

A Study of Chemical Composition of Some Leafy Vegetables of Fatehpur District

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Abstract: The leafy vegetables were collected from different places of Fatehpur district. The chemical composition, such as water, ash, iron and total vitamin C content, of 22 green leafy vegetables were analyzed in this investigation. The water content of the leafy vegetables varied between 83.8 to 95.5 g/100 g fresh vegetable sample. The ash content of the samples varied between 8.0 to 22.6 g/100 g of dry vegetable powder. The iron content of the leafy vegetables varied from 11.8 to 78.2 mg/100 g of dry sample and the total vitamin C content varied from 191.5 to 21.6 mg/100 g of fresh sample. These findings conclusively suggest that the locally available leafy vegetables are good source of water, minerals, iron and vitamin C.

Keywords: Leafy vegetables, composition, water, ash, iron, total vitamin C.

1. Introduction

Vegetables play a vital role in our daily food list and these are important sources of nutrients. People can survive on vegetables alone if they have nothing else to eat. This is specifically true for the poor people of the village of Fatehpur district. The importance of vegetables is unlimited because the required elements which are essential for our body are obtained from vegetables^[1]. More specifically green leafy vegetables have the greatest impact on blood pH, off setting the acidity caused by a number of unavoidable factors. In addition to the nutritional value and its possible effects of the blood pH, these vegetables can detoxify the unwanted metals and impurities of our body, found in modern highly processed diet^[2]. Leafy vegetables play a

leading role among various kinds of food in dietary intake to keep our body fit and healthy. For this, its thorough investigation is necessary to find out the different nutritional aspects of the leafy vegetables, which are commonly consumed by the people of Fatehpur district. Although investigations on the leafy vegetables have been carried out 1-2 more investigations are necessary using the modern techniques to explore their latent importance as nutritional aspects and medicinal role. With this end in view, this project was undertaken to carry out a thorough analysis of some indigenous leafy vegetables^[3]. The present report deals with the nutritional status of lesser known underutilized leafy vegetables grown in Fatehpur district and hence to explore its importance as a diet for local people.

Table 1: English, local and Botanical Name of the collected leafy vegetables of Fatehpur district

S.N.	English Name	Local Name	Botanical Name	Family
1	Amaranth leaves	Data Shak <i>Amara</i>	<i>nthus gangeticus</i> L.	Amaranthaceae
2	Ash gourd leaves	Chal kumra Shak	<i>Benincasa hispida</i> (Thunb.) Cogn.	Cucurbitaceae
3	Bottle gourd leaves	Shak	<i>Lagenariasiceraria</i> Standl	Cucurbitaceae
4	Cauliflower leaves	Fulkopi Pata	<i>B. oleracea</i> L. var. <i>botrytis</i>	Brassicaceae
5	Chickling pea leaves	Kaloe Shak	<i>Lathyrus sativus</i> L.	Fabaceae
6	Coriander leaves	Dhoney Pata	<i>Coriandrum sativum</i> L.	Apiaceae
7	Fenugreek leaves	Maythi Shak	<i>Trigonella foenum-graecum</i> L.	Fabaceae
8	Garden spinach leaves	Palong Shak	<i>Spinacia oleracea</i> L.	Amaranthaceae
9	Goose foot leaves	Bathua Shak	<i>Chenopodium album</i> L.	Amaranthaceae
10	Indian pennywort leaves	Thankuni Pata	<i>Centella asiatica</i> L.	Apiaceae
11	Indian spinach leaves	Pui Shak	<i>Basella rubra</i> L.	Basellaceae
12	Jute leaves	Pat Shak	<i>Corchorus capsularis</i> L.	Malvaceae
13	Mint leaves	Pudina Pata	<i>Mentha viridis</i> L.	Lamiaceae
14	Mustard leaves	Sarisha Shak	<i>Brassica napus</i> L.	Brassicaceae
15	Onion leaves	Pyaz Pata	<i>Allium cepa</i> L.	Amaryllidaceae
16	Pea leaves	Motor Shak	<i>Pisum sativum</i> L.	Fabaceae
17	Radish leaves	Mula Pata	<i>Raphanus sativus</i> L.	Brassicaceae
18	Sweet gourd leaves	Mistekumra Shak	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae
19	Sweet potato leaves	Mishti Alu Shak	<i>Ipomoea batatas</i> L.	Convolvulaceae
20	Taro leaves	Kachu Shak	<i>Colocasia esculenta</i> L.	Araceae
21	Turnip leaves	Shalgom Pata	<i>Brassica rapa</i> L. var. <i>rapa</i>	Brassicaceae
22	Water spinach leaves	Kalmi Shak	<i>Ipomoea aquatica</i> Forssk	Convolvulaceae

2. Experimental

Sample Collection

The leafy vegetables (Table-1) were collected from different places of Fatehpur district. Each of the collected fresh vegetable samples was washed with water to remove mud and dust particles. The cleaned raw plant material was first dried at room temperature and then in an oven at 45°C. The dried plant material was grinded to powder by a Cyclotec grinder (200 meshes) and the powder was stored in air tight bottle. The dried vegetable powder was used for estimation of ash and iron analysis. Total vitamin C and water content were determined using fresh vegetable sample^{[4] [5][6][7]}.

Determination of Different nutrients

The water, ash, iron, and total vitamin C content of the leafy vegetables (Table-1) were determined following standard procedure 3-5. Each of the samples was collected from three different places and each parameter was determined in triplicate. The average value of three determinations was used in presenting result of each parameter for each sample. The values of water and total vitamin C content were expressed on fresh sample basis. The values of iron content and ash content were expressed on dry powder basis. The results are given in Table-2.

Table 2: Composition of leafy vegetables

S.N.	Name of the sample Results (mean ± s.d.)	Water content*	Ash content**	Ascorbic acid content†	Iron content‡
1	Amaranths leaves	90.0 ± 0.8	16.74 ± 1.1	42.2 ± 0.7	37.05 ± 0.9
2	Ash gourd leaves	91.5 ± 0.2	15.00 ± 0.3	79.2 ± 1.2	42.10 ± 0.9
3	Bottle gourd leaves	92.8 ± 0.8	14.50 ± 0.2	89.0 ± 1.0	38.11 ± 1.1
4	Cauliflower leaves	92.9 ± 0.6	13.20 ± 0.1	165.6 ± 1.0	19.39 ± 0.7
5	Chickling pea leaves	87.7 ± 0.3	11.22 ± 0.6	59.1 ± 1.0	42.76 ± 0.8
6	Coriander leaves	88.0 ± 0.5	20.25 ± 0.3	140.5 ± 0.8	41.18 ± 1.2
7	Fenugreek leaves	86.5 ± 1.2	10.30 ± 0.3	94.8 ± 1.1	21.54 ± 0.5
8	Garden spinach leaves	95.5 ± 0.2	18.75 ± 0.3	41.2 ± 1.4	41.65 ± 0.4
9	Goose foot leaves	91.9 ± 0.9	13.70 ± 0.3	69.6 ± 0.5	14.25 ± 0.2
10	Indian pennywort leaves	87.5 ± 0.4	13.10 ± 0.5	42.9 ± 0.9	35.74 ± 0.3
11	Indian spinach leaves	94.5 ± 0.8	16.28 ± 0.2	66.7 ± 0.7	44.57 ± 0.5
12	Jute leaves	83.8 ± 0.7	11.60 ± 0.3	107.2 ± 1.0	58.03 ± 1.0
13	Mint leaves	85.2 ± 0.2	11.83 ± 0.4	32.6 ± 0.5	61.12 ± 1.0
14	Mustard leaves	92.1 ± 0.9	16.27 ± 0.5	35.5 ± 0.5	21.53 ± 0.5
15	Onion leaves	89.6 ± 1.1	8.00 ± 0.5	29.0 ± 1.0	26.50 ± 0.5
16	Pea leaves	87.7 ± 0.6	8.70 ± 0.4	38.0 ± 1.0	33.04 ± 1.0
17	Radish leaves	93.5 ± 0.3	20.50 ± 0.2	139.5 ± 0.5	64.31 ± 1.1
18	Sweet gourd leaves	90.5 ± 0.4	14.60 ± 0.4	102.8 ± 1.3	36.05 ± 0.9
19	Sweet potato leaves	91.7 ± 0.3	12.00 ± 1.0	28.8 ± 0.8	32.84 ± 0.8
20	Taro leaves	91.9 ± 0.9	13.70 ± 0.3	69.6 ± 0.5	14.25 ± 0.2
21	Turnip leaves	84.4 ± 0.4	10.25 ± 0.1	191.5 ± 1.7	15.79 ± 0.2
22	Water spinach leaves	92.6 ± 0.5	16.01 ± 0.3	36.4 ± 0.9	21.53 ± 0.5

*g/100 g fresh vegetables; **g/100 g dry vegetable powder; †mg/100 g fresh vegetables; ‡g/100 g dry vegetable powder.

3. Results and Discussion

Twenty Two different leafy vegetables (Table-1) were collected locally and their moisture, ash, iron and total vitamin C content were determined 3-5. Each parameter was determined for three different varieties of the same sample and each of the estimation was repeated for thrice. The average values are presented in Table-2. It appears from the Table-2 that the water content varies from 83.8 to 95.5 g/100 g in fresh samples. The water content of garden spinach leaves is found to be the highest (95.5 g/100 g) and lowest (83.8 g/100 g) in jute leaves. The water contents of the leaves of spinach (94.5 g/100 g) are closer to the highest value. On the other hand the water contents of the leaves of radish (93.5 g/100 g), cauliflower (92.9 g/100 g), bottle gourd (92.8 g/100 g), water spinach (92.6 g/100 g), mustard (92.1 g/100 g), sweet potato (91.7 g/100 g), ash gourd (91.5 g/100 g), sweet gourd (90.5 g/100 g), and amaranths (90.0 g/100 g), are very close. The ash content of goose foot leaves is found to be the highest (22.60 g/100 g) and lowest (8.0 g/100 g) in onion leaves. The ash contents of the leaves of radish (20.50 g/100g), coriander (20.25 g/100

g), garden spinach (18.75 g/100g), amaranths (16.74 g/100 g), spinach (16.28 g/100 g), mustard (16.27g/100 g) and water spinach (16.01 g/100 g), are closer to the highest value but these are almost double or more than that of the lowest value. This indicates that the leafy vegetables contain different types of minerals which are very important for human. The iron content of the samples was determined by formation of iron(II)-1,10-phenanthroline complex followed by measurement of the absorbance (at 510 nm) of the sample solutions⁴. Comparing this absorbance with that of standard samples, the proportion of iron in the respective samples was estimated. The results show (Table -2) that the iron content of the leafy vegetables varies from 11.78 to 78.24 mg/100 g of dry vegetable powder sample. It is found to be the highest (78.24 mg/100 g) in slender carpet weed leaves and lowest (11.78 mg/100 g) in goose foot leaves. The iron contents of the leaves of radish, mint, and jute are found to be 64.31, 61.12, 58.03 and 55.1mg/100 g of dry powder, respectively. The iron contents of the other vegetables are in between 12 and 49 mg/100 g of dry powder. These results indicate that the iron content in the leafy vegetable varies within wide range. This result provides an indication towards the utility

of the leafy vegetables as a source of iron in our daily diet. The requirement of iron for an adult women and men are 18 mg and 8 mg per day⁶. It may be concluded from the results that about 50 g of the leafy vegetables may fulfill the requirement of our daily need. The amount of total vitamin C is the highest (191.5 mg/100g) in turnip leaves and the lowest (21.6 mg/100 g) in garden lettuce leaves. The amounts of total vitamin C in the leaves of cauliflower, coriander, radish, jute and in sweet gourd are found to be 165.6, 140.5, 139.5, 107.2 and 102.8 mg/100 g of fresh leaves, respectively. On the other hand total vitamin C contents in the leaves of amaranths, garden spinach, pea, water spinach, mustard, mint, onion, sweet and potato are estimated as 42.2, 41.2, 39.7, 38.0, 36.4, 32.6, 30.1, 28.8 and 27.8 mg/ 100 g of fresh leaves respectively.

4. Conclusion

The results indicate that total vitamin C content of the leafy vegetables varies widely and this information helps us to select these vegetables as a good source of vitamin C as diet in our daily food habit. Vitamin C is essential for the function of our immune system, as well as to repair our tissues and cells. Vitamin C also helps to protect our body from infection. Recommended requirement of vitamin C is about 45 mg per day for an adult⁶. About 100-150 g of leafy vegetables may fulfill our daily requirement of vitamin C. From the present study, it is clear that the leafy vegetables are important source of minerals, iron and vitamin C. So, the poor people of the village of Fatehpur district can survive on vegetables alone if they have nothing else to eat and this is generally found. Hence the findings, conclusively suggest that our local leafy vegetables are good source of nutrients as diet.

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