



Utilization of underutilized vegetables crops as a source of potential health benefit compounds

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Fenugreek

With over half of humanity's calorific and protein need being met by only three crops maize, wheat and rice. Thus food basket has reached in a highly vulnerable situation and an urgent action to promote crop diversification is needed. Underutilized vegetable crops are rich source of vitamins such as beta carotene, ascorbic acid, folic acid and riboflavin as well as minerals such as iron, calcium and phosphorus. They also contain an

immense variety of bioactive non-nutritive health promoting compounds such as antioxidants and phytochemicals, which provide health benefits beyond

basic nutrition. Underutilized vegetable crops not only supply the protective nutrients and add variety to a monotonous diet, but also have an alternative taste, attractive colour, pleasing appearance and aroma. Some leafy vegetables especially, amaranth, fenugreek, palak and spinach has attained commercial status and its cultivation is wide spread in India. Because of their low production cost and high yield, Underutilized vegetable crops especially leafy vegetables are considered to be one of the cheapest vegetables in the market and it could be rightly described as 'poor man's vegetables'.

Chemical analysis of underutilized vegetables:

Drumstick is known for its medicinal properties since time immemorial and its leaves are used by physicians of traditional medicine for the hypertension. Coleonol, a diterpenoid from *coleus forskohlii* become a good



Amaranth



Spinach



Spinach beet



Chenopod or bathua

Table 1: Medical property of underutilized vegetable crops

Vegetables	Family	Activity
<i>Allium cepa</i> L.	Alliaceae	Anticoagulant, Bronchodilatory
<i>Allium sativum</i> L.	Alliaceae	Adaptogenic
<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	IUCD
<i>Capsicum</i> spp.	Solanaceae	Hypolipidaemic
<i>Coleus forskohii</i>	Labiatae	CNS depressant, Hypotensive
<i>Costus speciosus</i>	Costaceae	Hypotensive
<i>Gymnema sylvestre</i>	Asclepiadaceae	Hypoglycaemic
<i>Mollugo cerviana</i>	Molluginaceae	Cardiostimulant
<i>Momordica charantia</i> L.	Cucurbitaceae	Hypoglycaemic, Hypolipidaemic
<i>Solanum melongena</i> L.	Solanaceae	Analgesic, CNS depressant
<i>Trianthema portulacastrum</i> L.	Aizoaceae	Analgesic, Antipyretic



Sarson sag

antihypertensive agent. The anti-perkinsonian and prolactin reducing effect of legume vegetable, *Mucumapruriens* have been reported. Eating leaves of *Polygonumplebeium* as vegetable

improves

lactation. Among green leafy vegetables, namely Fenugreek (*Trigonella foenum-graecum* L.), amaranth (*Amaranthus tricolor* L.), spinach beet or palak (*Beta vulgaris* var. *bengalensis*), spinach (*Spinacia oleracea*), chenopod or bathua (*Chenopodium album* L.), sarson sag (*Brassica juncea* var. *rapa*), lettuce (*Lactuca sativa*), Swiss chard (*Beta vulgaris* spp. *cicla*) and Indian spinach or poi (*Basella* spp.) were utilized to determine their biochemical composition. On overall basis the antioxidant capacity of leafy vegetables were in order of amaranth > chenopod > spinach > palak > fenugreek > sarson sag. Water spinach proved to be heat

tolerant and amaranth moderately heat tolerant, while the majority of vegetable crops were either heat sensitive or only slightly heat tolerant as indicated by the membrane

stability of vegetable leaves. As a C4-cycle plant, amaranth can sustain high photosynthetic activity and water use efficiency under high temperatures and high radiation intensity, making it an ideal crop for

abiotic stress

conditions under changing climates.

Amaranth is a very nutritious leafy vegetable, both in raw and cooked form. The nutritional value of this crop is comparable to spinach, but much higher than cabbage and Chinese cabbage. The root bark of drumstick has a pungent taste similar to horseradish (*Armoracia rusticana*) and is used as a condiment. Dried leaf powder is a good option to supplement diets of children and pregnant and lactating women. Moringa powder has been recommended as an immune stimulant in HIV/AIDS treatment. Mungbean is a good source of dietary protein with high contents of folate and iron compared with many other legume crops. As it is a short duration legume, it fits well into the fallow

period between rice-rice, rice-wheat, rice-potato-wheat, maize-wheat, cotton, and other cash crop cropping systems in use across the Indo-Gangetic plain.



lettuce



Swiss chard



Indian spinach

Table 2 : List of underutilized vegetable crops

Sr. No.	Common name	Scientific name
1.	New Zealand spinach	<i>Tetragonia tetragoniodes</i> L.
2.	Amaranth	<i>Amaranthus tricolor</i> L.
3.	Lagos spinach	<i>Celosia argentea</i> L.
4.	Leek	<i>Allium ampeloprasum</i> L. var. <i>porrum</i>
5.	Shallot	<i>Allium cepa</i> (Aggregatum group)
6.	Welsh onion, Japanese onion	<i>Allium fistulosum</i>
7.	Chive	<i>Allium schoenoprasum</i>
8.	Basella	<i>Basella alba</i> L.
9.	Orach	<i>Atriplex hortensis</i>
10.	Bathua	<i>Chenopodium album</i> L.
11.	Beet	<i>Beta vulgaris</i> L.
12.	Swiss Chard	<i>Beta vulgaris</i> var. <i>cicla</i>
13.	Kale	<i>Brassica oleracea</i> var. <i>acephala</i>
14.	Brussels sprout	<i>Brassica oleracea</i> var. <i>gemmifera</i>
15.	Broccoli	<i>Brassica oleracea</i> var. <i>Italica</i>
16.	Rutabaga/Swede	<i>Brassica napus</i> var. <i>napobrassica</i>
17.	Pit sai Chinese cabbage	<i>Brassica pikinensis</i>

Table 2 contd...

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18.	Water cress	<i>Nasturtium officinale</i>
19.	Garden cress	<i>Lepidium sativum</i>
20.	Horse radish	<i>Armoracia rusticana</i>
21.	Globe artichoke	<i>Cynara scolymus</i>
22.	Chicory	<i>Cichorium intybus</i> L.
23.	Endive	<i>Cichorium endivia</i> L.
24.	Salsify	<i>Tragopogon porrifolius</i>
25.	Leaf lettuce	<i>Lactuca sativa</i> var. <i>crispa</i>
26.	Head lettuce	<i>Lactuca sativa</i> var. <i>capitata</i>
27.	Jerusalem artichoke	<i>Helianthus tuberosus</i> L.
28.	Fenugreek	<i>Trigonella foenumgraecum</i> L.
29.	Yam bean	<i>Pachyrrhizus erosus</i>
30.	Podina	<i>Mentha spicata</i>
31.	Chayote	<i>Sechium edule</i>
32.	Tarragon	<i>Artemisia dracunculus</i>
33.	Chekurmanis	<i>Sauropus androgynous</i> Meer
34.	Coleus	<i>Solenostemon rotundifolius</i>
35.	Thyme	<i>Thymus vulgaris</i> L.
36.	Rhubarb	<i>Rheum rhabarbarum</i>
37.	Sorrel	<i>Rumex acetosa</i>
38.	Water leaf	<i>Talinum triangulare</i>
39.	Curry leaf	<i>Murraya koenigi</i> L.
40.	Parsley	<i>Petroselinum crispum</i>
41.	Dill	<i>Foeniculum vulgare</i>
42.	Coriander	<i>Coriandrum sativum</i>
43.	Celery	<i>Apium graveolens</i> L.
44.	Chervil	<i>Anthriscus cerefolium</i>
45.	Parsnip	<i>Pastinaca sativa</i> L.
46.	Fennel	<i>Foeniculum vulgare</i> var. <i>dulce</i>
47.	Turmeric	<i>Curcuma longa</i>
48.	Ginger	<i>Zingiber officinale</i>
49.	Kakrol	<i>Momordica dioica</i> L.
50.	Broccoli raab	<i>Brassica rapa</i> (Ruvo group)
51.	Agathi	<i>Sesbania grandifolia</i>
52.	Drumstick	<i>Moringa oleifera</i>
53.	Winged bean	<i>Psophocarpus tetragonolobus</i>