

## Proximate composition of underutilized green leafy vegetables in Southern Karnataka

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### ABSTRACT

In India, various types of underutilized foods are available seasonally but are not utilized to the extent they should be in spite of their high nutritive value. Looking into the prevalence of high level of micronutrient malnutrition among vulnerable section, utilization of underutilized foods can be explored to overcome the nutritional disorders. Practically, there is no information available on the nutritive value of underutilized foods, which may contribute significantly to the nutrient intake of rural population. Thus, an attempt has been made to identify and analyze various underutilized vegetable for their nutrient content from selected region of south Karnataka. A total of 38 green leafy vegetables have been identified and the iron content of the same ranged between 3.68 to 37.34mg/100g, the highest iron content was observed in Nelabasale green, *Portulaca oleracea* (37.34mg). Calcium content ranged from 73 to 400mg/100g. Chilikere greens, *Oxalis acetosella* (400mg) had maximum calcium content. The highest ascorbic acid content was found in Knol Khol greens, *Brassica oleracea*.

**Key words :** Underutilized, Proximate composition, Green leafy vegetables.

Green leafy vegetables occupy an important place among the food crops as these provide adequate amounts of many vitamins and minerals for humans. They are rich source of carotene, ascorbic acid, riboflavin, folic acid and minerals like calcium, iron and phosphorus. In nature, there are many underutilized greens of promising nutritive value, which can nourish the ever increasing human population. Many of them are resilient, adoptive and tolerant to adverse climatic conditions. Although, they can be raised comparatively at lower management cost even on poor marginal lands, they have remained underutilized due to lack of awareness and popularization of technologies for utilization. Now-a-days, underutilized foods are gaining importance as a means to increase the per capita availability of foods.

Since low consumption of green leafy vegetables in diet is one of the major factors, which leads to deficiency of vitamin A and iron, an attempt was made to identify and analyze the various underutilized green leafy vegetables for their nutrient content from selected regions of southern Karnataka.

### METHODOLOGY

A total of 275 households from five districts comprising of 32 villages were randomly selected and the respondent (woman) of each family was interviewed to elicit information on availability and utilization of underutilized foods. Samples of underutilized foods were identified and all the samples were collected directly from the fields. The moisture and ascorbic acid content of fresh

samples were determined within 24 hours of procurement.

The fresh samples were cleaned, washed, chopped and oven dried at 80° C for 16 to 18 hours. They were ground to pass through a 40-mesh sieve and stored in airtight containers under refrigerated temperature for further use. The powdered samples were subsequently used for chemical analyses. All the analyses were carried out on dry weight basis and expressed per 100g of edible portion. All the chemical analyses were carried out by standard procedures of AOAC (1975).

### RESULTS AND DISCUSSION

Macronutrient composition of underutilized greens has been reported in Table 1. Protein content of the samples ranged between 0.7 to 3.6g/100g. It was high in Bilihonagone soppu, *Alternanthera sessilis* (3.6g) and Mulla Harave soppu, *Amoaranthus spinosus* (3.6g) followed by Chinese soppu, *Souropus androgynus* (3.4g). Crude fibre content varied from 0.2 to 2.6g/100g being highest in Vayu soppu, *Gynandropsis pentaphylli* (2.6g) followed by Maddittu soppa (2.2g). The energy content ranged between 17-97 Kcal/100g.

Vegetables and greens are good sources of micronutrients as well. Micronutrient composition and oxalic acid content of vegetables has been presented in Table 2. Among the underutilized green leafy vegetables identified, iron content ranged between 3.68 to 37.34 mg/100g. The highest iron content was observed in Nelabasale soppu, *Portulaca deracea* followed by Annesoppu, *Celosia argentea* (28.26mg) and Naroli

soppu, *Duranta repens* (27.25mg). By including these iron rich greens in daily diet one can easily fulfill 20-25 per cent of the daily requirement of iron from one serving. It is evident from the Table that among the underutilized greens the calcium content ranged from 73-740mg/100g. Chilikere soppu, *Oxalis acetosella* (400mg) was maximum followed by Jeeramenasina soppu, *Pimpivella* sp. (375mg) and Nela basale, *Portulaca deracea* (325g) as plant foods contain some natural compounds which act as an antinutritional factor interfering with the utilization of some of the nutrients. Oxalic acid is known to interfere with calcium absorption by forming insoluble

salts with calcium. Oxalic acid content in samples was found in the range of 10.76 to 121.09mg/100g. The higher ascorbic acid content was found in Knol khol greens, *Brassica oleracea* (16.87mg) followed by Seege soppu, *Acasia* sp. (44.30mg) and Pundi soppu, *Gareinina indica*, Annesopu (18.10mg). Considering the daily recommended intake of ascorbic acid *i.e.* 40mg. consumption of these greens in fresh form can provide the day's requirement of vitamin C. Similar trend in the nutrient composition of greens has also been reported by Raghuvanshi *et al.* (2001).

The less commonly consumed greens analyzed show

Table 1 : Macronutrient composition of underutilized green leafy vegetables

Sr. No.	Local Name	Botanical Name	Moisture (%)	Protein (g)	Fat (g)	Fibre (g)	Carbohydrate (g)	Energy (Kcal)
1.	Kadanugge soppu	<i>Rhynocia refescens</i>	71	1.7	0.3	0.9	19.2	86
2.	Anne soppu	<i>Celosia argentea</i>	85	1.2	1.2	0.7	1.9	23
3.	Vayu soppu	<i>Gynandropsis pentaphylla</i>	83	2.0	0.6	2.6	2.8	25
4.	Bakaracholi soppu	<i>Portuaca oleracea</i>	79	1.2	0.9	2.1	2.4	22
5.	Putte soppu	<i>Boerhavia diffusa</i>	89	1.3	1.9	1.0	3.0	34
6.	Dogalagare soppu	<i>Amaranthus viridis</i>	91	2.0	0.9	1.1	2.2	24
7.	Knol Khol soppu	<i>Brassica oleracea</i>	85	3.5	0.4	1.8	6.4	43
8.	Bilionagone soppu	<i>Alternanthera sessilis</i>	84	3.6	1.3	1.2	2.2	35
9.	Marakesavu soppu	<i>Colocasio esculenta</i>	86	1.5	1.1	0.7	3.7	30
10.	Harave (Bitter) soppu	<i>Amaranthus</i> sp.	93	3.2	0.3	1.2	1.3	21
11.	Jeeramenasina soppu	<i>Pimpivella</i> sp.	93	2.5	2.6	1.2	0.4	35
12.	Mulla Harave soppu	<i>Amaranthus spinosus</i> .	84	3.6	1.4	0.6	8.7	62
13.	Ganake soppu	<i>Solanun nigrum</i>	74	2.0	1.3	0.7	13.2	73
14.	Kaddanaki soppu	<i>Alternanthera sissilis</i>	82	3.3	0.7	0.8	1.5	25
15.	Nela Basale	<i>Portulalca deracea</i>	92	0.8	1.2	0.3	1.7	21
16.	Ondelaga	<i>Centella asiatica</i>	69	2.0	2.0	0.7	1.7	23
17.	Chotte soppu	<i>Cassia tora</i>	85	0.7	2.0	0.9	1.4	17
18.	Gida Basale	<i>Basella</i> sp.	93	3.3	1.9	0.3	0.4	31
19.	Chinese soppu	<i>Souropus androgynus</i>	88	3.4	1.4	1.7	0.5	28
20.	Belesoppu	<i>Drymaria cordata</i>	84	1.5	0.9	0.9	8.9	49
21.	Chilikere soppu	<i>Oxalis acetosella</i>	68	1.5	0.8	1.5	21.0	97
22.	Bilidoddapathre	<i>Coleus</i> sp.	91	0.9	1.2	2.1	1.7	22
23.	Hulisoppu	<i>Oxalis corniculata</i>	68	1.2	0.5	2.0	6.9	63
24.	Kake soppu	**	86	2.1	1.0	1.3	3.7	33
25.	Paiche soppu	**	83	2.5	1.4	1.2	5.6	45
26.	Kadakesa	**	75	1.8	0.9	2.3	15.2	76
27.	Maddittu soppa	**	91	2.5	0.9	2.2	1.9	26
28.	Yelaguri soppu	**	89	2.7	0.9	1.9	2.0	27
29.	Goni soppu	<i>Portulaca oleracia</i>	83	1.9	0.4	1.36	11.2	56
30.	Belwadeke soppu	<i>Portulaca quadrifida</i>	88	1.6	0.8	2.13	1.2	18
31.	Uttrani soppu	<i>Achyranthes aspera</i>	78	2.1	0.7	1.92	8.3	48
32.	Pundi soppu	<i>Hibisus</i> sp.	87	1.7	1.3	0.21	6.3	44
33.	Seege soppu	<i>Acasis</i> sp.	78	2.5	1.8	0.54	13.2	79
34.	Ili kevi soppu	<i>Agferanceae</i>	88	1.3	1.7	0.21	4.3	39
35.	Yelsuri soppu	**	78	1.9	0.2	1.34	14.5	67
36.	Naroli soppu	<i>Duranta repens</i>	76	2.2	2.1	1.7	11.6	73
37.	Punarpulli	<i>Gareinina indica</i>	75	2.3	0.5	1.24	17.2	82
38.	Guava leaves	<i>Psidium guajava</i>	80	0.8	1.2	0.69	3.9	30

\*\*To be identified

Table 2 : Micronutrient composition and axalic acid content of underutilized green leafy vegetables

Sr. No.	Local Name	Botanical Name	Iron (mg)	Calcium (mg)	Ascorbic acid (mg)	Oxalic acid (mg)
1.	Kadanugge soppu	<i>Rhynocia refescens</i>	25.23	238	35	42.50
2.	Anne soppu	<i>Celosia argentea</i>	28.26	175	59	24.33
3.	Vayu soppu	<i>Gynandropsis pentaphylla</i>	29.18	233	17	28.80
4.	Bakaracholi soppu	<i>Portuaca oleracea</i>	20.18	244	27	29.48
5.	Putte soppu	<i>Boerhavia diffusa</i>	17.16	251	21	10.76
6.	Dogalagare soppu	<i>Amaranthus viridis</i>	18.16	188	17	56.37
7.	Knol khol soppu	<i>Brassica oleracea</i>	13.30	740	157	16.87
8.	Bilihonagone soppu	<i>Alternanthera sessilis</i>	14.13	73	14	58.76
9.	Marakesavu soppu	<i>Colocasio esculenta</i>	18.16	225	6	35.00
10.	Harave (Bitter) soppu	<i>Amaranthus sp.</i>	21.03	305	30	30.28
11.	Jeeramenasina soppu	<i>Pimpivella sp.</i>	22.20	375	15	50.54
12.	Mulla Harave soppu	<i>Amaranthus spinosus.</i>	13.12	248	33	33.25
13.	Ganake soppu	<i>Solanun nigrum</i>	17.16	204	12	50.62
14.	Kaddanake soppu	<i>Alternanthera sessilis</i>	11.10	300	15	28.15
15.	Nela Basale	<i>Portulalca deracea</i>	37.34	325	6	121.09
16.	Ondelaga	<i>Centella asiatica</i>	15.14	275	18	47.05
17.	Chotte soppu	<i>Cassia tora</i>	20.18	144	29	19.65
18.	Gida Basale	<i>Basella sp.</i>	5.45	187	15	60.84
19.	Chinese soppu	<i>Souropus androgynus</i>	10.09	313	22	33.25
20.	Belesoppu	<i>Drymaria cordata</i>	12.74	278	15	38.66
21.	Chilikere soppu	<i>Oxalis acetasella</i>	11.10	400	6	41.95
22.	Bilidoddapathre	<i>Coleus sp.</i>	12.45	208	25	34.18
23.	Hulisoppu	<i>Oxalis corniculata</i>	14.75	234	21	25.37
24.	Kake soppu	**	15.67	230	16	33.00
25.	Paiche soppu	**	5.14	254	14	38.93
26.	Kadakesa	**	16.55	280	3	51.55
27.	Maddittu soppa	**	14.13	175	45	34.57
28.	Yelaguri soppu	**	16.78	208	12	44.82
29.	Goni soppu	<i>Portulaca oleracia</i>	16.17	227	15	61.35
30.	Belwadeke soppu	<i>Portulaca quadrifida</i>	5.25	269	13	52.42
31.	Uttrani soppu	<i>Achyranthes aspera</i>	18.16	304	8	73.87
32.	Pundi soppu	<i>Hibisus sp.</i>	3.68	274	57	88.21
33.	Seege soppu	<i>Acasis sp.</i>	11.10	275	83	44.30
34.	Ili kevi soppu	<i>Agferanceae</i>	18.34	187	16	36.83
35.	Yelsuri soppu	**	17.66	138	18	44.96
36.	Naroli soppu	<i>Duranta repcus</i>	27.25	250	17	52.45
37.	Punarpulli	<i>Gareinina indica</i>	15.14	250	10	18.10
38.	Guava leaves	<i>Psidium guajava</i>	13.12	75	14	23.46

\*\*To be identified

a wide range of nutrient composition. These foods if consumed on a daily basis can take care of the micronutrient deficiency of the population.

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## REFERENCES

- AOAC (1975)**. Official Methods of Analysis , 14<sup>th</sup> Edn. Association of Official Analytical Chemists, Washington , D.C.
- Macrae, R., Robinson, R.K. and Sadler, M.J. (Eds.) (1993)**. Encyclopedia of Food Science, Food technology and Nutrition, Vegetables of Temperate climates. Academic press, New York.
- Raghuvanshi, R.S., Singh, R. and Singh, R. (2001)**. Nutritional composition of uncommon foods and their role in meeting in micronutrient needs. *Int. J. Food Sci. & Nutr.*, **52** : 331-335 (2001).

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