotus rhizome are phenolics including dopa, catechol, gallic acid, D-(+)-catechin and L-(-)-epicatechin (Wang et al., 2004). In Kashmir it grows in lakes Nigeen, Achar, Manasbal but most of the produce is collected from Dal Lake in Srinagar.



Figure 2 Nadru (*NelumboNucifera*)

1.3.3 ShajeKan (*GeoporaArenicola*)

Mushrooms are macrofungi with different fruiting bodies and different shapes which can be either hypogeous or epigeous large enough to be seen and picked. ShajeKan is a wild variety of edible fungus, botanically known as *Geoporaarenicola*. These are found mostly in southern Europe and northwest Himalaya in Jammu and Kashmir. *Geoporaarenicola* is known as ‘Kundii’ meaning mortar (made of hard stone) shaped in Bhadarwahi and shajekan in Kashmir. ShajeKan form a round shaped fruiting body underground on sandy loam soils. After remaining under soil for most of the year, the edible body breaks the surface with the onset of spring to form a cup. They’ve a very short season of only 40-50 days. Mineral accumulation in macro fungi has been found to be affected by environmental and fungal factors. Amount of organic matter, pH and metal concentrations of underlying soil can be listed as environmental factors. Because of such ecological and genetic factors, the fruiting bodies of mushrooms are often relatively rich in mineral contents (Kayani and Bag, 2012).



Figure 3 ShajeKan (GeoporaArenicola)

1.4 Value Addition

Value addition is the process of enhancing quality, palatability, acceptability, shelf life of any product by various food processes. There is great scope for processing and value addition to the underutilized vegetables of Kashmir like Nadru, Hand, ShajeKan into various products like pickles, chips, soups, desserts and dried products respectively. The unique strength of certain underutilized vegetables in their rich and conducive nutritional composition, nutritional value and product development offers uncommon opportunities for income generation to the farmers and stakeholders. Processing of food products which refer to various techniques and operations by which raw foodstuffs are transformed into food that are suitable for consumption, cooking, or storage. It consists of processes like the basic preparation of foods, the alteration of a food product into another form (as in making preserves from fruit), and preservation and packaging techniques. Processing involves any type of value addition to agricultural or fruit produce and also includes processes such as grading, sorting and packaging which enhance shelf life of food products.

Conclusion

There are strong, direct relationships between agricultural production and sustainability. Enhancing productivity and production can help to mitigate the growing food crises. The underutilized vegetables that are present in abundance in Kashmir have the tendency to survive in the changing climatic conditions are seen as the best nutritional diets. The reason of their less consumption has multifold reasons; lack of awareness of their nutritional value, medicinal importance and techniques to grow them at larger scale. It is incumbent upon the policy makers to take up programmes to help the people about the importance of underutilized vegetables, thereby ensuring food and nutritional security in the region. The study is an endeavor to understand some of the underutilized vegetables explored so far and highlights their economic importance. It also provides a baseline for future research and development in this area. Underutilized vegetables though being used for long time in past need to be revitalized and brought back into mainstream diet to mitigate the dietary issues in rural population.

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